

## **INTRODUCTION & COMPANY PROFILE**

M A N Systems appreciates the opportunity to provide our quality products to retail clients through your representation. We hope that this information package will provide you with the knowledge needed to market our product effectively.

M A N Systems is a Canadian based manufacturing and consulting company that has now served the needs of North America for 28 years. Its strength and success is based on providing custom solutions to environmental challenges relating to the control of temperature and humidity.

Along with custom manufacturing, M A N Systems has a product line of readily available self-contained refrigeration systems, the CW-30 Series. Although this unit was originally designed for wine storage, variations of it have made it applicable for a wide variety of applications such as:

- Environment Rooms (Research Facilities)
- Morgues (Hospitals)
- Special Collections including Art Vaults
- Wine Storage
- Audio/Visual Media Storage (Archives)
- Pantries
- Fur Storage
- Flower Display Rooms

This marketing information package focuses attention on the CW-30 product line. However, if your market demand warrants it, M A N Systems is capable of developing a product to meet your specific needs.

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## CW-30 SERIES – SYSTEM COMPONENTS & FEATURES

Understanding the unique features of this product line will help you market this equipment effectively. All our products are designed with the best available components and with the following standard features:

- **Powerful:** Can cool a properly insulated space (R20) as large as 2000 cubic feet.
- **Refrigerant access fittings** for easy servicing.
- **Fan:** Maintenance free motor, powerful scroll cage blower (CW-30M & CW-30W).
- **Evaporator** with industrial tube thickness and dip-coated (CW-30M & CW-30W) to resist pitting failure.
- **Stainless steel thermal expansion valve** automatically regulates refrigerant according to the load for efficient operation and minimized dehumidification.
- **Embossed aluminum casing;** double walled construction.
- **Insulation** for high efficiency and quiet operation.
- **Condensate pump** for installations without a gravity drain.
- **Pressure activated water valve** automatically regulates water flow (0-100%) for high efficiency and water conservation.
- **Cupro-nickel coaxial condenser** for efficient heat transfer and a high resistance to a failure from a chlorinated water supply.
- **Sight glass** for accurate charging and troubleshooting.
- **Removable access panels** for easy servicing.
- **Hermetic compressor** with internal-external vibration isolators.
- **High pressure safety control** disables unit if operating pressure exceeds preset limit preventing catastrophic compressor failure.
- **Low pressure safety control** disables unit if operating pressure exceeds preset limit preventing compressor seizing and likely failure.
- **High temperature safety control** disables unit if the compressor cavity exceeds normal operating temperature.
- **Double vibration isolation** for quiet operation.
- **6 foot line cord;** no hard wiring required.
- **R134a environmentally friendly refrigerant.**
- **Remote electronic thermostatic control** for accurate temperature control. Equipped with OFF/ON switch.

**A Remote Electronic Thermostat  
With Digital Display Is Standard With  
The CW-30 Series**



- **CSA Certification** with both 'C' and 'US' indicators; product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the US respectively.

Since M A N Systems continually strives to improve its equipment design, we reserve the right to change specifications and design without notice.

## **CW-30 SERIES – COMPARRISON WITH OTHER PRODUCTS**

### **Through-The-Wall Air-Cooled Systems**

Air-cooled systems usually require wall openings to adjacent rooms inside the home into which they reject great amounts of heat, especially during the summer months, resulting in decreased efficiency during peak operation as the system attempts to vent heat into an already hot environment. If the adjacent room is a living space, the occupants may complain due to the excess heat and unwanted noise produced by such a system. Vibration transmission through supporting walls to the stored product can also make this type of system an undesirable option.

Units that vent to the outdoors may solve problems associated with unwanted noise and excess heat within the home; yet, they are exposed to the elements and often very hot environments, resulting in inefficient operation and quicker deterioration.

The CW-30 product line does not require air venting; therefore there is no need of any wall openings if the unit is installed within the wine cellar. It does not reject any heat into any adjoining space but rather pumps the heat into either domestic cold water (city water), chilled water, condenser water, geothermal (or heat pump) loop water. Also, the elimination of the need to vent offers more flexibility for unit placement resulting in a more aesthetically pleasing installation.

The CW-30 product is either ducted to an adjacent room or completely contained within the wine room (depending on the model chosen), keeping noise to a minimum level. Units are typically installed at floor level eliminating any vibration transmission to the wine collection.

Since the CW-30 employs a water regulating valve to control water flow, the system will always operate at peak efficiency. Water consumption is fully regulated to a minimum; for example, domestic water consumption (at 60°F) is only approximately one gallon for every five minutes of operating time or about one tenth the consumption of a low consumption shower head. If domestic cold water is used and is metered, the system is still economical in that it does not have the condenser fan found in all air cooled systems, thus creating a balance in operating cost and environmental impact. Further, for homes/buildings equipped with chilled, geothermal, heat pump or condenser water loops, the CW-30 will operate with minimal environmental impact.

### **Air or Water-Cooled Split-Systems**

Split systems are costly to install since they require a refrigeration technician to layout refrigeration lines, evacuate the system and then charge it. On site installations never allow for the same testing and quality control that can be done in the factory. Further, servicing must be done by a refrigeration technician on site. Thus, such systems are not suited for quick replacement.

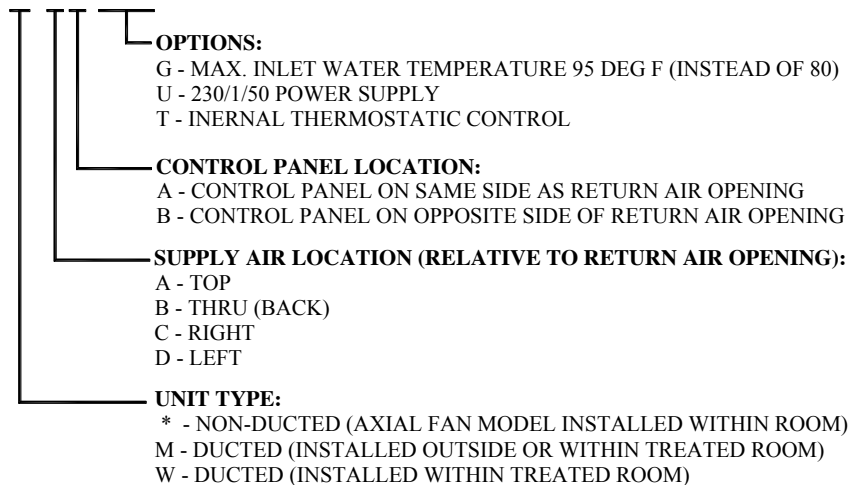
The CW-30 product is completely self-contained. Therefore, it does not require a refrigeration technician for installation. With utilities in place, installation can be done with just a small crescent wrench. Should the unit fail, it can be disconnected in minutes and exchanged or shipped back for repairs.

## CW-30 SERIES – SYSTEM CONFIGURATIONS AND CAPACITIES

For 28 years, the CW-30 has been available in its original unchanged configuration. This unit is designed to be installed within a wine cellar and is appropriate when aesthetics are not an issue.

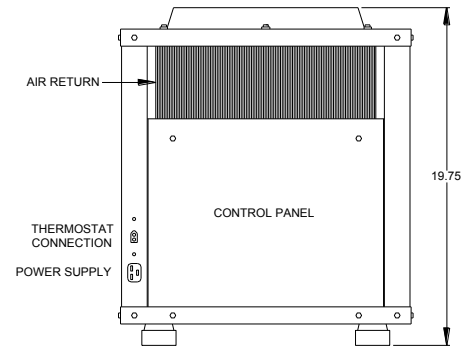
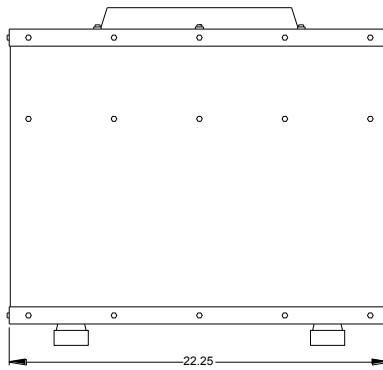
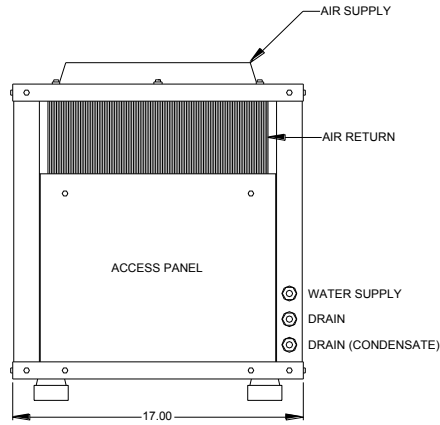
In time, the aesthetic nature of a wine cellar became a focal point of architects and interior designers, making way for the introduction of our ducted models, the CW-30M, available in seven further configurations, and the CW-30W, all of equal capacity and quality (see shop drawings on pages 6-9). These units' design allows them to be completely hidden within cabinetry or racking or to be placed in an adjoining space, such as a mechanical room, closet or crawl space (CW-30M only). *When determining the correct configuration, ensure that the model chosen allows for the simplest duct pattern (to minimize static losses and noise), the shortest supply duct run (to minimize heat gain), and at the same time, one that will allow easy access to the control access panel.* For example, if the unit is to be installed in a crawl space or attic area, the CW-30M-BB may be the best choice since it offers a straight through air pattern (and therefore the simplest duct run) and easiest access to the control panel. The CW-30W is best suited for applications where cooling equipment is to be concealed within single bottle depth racking. If in doubt about which configuration best suits a specific job, we be happy to help you make the proper selection.

MODEL: CW-30 M - A A- G U T

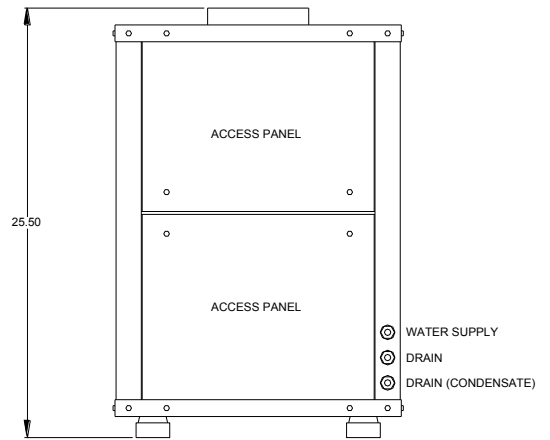
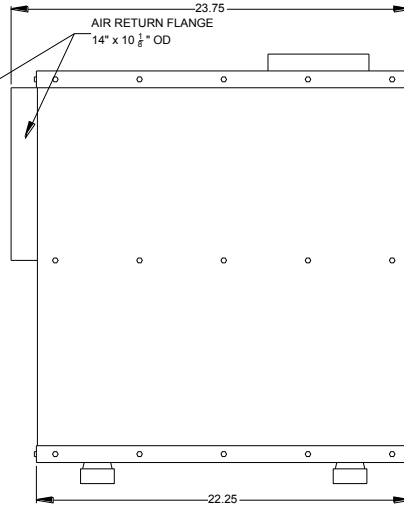
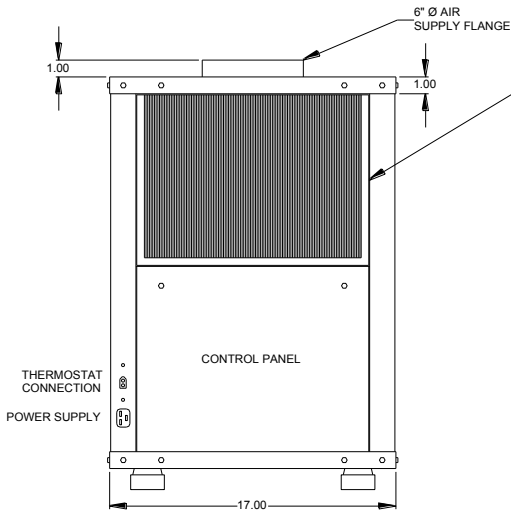


In an effort to satisfy customers' needs, customized products are also available. M A N Systems has designed equipment for cabinet sized storage to wine cellars as large as 300,000 ft<sup>3</sup>. However, our experience has shown that the capacity of the CW-30 product line is capable of satisfying the demands of most cellars. Manufacturing one standard size ensures the lowest possible production and inventory costs, as well as allowing for more cost effective marketing.

