

# OPERATION **MANUAL**

**CM12**



READ THIS MANUAL CAREFULLY FOR INSTRUCTIONS ON CORRECT  
INSTALLATION AND USAGE, AND READ ALL SAFEGUARDS.



**MOVINCOOL**<sup>®</sup>  
THE #1 SPOT COOLING SOLUTION

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# FOREWORD

Congratulations on purchasing the MovinCool CM12.

This manual explains how to assemble, install and operate the MovinCool CM12 air conditioning unit. Please read this operation manual thoroughly to familiarize yourself with the features of the unit and to ensure years of reliable operation. You may also find it useful to keep this operation manual on hand for reference.

Components and/or procedures are subject to change without prior notice.

## Definition of Terms

***⚠WARNING: Describes precautions that should be observed in order to prevent injury to the user during installation or unit operation.***

***⚠CAUTION: Describes precautions that should be observed in order to prevent damage to the unit or its components, which may occur during installation or unit operation if sufficient care is not taken.***

***NOTE: Provides additional information that facilitates installation or unit operation.***

- Para Español, visita **[www. movincool.com](http://www.movincool.com)**
- Pour le français voit la **[www.movincol.com](http://www.movincol.com)**

# GENERAL WARNINGS & CAUTIONS

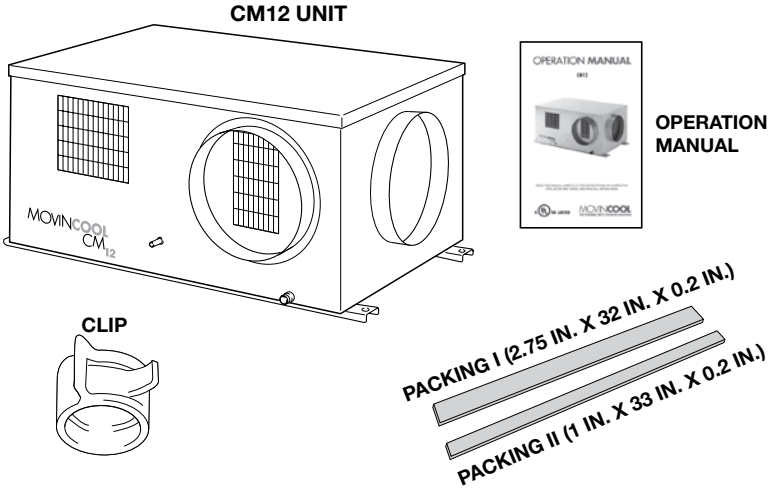
- All electrical work should only be performed by qualified electrical personnel. Repair to electrical components by non-certified technicians may result in personal injury and/or damage to the unit. All electrical components replaced must be genuine MovinCool parts, purchased from an authorized reseller.
- Installation should be conducted by qualified technician only and DENSO and DENSO affiliate are not responsible for injuries and/or damages caused by improper installation.

# INVENTORY

After unpacking your MovinCool unit, please check to make sure you have the following items:

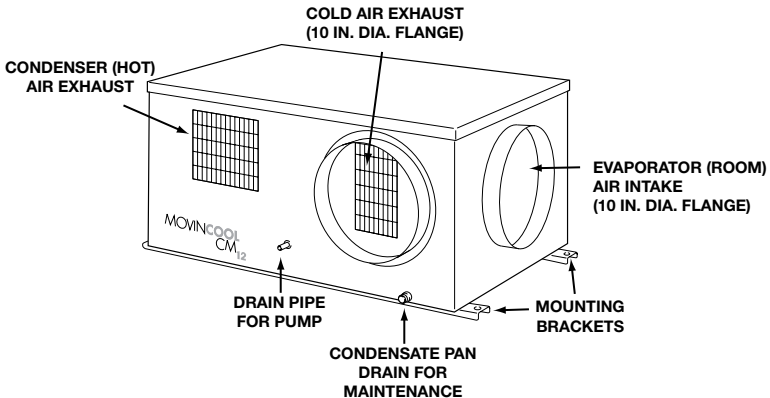
- CM12 MovinCool Unit (1)
- Operation Manual/Warranty Card (1)
- Clip (1)
- Packing I (1)
- Packing II (1)

**NOTE: If any of these items were not included in the box or appear damaged, please contact your MovinCool reseller for replacement.**

