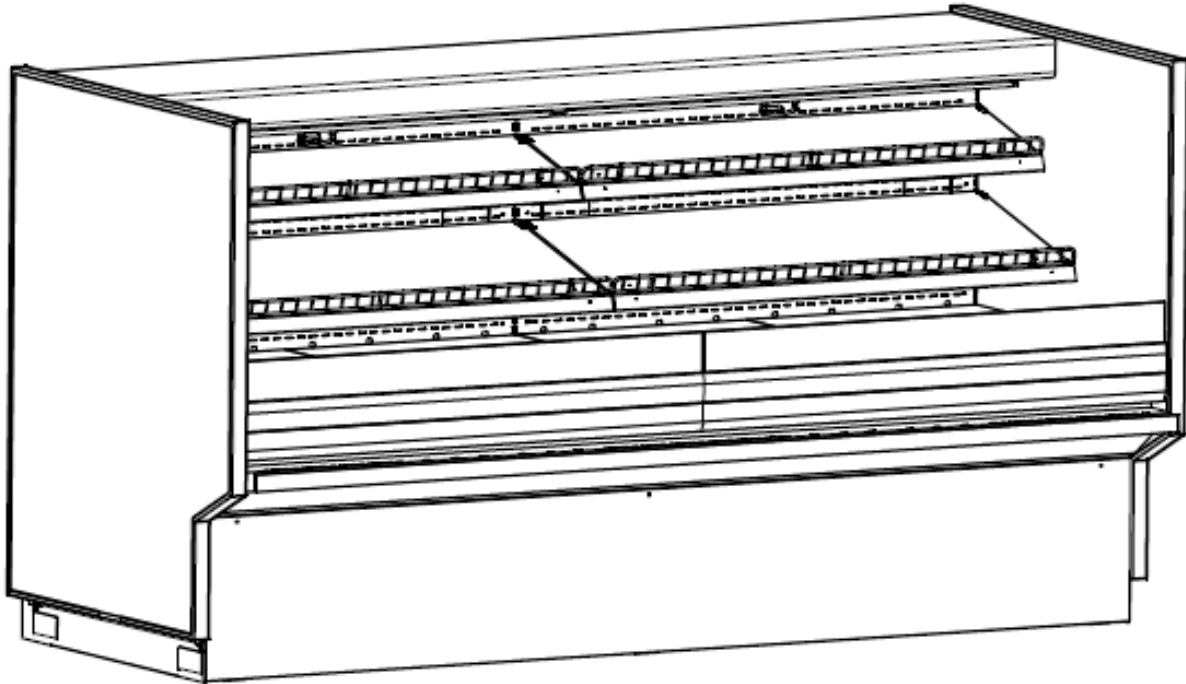


HUSSMANN®



DM LOW HEIGHT SERIES – FRONT OPEN MULTIDECK INSTALLATION MANUAL: IM-013

Standard remote versions
The following models are covered by this Manual

DM13

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Pre installation

Important Safety Instructions

Please read the user manual carefully and store for later reference. In this document you will see these symbols with following meanings



NOTE

Information in this manual is to be followed in conjunction with specifications, work practices and regulations of the customer, installing company and relevant industry.



CAUTION

Care must be taken to avoid damage to drainage outlets and electrical equipment mounted under or at the rear of cases.



CAUTION

This symbol indicates electrical safety must be concerned



WARNING

- Leave enough space to install the system. The space requirement will be instructed in “Pre-installation” section.
- Before installing the system make sure the power source is accessible to the cases array.
- All the power source has to be properly earthed.
- If any potential fail or product disconformity is investigated, please consult a qualified service technician.
- Always disconnect the power of the cases before conducting any service or maintenance.
- Keep the case out of direct sunlight, fire hazardous environment, or high moisture or humidity area.
- Fail to install the system as instructed in this manual may void Hussmann Warranty.



REFRIGERANT WARNING

- Refrigerant is not factory charged.
- Default refrigerant is shown on the product rating plate.
- Other refrigerant types are available upon request
- Ensure that during the transportation and installation the refrigerant circuit is not damaged. Please contact Hussmann for product maintenance help.

The installation should follow AS1677.2 or other local safety requirements.