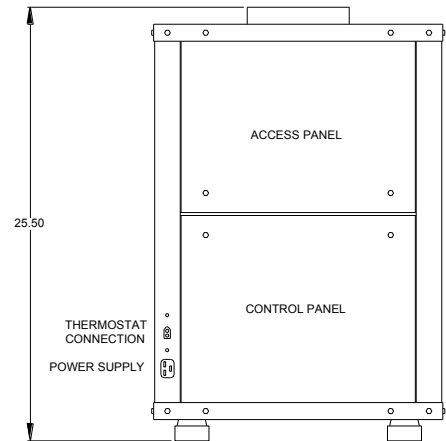
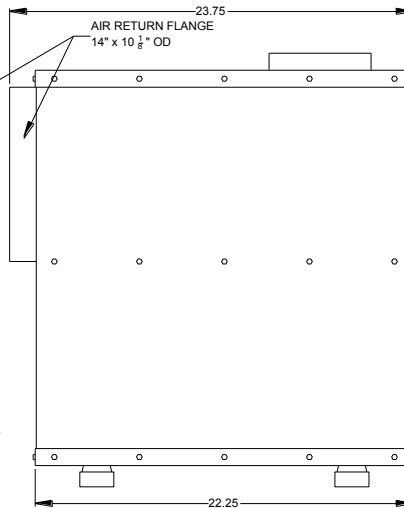
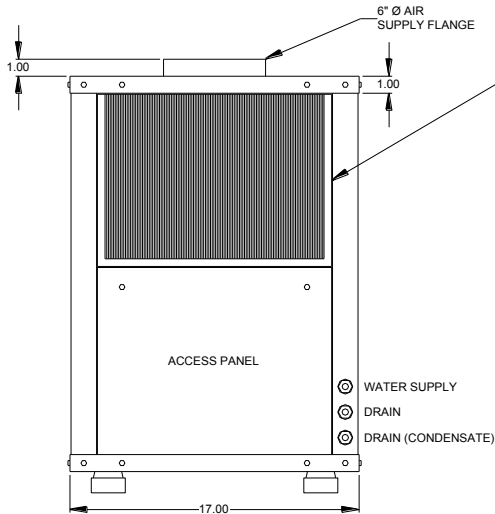
In cases where wine cellars are larger than 2000 ft<sup>3</sup>, M A N Systems often recommends the use of multiple units for many reasons. For example, the prestigious BC Wine Research Center at the University of British Columbia specified the use of three CW-30 systems. Redundancy (should a unit fail), ease of installation (less ducting), increased efficiency (due to multi-staged operation), and compactness of unit size convinced the specifying engineer and the architect to make this choice, although they had the option of using a custom unit.