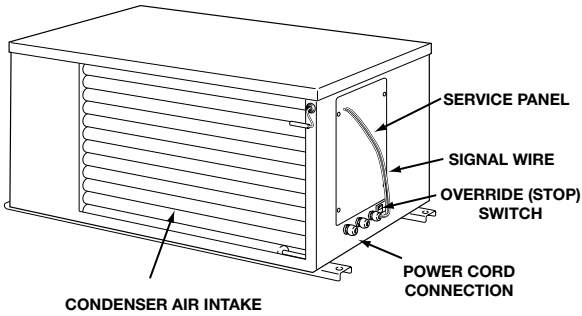


# INSTALLATION

## Unit Overview



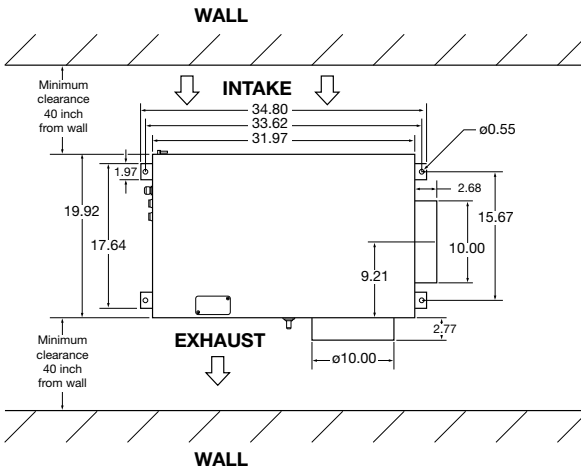
# INSTALLATION



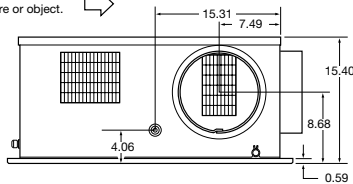
**⚠WARNING:** Remove protective cardboard from condenser intake after installation.

## Clearance Requirement

All dimensions are in inches  
**WEIGHT: 121 LBS**



Top of the unit should not contact any building structure or object. →



# INSTALLATION

## Mounting the CM12 to a Roof Structure

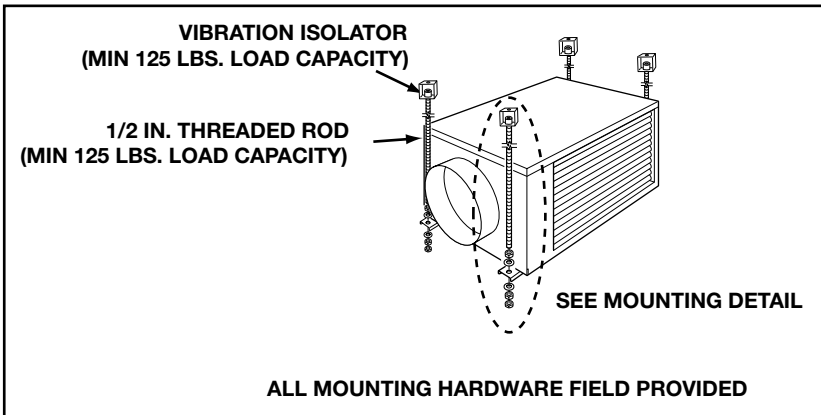
**⚠WARNING:** Be sure that the supporting roof structure is capable of supporting the weight of the unit, mounting hardware and the accessories (Roof structure should be capable to support four times of total weight or more. Unit weight is 121 lbs).

**Be sure to securely anchor the top ends of the suspension rods. Make sure all nuts are tight. Be sure to follow all application codes.**

The CM12 unit is usually mounted above the ceiling and must be securely mounted to the roof structure. The ceiling support of the existing building may require reinforcements.

Use field-supplied threaded 1/2 inch suspension rods, washers, nuts and vibration isolators.

The recommended clearance between ceiling grids and building the structural member is the unit height plus 3 inches.

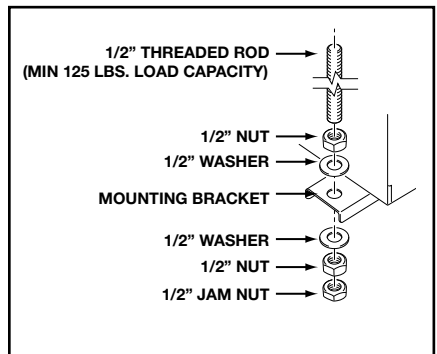


Install the four field-supplied rods by suspending them from suitable building structure members. Locate the rods so that they will align with four mounting holes in the mounting bracket that are part of the unit base.