Case Services Dimensions

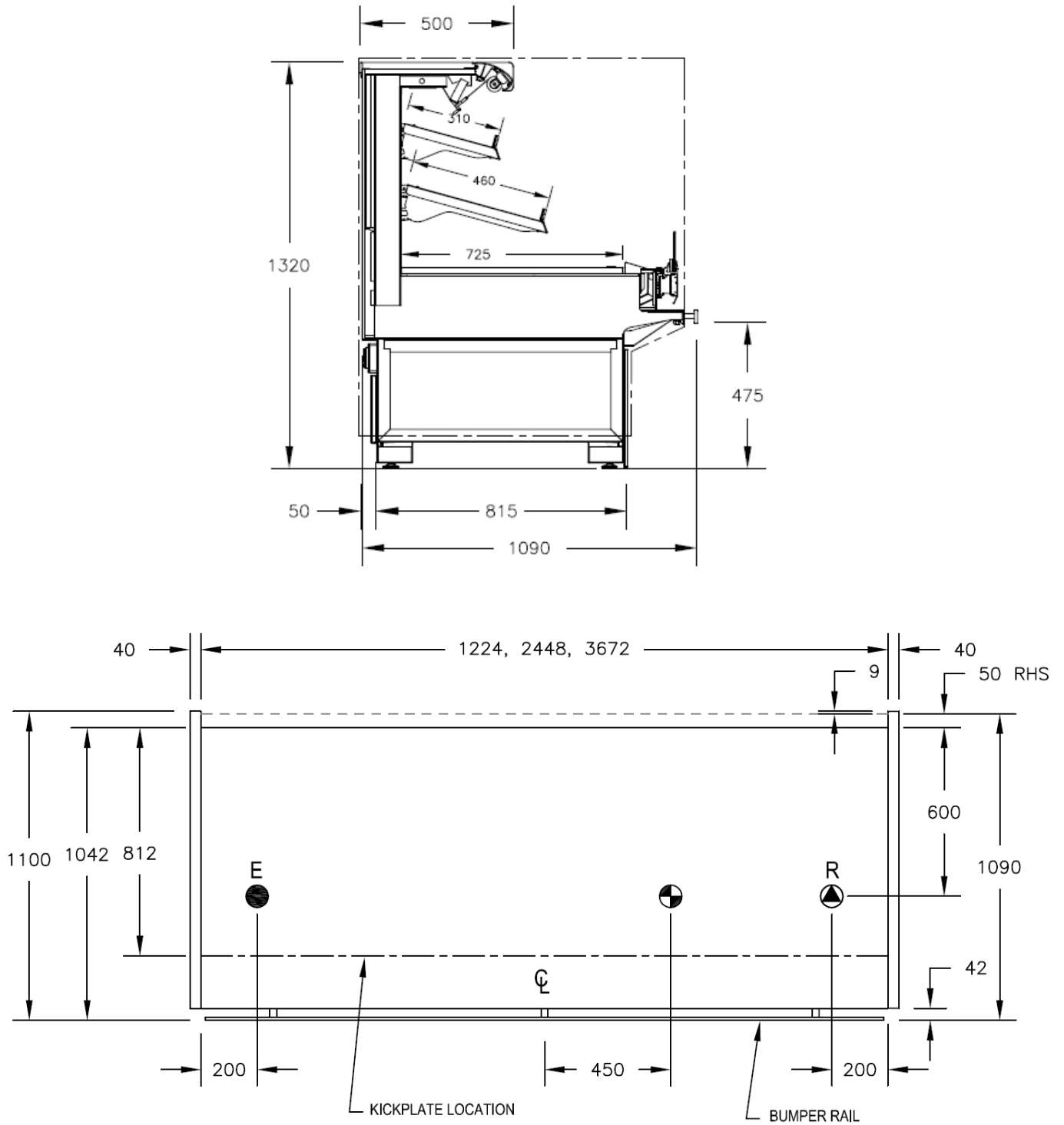


Fig (1) Service layout standard depth case

- ⊕ DRAIN
- ELECTRICAL
- ▲ REFRIGERATION

Operating Environment

All Hussmann Cases have been factory tested to AS1731, 25°C at 60% RH. For best performance, store temperature should be maintained at or below 24°C at 50% RH, otherwise an “air ventilation kit” may be required to avoid under or rear cabinet sweating.

To avoid condensation build-up, cases should be positioned to allow air to freely circulate around the underside and rear of the case. Ideally, the floor will be levelled.

Cases must not be positioned in areas that may be subject to heat or air currents such as ventilation ducts, open doors or windows, direct sunlight, electric fans or ovens, etc. Otherwise the cabinet may show poor temperature performance or the operating life is affected.

**NOTE**

Refer to product MSDS for all hazardous substances used during installation in relation to their application, PPE, first aid, disposal and emergency management. Refer page 27 (Risk Analysis)
For MSDS sheet contact your Hussmann Representative

Handling and Transporting cases

Case dimensions can be found in the product engineering data sheets.

(This manual is a guide only. Always refer to the latest case information available from Hussmann Customer Service)

Always ensure that the moving device is of a suitable type, and has sufficient lifting capacity for the case weight and dimension. Always lift cases from the underside.

Refer to and follow the manual handling policies of your Company when moving cases.

**CAUTION**

Care must be taken to avoid damage to drainage outlets and electrical equipment mounted under or at the rear of cases.

Shipping Damage and Shortages

If possible, it is recommended that packaging be removed from the cases before they are moved into the store.

After removing packaging, inspect the case for any shipping damage and ensure that all case inclusions, such as trims etc are accounted for. Immediately report any shipping damage to the carrier and inform Hussmann Customer Service of any short supplies.

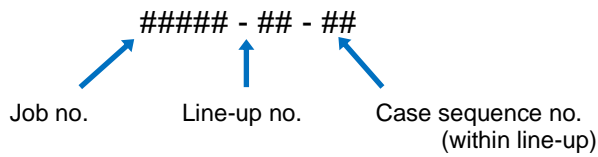
Installation



NOTE
 Information in this manual is to be followed in conjunction with specifications, work practices and regulations of the customer, installing company and relevant industry.

Positioning and Levelling

Each case has a unique identification number as follows:



Example: **106076.42.4** identifies this case in the 4th sequence of the line 42 for the job 106076.

As well as on the packaging, the case identification number appears as a serial number on the rating plate (most commonly located on the ceiling panel left hand end of the case) refer to Fig (3) and is printed on a decal on the rear of the case ref Fig (4). The case sequence number is also written on a ticket on the front panel.

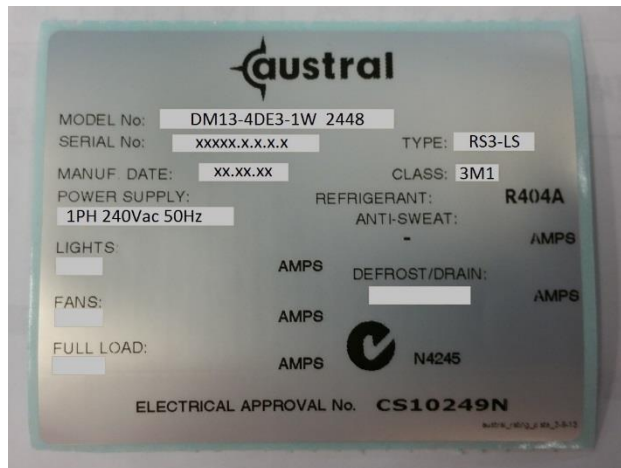


Fig (3) Rating Plate



Fig (4) Decal rear of case with case sequence number

Cases must be positioned so that line-up numbers and case sequence numbers run in succession left to right standing in front of the cabinet.



CAUTION

Ensure the lifting capacity of the trolley, etc. is sufficient for the case. Refer to the product engineering data tables and Risk Analysis (page 27).

To position the cases:

1. If the plinth surface is level, position the case designated as line up number 1 and case sequence number 1 in the required position.
2. If the plinth surface is not level, determine where the highest point of the plinth is, and position the case allocated to this position first.
3. Adjust the case height using the adjustable feet (if fitted) or metal shims (do **NOT** use **timber**) to ensure the case is level to **within +/- 1.5mm** from front to back and side to side and chassis of case is **NOT twisted**. Maximum 25mm adjustment.