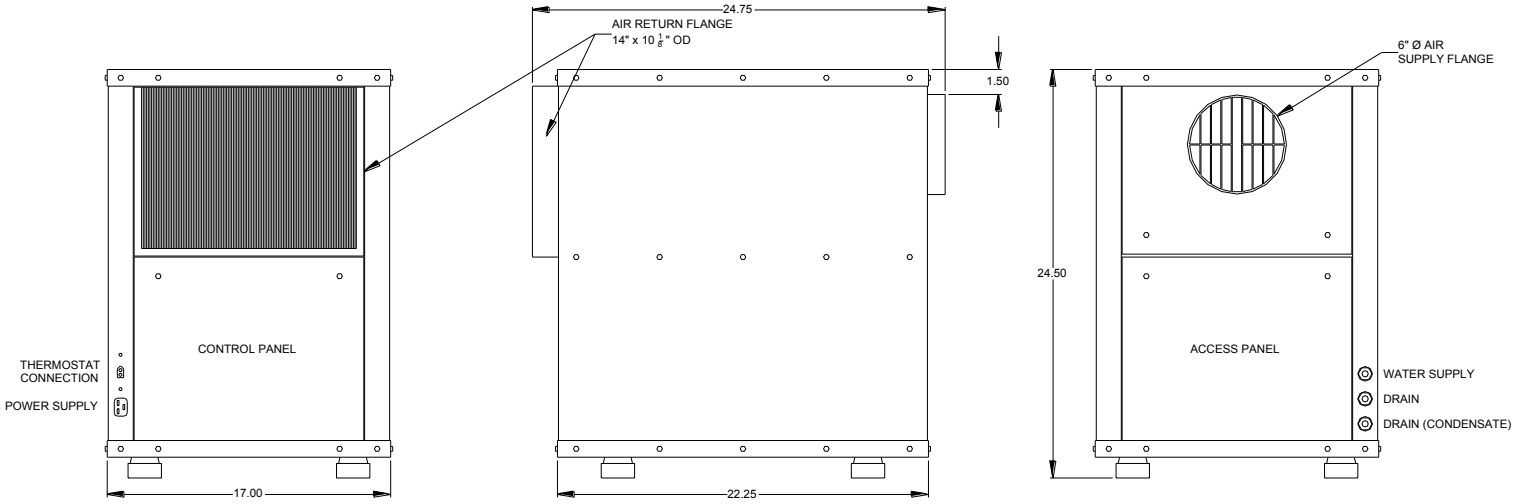
MODEL: CW-30



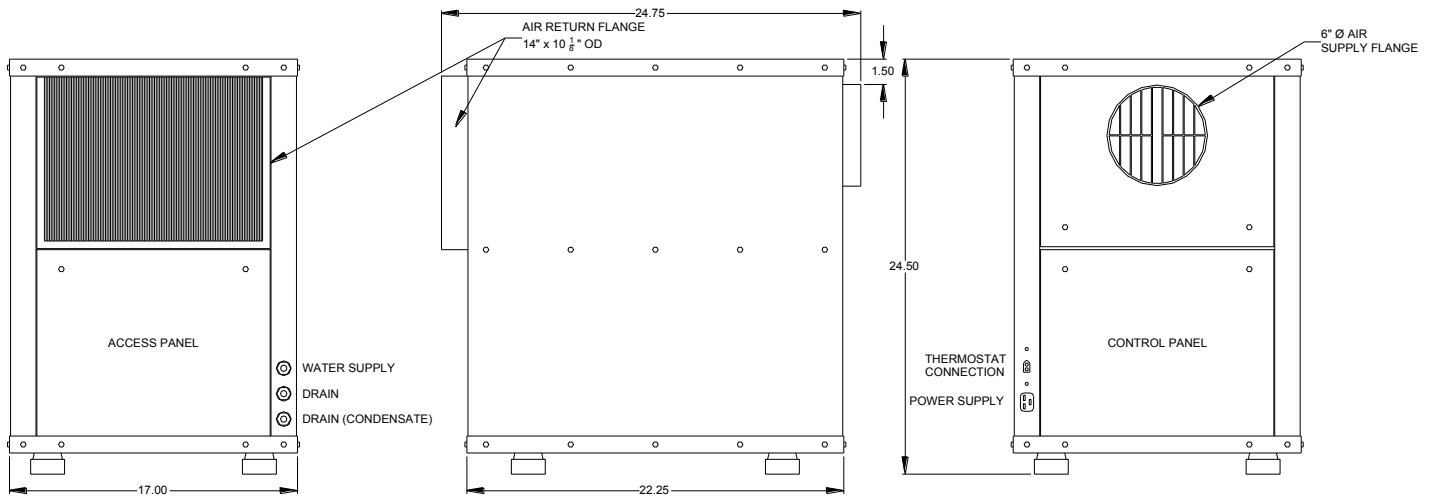
MODEL: CW-30M-AA



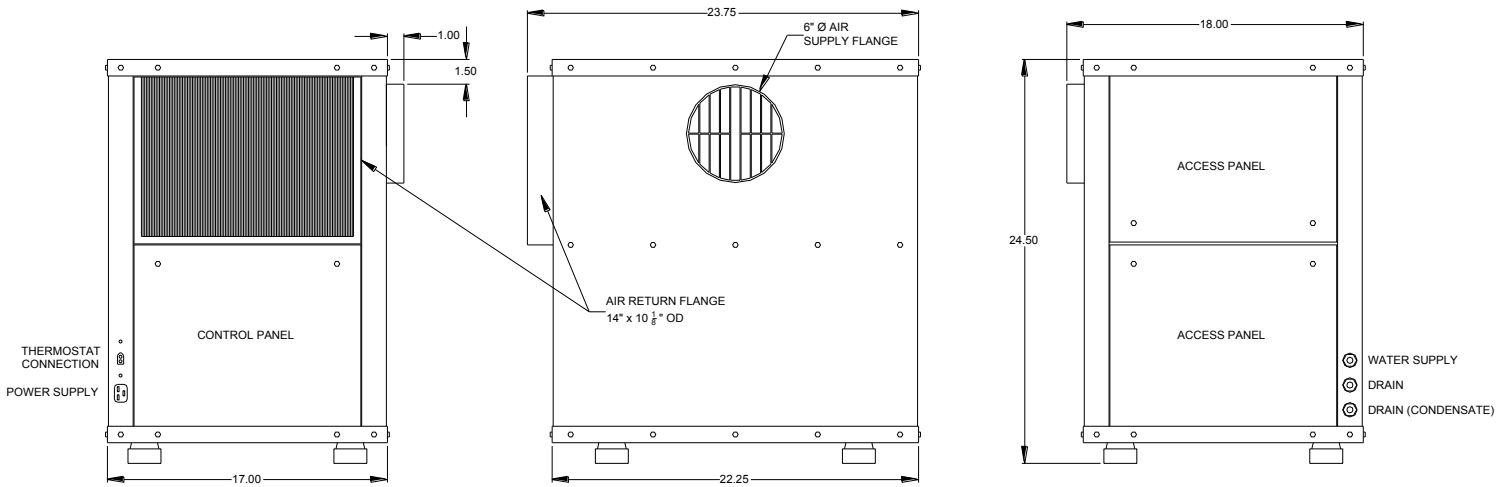
MODEL: CW-30M-AB



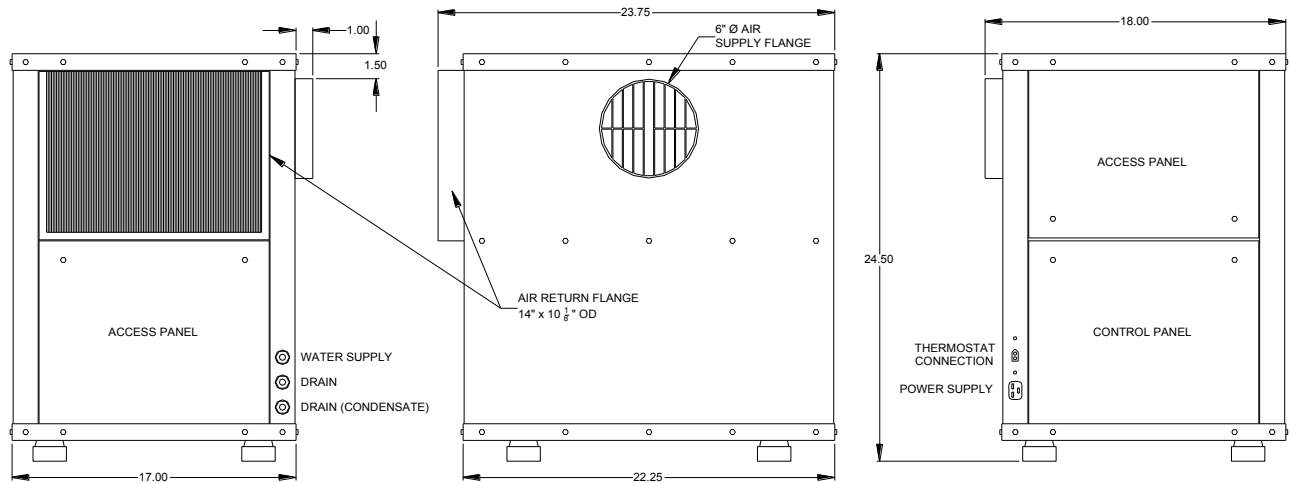
MODEL: CW-30M-BA



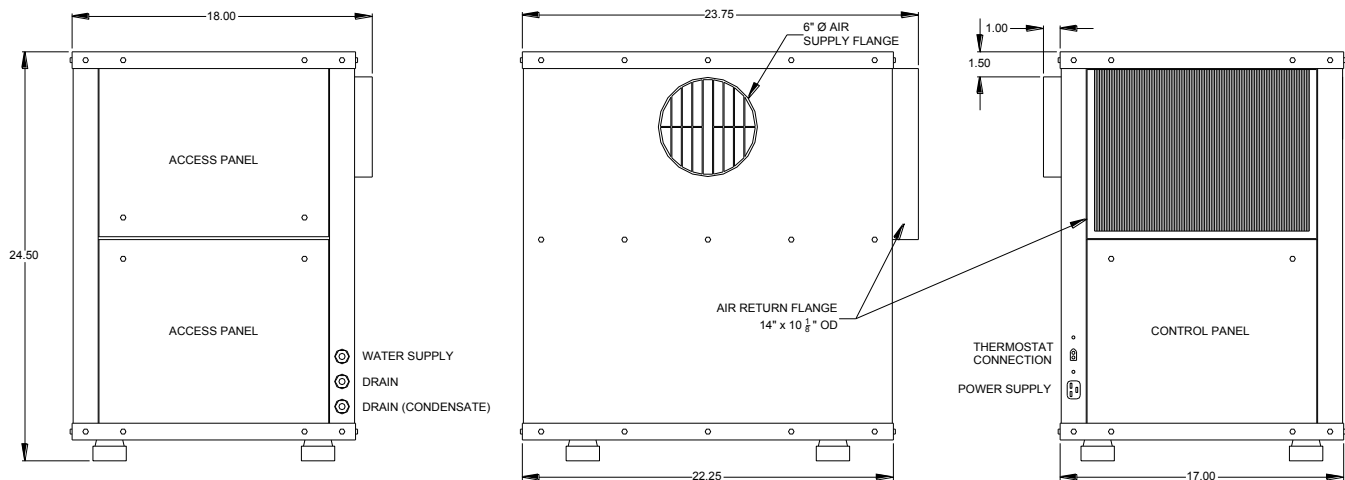
MODEL: CW-30M-BB



MODEL: CW-30M-CA

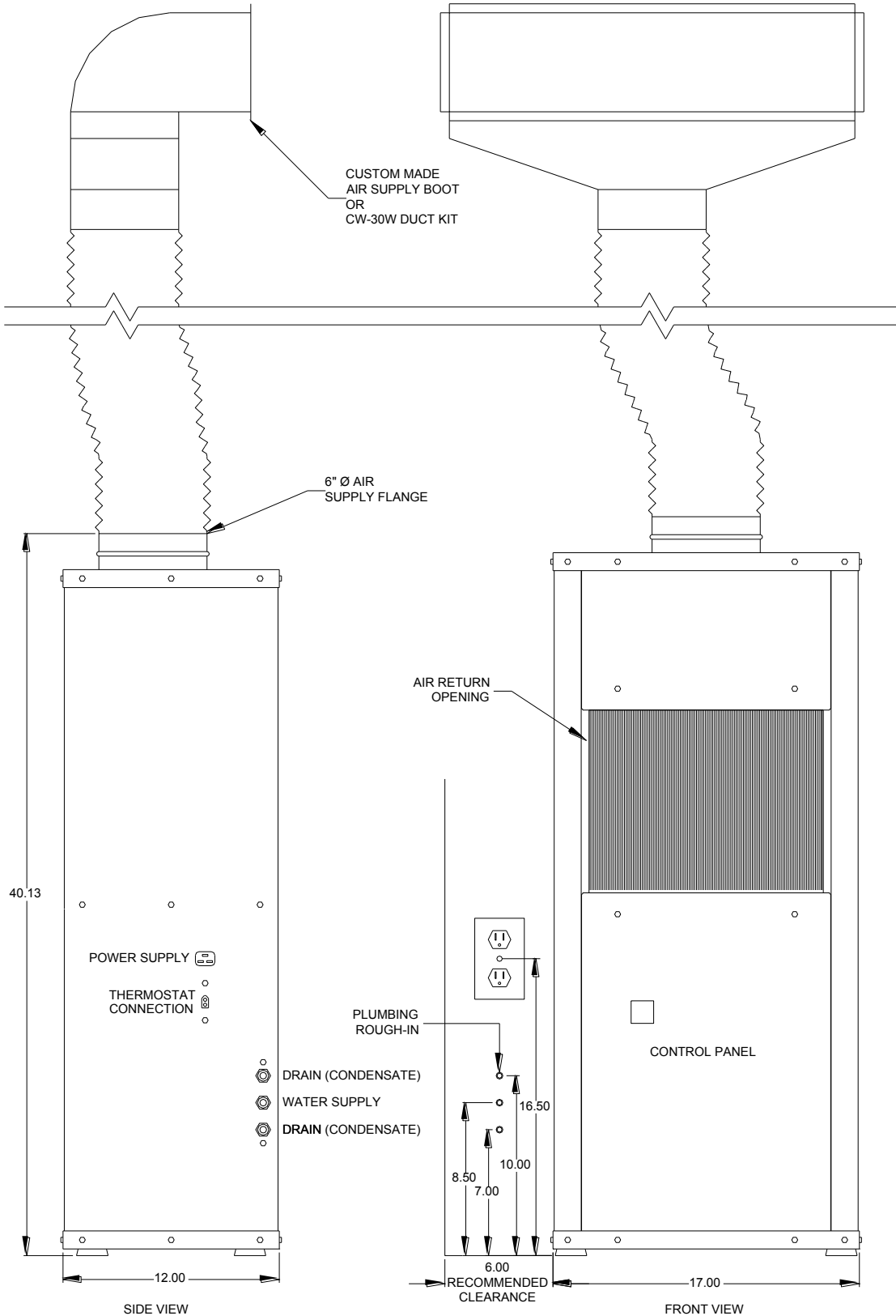


MODEL: CW-30M-CB



MODEL: CW-30M-DA





## **CW-30 SERIES – OPTIONS**

Apart from our custom units, our CW-30 product line can be customized to allow for the following options:

### **230VAC Option:**

European/Asian Model with 230/1/50 power supply capability. Units bear a CE mark.

### **Internal Digital Thermostatic Control Option:**

For applications where a remote thermostat is not practical. This option is available with or without a remote sensor. There is no extra charge for this option. (Not available for the CW-30W)

### **DDC or Other Control Systems:**

Any type of DRY CONTACT control device can be used in place of the supplied thermostat. Please refer to the electrical diagram in the Appendix.

### **Liquid Sensor Option?**

Some manufacturers use a bottle sensor and recommend such as a wise choice, causing some potential customers to question why the CW-30 product does not make such a sensor available. However, M A N Systems has long maintained that in any properly treated environment room, air temperature is the determining factor and not the item being stored (in this case, the wine). Why?

All thermostats have a differential (usually one or two degrees) between the start and stop temperatures. In other words, the unit will start operating at 55°F and stop when the temperature reaches 54°F.

Due to the high specific mass (relating to density) of the wine compared to air, wine will adjust very slowly to any changes of air temperature. For example, if the air temperature fluctuates by two degrees within a short period of time (an occupant enters the room), the wine temperature may move a fraction of a degree at most within that same time period.

If the sensor is in the air, the unit will begin operation immediately to offset the load and the wine temperature will fluctuate a fraction of a degree. However, if the sensor is in the wine, the wine temperature will fluctuate by 1°F before the equipment begins to operate (the differential). As the objective is to prevent unnecessary fluctuations in the wine temperature, the liquid sensor fails to do so.

Further, since the response time for a temperature change in the wine bottle is very long (due to its specific mass), the air temperature in the wine cellar may drop closer to 50°F before the wine temperature reaches 54°F. Since the air temperature has overshot, there will be a higher amount of heat loss through the wall (the lower the wine room air temperature is, the higher the heat loss) and an excessive and unnecessary amount of dehumidification due to a lower evaporator temperature. Therefore, having the immersed sensor is not only inaccurate, but also inefficient.

It is true that a system that senses air temperature rather than wine temperature will cycle more often. However, having a well designed and constructed unit cycle on and off at moderate intervals will not affect its integrity.

### **Comments Regarding Humidity, Humidification and Associated Options**

The issue of maintaining proper levels of relative humidity in a wine cellar is a greatly debated topic. One research manual suggested the following explanation:

“If an area is dry, moisture is drawn from any water/moist surface. To illustrate this, consider the air-system in a pressurized airplane cabin. The air being conditioned by the aircraft is so dry that moisture is actually drawn even from the passengers’ bodies. Therefore drinks are freely offered during most flights avoid any effects of dehydration. The same principle applies to wine storage: a dry environment will absorb moisture from a wine bottle. When this occurs, a pressure imbalance will result drawing air from the cellar into the bottle...

“Similar arguments as these presented above, have caused some to assume that the highest possible humidity would constitute the best possible environment for wine storage. However, the ideal humidity cannot be 100% for obvious reasons. Construction materials and finishes cannot be maintained under such conditions. What then is the ideal humidity for wine storage?

“The authority on this is the world known organization ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), based out of Atlanta, Georgia. In their publication “Desiccant Cooling and Dehumidification” published in 1992. ASHRAE published the findings of research done at the Simon Fraser University, located in British Columbia, Canada. The research clearly showed that deviations from a mid-range of relative humidity of 40% to 60% coincide with increased levels of bacteria, viruses, fungi, mites, chemical interactions, as well as increased incidence of asthma. On page 9 of that book, the following conclusion was drawn: ‘This review of the indirect health effects of relative humidity indicates that adverse health effects would be minimized by maintaining relative humidity between 40% and 60%.’

“Apart from creating unsightly stains and being causes of allergies and other forms of illness, mold and mildew fungi can also affect a wine cellar by damaging paint, wood, drywall, a variety of fabric, cardboard, corks, and bottle labels. Also, although most fungi require condensation to start growing, some actually generate moisture and then continue growing even when condensation stops. Preventative measures must therefore be considered if high humidity is predicted to be a problem.

“Since the optimum range for relative humidity is between 40% and 60% and high humidity is beneficial for wine maturation, the ideal humidity level of a wine cellar should be approximately 60%. As a result, a fine balance is struck between a healthy and an effective cellar.”

For this reason, M A N Systems designed its equipment to maintain humidity levels to approximately 60% RH. This is done by designing and sizing components that will prevent condensation at humidity levels below 60% RH at 55°F. Since the CW-30 was designed in the Northwest, ambient humidity levels were taken into account and proven to be high enough to prevent the need of additional moisture to be added to maintain that level. Therefore, although the CW-30 cannot add moisture to the air, its internal design prevents unwanted dehumidification allowing for acceptable levels of relative humidity.

Even in dryer climates, this technique of humidity control can theoretically operate effectively since the RH level rises as the temperature drops. For example, assume a room with environmental conditions of 75°F and 30% RH. If this room is dropped in temperature to 55°F with minimal dehumidification (which the CW-30 is capable of doing), the final RH level will be close to 60% without the addition of a single drop of water. However, maintaining that moisture level will be impossible in practice. Since the conditions outside this room are much drier, the tendency will be for moisture to permeate out of the room. Even the best of vapor barrier systems cannot prevent this moisture transfer.

In cold environments, maintaining a high humidity is a greater challenge. For example, if a room has environmental conditions of 40°F and 100% RH and we raise the temperature to 55°F without adding or removing any moisture, the resulting RH level will be 55%. However, the home environment usually adds some stability to this problem making it less extreme (this is because household activities and occupants generally humidify).

Most clients are happy with this passive approach of humidity control, but for others who require tighter control, or for those who require humidity levels in excess of 60-65% despite the health risks outlined above, M A N Systems provides two options (that we have discussed before):

1. A self-contained refrigeration system with a built in steam generating humidifier. This system will add moisture and maintain whatever RH level is desired.
2. A humidifier unit. There are a variety of units available, but we recommend steam generating types (see figure on page 13), as they operate without creating breeding grounds for bacteria. Such a product can be installed in conjunction with the CW-30 Series or can be installed as a stand-alone unit. This product can be supplied through a wholesaler close to you.



