MD DEHUMIDIFIERS

INSTALLATION, OPERATION &
MAINTENANCE INSTRUCTIONS

SPC

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1. GENERAL DESCRIPTION

The dehumidifier is based around a closed refrigeration system comprising evaporator coil, condenser coil, expansion valve and compressor. It uses heat pipes to increase the cooling efficiency, allowing more moisture to be extracted, compared to conventional dehumidifiers. A fan is used to draw air in through a filter and across the evaporator and discharge it through the condenser. Moisture is removed from the entering humid air at the evaporator coil and it is collected in a drain pan mounted below the coil. The collected condensate is then removed by an integral condensate pump.

Figures 1. to 4. Show the general layout of the dehumidifiers externally and internally.

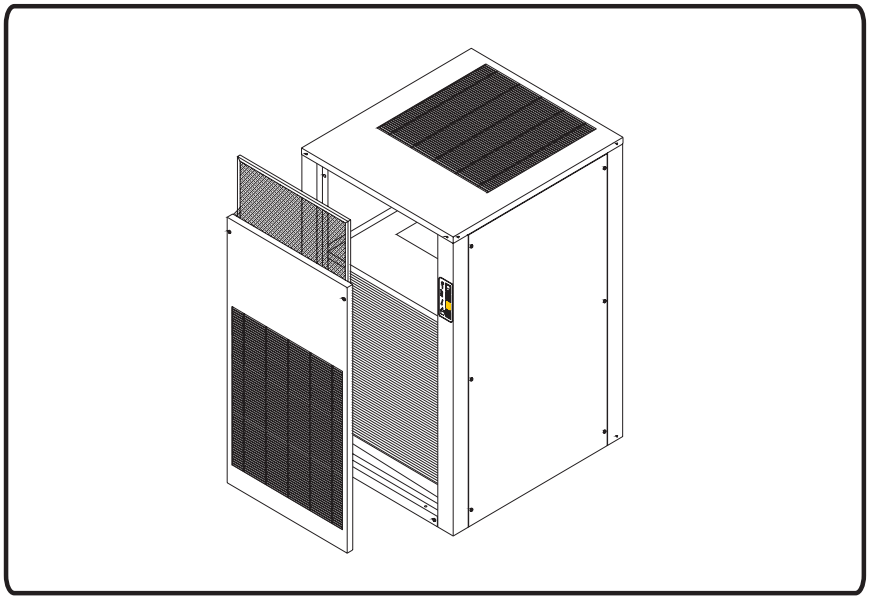


Figure 1. General layout of MD units with front grille removed

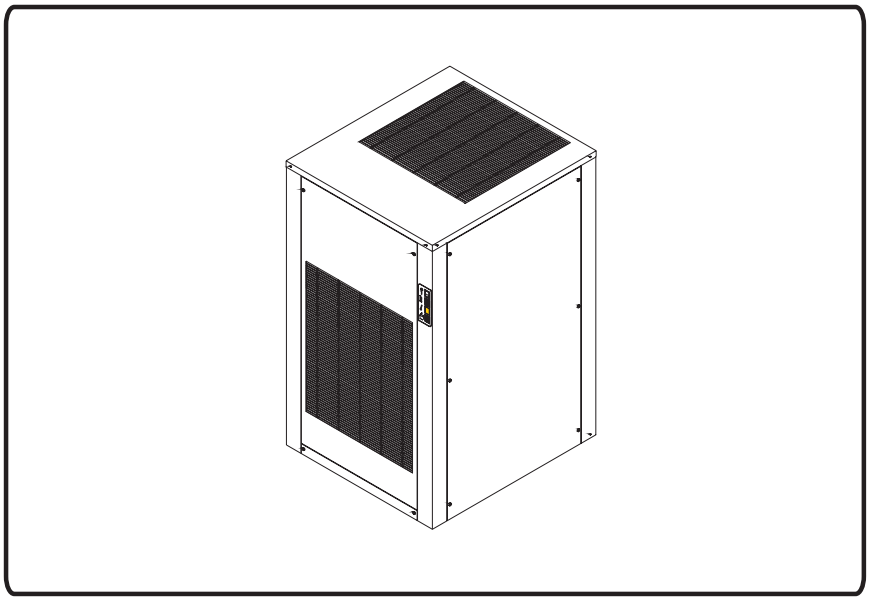


Figure 2. General layout of MD units

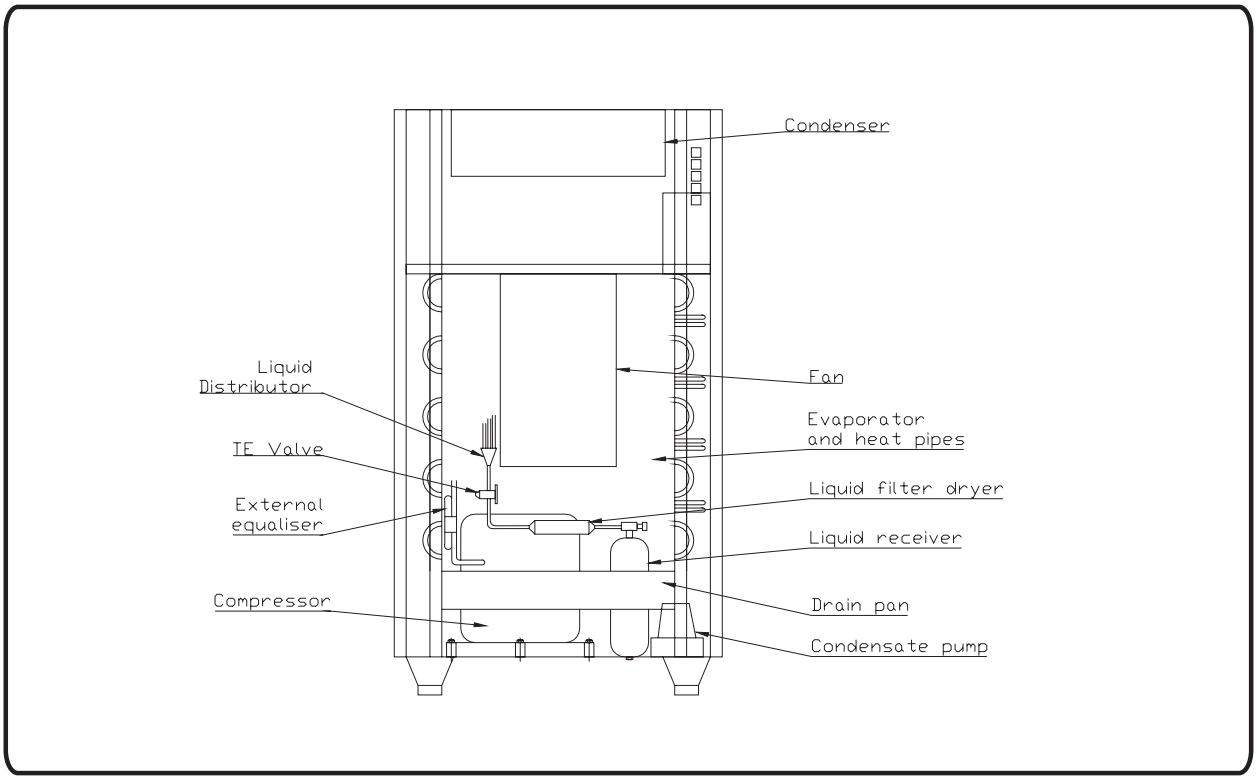


Figure 3. Front view with front panel removed

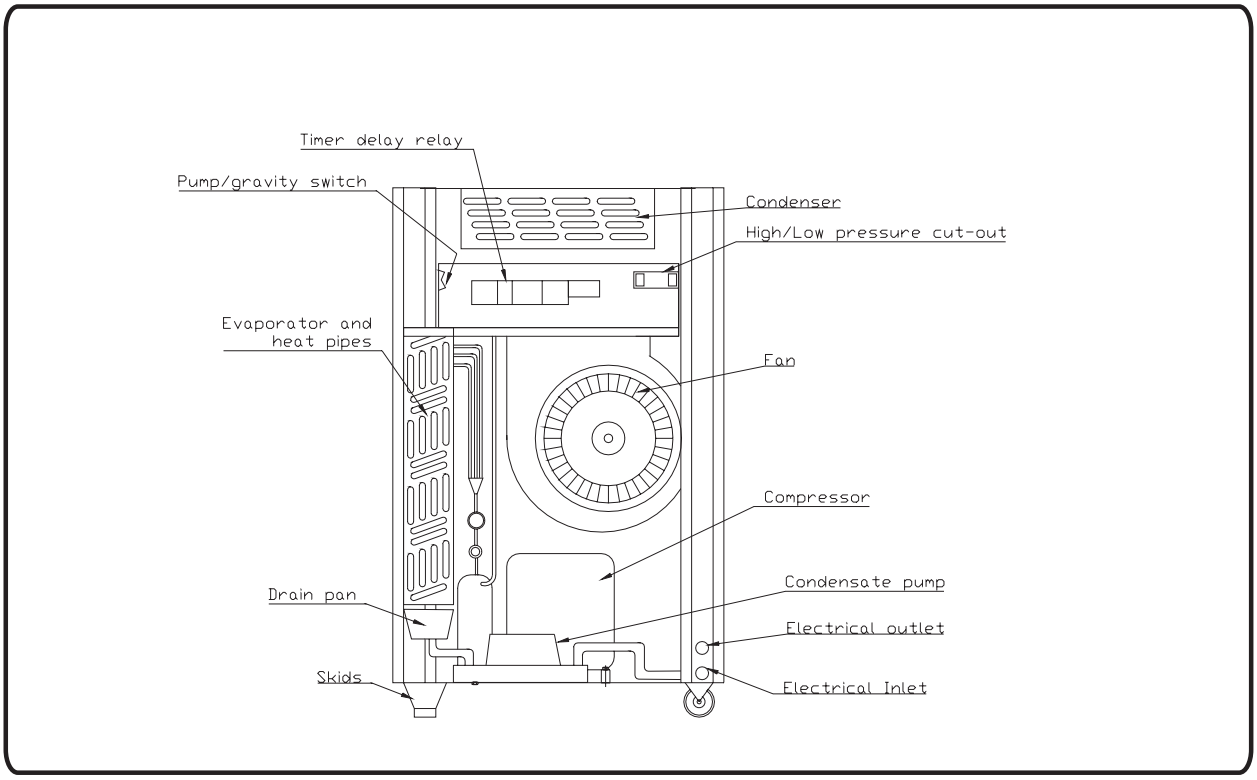


Figure 4. Side view with side panel removed

1.1. General

The dehumidifiers are mounted on 2 skids at the front and 2 fixed wheels at the back. These allow secure siting of the units and make provision for local manoeuvring. All units are designed to allow lifting by forklift. Dimension and weights are shown below:

Model	MD100	MD160	MD200
Width (mm)	690	690	690
Depth (mm)	770	770	770
Height (mm)	920	1234	1234
Weight (mm)	150	169	173

Voltage Supply 230V. 4% 50 Hz. Single Phase.

The supply current required by each model is detailed in Section 4.

The unit is constructed around 4 'pentapost' type pillars. The panels are screwed into the pillars via a series of screws and captive nuts fitted inside the pillars. Removal of the side panel allows access to the control void where the majority of the controls are located. These controls should not be altered from their factory settings. The upper front panel carries the inlet grille and allows access to the air filter. This panel sits on the lower front panel supported by studs and is removed by using the keys provided to unlock the panel, and hinging forward.

The control panel allows switching between different modes, see section 5.

1.2. Refrigeration system

Compressor type: Scroll
Compressor oil type : Mineral
Refrigerant type: R22

Model	MD100	MD160	MD200
Refrigerant Charge (g)	1500	2000	2200

The evaporator with heat pipes is mounted vertically behind the front grille.
The condenser is mounted horizontally at the top of the unit below the discharge grille.

To prevent the evaporator coil freezing below design range conditions, a low pressure cut-out is included in the refrigeration system. This detects if the condensate is freezing on the evaporator and stops the compressor. The coil is allowed to thaw passively before the compressor is restarted.

1.3. Fan and ventilation system

All dehumidifiers use double inlet low-pressure centrifugal direct drive fans fitted with forward curved impellers.

Restriction or adjustment of the air flow rate has a significant effect on the performance of the units. Therefore, the inlet and exhaust must never be obstructed or attempts made to duct the air to or from the units.

The filters remove air borne dirt from the air and keep the evaporator clean and this should not be removed, except for cleaning purposes, as indicated in section 6.1. The filters should not be replaced by other filters with different pressure drop characteristics.

To ensure that the air is drawn through the evaporator, great care has been taken to seal and insulate all panels. To ensure proper operation the dehumidifier must never be operated with any of the panels removed. Great care should also be taken to avoid damage to the seals on the panels.

1.4. Safety features

Compressor on delay

To protect the compressor from hunting, a start delay has been built into the electrical start-up circuit. It is important that this delay is not adjusted as this may result in compressor damage.

Hi/low pressure cut outs

To protect the compressor from operating at temperatures too high or too low, pressure cut-outs have been included in the refrigeration circuit. These are mounted in the control void behind the side panel. Both pressure cut outs are automatically reset when the pressure has returned within the design range.

The low pressure cut-out is set to prevent operation against conditions which would encourage the freezing of the evaporator. The coil is allowed to thaw passively should any ice would have built up, before the compressor is restarted.

High level condensate

If the level of the condensate in the pump drain pan becomes excessively high, the warning light on the front panel lights up, Figure 10. If this occurs refer to section 6.2.

1.5. Performance

The MD range of Dehumidifiers has been designed to operate between the following conditions:

	Dry Bulb Temperature (°C)	Relative Humidity (%)
Lower Limit	21	40
Upper Limit	40	50

This corresponds to an approximate minimum wet bulb temperature of 13 °C and maximum of 31 °C. Performance is dependant upon both dry bulb temperature and relative humidity as shown in figure 6.

The moisture removal for a range of operating conditions is shown in the curves below:

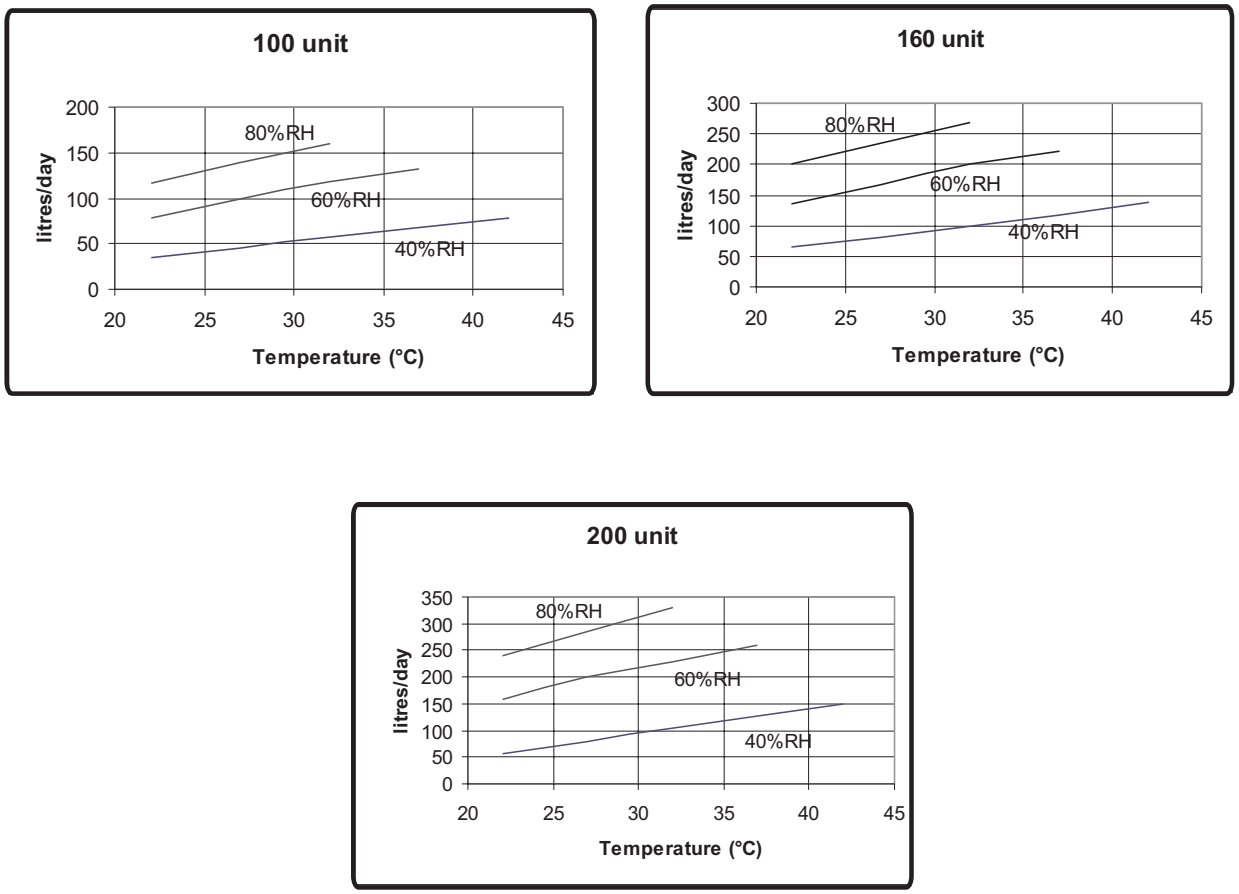


Figure 6. Dehumidification rates for a range of operating conditions

2. PREPARATION OF DEHUMIDIFIER FROM DELIVERY

The dehumidifiers are shipped with the mains cable and condensate discharge hose stored inside the unit casing.

Once located in the area where the unit is to operate (see section 3.1), the dehumidifier can be prepared for operation. The side panel should first of all be removed. This will require a Philips screwdriver to remove the panel fixing screws.

- Remove the side panel
- Pass the mains cable through the upper circular hole at the foot of the pillar and secure with the cable gland.
- Pass the end of the condensate hose through the lower circular hole in the pillar.
- The condensate discharge system is designed to operate with the hose supplied. Under no circumstances should a smaller internal diameter hose be fitted as this will impair the ability of the units to discharge the condensate at the required rate.
- Place the condensate discharge hose in an appropriate drain. If the dehumidifier is to be discharged by pump then the drain should not be more than 2 metres above the base of the dehumidifier. If the dehumidifier is to discharge by gravity then the hose must be laid on the floor and taken to a drain that is below the base of the dehumidifier.
- The dehumidifier is supplied ready to discharge the condensate by pump. If gravity discharge is required then refer to the operation section 3.2. of this manual.
- Replace the side panel.
- The dehumidifier is supplied with a remote humidistat. This can be positioned either remotely within the space or mounted directly on to the casing of the dehumidifier. It is wired into the electrical box via the terminals shown on the wiring diagram. If the unit is required to operate without the humidistat then these terminals should be linked together.
- It is recommended that the unit, once positioned, is stood at rest for 24 hours prior to operation.

3. GENERAL OPERATING INSTRUCTIONS

This section describes the practical operation of the MD range of dehumidifiers.

3.1. Siting of the dehumidifier

The dehumidifiers should never be moved down slopes as they may become unstable and fall over. To move from one level to another they must be lifted by an appropriate lifting device operated by a competent person.

The dehumidifier should always be operated on a level surface. The compressor is not designed to operate in an inclined plane and to do so may result in premature failure of this component.

The dehumidifier must never be placed in a position where it may be splashed with water or have water drip onto the casing. As with all electrical equipment of this nature the dehumidifiers should never be operated with wet hands.

Condensate is collected within the dehumidifier and then discharged via the drain hose. To ensure that this takes place, the dehumidifier must be placed close to a suitable drain point within the building.

The condensate discharge system is designed to operate with the hose supplied. Under no circumstances should a longer or smaller internal diameter hose be fitted as this will impair the ability of the units to discharge the condensate at the required rate.

- If the dehumidifier is to be discharged by pump then the drain should not be more than 2 meters above the base of the dehumidifier.

- If the dehumidifier is to discharge by gravity then the hose must be laid on the floor and taken to a drain that is below the base of the dehumidifier.