Wear gloves to avoid injury during installation

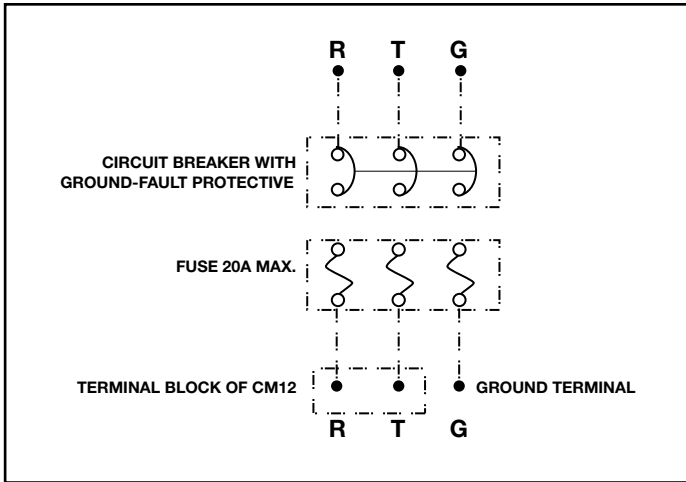
Tightening torque for nuts: 33lb•ft

**⚠CAUTION:** Make sure the unit is level (must be less than 2° incline).



## Power Supply Requirements

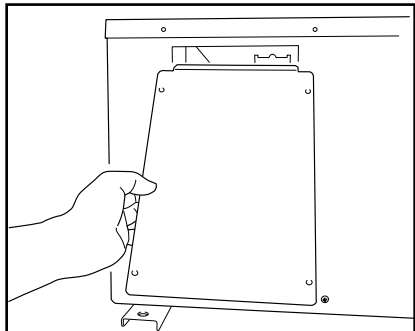
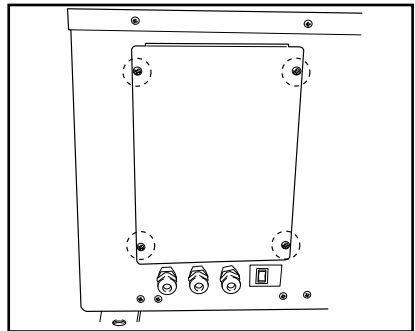
- The CM12 requires a single-phase 115V, 60Hz power supply to operate.
- The power supply should be a dedicated single outlet circuit with a UL approved short-circuit and ground fault protective breaker with a fuse size of 20A maximum.



## Service Panel Access

Access service panel by removing 4 screws.

Tightening torque for screw is 0.8 lbf•ft.



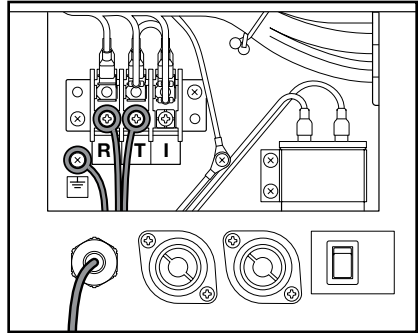


## Power Connection

### Connecting Power Supply to Unit

The following are recommended wire sizes and electrical ratings:

- Cord Type: SJT (3 wires) or equivalent
- Wire Gauge: 14 AWG
- Voltage Rating: 300V min
- Heat Resistance: 60°C
- Remove service panel from the right side of CM12 unit.
- Route power cord wires through the opening of the left grommet connector located below service panel. Tighten the grommet connector at about 2.17lbf•ft torque.
- Connect the neutral wire (white color label “R”) to the left screw connection of terminal block. Tighten screw at about 0.96lbf•ft torque.
- Connect the line wire (black color label “T”) to the center screw connection of terminal block. Tighten screw at about 0.96lbf•ft torque.
- Connect the ground wire (green color label “G”) to brass screw located below terminal block. Tighten screw at about 0.96lbf•ft torque.



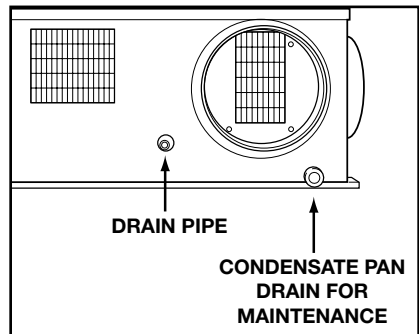
**⚠WARNING: All electrical work should only be performed by qualified personnel. Repair to electrical components by non-certified technicians may result in personal injury and/or damage to the unit.**

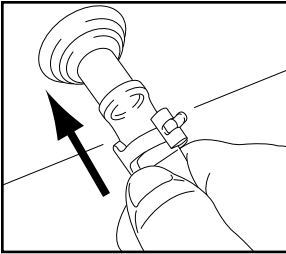
## Drain Hose Connection

The CM12 is equipped with an internal condensation removal pump. Maximum lift is 4 ft.