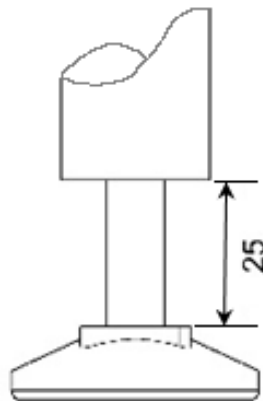


Fig (5) Levelling feet adjustment

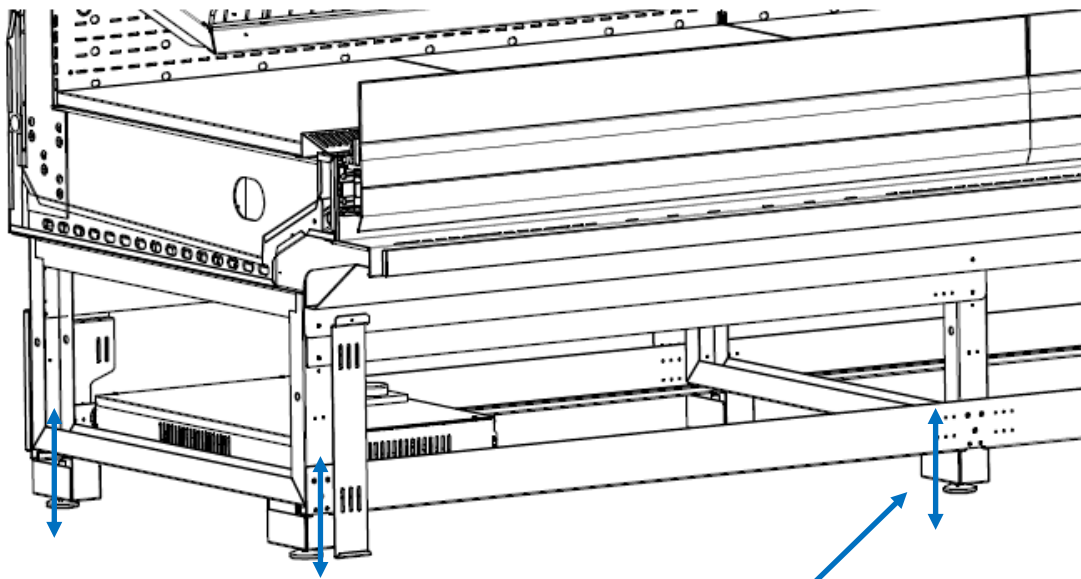


NOTE

It is important that all cases are level for correct case joining and operation. If cases are not properly levelled and positioned, door misalignment will be evident, resulting in the job needing to be redone at complete cost to the installer.

Hussmann is not liable or responsible for the cost involved in fixing problems arising directly from the installers' failure to follow the requirements outlined in this manual.

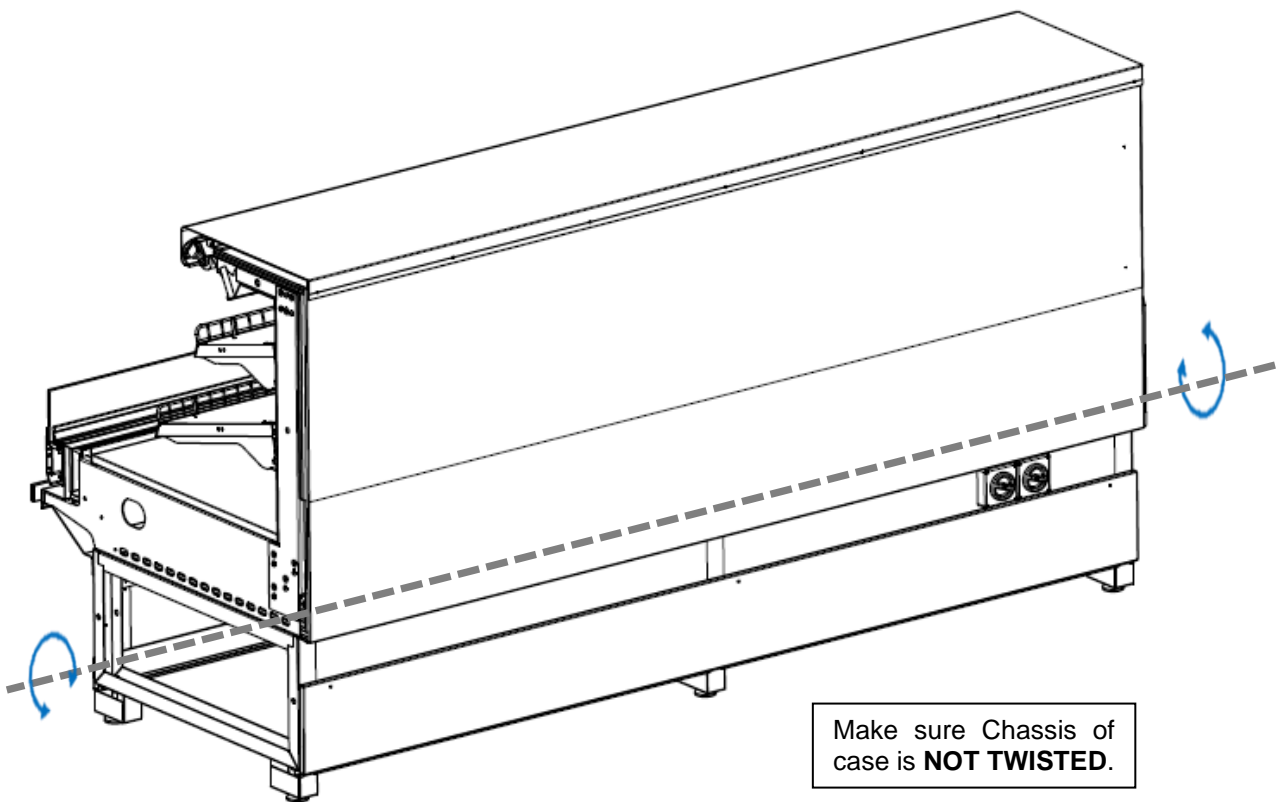
DO **NOT** SET CASE LEVELS OFF THE PATCH END fitted to a case.