**An Example of a Steam Generating Humidifier**

**The Nortec Resdelux Humidifier**

Unit requires the following: Water supply, gravity drain, dedicated 115VAC 15 Amp receptacle, and the wiring of a humidistat. Actual height is 25”.

Picture courtesy of Nortec.

**Other Products and Humidity Claims**

As with the CW-30 product line, competing products (except those that offer humidifiers) do not add moisture to the air. One very well-known competing product claims to be able to achieve 50% RH or higher. Their web site contained the following information:

“Condensate evaporator system – The unit is designed to collect and dissipate excessive moisture, which accumulates during normal operations. A sophisticated heating element dissipates the collected moisture and evaporates it through the exhaust port located on the rear of the unit. This eliminates the need to attach drain lines and the hassle of periodically emptying containers.”

The same information source notes the fact that the control system of this unit has a defrost cycle. A defrost cycle is used when icing occurs which in turn only occurs when the evaporator coil temperature drops below freezing and moisture is removed from the air. Generally, manufacturers will allow a coil to drop to such a low temperature in order to minimize the size of the coil. The colder the coil temperature, the more moisture will be removed. For this reason, the CW-30 product line has evaporators sized to support high coil temperature performance and minimize dehumidification. This fact alone favors the design of the CW-30 although only a case study could actually prove the superiority of one product over another with regards to which one can maintain the highest humidity level.

Interestingly, many products reject this moisture into the adjacent room (as is implied by the information above). M A N Systems has reservations about this practice as it creates possible health risks that probably will never be fully proven, but that cannot realistically be denied as improbable. Therefore, the CW-30 is designed so that any moisture in excess of 65% RH is extracted from the room and removed via the condensate drain connection.

## CW-30 SERIES – ACCESSORIES

In order to help you suit your clients' needs, we have developed and make available the following accessories which are completely compatible with the CW-30 product line:

**Ducting Kits:** For installations where the retailer or the client does not wish to involve a sheet metal contractor, M A N Systems has developed two ducting kits. An equivalent package can be fabricated locally. Although this form of ducting works well, a professionally installed ducting system with acoustic lining will dampen sound better:

1. CW-30M Duct Kit: The package includes two transitions (one 6" dia. to 10" dia. and one 10 1/8" x 14" to 10" dia.) that mount onto the unit flanges, as well as two wall flanges (designed to fit between and mount on studs spaced at 16" o.c.) and extend from the wine cellar, through the wall and into the room when the unit is installed (flanges have 10" dia. collars). It also includes a 25' pack of 10" dia. flexible insulated ducting (with an insulation value of R8).
2. CW-30W Duct Kit: The package includes one right angle boot and a small length of 6" flexible ducting.

## THE M A N SYSTEMS LIMITED WARRANTY

M A N Systems warrants all their equipment to be free of manufacturing defects both as to workmanship and materials for a period of two years from the purchase date, FOB M A N Systems, Surrey, BC, Canada. If the retailer wishes to have the unit inspected and corrected by a local refrigeration contractor, M A N Systems will replace and ship prepaid (three business days air freight within Canada and the continental USA) any defective component, but will not reimburse for any labor charges incurred in the field.

Requests for a return authorization, troubleshooting equipment in the field, repair parts, field labor, returning equipment, or warranty information should be directed to M A N Systems by the retailer by calling 604-880-5720 (pacific time zone).

**Applicability:** This warranty applies only if the equipment

- a) is installed in accordance with all instruction sheets provided,
- b) is properly and reasonably maintained,
- c) has not been subject to damage, misuse, or abuse.

**Factory Return:** Only M A N Systems will determine if the equipment is to be repaired or replaced. Replacement parts and factory labor warranty will be done for a period of two years from date of purchase. Repaired or replaced units returned to purchaser will be shipped from the manufacturer prepaid. Replacement units will be invoiced and a credit will be made for the returned unit only after it has been received and inspected.

**Limitations, Exclusions, Remedies:** There are no warranties that extend beyond the descriptions of the face hereof. This limited warranty is in lieu of all warranties, expressed or implied and of all other obligations or liabilities on the part of M A N Systems. There shall be no implied warranty of merchantability. M A N Systems neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the sales of its products. Damages for breach of this warranty shall not exceed the lesser of the cost of repair or replacement. Repair or replacement shall be the exclusive remedy available to the purchaser. Under no circumstances shall M A N Systems be liable by virtue of this warranty or otherwise for any special, indirect, secondary, incidental, or consequential damage of any nature to any person or property arising directly or indirectly out of the use or inability to use a warranty product, including any actual or perceived damage of wine stored within the cellar.

### Limited Warranty – The Intent

With over 15 years of production experience with the CW-30 product line, as well as use of the best componentry the market has to offer, warranty issues are few. However, when they arise, it is most often the case that on site diagnosis and repair of the problem is possible, therefore alleviating costly warranty procedures. Also, since most problems experienced during start-up are site specific, on site diagnosis becomes a necessity (see Troubleshooting Guide starting on page 17).

For this reason, M A N Systems requires that such an on site diagnosis be made by a trained retailer or by a technician hired by the retailer (at the retailer's expense unless approved by M A N Systems). When such an inspection is required, M A N Systems should be notified of this immediately to establish the time of his visit so that we can ensure that technical support will

be available at that time. Usually, a qualified and properly equipped individual, even if not a technician, can isolate and correct the problem within minutes if he is directed over the phone by one of our technical representatives.

Should the diagnosis lead to the conclusion that a defective part requires on site replacement, we will ship out a replacement part within 3 days at our expense to be installed by the retailer or a technician hired by the retailer. M A N Systems will determine whether to cover the labor cost on an individual case basis.

Of course the retailer always has the right to ship (at the retailer's expense) any malfunctioning equipment back to M A N Systems for repair within two years of the purchase date. We will cover the cost of all parts and labor and should there be a legitimate problem due to a defective component or of some manufacturing fault. M A N Systems will determine on an individual case basis which, if any, of the shipping cost incurred by the retailer will be covered.

### **Product Improvement**

M A N Systems is committed to product improvement. Improvement most often comes from field experience. For this reason, whenever a technical difficulty arises, we appreciate receiving prompt feedback as this lessens the probability of repeated errors in manufacturing, or it may cause us to change problematic componentry.

### **Our Commitment to Reparability**

With a constant need to refine a product so that it stays as the industry's standard, concerns often arise as to the availability of replacement parts should a repair become necessary years after the units production. M A N Systems stands apart in this aspect as well in that we continue to stock equivalent and completely compatible components for all existing CW-30 units in the market (the oldest of which is 18 years old).

### **Post-Warranty Servicing**

After the warranty period has elapsed and servicing becomes necessary, it is best for the client to contact a refrigeration company in their locality (M A N Systems is not in a position to make specific recommendations of companies that can service the CW-30 Series). In turn, M A N Systems will offer troubleshooting assistance, as needed, to qualified technicians. We will also supply and ship replacements parts directly to the client, but only if they are ordered through the local representative (the one through whom the original sale was made).



## CW-30 SERIES – TROUBLESHOOTING GUIDE

What follows are common faults that may occur and that can be easily rectified on site. In an effort to be equipped for quick troubleshooting, all retailers of this product should have some specific tools to assist in accurately assessing the true nature of the problem. Apart from a typical toolkit, it is recommended that the following tools be carried:

- 1/4" driver
- Digital thermometer with a probe extension
- Flashlight
- Voltage/amperage/ohm meter
- One four-foot stainless steel flexible pipe (3/8" comp. x 3/8" comp.)

### Water leaks:

M A N Systems performs very rigorous testing to confirm the integrity of the internal piping network. Therefore, a water leak usually consists of a small puddle of water that accumulates near the unit. Possible sources and solutions for such leaks are as follows:

1. **Exterior water connections:** Has the installer used Teflon tape or paste when installing the brass fittings supplied with the unit? Is the compression fitting on tight enough to keep the joint dry? Although it may seem that these connections are not the source of the leak, they often are.
2. **Condensate pump malfunction:** Open access panel nearest plumbing connections. Is the inside of the unit wet near the pump location. If so ensure that the clear vinyl tubing (the condensate line) extending from the top cavity of the unit is inserted in the rear left opening of the pump. If it is in place, slowly pull the pump out of the unit and check the water level within the pump. If the tank portion of the pump is full of water (causing overflowing and therefore the leaks) and pump is not running, remove upper section of pump from tank (snap fit). Check operation of float and float switch (in rare instances, this switch will dislodge). In the rare occasion that the switch is properly triggered by the float, but the pump does not operate and power supply to pump is confirmed with a voltmeter, pump may have to be replaced. If pump is operating but not pumping, remove the condensate drain connection and connect a temporary line diverting drain water into a bucket – if pump begins to operate properly, the condensate drain line is plugged or its head exceeds 15'.
3. **Icing up:** If the unit operates under abnormal conditions for extended periods of time or if there is a refrigerant leak in the system, ice may develop on the evaporator coil. When, the unit finally stops operating (usually due to the low pressure cut-out control), the ice build-up on the coil will melt and some of it may not be captured by the condensate tray and enter into the return air ducting. In cases where this problem persists, see section "System operates, but does not cool" and consult M A N Systems for technical assistance.

**Condensation on unit and/or ducting:**

If unit is operated under conditions other than those specified by the installation manual, the cold surface of the unit and the ducting may cause condensation (see Installation Instructions, General Notes, point 4).

**System operates, but does not cool room:**

In order to ascertain the source of this problem, the technician will have to establish the return and supply air temperatures by taking readings at the return air grill and the supply air grill. Phoning this information in to M A N Systems will be most helpful.

Prior to visiting the client, it is wise for the technician to ask the client if air is discharging from the supply air grill as before (at start-up). If not, (in other words, unit is operating but little or no air is felt discharging) it is quite possible that for various reasons, the evaporator is iced-up. Since it is futile to try to troubleshoot a unit if the coil is iced up, the technician should ask the client to shut the unit off (which can be done using the off switch on the remote thermostat or by simply unplugging the unit). Unit can be turned on after 48 hours (thus allowing sufficient time for the ice to melt) and the supply and return air temperature readings should be taken five minutes after start-up.

Another feature of the CW-30 Series is the “sight glass”, clearly visible within the control panel of the unit. A trained technician can use this to ascertain whether a system has a refrigerant leak or not.

**Water-hammer:**

If a distinct hammer noise is heard coming from the unit, or nearby piping while the unit is operating, this phenomenon is called water-hammer. This usually occurs within equipment or a home's plumbing system in conjunction with any fixture or appliance that has a solenoid or water regulating valve (a feature of the CW-30 Series). Two possible causes of water hammer are as follows:

1. “Water Out” and “Water In” connections are reversed. Check connections to confirm that they are installed correctly.
2. In certain areas, water pressures can exceed the recommended operating water pressure (see Utility Rough-In Instructions). Install a pressure reducing valve (set to 15 psi) to correct this problem. Please note that it is not recommended that such a valve be installed unless this problem arises.

**High Pressure Reset Fault:**

As mentioned in the operating instructions of this manual, the high pressure reset switch will almost always trip when there is a shortage of water. This can occur at times when the water shut off valve supplying the unit has been forgotten in the off position, the water main shut off valve is closed by a plumber doing a service call at the residence, or the municipality water service department has shut off the water in a certain neighborhood without warning (often at night). In such cases, resetting the unit will correct the problem.