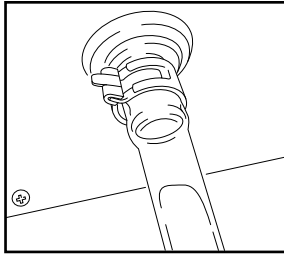
Use the provided 1/2 inch female connection on the unit for the evaporator coil condensate drain. The drain line must be located so it will not be exposed to freezing temperatures. The drain should be the full size of the drain connection. (Connect the drain hose to the condensation drain or the janitor closet.)

A 1/2 inch ID (5/8 inch OD), PVC tubing is required for the drain. Insulate the drain hose; condensation may occur during humid conditions. (Field supplied material)

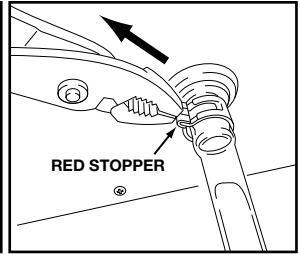




Plug in the 1/2 inch drain hose with the loose clip into the drain pipe. Make sure the hose is all the way in and flush with the grommet.



Position the clip to the top of the drain pipe near the unit as shown.

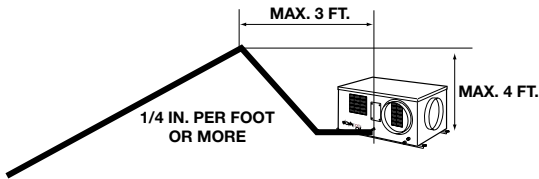


Pull out the red stopper and secure hose. Make sure there are not kinks or bends.

When using the gravity drain, make sure the hose is connected as a decline.

**NOTE: Do not use more than 4 feet of drain hose vertically. This is maximum head (lift) of the condensation pump.**

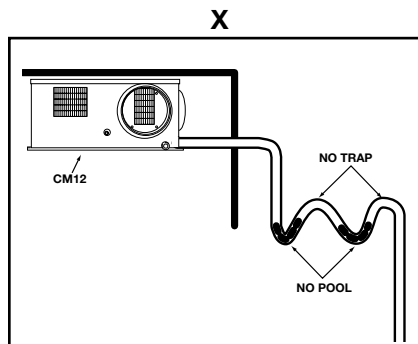
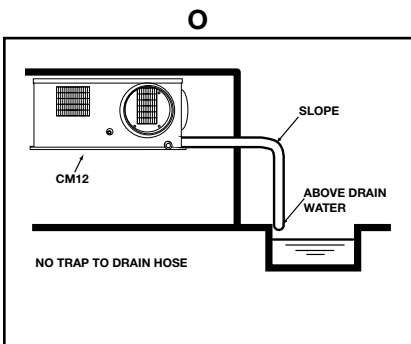
When securing the drain hose to the highest vertical position (no more than 4 feet high) and running the hose to the drain, run the drain hose on a downward slope at the rate minimum of 1/4 inch per foot for proper drainage.



Check following items:

1. No kinks or bends on the drain hose
2. No trap in the drain hose
3. The end of the drain hose should be higher than the water level at the drain
4. No dripping from the drain hose at the clamping area

### DRAIN HOSE ARRANGEMENT



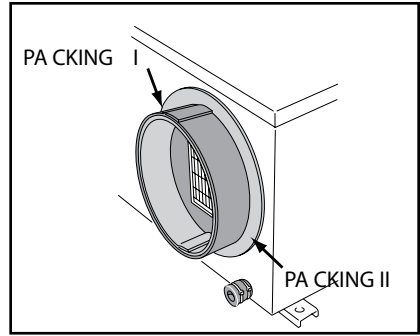
When uninstalling the unit, empty the drain pan by draining out the water through the drain pan drain pipe.

## Packing Attachment

Apply include "Packing I" (provided) and "Packing II" (provided) to the cold air outlet flange to prevent condensation in high humidity environments.

Release the liner on Packing I and apply to outside flange cylinder of the ring as shown.

Release the liner on Packing II and apply to edge of Packing I as shown.