Make sure case is level:
Front to Back: +/- 1.5mm
Side to Side: +/- 1.5mm

Make sure **all** adjusting feet, NOT just the ones at the end of the case, are adjusted firmly to ensure case does not sag

Fig (6) Case Levelling



Make sure Chassis of case is **NOT TWISTED**.

Fig (7) Case twisting

Sealing Case Join

Before joining, all cases must be sealed to protect against water and air leakage.
To seal the joins

1. Remove the shelves and racks from the end bays, if necessary



CAUTION

Electrical cords are connected between Air Delivery Panels and Shelves on Meat and Deli cases.

Take care if disconnecting leads to remove Shelves when joining the cases

2. Remove the pan decks.
3. Apply a bead of sealant (approximately 10mm wide) ensure case seal correctly.

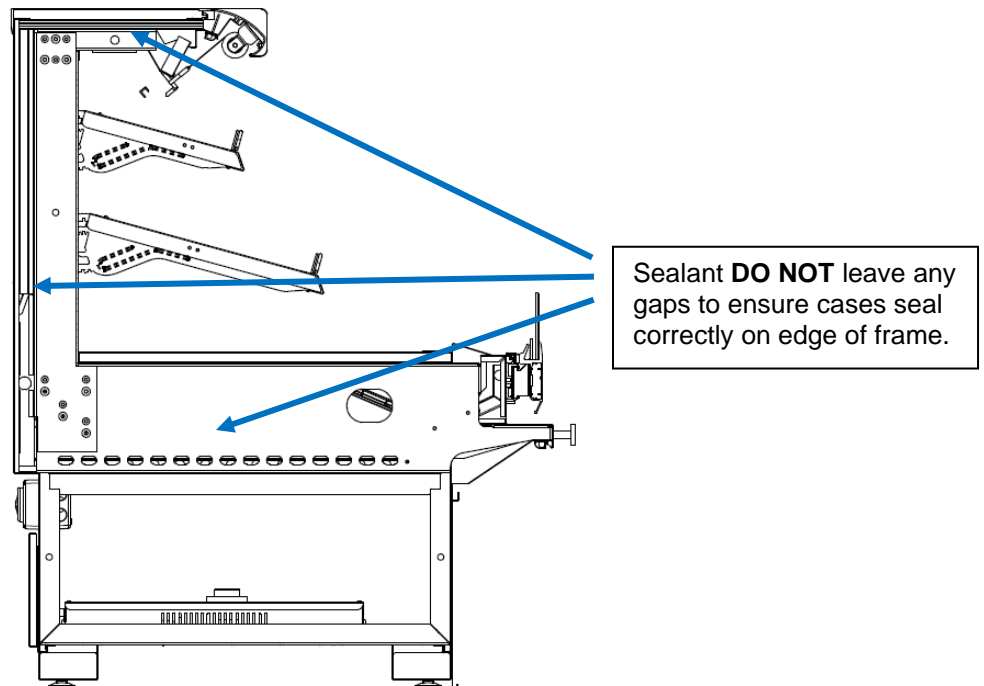


Fig (8) Case-end sealing positions

Joining the Cases

Ensure cases are sealed before joining them to other cases

For instructions on attaching case ends, refer to appendix 4: attaching case ends



CAUTION

Do not walk or sit on cases.

To join the cases

1. Draw up the required case tightly against the case already in position



CAUTION

Case joining bolts should only be used, with care, at the final pulling-up stage.

2. Ensure that the case is level, from front to back and side to side, with the existing case.
3. Insert the joining bolts, found in the blister pack, into the end holes and tighten – see Fig (9): joining hole locations

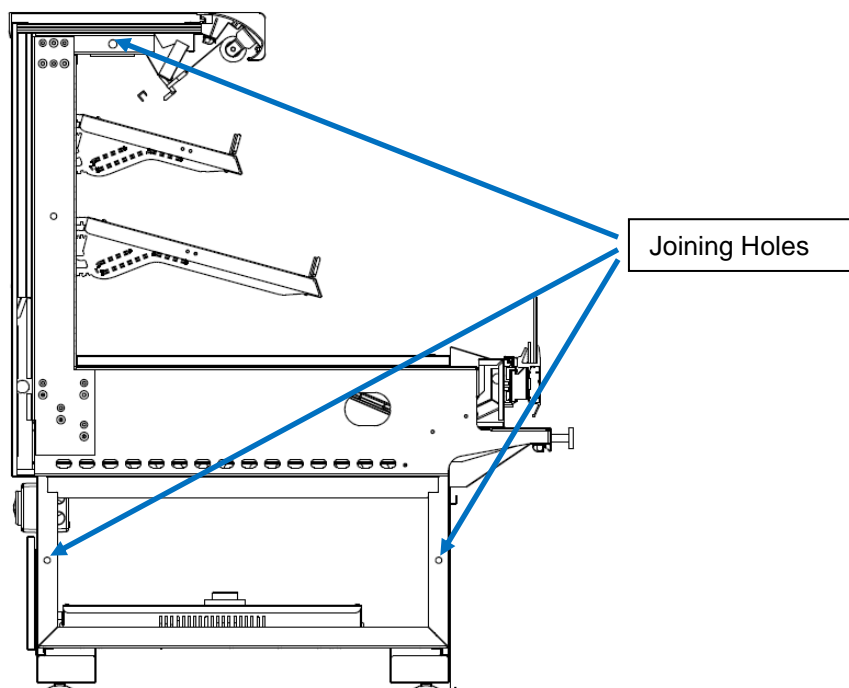
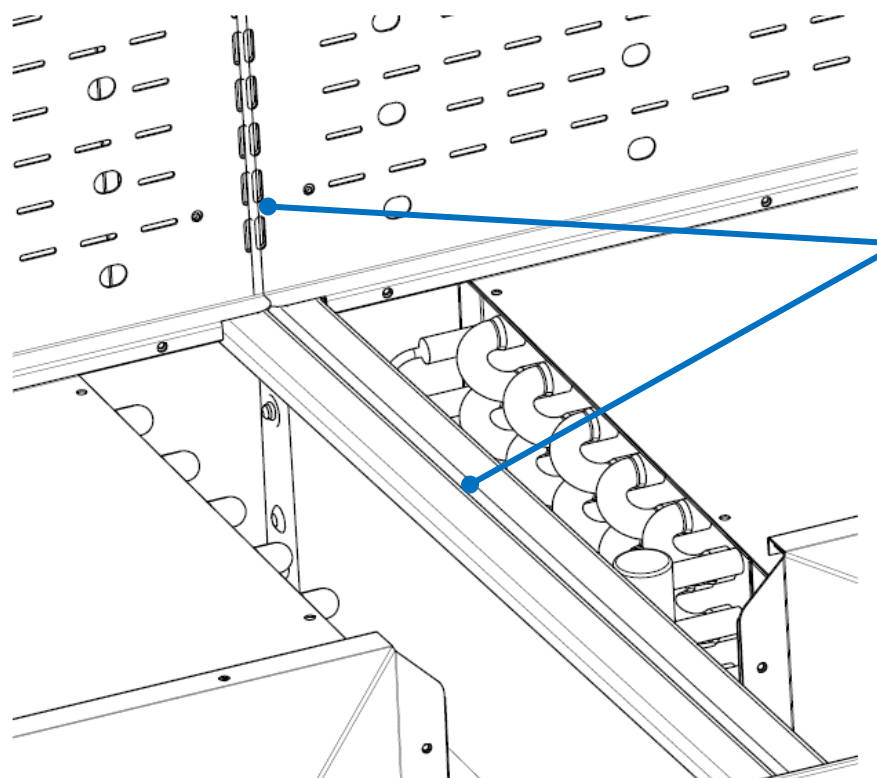