It is very important that the drain hose is not crushed or kinked. If this occurs, the pump will not discharge the condensate, and the dehumidifier will cut out as the high condensate level switch is operated. If this occurs the amber light on the front panel will light and the fan and compressor will stop operating.

As the dehumidifier operates, it removes water vapour from the air within the conditioned space, and the humidity level will gradually fall. This may result in the compressor stopping as the required humidity level is achieved. The fan will continue to operate in order to circulate the air within the space being conditioned.

Should the humidity then rise above that required level the compressor will cut back in. The units are acoustically lined and whilst every effort has been taken to minimise the noise generated by the compressor on start-up, the intermittent nature of this operation should be considered when positioning the dehumidifiers.

The panels must never be removed when the mains power is connected. Turn the dehumidifier off and either remove the plug from the socket or isolate the supply if access is required.

3.2. Changing from pump to gravity condensate discharge

The condensate removed by the dehumidifier can be removed by pump or gravity to a suitable drain.

Consideration as to the siting of the dehumidifier in relation to the drain is given in section 3.1. above.

The dehumidifiers are all supplied with the drain system set up for pumped condensate discharge. This mode of operation is recommended as it allows the dehumidifier to be sited further away from, and lower than, the drain point.

If gravity discharge of the condensate is required then change over can be achieved as follows:

- Remove side panel.
- Remove clip and short length of hose between drainpan and condensate pump. Keep this short length of hose in a safe place in case it is subsequently required.
- Fit the longer length of hose supplied with the unit to the spigot on the drainpan using the clip supplied.
- Pass the hose through the lower of the two round holes in the base of the pillar and run to drain.
- Change the discharge mode switch, shown in figure 4., from pump to gravity.
- Replace the side panel.

If the drain hose becomes kinked, crushed or the drain point is not below the base of the dehumidifier then the drain pan will fill and the high level cut out will prevent overflowing of the drain pan.

If it is required to change the discharge mode from gravity to pump then reverse the above instructions.

3.3. Fan only / dehumidifying (modes of operation)

The dehumidifiers are designed to operate in full dehumidifying mode or to operate in fan mode only.

Fan only mode may be chosen if the humidity level in the conditioned space has been lowered to the required level but it is still desirable to have air movement within the space to minimise stratification or air stagnation.

To operate in dehumidifying mode the switch on the front panel should be placed in the dehumidify position, see figure 10. The dehumidifier will now operate until it is either turned off or the humidity in the space falls below that set on the humidistat. The required level of humidity should be set by adjusting the humidistat as required. It is recommended that the dehumidifier is not left running on the minimum setting as this may reduce the humidity to an unacceptable level. A value between 50 and 60% is recommended for optimum comfort conditions and to minimise the potential of discomfort for excessive moisture removal from building materials.

When the desired level of humidity is reached the compressor will stop. When the humidity rises the humidistat will sense this and initiate the start sequence for the compressor. This includes a time delay to prevent hunting of the compressor. Note that if the humidistat setting is reduced to allow the dehumidifier to operate then the fan will operate immediately, followed by the compressor cutting in after the delay period.

3.4. Fan speed operation

The speed of the fan can be changed from full to slow using the switch on the front panel, see figure 10.

At slow speed the dehumidification rate is lower than at full speed and the mixing of the air within the space is reduced. The refrigeration circuit is also more sensitive to variations in changes in air temperature and relative humidity, which has the result of reducing the operating envelope in which the dehumidifier will operate.

It is therefore recommended that the dehumidifier be operated at full fan speed at all times. Slow speed fan operation should only be chosen for short periods when the quieter operation of this mode is necessary. When the room is then vacated the dehumidifier must be returned to full speed operation.

4. INSTALLATION WIRING

Voltage Supply: 230V ± 4% 50 Hz. Single Phase.

Model	MD100	MD160	MD200
Normal Running Current (A)	11	13	17
Power Consumption (kW)	2.5	3.1	3.9
Supply Current Required (A)	13	20	20

The MD100 is suitable for running from a 13 Amp supply socket.
Both the MD160 and MD200 should be hard-wired from a 20 Amp supply.
Wiring diagrams for the MD100, MD160 andMD200 are shown in figures 7. to 9.