## Wall Thermostat Connection (Millivolt System ONLY)

### Preparation for Thermostat Connection

- Use with a single stage wall thermostat.( Type: Millivolt System )
- Set the wall thermostat to cooling system mode, since most wall thermostats are designed for both heating and cooling.
- Prepare the wire harness for connection from the unit to the thermostat. The recommended wire size is:  
Wire Type: Thermostat cable / Solid wire  
16 ~ 26 AWG
- Identify the thermostat connectors labeled G, G1, Y, and RC.  
G (Fan on/off), G1 (Fan Speed Hi/Lo), Y (Cooling on/off) and RC (Cooling Transfer - Common)

### Connecting Thermostat to CM12 Unit

Wall Thermostat Connector Name	CM12 WIRES		Function
	Label Name	Color	
RC	RC	Brown	Common
Y	Y	Red	Cool On/Off
G	G	Orange	Fan On/Off
G1	G1	Yellow	Fan Hi/Low

- Install the wall thermostat to the proper location inside the room where it can be conveniently accessed. Do not install the wall thermostat where unusual heating condition may occur (i.e. hot stove, hot pipe, fireplace, direct sunlight ,etc.)
- Most thermostats provide these basic functions:  
Fan Mode : On / Auto (Select the desired fan mode)  
System : Cool / Heater (Select Cool only)

## **Warning Signal Connection (Output Signal)**

The CM12's controller is equipped with a warning signal output relay type (Form-C, normal open dry contact), which can be used for monitoring the CM12's failure condition. Relay contactor (not connector) is closed when the following condition has occurred:

- a. Condensation Overflow
- b. Temperature Sensor fails
- c. Cooling Function fails

The output of the relay is rated 5A at 30VDC or 5A at 250VAC (resistive load). This can be used to connect output is compatible with various warning devices such as alarm speakers, light indicators, etc.

### **Connecting Warning Signal From CM12**

- Connect the warning device to CM12 signal wires labe L+ and L-.
- The recommended warning signal wire size is 16AWG to 26AWG for a solid wire, or 16AWG to 22AWG for a stranded wire.

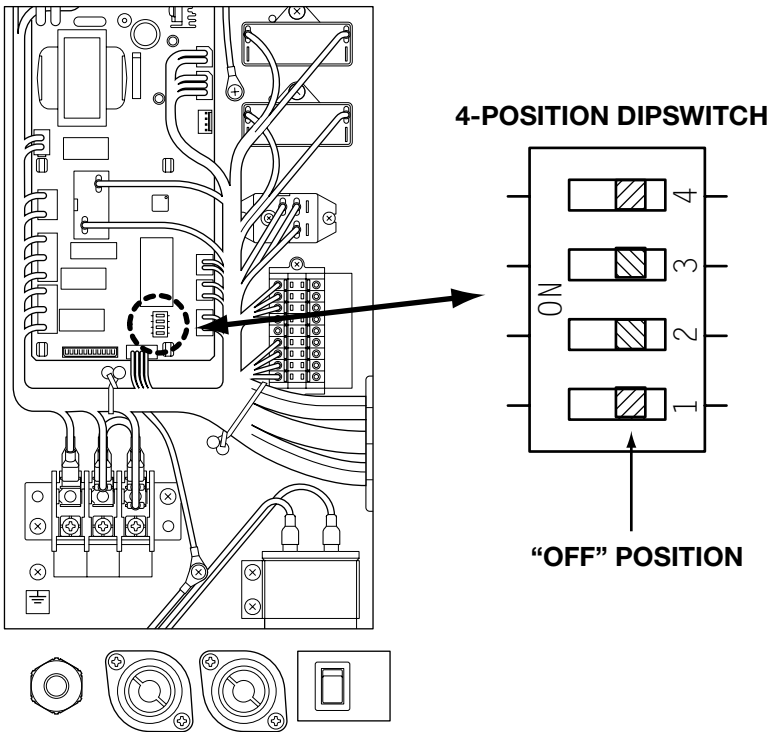
## Fire Alarm Control Panel Connection (Input Signal)

The CM12's controller is equipped with a normal open input signal, which can be connected directly from the fire alarm control panel. When receiving the signal from fire alarm control panel, the CM12 will turn off and will not turn back on until power source is reset.

### Connecting Fire Alarm Control Panel to CM12

- Connect the fire alarm signal wires to CM12 signal wires label E+ and E-.
- The recommended fire alarm signal wire size is 16AWG to 26AWG for a solid wire, or 16AWG to 22AWG for a stranded wire.