Fig (9) Joining holes location

4. Seal all internal joints with silicon.
5. Apply either black or white silicon (depending on the interior colour of the case) all the way along the inside join between the cases, (as supplied)
6. Applying slight pressure, run your finger along the length of the silicon.
7. Replace the square bungs in the air delivery panels and ceiling panels.



Seal joint between cases with appropriate coloured silicon between:

- End Frame Bottoms
- Air Delivery Panels

Fig (10) Sealing joins

Attaching Trims

1. Attached joining trims refer figure 11.
2. Ensure that the case is level from front to back and push them together.
3. Place trim to top canopy and align holes to suit.
4. Screw and join trim to canopy.

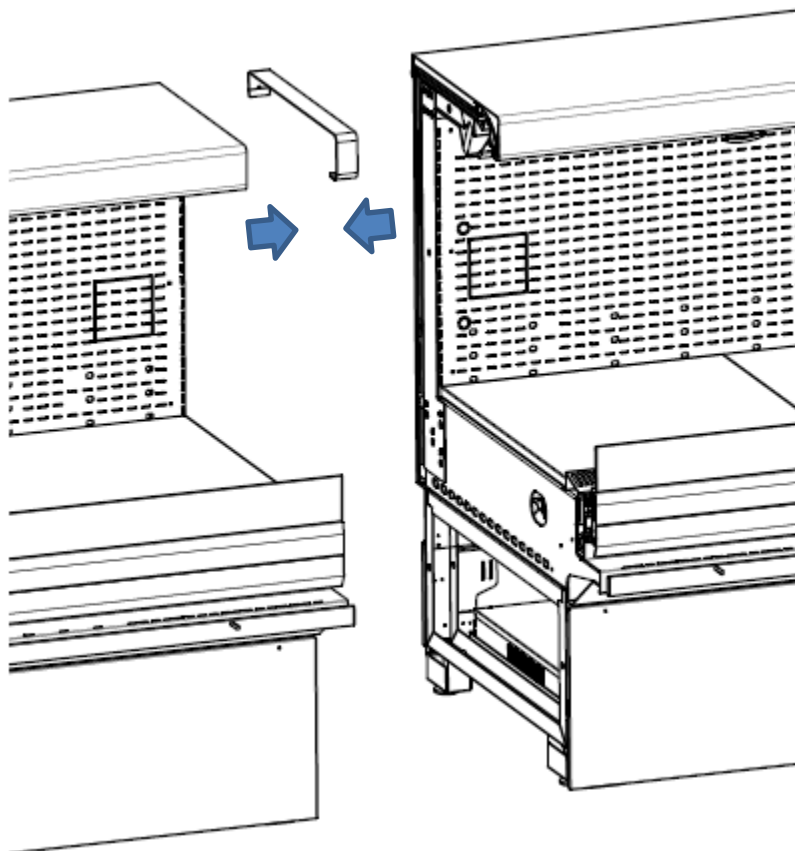


Fig (11) Case joint trim kit

NOTE: Attach the bumper using a rubber mallet ONLY

Attaching Kickplates

(This should be done after final Installation of Refrigeration and Drainage connections)

Attach kickplates and, if required, silicon seal to the floor once installation is complete and drains checked for water leaks.

Front Panel

1. Attached front panel and align with front skid rail refer figure 12.
2. Push front panel into bottom and top clips.
3. Check front panel is securely in position.

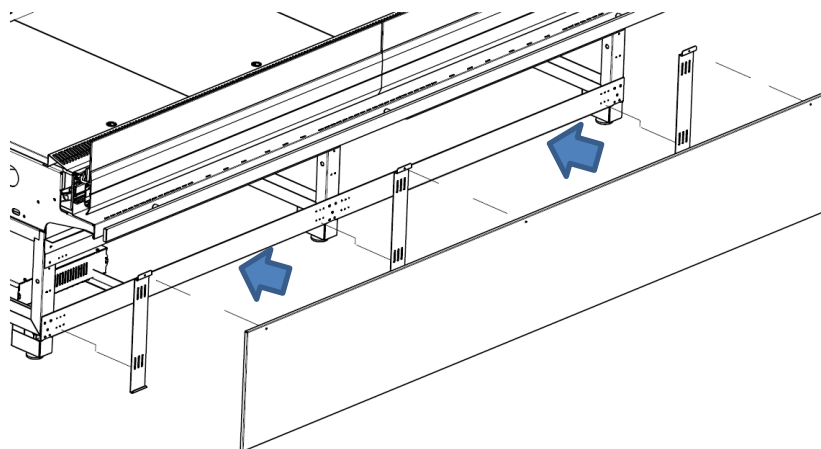


Fig (12) Attached front panel

Back Panel

1. Attached back panel and align with back skid rail refer figure 13.
2. Push back panel into bottom clip and over top clips.
3. Check back panel is securely in position.