FIGURE 7. WIRING DIAGRAM FOR THE MD100

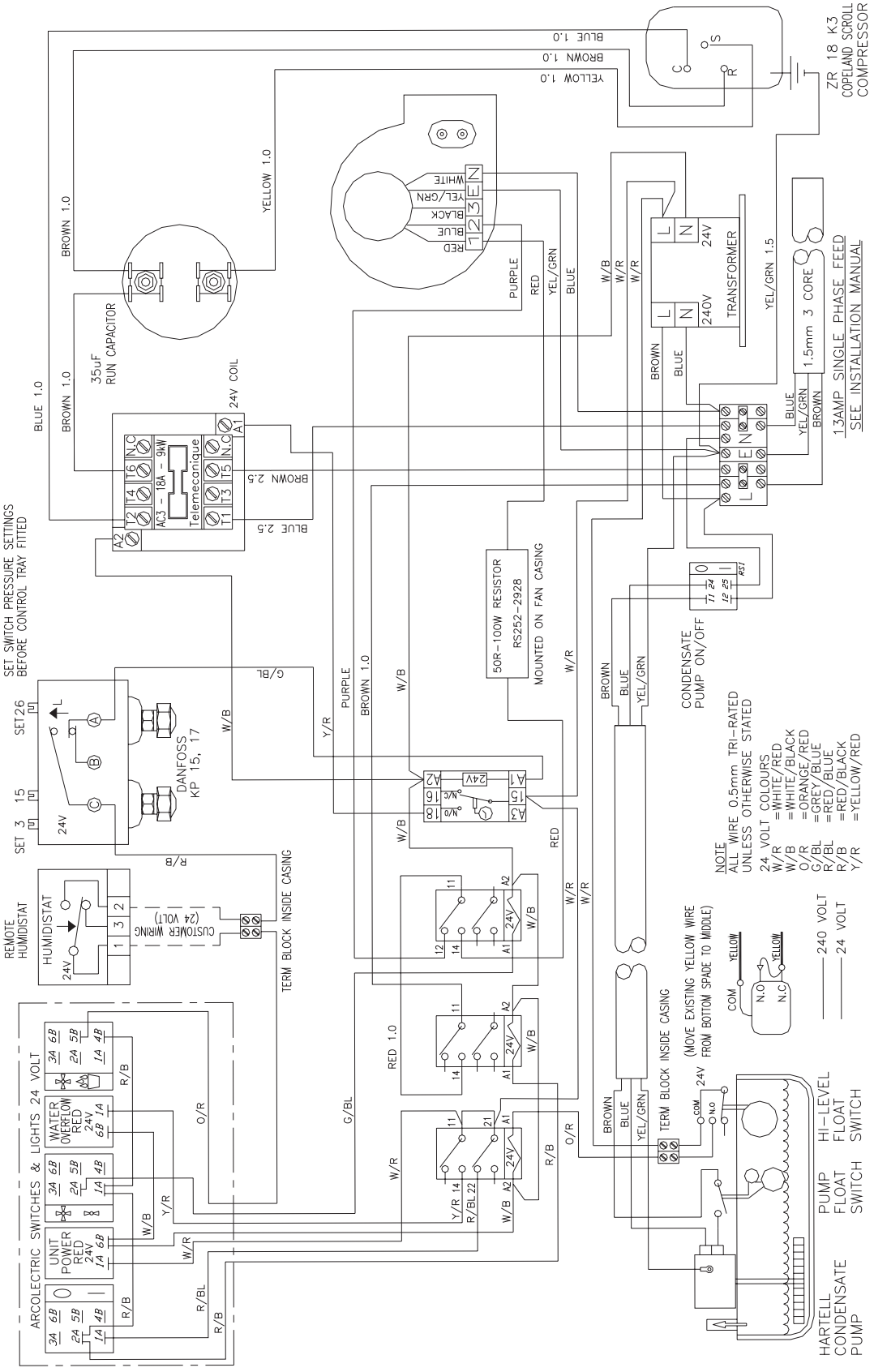


FIGURE 8. WIRING