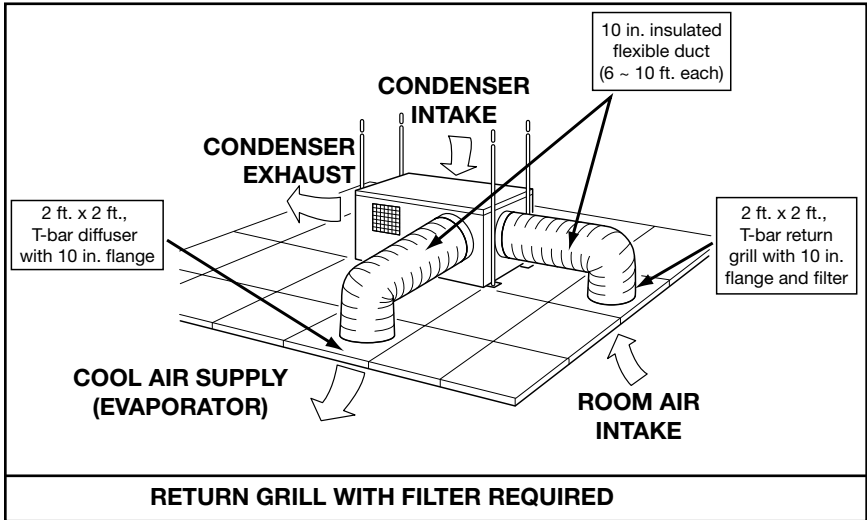
### Dip Switch Configuration and Setting



The CM12's controller is equipped with a 4-position dipswitch, which defaults in the OFF position. The dipswitch can be set to configure the following functions:

- When the switch position # 1 is ON, the evaporator and condenser fan motor will turn on. This function is used for test purposes and verification.
- When switch position # 2 is ON, the compressor, evaporator and condenser fan motor will turn on. This function is used for test purposes and verification.
- When switch position # 3 is ON, the compressor delay timer function is disabled.
- When switch position # 4 is ON, the buzzer sound function is disabled.

## Ducting With Typical Drop Ceiling



Use a 10 inch diameter insulated duct with low friction and air resistance.

The duct should be bent in a large radius. If the bending radius is less than 15 inches, then use vanes or guides to reduce air resistance.

Make sure the ducts are secured in order to absorb vibration from the unit.

Avoid bending the duct suddenly and have air ducts travel in a straight line for improved performance.

- Following field supplied hardware requires:
  - Insulated 10 inch diameter ducts
  - Return air grill with filter for evaporator air intake
  - Diffuser for cold air
- Maximum external static pressure, 0.4 IWG for evaporator duct and grills

**⚠ CAUTION: DO NOT OPERATE CM12 WITHOUT THE FILTER INSTALLED ON THE RETURN AIR GRILLE.**

# FEATURES

## CM12 Features

- Built-in condensation removal pump
- Built-in mounting bracket
- Built-in flange for supply and return air (room air) - 10 inch diameter, 2.8 inch deep cylinder for easy installation
- Fire alarm control panel connection ready for automatic shut off
- Automatic shut off and warning signal output and alarm for
  - Condensation Overflow
  - Unit Failure (no cooling)
  - Temperature Sensor Failure

# DAILY INSPECTION & MAINTENANCE

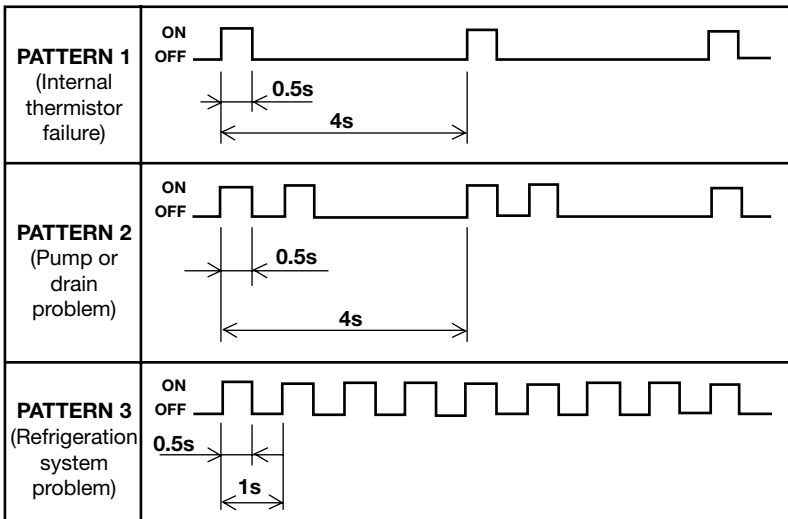
## Cleaning Air Filters

The air filter on the evaporator return grill should be checked weekly for dust buildup. Clean or replace air filter on a weekly basis. If the unit is used in a dusty environment, more frequent cleaning may be required.

A dirty air filter will reduce the air output, resulting in a decrease of the cooling capacity of the unit.