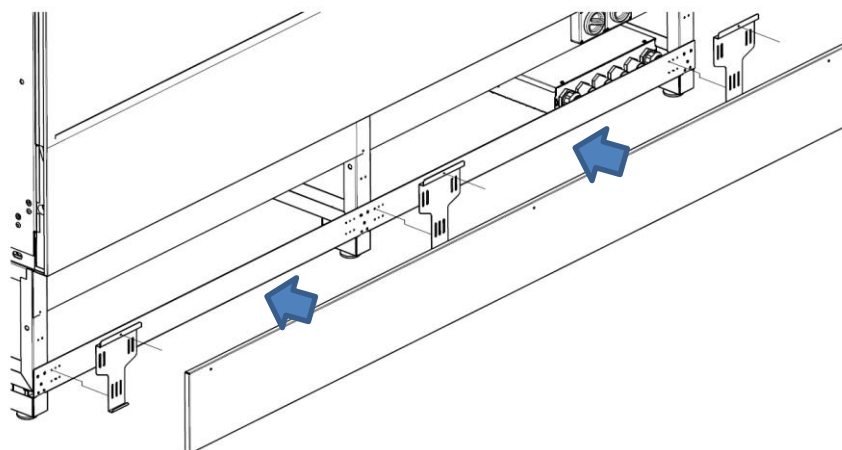


Fig (13) Attached back panel

Side kickplate

1. Attached side kickplate as per drawing refer figure 14.
2. Adjust slot in kickplate to suit. Make sure kickplate is above floor.
3. Screw kickplate in position.
4. Check kickplate is securely in position.

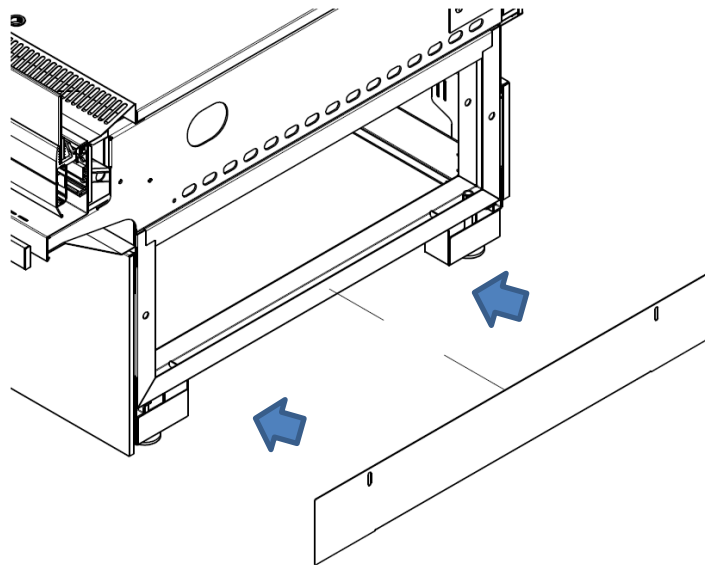


Fig (14) Attached side kickplate

Connecting Refrigerant Lines

Connection of refrigeration lines is to be undertaken by **qualified persons only**.

Refrigeration pipes are located under the pan decks and can be run from case to case through designated access holes in the end frames and/or out via the bungs at the rear and base of the case. See Fig (1): service layout for location of the refrigerant up-stand, and Fig (15) for the location of access holes.

Up to four cases can share one refrigeration up-stand, however, to ensure best performance, it is recommended that no more than three cases share an up-stand.

The evaporator coils have been charged with dry nitrogen in the factory.