DIAGRAM FOR THE MD160

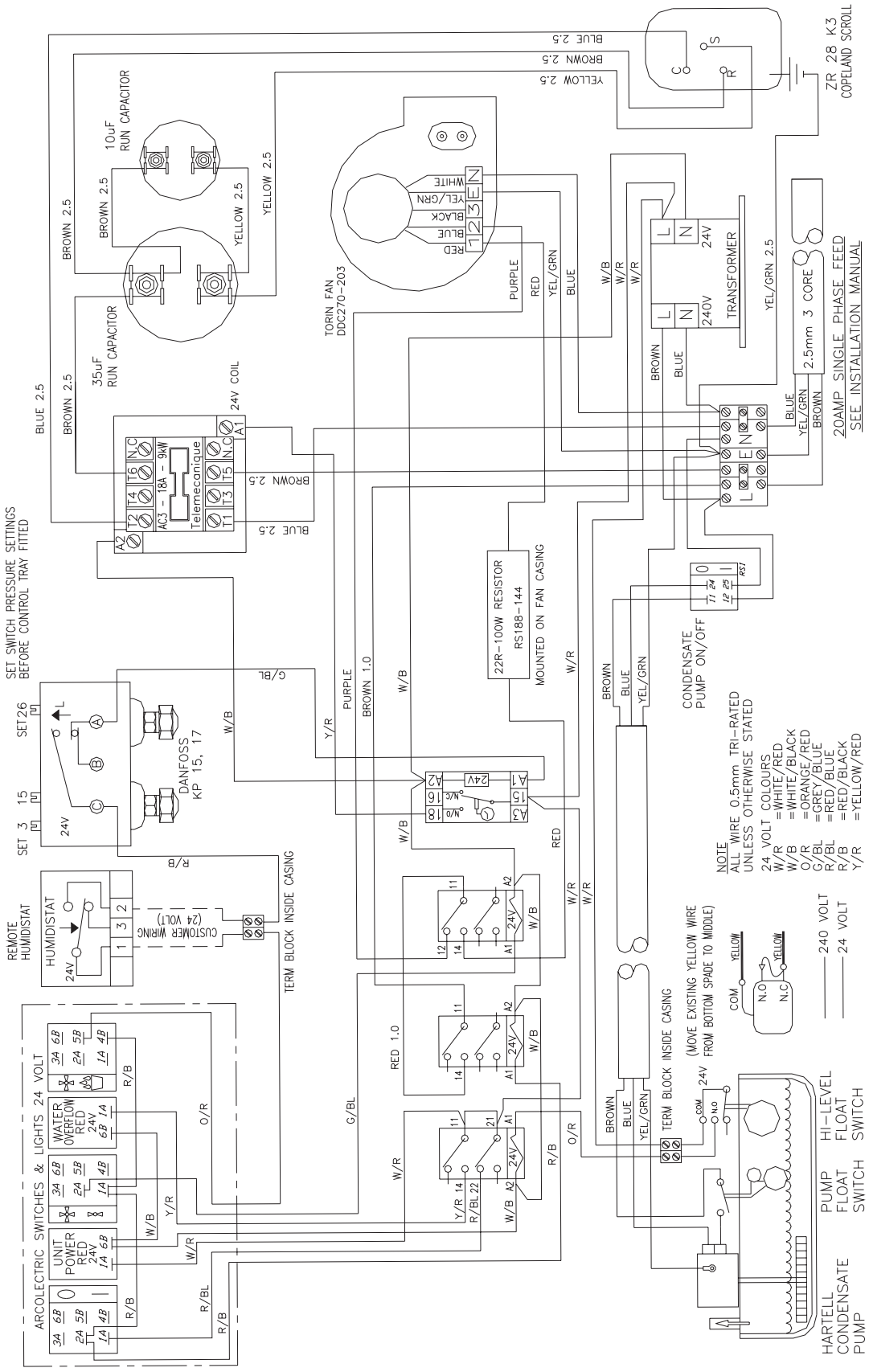
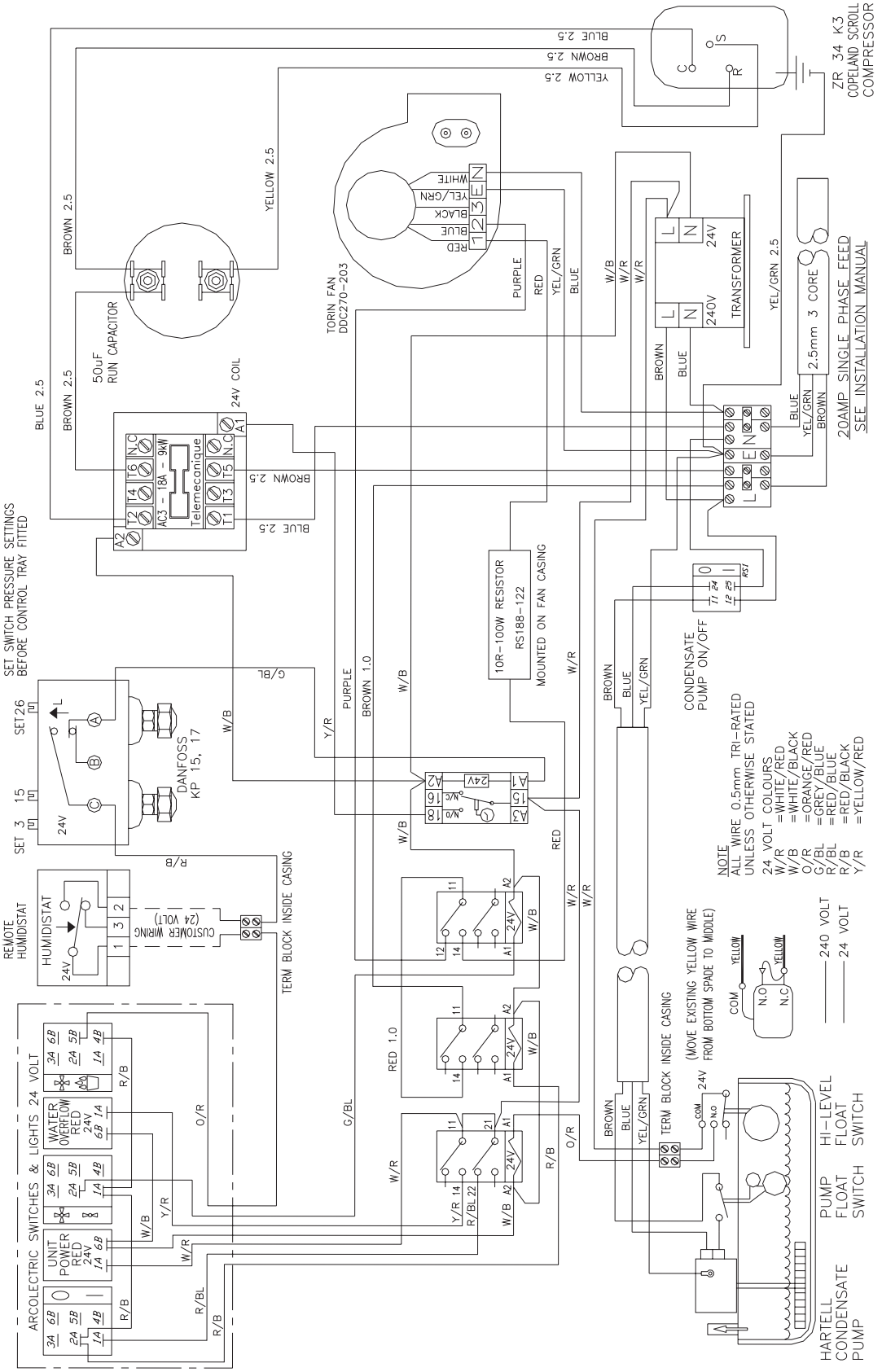