At times however, the unit will trip this safety switch due to a lack of water pressure which can be caused by five things (shown in the order most likely to occur) that can readily be checked by a plumber:

1. **Improper plumbing connections:** Verify that the one water supply and two drain connections are installed as indicated in the installation instructions and by the labels located next to the plumbing connections on the unit.
2. **A plugged drain line:** To check for this, remove the drain connection (middle connection) and connect a temporary line diverting drain water into a bucket. Test unit operation and see if problem recurs. If water is surging out and is cold to the touch, proceed to point four. If water flow is low and warm to hot to the touch, leave the temporary line in place and try test for a plugged or constricted supply line (see point 3 below).
3. **A plugged or constricted supply line:** While unit is operating, shut off the water supply for 15 seconds and reopen valve quickly. If supply line has no restrictions, water will surge out of the drain connection for a few seconds and then resume normal water flow volume. If water does not surge, remove water supply connection and check flow of supply line (water flow should be very high). If water pressure and flow appears to be low, a restriction upstream is causing the fault. It could be a blockage in the pipe itself, a plugged strainer or filter, or a restrictive supply valve. If water pressure and flow is high, proceed with point four below.
4. **A plugged condenser:** Back-flush the unit by connecting the water supply line to the drain connection and a temporary line from the water inlet to a bucket. Turn system on and check for debris that will back-flush out of the condenser and into the bucket. Back-flushing may cause a hammering noise within the unit, which will not cause harm if ignored for a minute or so while back-flushing the unit.
5. **Restrictive airflow:** In rare cases, restrictive airflow will cause a high pressure fault. One way to check for this is by disconnecting the return and supply ducting and seeing if the problem recurs.

#### **Low Pressure Reset Fault:**

If a low pressure fault recurs continuously, the two most likely causes are as follows:

1. **Restrictive airflow:** To check for this, disconnect the return and supply ducting and seeing if the problem recurs.
2. **Refrigerant leak:** Please contact your representative to make such a diagnosis.

## PRICING

It is our hope that our pricing structure will assist new retailers in carrying marketing costs and providing excellent customer service in connection with our product. Packaging and other factors may also affect pricing, which can be resolved as the business relationship grows.

Due to current sales trends, the pricing for our equipment is governed by the US retail price. Pricing includes shipping (via ground) to the retailers/distributors central depot.

## AVAILABILITY

M A N Systems will complete all orders received and ship within a three week period from receipt of a purchase order. If a retailer projects a need of continual monthly supply of a certain model, M A N Systems will maintain stock of such for immediate delivery.

## TERMS

Line of credit and terms to be determined and adjusted according to volume.

## MISCELANEOUS

Marketing our products is a strength we leave to distributors and retailers. We have printed and distributed thousands of copies of brochures for our CW-30 product line and we will be happy to pass copies of this brochure for your use as well. However, you may wish to market the product in a way that will suit your specific market best.

Therefore, M A N Systems authorizes retailers to create additional advertising or marketing aids (at the retailer's expense). Any material representing the M A N Systems and its products not directly created by M A N Systems must be approved in writing by M A N Systems prior to use. Credit must be given in such material to M A N Systems as being the manufacturer of the products.

Retailers shall not do or permit anything to be done to prejudice the market image of the products or M A N Systems. Any items used in conjunction with the products, for purposes of transport, to enhance their marketing appeal or variance of usage, or anything whatsoever that may affect the performance to the products must be pre-approved in writing by M A N Systems.

The retailer shall not characterize itself or enter into any transaction as an agent or in the name of M A N Systems. Further, M A N Systems shall not be held legally responsible for any activities carried out by the retailer.

**Making a purchase from M A N Systems constitutes acceptance and compliance of what is contained within this information package.**

## **APPENDIX**

CW-30 Series Instruction Sheets  
Utility Rough-In  
Installation  
Operating

Electrical Diagram for DDC Controls

Remote Thermostat Installation & Operating Instructions

Ducting Kit Installation Instructions

Full Page Shop Drawings

## CW-30 SERIES UTILITY ROUGH-IN INSTRUCTIONS

### Electrical Connection:

- Provide a receptacle on separate circuit at point of installation (unit is not hard-wired). For a 115/1/60 power supply, provide a dedicated 15 Amp circuit breaker. (For 230/1/50 power supply, provide a dedicated 10 Amp circuit breaker. For full electrical data, please see equipment data label on unit.
- Thermostat rough-in: Provide a single gang switch box (mounted in a vertical position) in a spot where the cold air discharging from the unit will not affect the sensor reading. Provide an 18-2 stranded conductor (the equipment comes with wall mounted thermostat and 20' of 18-2 stranded cable).

### Plumbing Connections:

- Three ¼" FPT plumbing connections (see shop drawing for location) are required as follows:
  1. **One cold water supply connection** (labeled as Water In on unit). If domestic cold water is used, pressure should be regulated to a maximum of 80 PSI. A minimum water pressure of 15 PSI is required for units having gravity drains. Otherwise, add loss of piping and head of drain line to calculate required water pressure (this calculation is not necessary if unit is operating under full city water pressure). For closed loop systems, do not install a balancing valve and ensure that inlet water temperature will not exceed 95°F. (Flow Characteristics: 0.25gpm @ 60 °F / 1 gpm @ 95°F, 1 PSI PD)
  2. **One water drain connection** (labeled as Water Out on unit). For domestic cold water applications, connect to a main sanitary waste or storm drain line, according to local code (a dishwasher type drain connection or a floor drain is usually appropriate). If tying in to an overhead drain line, tap into the top end of the pipe to prevent back pressure. Since this line is under city pressure, head of drain line is only limited by city pressure.
  3. **One condensate drain connection** (labeled as Condensate Drain on unit). Unit is equipped with an internal condensate pump capable of 15' of head – a gravity drain is not required. *DO NOT TIE TWO DRAIN CONNECTIONS TOGETHER UNTIL REACHING MAIN DRAIN LINE.* Separately connect to a main sanitary waste or storm drain line, according to local code (a dishwasher type drain connection or a floor drain is usually appropriate). If tying in to an overhead drain line, tap into the top end of the pipe to minimize back pressure. Line should be brought up high enough to allow for a ¼" to 1' downward slope for the entire horizontal run of the pipe.
- It is recommended that each of the three lines be 3/8" OD copper tubing, PEX tubing or the braided stainless steel pipes supplied with each unit.
- Three ¼"MPT x 3/8" compression elbow fitting adapters are supplied with the unit for ease of installation (use Teflon tape or paste prior to connecting these or any other fittings to unit).
- Install a water shut-off valve for water supply connection near unit connection for easy servicing. Tag all water shut-off valves that will affect flow to the unit as follows: "Turn wine cooler off prior to shutting this valve and turn cooler back on after reopening valve."

# **CW-30 SERIES INSTALLATION INSTRUCTIONS**

## **General Notes:**

- Do not make any adjustments. This unit has been thoroughly tested and preset to operate at desired settings. Any changes made that are not authorized by M A N Systems will void the warranty. *Note to Refrigeration contractors:* Do not add refrigerant unless authorized by M A N Systems – this equipment is critically charged.
- Unit must be installed on a level surface.
- Unit must be installed so that the control panel can be easily accessed and removed by the user.
- Unit is intended for indoor installations only. Unit should *not* be installed in an environment subject to temperatures below 4°C (40°F) or temperature and humidity levels exceeding 30°C (85°F) and 85% RH. For applications where the operating environment does not meet these criteria, install unit within wine room environment.
- Units are to be used in fully insulated and sealed rooms. Ensure all doors have weather stripping and door sweeps installed. Models CW-30 and CW-30W to be installed within treated room.

## **Plumbing Connections:**

- Please refer to utility rough-in instructions.

## **Electrical Connection:**

- Please refer to utility rough-in instructions.
- Unfold line cord prior to use.
- Plug unit directly into receptacle (do not use an extension cord). Ensure that all plumbing connections are complete and that the water supply is on.

## **Clearances for the CW-30 (non ducted system):**

- Sufficient space should be provided to allow for unhindered air movement. The two air return openings (inlets) located on the sides of the unit should have a minimum clearance of six inches to any adjacent wall or racking. Minimum clearance for the air supply (located on the top end of the unit) is four feet.

**Clearances & Ducting Requirements for the CW-30M and CW-30W(ducted systems):**

- If unit is installed within the wine cellar, it is not required to have a ducted air return, but must have a minimum clearance of six inches from the air return to any adjacent wall or racking. (Please note that model CW-30W must be installed within wine cellar).
- It is preferable for the supply air to be as close to the ceiling as practical and for the return air to draw from as near to the floor as possible. *Supply air must be ducted and discharged a minimum distance of four feet away from the air return to prevent short-cycling.*
- Choose one of the following duct sizing methods:
  1. **Quick duct sizing:** All ducting must have a minimum cross-sectional *free area* of 80 in<sup>2</sup>. (Note: Supply air must be diverged to meet minimum area requirement.) Return and supply duct runs not to exceed a total of 25 feet in length. It is recommended that louvers have a total area of 150 in<sup>2</sup>.
  2. **Duct Kit:** Read instructions supplied with the package. Specify model when ordering kit.
  3. **Duct sizing for engineers and designers:** Use fan performance shown below. Coil static pressure drop is 0.3” water. Design for a minimum of 390 cfm.

CW-30M FAN PERFORMANCE								
STATIC PRESSURE (IN. WATER)	0	1.65	2.0	2.2	2.3	2.4	2.45	2.5
AIRFLOW (CFM)	441	390	325	260	195	130	65	0

- Noise treatment can be accomplished by means of flex connectors on the return and supply flanges as well as with the use of acoustic lining. Both are recommended although not required.
- Only fasten ducting to the return and supply air flanges. Do not drill any holes on any other part of the unit as this may result in damage not covered by the warranty.
- All duct joints must be sealed with duct tape or preferably with a duct sealant (paste). Ducting located outside the wine cellar must be insulated to an R10 factor.

**Thermostat Installation and Connection:**

- Please read the instructions for installation supplied with each thermostat. Consult Operating Instructions for thermostat operation.
- Please note that dip switches have been factory preset for this application. Do not alter.
- Ensure that thermostat is installed inside the wine cellar, in a location which will best indicate the average temperature of the room.



# CW-30 SERIES

## OPERATING INSTRUCTIONS

### Remote Digital Thermostat Quick-Set Instructions

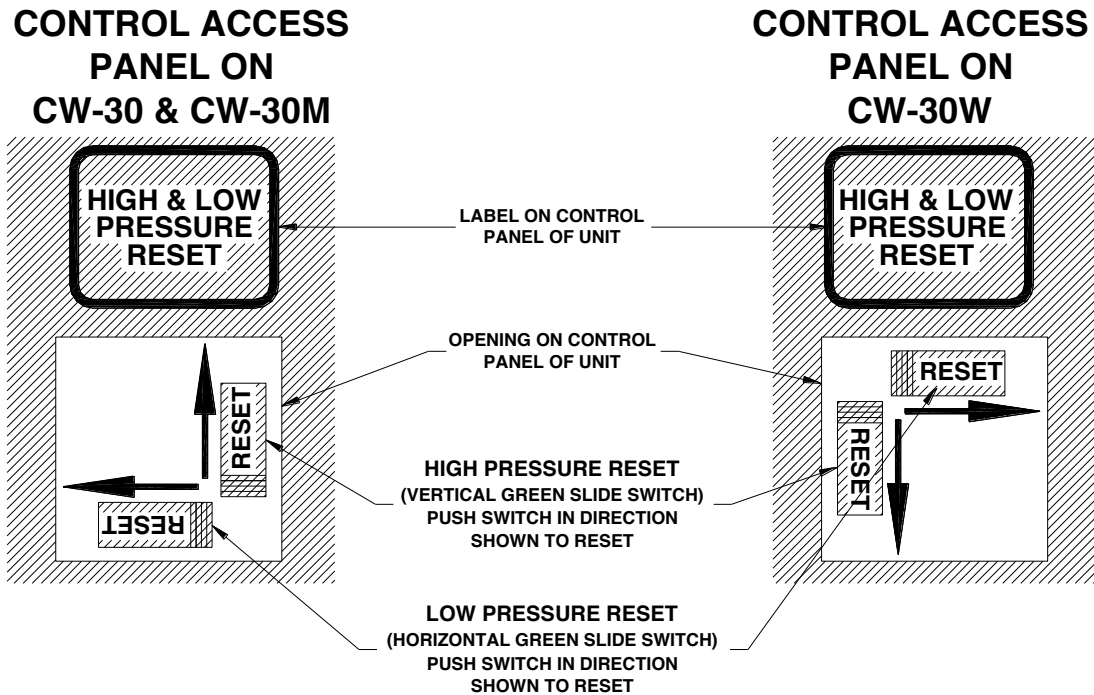
- **Viewing Room Temperature and Unit Operation Status:** The LCD will display the actual room temperature during normal operation. If the display is blank, replace the batteries. Further, a snowflake symbol will appear on the display when there is a demand for cooling (unit should operate when this symbol is illuminated).
- **Setting the temperature:** Turn setting dial. The display will flash indicating the setpoint temperature selected. After a short period, the display stops flashing and shows actual room temperature.
- **Low Battery Indication and Changing Batteries:** A battery symbol will flash in the display when batteries require replacement. Batteries should be replaced within 15 days, after which the thermostat will turn off the unit. When this happens, “OF” will be displayed. To avoid having this happen, replace the batteries every 18 months. Thermostat takes 2xAA/MN1500 Alkaline Batteries. Ensure that unit is unplugged or that electric circuit to unit is turned off, prior to replacing batteries.
- **AUTO/OFF Switch:** When the switch is set in the “O” position, thermostat will turn unit off and “OF” is displayed.