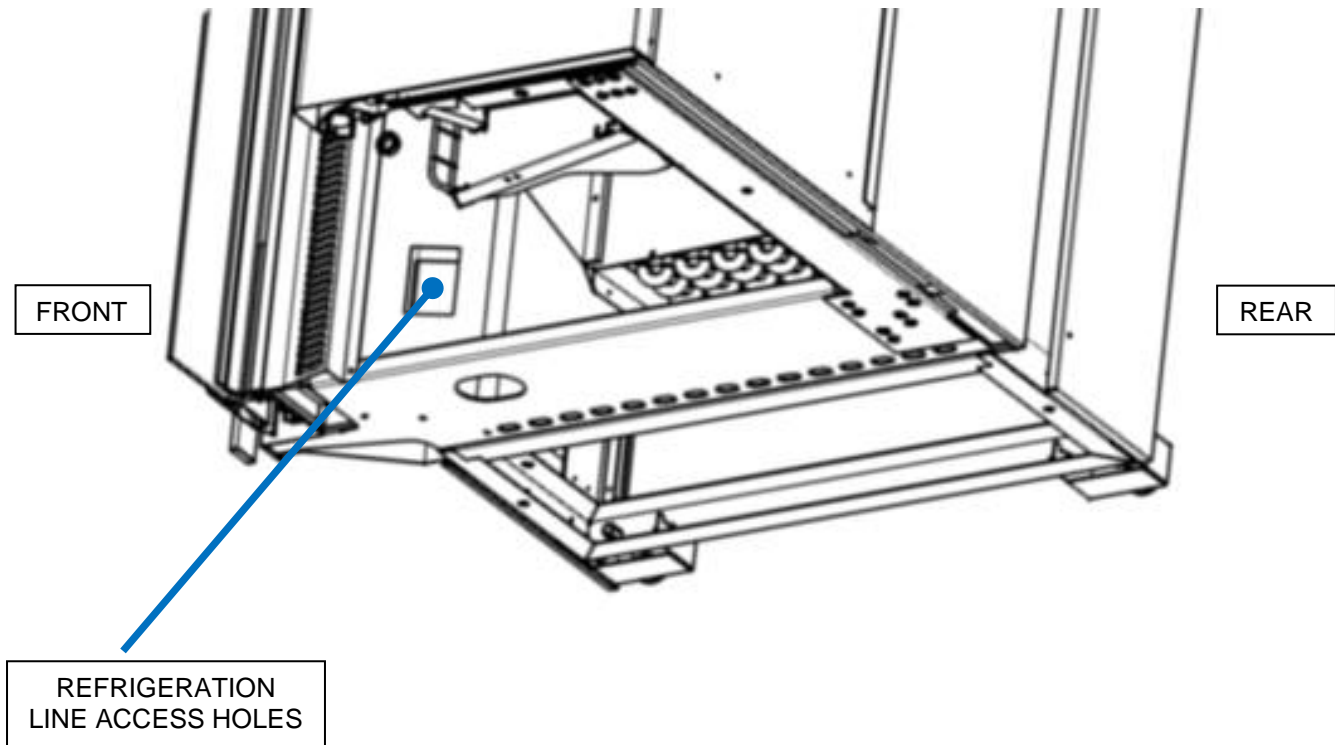


Fig (15) Refrigeration access holes



CAUTION

Do not run refrigeration lines from another compressor through a case. Since pressure in the first system responds to the coldest location, refrigeration lines from the first system running through a second system may be chilled to the point that its pressure control will respond to the pressure from the second system. This is called cross controlling and should be avoided.

To connect refrigeration lines:

1. Ensure the evaporator coils are fully charged by checking the dry nitrogen holding charge against the pressure written on the tag attached to the coil.
2. Drill holes through bungs and foam and run pipes as per store requirements.
3. Braze the pipes to the coil using dry nitrogen to prevent any foreign matter being left in the lines. Keep pressure below 1700kPa (250 Psig).



CAUTION

Relocate or protect the expansion (TX) valve feeler bulbs (or power lead if electronic valve) from heat. Ensure the power lead is clear of heat and flame.

4. Insulate all external pipe work to Standard practice and Customer specifications.
5. Seal off all external access holes with polyurethane foam and then bituminous paint to prevent leakage and condensation.
6. Connect to condensing unit or compressor.
7. Pressure test all welded and fastened connections to ensure they are free of leaks.
8. Dehydrate the refrigeration system using the triple evacuation method. Use a vacuum pump to 1000 microns for the first two evacuations and 500 microns on the third, or to the customer's specific requirements. Break evacuations 1 and 2 with dry nitrogen, allowing the pressure to rise above atmospheric pressure each time.
9. Charge with refrigerant after final (3rd) evacuation.

Installing a Waste Drain



NOTES

Drains must be connected as per stipulated local council requirements.

All joins must be solvent welded.

Each case must be connected to its own waste drain See Figure 1: service layout for of the drain up-stand. It is recommended that 40mm DWV (PVC) piping be used.

To install a waste drain:

1. Fit an elbow and pipe to the existing pipe work.
2. Check that the drain is as per Fig (16).

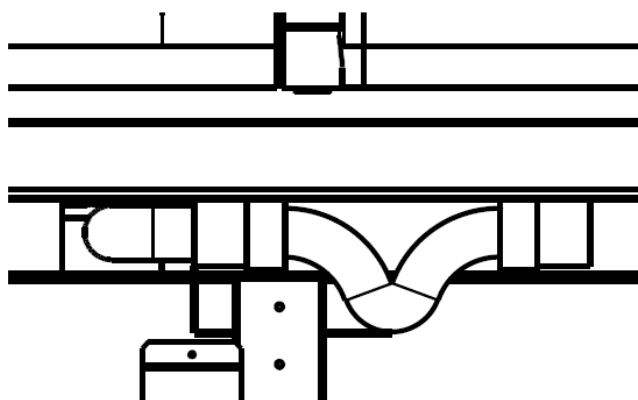


Fig (16) Drain trap orientation

**CAUTION**

Incorrectly installed drain traps will result in adverse air leaking into the case.

3. Fix remaining pipe work to floor waste drains.
4. Test for leakage by pouring water down the drain and ensure trap is primed before starting refrigeration.
5. NOTE: All joints to be glued with suitable adhesive.

Connecting Power Supply (*only for electronically controlled versions*)

- The appliance must be installed so the power is accessible.
- To ensure that the appliance is not accidentally switched off, connect unit to its own power source. Do not connect any other appliance using this source.
- Size the cable according to AS3008 or relevant local standards. For power rating please refer to product engineering datasheet for details.

Ensure the appliance is properly grounded (earthed).

Installing Sensor Probes

The DM13 range of cases have the probes pre fitted at the factory. Probe location as per Fig 17



CAUTION

Refer to relevant State or Territory legislation relating to safe working heights.

Probe location:

1. Air off probe in the ceiling panel.
2. Defrost temp probe in the coil area
3. Suction coil temp probe in the coil area.