FIGURE 9. WIRING DIAGRAM FOR THE MD200



5. CONTROL PANEL

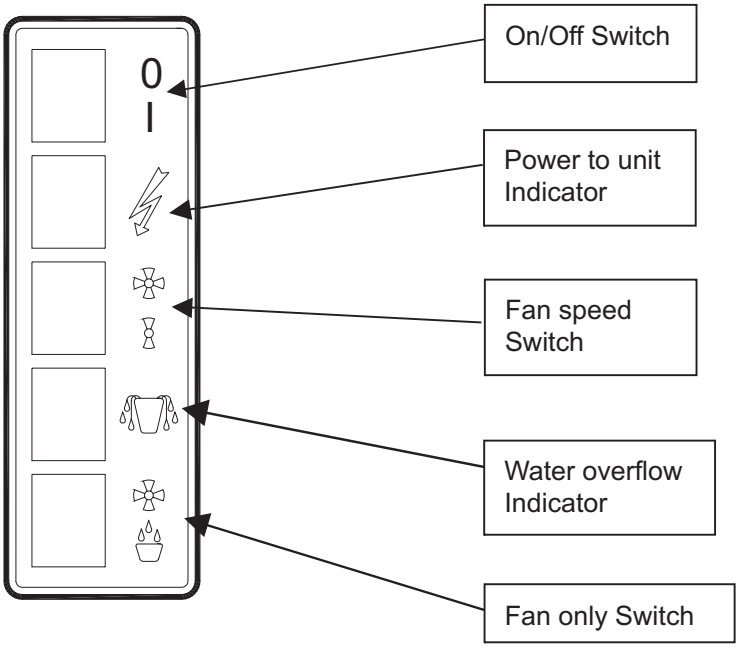


Figure 10. Layout of control panel on pillar

6. MAINTENANCE AND FAULT FINDING

Electrical and refrigerant work should only be carried out by competent engineers. Work which is not conducted in accordance with the information contained in these instructions may result in the warranty becoming void.

6.1 Maintenance

Cleaning of filter: Carry out at intervals not exceeding 4 months or more often if in a dirty environment. The upper front panel carrying the inlet grille should be removed to gain access to the filter. This panel is carried on a number of studs, and can be removed by hinging and lifting forward after unlocking. The filter can be removed from the retaining bracket and cleaned. This involves gentle tapping to remove accumulated dust and cleaning with a vacuum cleaner. The filters can also be washed in soap and water and air-dried. Replacement filters are available (see Spares List).

Cleaning of drain pan: Carry out at intervals not exceeding 4 months or more often if in a dirty environment. The side panel should be removed to gain access to the drain pan. The drain pan is located underneath the evaporator coil, and can be removed by gently twisting the slotted plastic bracket holding it in place. The drain pan can be cleaned with any proprietary-cleaning agent. For replacement, reverse the above process.

The panels must never be removed when the mains power is connected. Turn the dehumidifier off and either remove the plug from the socket or isolate the supply when access is required.

6.2 Faults

Fan not on / red light not on:

- Mains power not on
- Mains fuse blown
- Switch on
- Replace fuse

Fan on but compressor not:

- Dehumidify / fan only switch is in the fan only position
- Start time delay
- Defrost cycle in operation
- Change to dehumidify
- Wait for compressor start time delay to complete
- Wait for defrost cycle to complete

Pump drain pan full amber light on:

- Pump drain pan full
- Turn off at switch on control panel and mains
- Check condensate hose is not blocked or kinked
- Check pump / gravity switch is in correct mode for the discharge mode in use
- Condensate pump failure. This requires an engineer to investigate

Drain pan overflows:

- Condensate high level switch failure
- Float switches are located within the pump drain pan and require an engineer to check their operation

Compressor on / off all of the time:

- Dehumidifier is operating below its operating range and freezing
- The humidity of the space is reduced to that required but rises as soon as the dehumidifier cuts out
- Turn the dehumidifier to *fan only* operation or off at the mains
- The space the dehumidifier is operating in is too small and is causing hunting, move the dehumidifier to a larger space or address the source of the moisture generation

6.3. Technical Support

Local supplier:

Telephone/ fax support:

Please quote Supplier, Model Type and unique Serial Number. This can be read from the serial plate located on the back panel.

7. SPARES LIST

7.1 Electrical

Humidistat	8A D.P.C.O relays
18A contactor	On delay timer
Switches	Condensate pump
Fan	
Compressor start kit	

7.2 Refrigeration / Mechanical

Air filter	Compressor
Thermal expansion valve	Liquid line drier
Pressure switch	Liquid receiver
Evaporator coil	Condenser coil

S & P Coil Products Ltd
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