### Optional Internal Digital Thermostat Quick-Set Instructions

- Unit has been preset to maintain 55°F. To view and adjust the setpoint, follow these steps:
  1. Remove control panel and locate thermostat (gray box with LCD display). Display will read current sensor temperature (actual temperature of room).
  2. Press the Menu button once. The display changes to flashing “SP”.
  3. Press the Menu button again. The current setpoint is displayed.
  4. Press the Up or Down button to adjust the setpoint temperature.
  5. Press the Menu button to save new setpoint. The display then returns to the sensor temperature. Note: If the Menu button is not pressed after changing the setpoint, the control reverts to the setpoint value previously programmed into the thermostat. Also, if no entries are made for 30 seconds, the control reverts to the temperature display.

### High Pressure and Low Pressure Safety Switch Operation

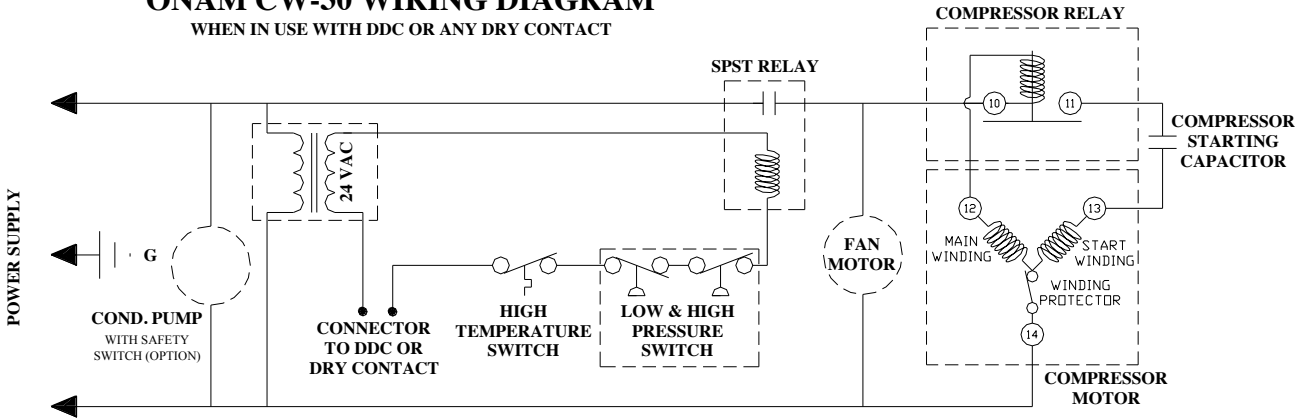
- If unit is operated without water, it will be automatically switched off and it will not resume operation even if water pressure is restored unless the high pressure reset switch is reset. To do so, locate the small opening on the control panel of the unit labeled “High Pressure Reset.” Control panel does not need to be removed in order to reset unit. Two slide switches are located just within the opening and are labeled on the figure below. Firmly slide the High Pressure Reset Switch “*up*”. Unit should resume operation within 5 seconds.
- If unit does not reset, attempt to reset the low pressure reset switch by sliding it firmly to the “*left*”. If unit begins to operate but a low pressure cutout recurs, contact your local representative immediately (an adjustment or servicing may be required).
- If unit does not reset with either the high or low pressure reset switches, please check the following items before calling for servicing:
  1. Ensure the receptacle has power and that the power cord is firmly connected to the unit.
  2. Ensure the thermostat has a snowflake icon on display and that the thermostat harness is firmly connected to the unit.



# CW-30 SERIES USE OF DDC OR ALTERNATE CONTROLS

- Any type of DRY CONTACT control device can be used in place of the supplied thermostat. Please refer to the electrical diagram below. Please note that this cannot be done if the unit has been ordered with the optional Internal Digital Thermostatic Control System.

**ONAM CW-30 WIRING DIAGRAM**  
WHEN IN USE WITH DDC OR ANY DRY CONTACT



# DUCTING KIT INSTALLATION INSTRUCTIONS

## DUCTING PACKAGE INCLUDES:

1. 25 feet of insulated flexible duct.
2. 4 (four) 10"Ø gear clamps.
3. 1 (one) 6"Ø to 10"Ø transition.
4. 1 (one) 14" x 10 1/8" to 10"Ø transition.
5. 2 (two) wall flanges with 10"Ø collars.
6. 1/2" sheet metal screws.

## INSTALLING FITTINGS:

### 6"Ø to 10"Ø Transition:

1. Slide the 6"Ø end of the transition onto the 6"Ø supply air flange on the unit.
2. Secure in place using at least 2 (two) 1/2" sheet metal screws. Please note that holes are not predrilled.
3. Seal joint with duct sealer or duct tape, making it airtight.

### 14" x 10 1/8" to 10"Ø Transition:

1. Slide the fitting into place onto the 14" x 10 1/8" return air flange on the unit.
2. Secure in place using at least 8 (eight) 1/2" sheet metal screws (two per side). Please note that holes are not predrilled.
3. Seal joint with duct sealer or duct tape, making it airtight.

**Wall Flanges With 10"Ø Collars:** These two identical fittings are to be used in conjunction with return air and supply air grilles (not supplied with this package) and are designed to fit between wall studs or floor joists spaced at 16"OC. In determining the location of these fittings, consider the following:

- Return and supply duct runs are not to exceed a total of 25 feet in length.
- The supply air grille *must* be a minimum distance of 4 (four) feet away from the air return grille.
- Place the supply air grille as close to the ceiling of the wine cellar as is possible.
- Place the return air grille as close to the floor of the wine cellar as is possible.

Once the location of these two fittings is determined, their installation can be done during the following two stages of construction:

1. *Pre-drywall phase (rough-in):* Nail the flange onto the studs or joists with the duct collar of the fitting extending outwards from wine cellar wall towards the location of the cooling system. When room is being drywalled, the required 10"Ø holes are to be cut exposing the duct opening. Seal around flange to make room airtight.
2. *Post-drywall phase:* Cut 10 1/2"Ø holes into the drywall (centered between studs or joists). Nail the flange through the drywall and into the wall studs with the duct collar of the fitting extending outwards from wine cellar wall towards the location of the cooling system. Seal around flange to make room airtight.

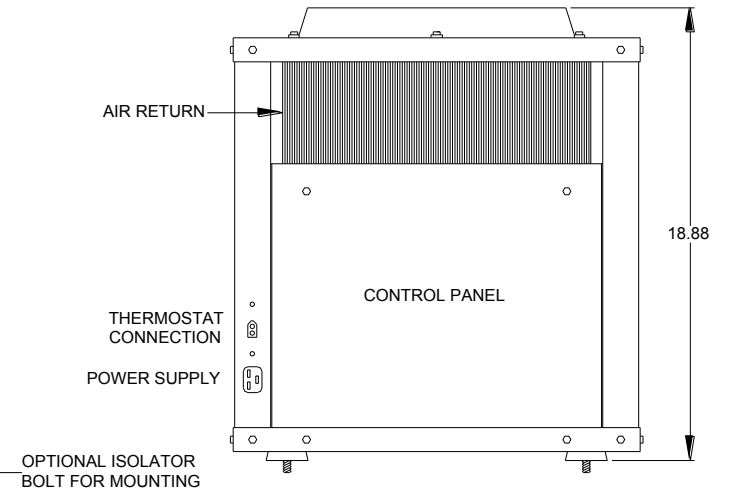
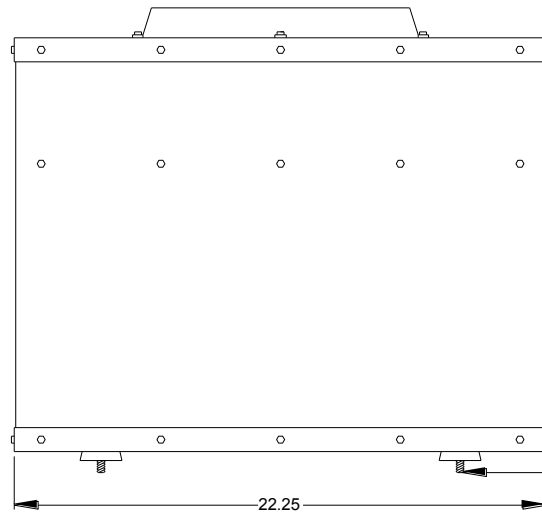
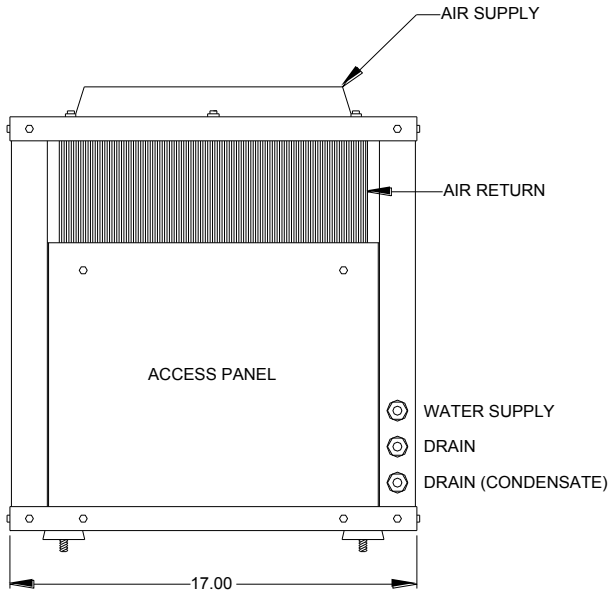
## INSTALLING THE DUCTWORK:

After positioning cooling unit to the desired location, determine the two lengths of ducting required ensuring that both duct runs to not exceed a total of 25 feet and cut supplied length accordingly.

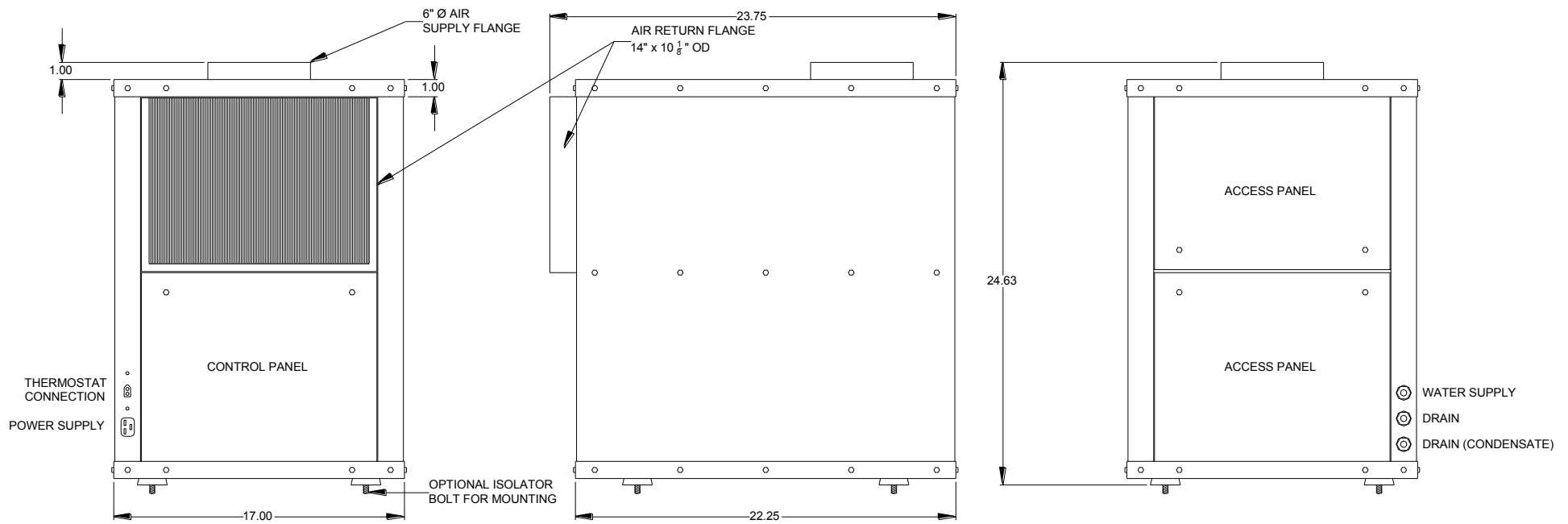
1. Supply air duct run (6"Ø to 10"Ø transition connected to wall flange fitting positioned closest to cellar ceiling):
  - Slide duct completely over the transition until it touches the cooling unit (maximizing insulation coverage).
  - Slide duct completely over entire length of collar of wall flange fitting.
2. Return air duct run (14" x 10 1/8" to 10"Ø transition connected to wall flange fitting positioned closest to cellar floor):
  - Slide duct completely over collar of transition.
  - Slide duct completely over entire length of collar of wall flange fitting.