The ground fault breaker should be tested at least once a month.

## Buzzer Pattern



# TROUBLESHOOTING

Check the following points before calling a qualified technician.

If symptoms persist after the above actions have been taken, turn the unit off, disconnect the power and contact your MovinCool reseller.

SYMPTOM	POSSIBLE CAUSE	REMEDY
<i>Unit does not operate</i>	<ul style="list-style-type: none"> <li>• Power supply is off</li> <li>• Power interruption</li> <li>• Blockage of air duct</li> <li>• Turn off signal input</li> <li>• Override (Stop) switch is active</li> <li>• Battery ran out on thermostat</li> </ul>	<ul style="list-style-type: none"> <li>• Check circuit breaker</li> <li>• Unit will turn on automatically when power back (Some thermostats require you to reset)</li> <li>• Check duct for any blockages or excessive kinks in ducting</li> <li>• Check for turn off signal input (fire alarm control panel)</li> <li>• Ensure the switch is in “OPERATE” position</li> <li>• Change battery</li> </ul>
<i>Insufficient Cooling / Unit operation interrupted frequently.</i>	<ul style="list-style-type: none"> <li>• Blockage of Condenser air intake or outlet in the ceiling</li> <li>• Dirty Surface of Condenser Core</li> <li>• Dirty / Blocked filters</li> <li>• Excessive evaporator air ducting</li> <li>• Blockage of Condenser air intake or outlet in the ceiling</li> <li>• Outside of operating range</li> </ul>	<ul style="list-style-type: none"> <li>• Check any blockages in the ceiling</li> <li>• Clean surface of Condenser Core</li> <li>• Clean / replace air filter</li> <li>• Evaporator ducting should not exceed 30’ and bend radius should be larger than twice of duct diameter.</li> <li>• Remove the blockage</li> <li>• Use within operating temperature range</li> </ul>
<i>Beeping / Alarm coming from unit and unit stop (Buzzer sound pattern indicated on page 12)</i>	<ul style="list-style-type: none"> <li>• Internal thermistor failure (Sound pattern 1)</li> <li>• Pump or drain problem (Sound pattern 2)</li> <li>• Refrigeration system problem (Sound pattern 3)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace internal thermistor</li> <li>• Check for drain connection. Blockage, kink or bend on drain hose (Refer to drain connection of this manual)</li> </ul>



**CM12: Installation Check Sheet**

		ITEMS	✓
<b>Installation</b>	<b>Unit</b>	Check and make sure all screws are tight and unit is secured in place	
		Check and make sure inlet / outlet air exhaust are clear without blockage	
	<b>Wiring</b>	Check and make sure the unit is properly connected to the dedicated circuit breaker.	
		Check and make sure all wiring are properly connected and secured.	
		Check and make sure ground wire is tighten and secured	
	<b>Dipswitch Setting</b>	Check and make sure all dipswitches located on relay board are set to "OFF" positions.	
	<b>Drain Hose Connection</b>	Check and make sure that drain hose provided with heat insulator to prevent condensation on hose surface.	
	<b>Grill Installation</b>	Check and make sure that grill is secured and properly installed\	
	<b>Wall Thermostat</b>	Check and make sure wall thermostat is connected properly to unit.	
<b>Other</b>	Remove card board on Condenser inlet side		
<b>Before Test Operation</b>	<b>Maintenance Switch</b>	Check and make sure override switch located below maintenance's panel is at "OPERATE" position before test operation	
<b>Test Operation</b>	<b>Check Operation with Wall Thermostat</b>	Set wall thermostat to Fan On or Fan Only mode to confirm fan only mode operation	
		Set wall thermostat to Fan Auto or Cool mode operation. During cool mode operation check and cinform cooling operation after delay timer is expired. (Note: delay timer vary from 2 ~ 5 minutes depending on thermostat model used)	
	<b>Abnormal Noise</b>	Check and observe abnormal noise during Blowing/Cooling operation	
	<b>Drain</b>	During cooling operation check and observe condensation drip through normal drainage path	
	<b>Air Leakage</b>	Check for air leakage from duct and duct connection	