Secure duct to fittings with supplied gear clamps. Pull back foil and insulation to expose internal plastic duct membrane. Install gear clamp and recover duct with insulation and foil cover.

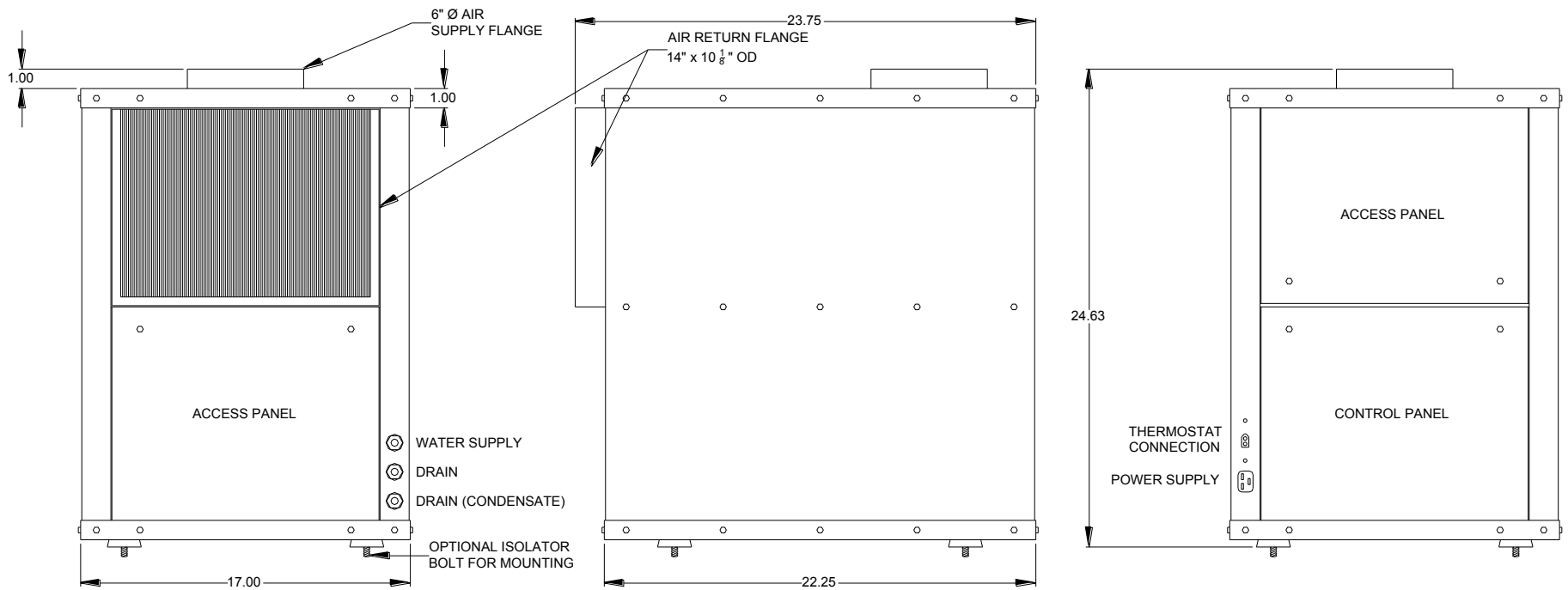
**IMPORTANT NOTE:** Ducting must be supported so as not to sag. Ensure that flexible ducting is stretched out to the greatest extent possible to eliminate unnecessary restrictions.