# TECHNICAL SPECIFICATIONS

<b>Electronic Features</b>	Control Panel	Wall Thermostat	
	Thermostat Control	Electronic	
<b>Cooling Capacity</b>	80°F 50%RH ( <i>Evaporator</i> ) 95° 40%RH ( <i>Condenser</i> )	10,500 BTU/h	#1
<b>Electrical Characteristics</b>	Voltage Requirement	1 Phase, 115V, 60 Hz	
	Total Power Consumption	1.23 kW	#1, #2
	Current Consumption	11.9 Amps	#1, #2
	Recommended Fuse Size	15 Amps	
	Min. - Max. Voltage	105 - 125	
<b>Fans</b>	Motor Output ( <i>Evaporator</i> ) - high/low	0.04/0.013 kW	
	Motor Output ( <i>Condenser</i> ) - high/low	0.1/0.025 kW	
<b>Evaporator</b>	Fan Type	Centrifugal	
	Max. air Flow - high/low	324 CFM / 228 CFM	#1
	Max External Static Pressure	0.16 IWG	
<b>Condenser</b>	Fan Type	Centrifugal	
	Max. air Flow - high/low	700 CFM / 370 CFM	
	Max External Static Pressure	0.12 IWG	
<b>Compressor</b>	Type	Hermetic Rotary	
	Output	0.89 kW	
<b>Refrigerant Charge</b>	R-22	1.14 lbs	
<b>Dimension</b>	W x D x H ( <i>without flange and mounting bracket</i> )	32 x 20 x 15 inches	
	W x D x H ( <i>with flange and mounting bracket</i> )	35 x 23 x 15.5 inches	
<b>Net Weight/Shipping</b>	Weight	121 / 140 lbs	
<b>Condensate Pump Capacity</b>	Pump rate	5 gal/hr	
	Head	4 ft.	
<b>Operation Conditions</b>	Min. - Max. (@50% RH)	65 - 95°F ( <i>Evaporator</i> ) 65 - 113°F ( <i>Condenser</i> )	#1, #3
<b>Max. Duct Length</b>	Cold Duct Hose ( <i>Evaporator</i> )	20 ft.	#4
	Hot Duct Hose ( <i>Condenser</i> )	10 ft.	#4
<b>Max. Sound Level</b>	Under Ceiling Tile with Evaporator Duct	52 dB(A)	

#1: With two 6 ft. duct with one 90° bend each, supply grill and return grill with filter (0.16 IWG external static pressure)

#2: Ambient condition for rating: Evaporator: 80°F 50% RH / Condenser: 95°F 40% RH

#3: When ambient temperature is lower than 65°F, operation may interrupt due to anti-freeze protection activation

#4: Confirm pressure drop of duct, grills and filter with manufactures specifications





## LIMITED WARRANTY

DENSO SALES CALIFORNIA, INC. (“DENSO”) warrants its MOVINCOOL Products only to the extent stated in its official written warranties. Unless otherwise specifically provided in writing by DENSO, DENSO warrants to end-user that the Products shall be free of defects in materials or workmanship and will function in accordance with DENSO’s published specifications under ordinary intended use and service for a period of twelve (12) months after delivery to the end-user; provided, however, in the case of the compressor element of the Products such warranty shall be for a period of thirty six (36) months after delivery to the end-user. DENSO shall, at its sole option, repair or replace any defective Product covered by this warranty. Such remedy shall be end-user’s sole remedy with respect to any particular defect in the Products.

This warranty does not cover defects or malfunctions which result from causes beyond DENSO’s control, including, without limitation, (i) unusual physical or electrical stress; (ii) accident, neglect, abuse, misuse or other abnormal use; (iii) failure to perform routine maintenance in accordance with DENSO’S recommended procedures; (iv) normal wear and tear; (v) repairs or attempted repairs by an unauthorized person; (vi) modifications or alterations to the Products; (vii) use with supplies or devices not supplied or approved by DENSO; (viii) improper installation or service; or (ix) parts not supplied by DENSO. This warranty shall extend only to the original end-user and shall be void if any labels or other identifying marks permanently affixed to Products when shipped by DENSO are removed, altered, defaced or obliterated.

The aforesaid warranty is the only warranty made by DENSO with respect to the Products and is in lieu of all obligations or liabilities on the part of DENSO for damages arising out of or in connection with the sale, use or performance of the Products, including, without limitation, any lost profits or any other consequential, incidental, special or exemplary damages of any kind. DENSO DISCLAIMS ALL OTHER WARRANTIES WITH REGARD TO THE PRODUCTS, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION CONTAINED HEREIN.

**PURCHASE DATE:** \_\_\_\_\_

**SERIAL NUMBER:** \_\_\_\_\_

***DENSO***  
**DENSO SALES CALIFORNIA, INC.**  
3900 Via Oro Avenue  
Long Beach CA 90810-1868  
800-264-9573 / 310-834-6352  
[www.movincool.com](http://www.movincool.com)

GAC P/N: 484007-1970