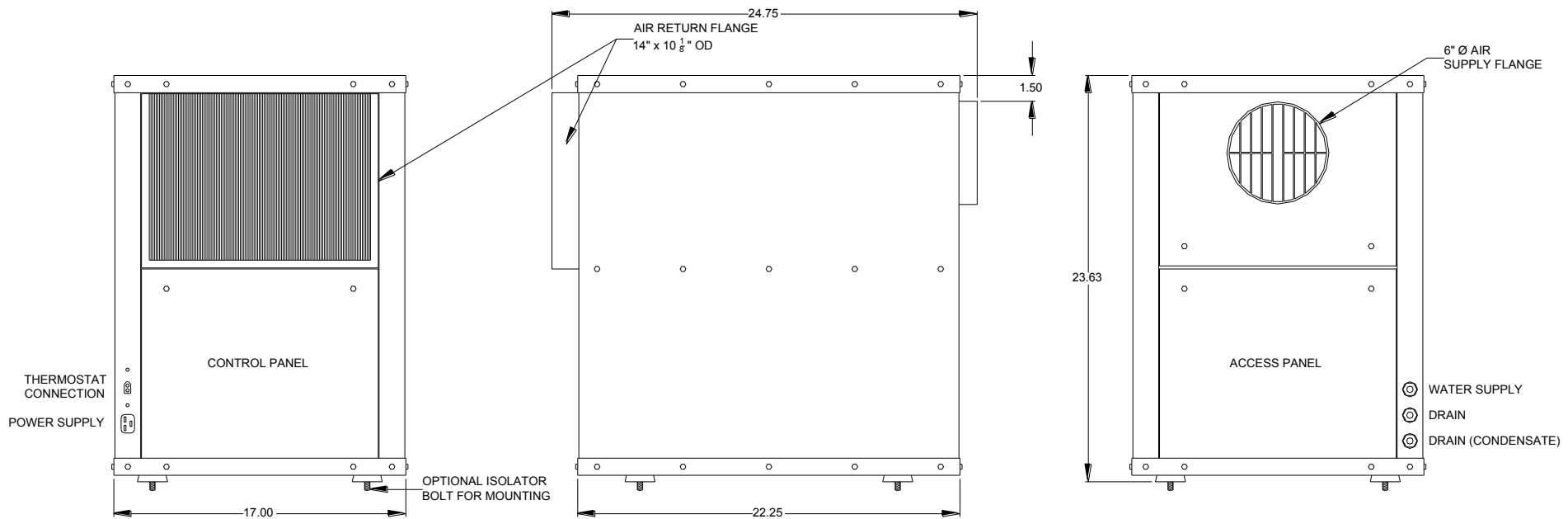
MODEL: CW-30



MODEL: CW-30M-AA

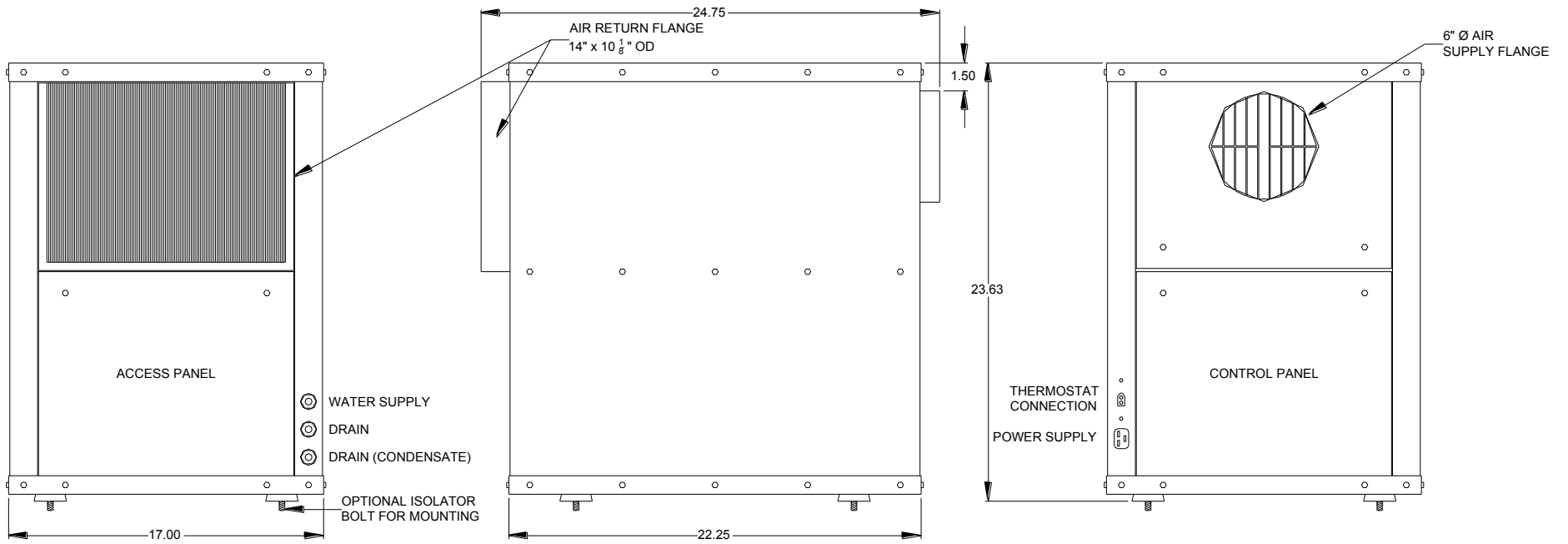


MODEL: CW-30M-AB

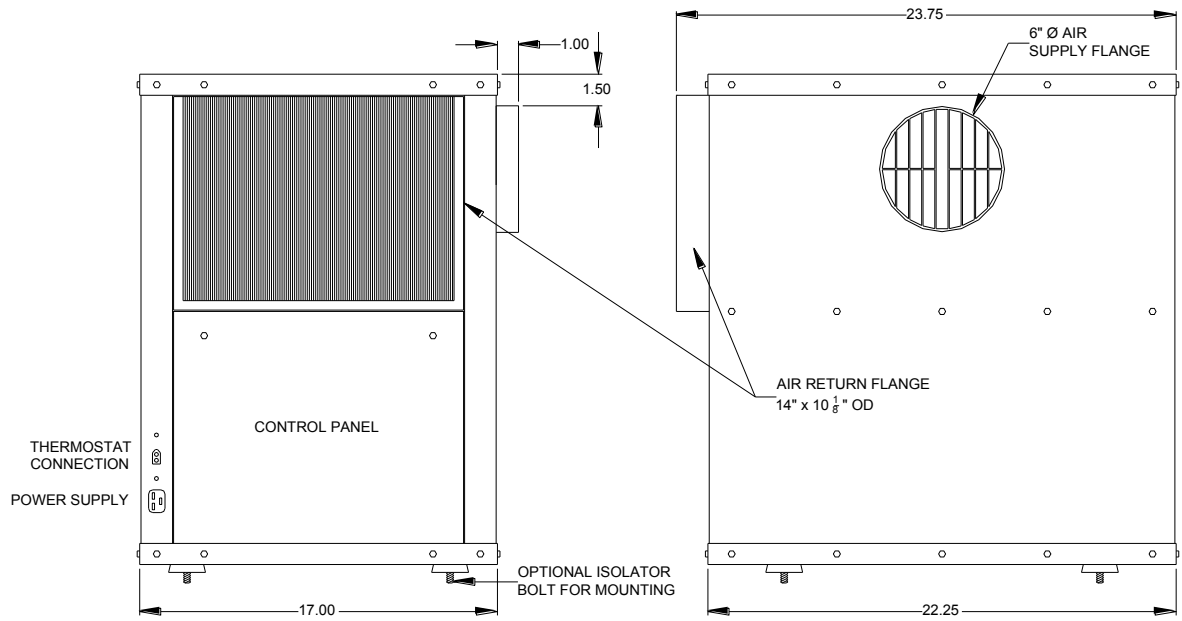


MODEL: CW-30M-BA

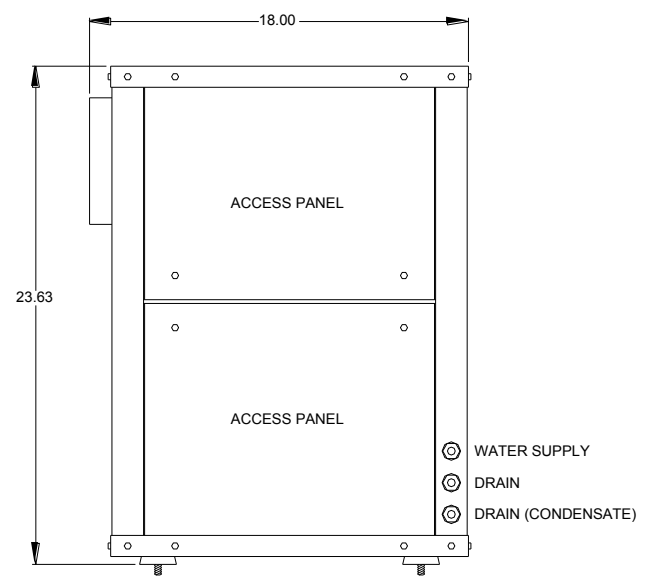


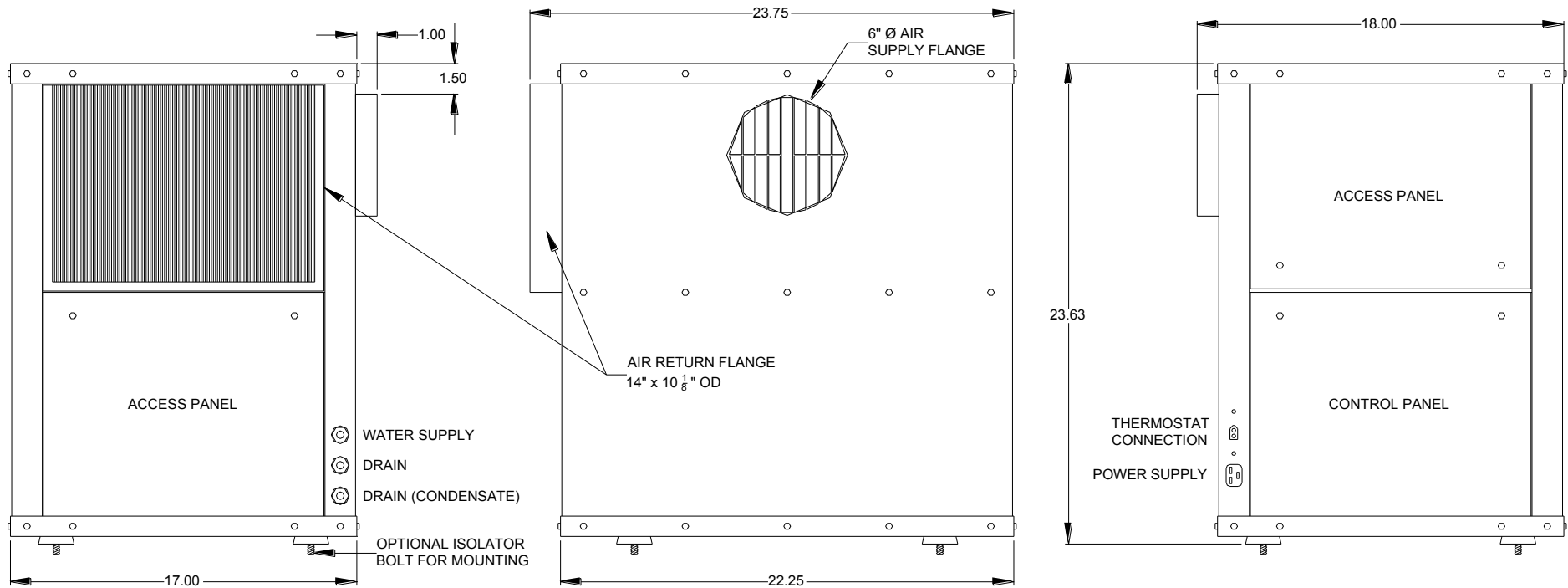


MODEL: CW-30M-BB

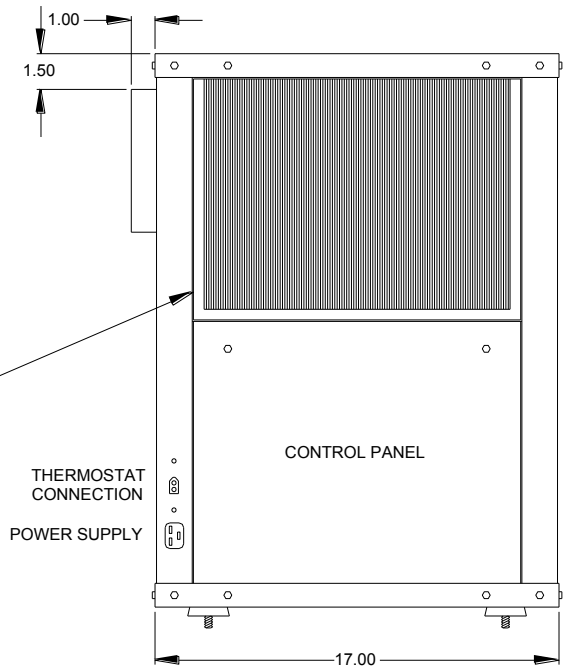
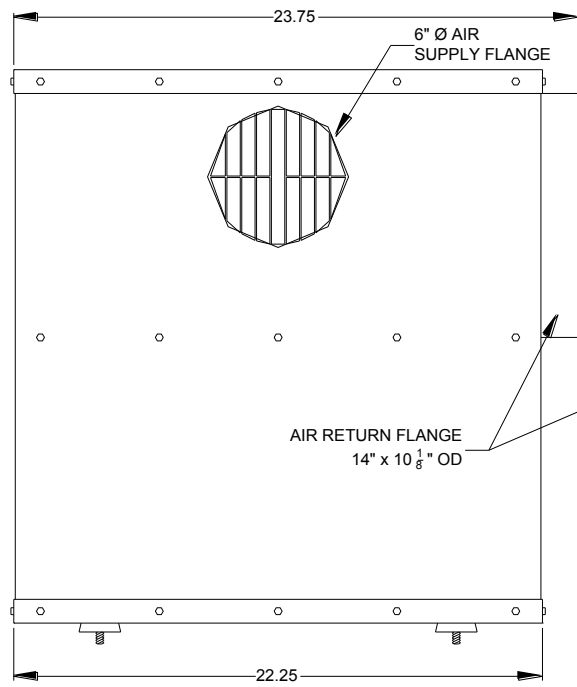
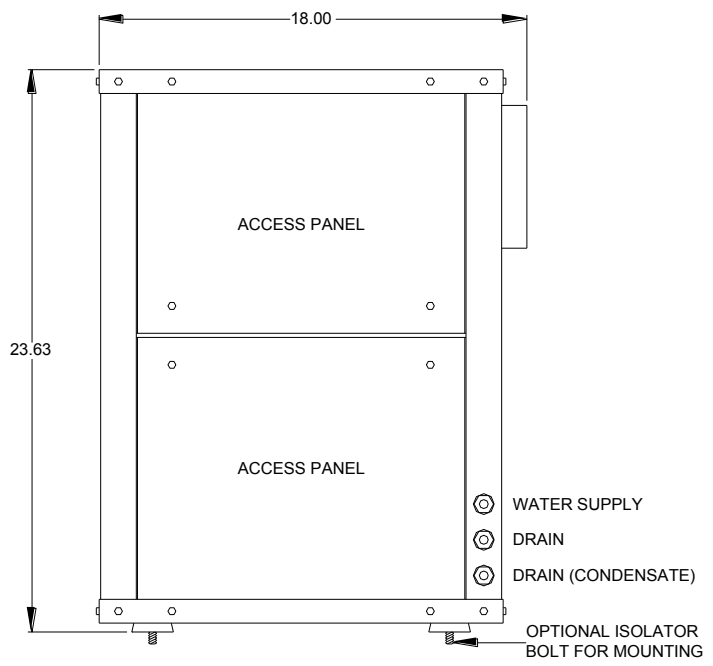


MODEL: CW-30M-CA

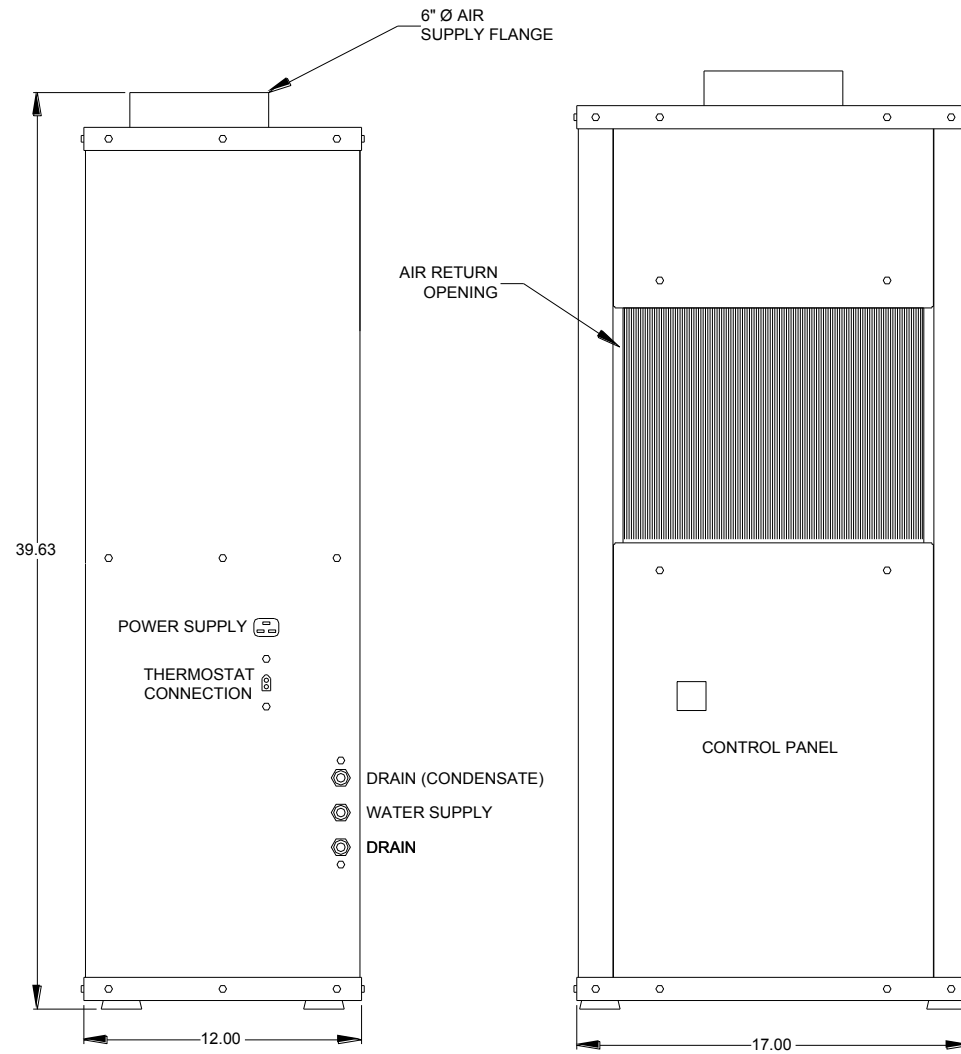




MODEL: CW-30M-CB



MODEL: CW-30M-DA



MODEL: CW-30W