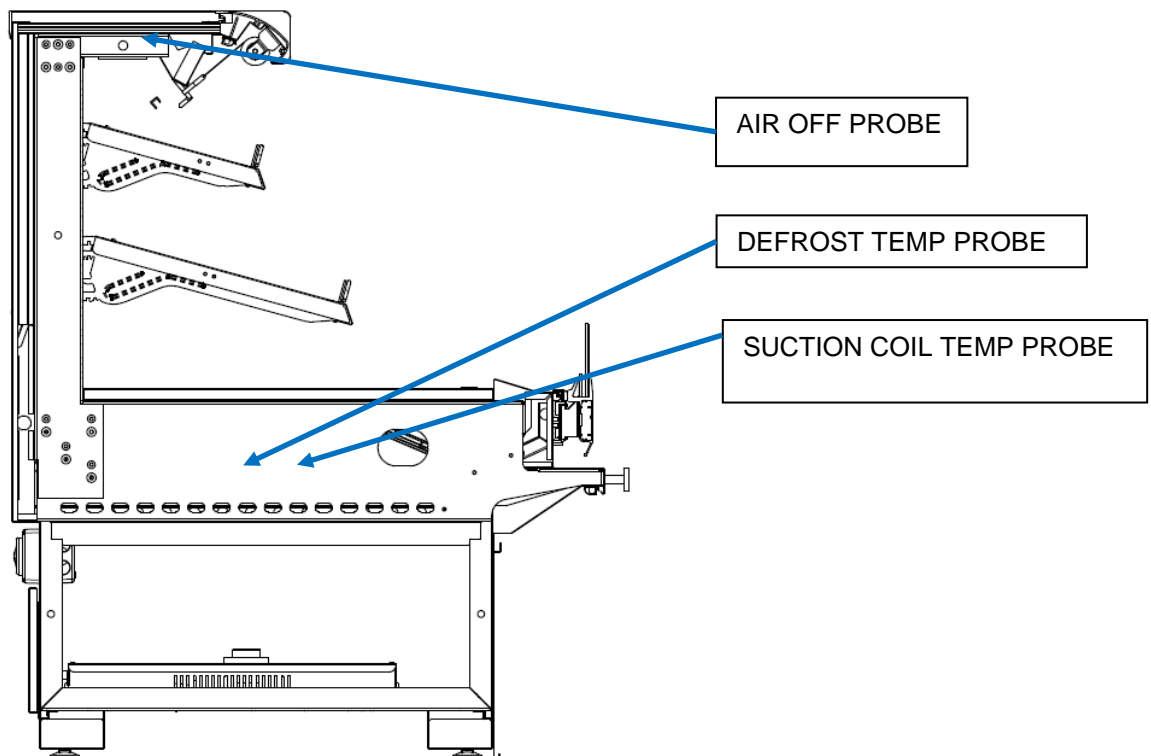


Fig (17) Location of probe



CAUTION

Do not walk or sit on cases.

Mounting fixtures



Replace racks and shelves etc, as necessary to store requirements. Fitting racks and shelves in manners other than configured as per the product engineering data sheet may compromise cabinet performance.

**NOTE**

Incorrect pan and display tag configurations may compromise case performance.

Commissioning

Cleaning case

1. Remove the PVC protective coating on stainless steel, where applicable
2. Remove any residue, silicon or tape marks with a cloth moistened with rubbing alcohol
3. Remove all debris from in and around the case
4. Wipe case with a clean, damp cloth, if necessary

Starting up

1. Refer to appendix 1 to 3 for documents may be required during commission.
2. Check supply power is ready and correct voltage. (by Licensed Person).
3. Confirm correct operation of RCD (if fitted) (by Licensed Person).
4. Turn case power on.
5. The controller on board the cabinet is pre-programmed to operate without any adjustment required.

Start-up checks – (by qualified persons only)

1. Ensure that the drain trap is installed the right way up (refer to Fig (16): drain trap orientation in the section installing the waste drain)
2. Check that all fans and lights (and light RCDs, if installed) are working correctly.
3. Check the anti-sweat circuit, ensuring the thermostat is set correctly (If installed).
4. Set evaporating pressure as per Product Engineering Data – Available from Hussmann.
5. Approximately 24 hours after start-up, check that the case is at correct operating temperature (refer the Product Engineering Data).

Decommissioning

Plan and risk assess the decommissioning process to include the following:

1. Isolate the case from both the refrigeration and electrical systems.
(Disconnection is to be undertaken by qualified persons only).
2. Removal of the case is to be in the reverse order of installation listed previously.

Disposal

Case disposal is to be carried out by the following:

1. Metal component removed and recycled
2. Remaining by commercial waste management

Operation

Loading Merchandise

Cases should only be stocked with merchandise for which they were manufactured as indicated by the case model number on the rating plate (see Fig (18): Rating Plate) that is typically located, on the rear back panel at the lower right hand end as viewed by the operator.

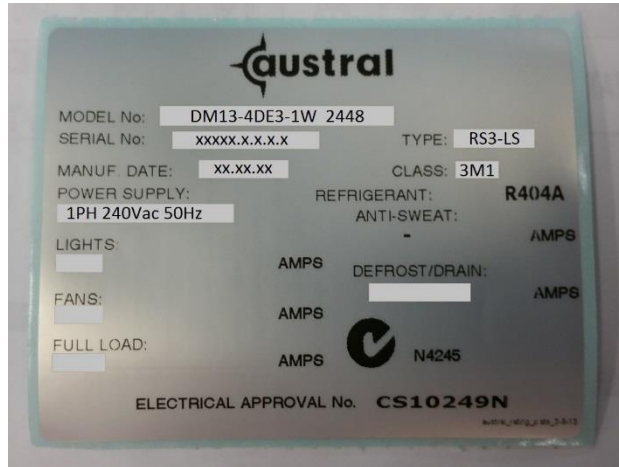


Fig (18): Rating Plate

Use only fittings and accessories supplied with the case or approved by Hussmann.



CAUTION

Do not climb in or on the case as this may result in personal injury and/or case damage.

Cleaning and Maintenance

Daily Checks

- If an alarm system is not part of the refrigeration installation, the temperature of each case should be checked on a daily basis via the thermometer that may be located in the left hand side of the ceiling panel, or via another reliable method.

The case temperature should be in the range of 0°C - 2°C for both case types.

Up to three separate readings may have to be taken to ensure the case temperature isn't being taken during a defrost cycle (which would give a higher than desired reading).

If it is consistently outside this range, contact Hussmann or your service contractor.

- Visually check the case for damage or spills and take appropriate remedial action.



CAUTION

If any damaged electrical components are identified during inspection isolate case power and contact service contractor.

- Visually inspect drain strainer and drain for any debris which could result in the drains becoming blocked with the possibility of spilling on the floor creating a slip hazard

Cleaning

A thorough cleaning and service of the case should be carried out by qualified refrigeration and electrical engineers on a six monthly basis. Please contact your service contractor.

Cases should also be cleaned by store staff on at least a weekly basis; some cases may, however, require more frequent cleaning.

Important Notes

- Do not use hot water on cold glass surfaces as the glass may shatter and cause serious injury.
- Do not use abrasive, solvent, ammonia or oil-based cleaners.
- Do not use steam or a high-pressure system to clean the case.
- When flushing the waste drain, do not use high-pressure water hoses and be careful not to introduce water faster than the waste outlet/drain can drain it.

Cleaning Procedure

1. Turn off the cleaning switch. Isolate power and remove stock.



CAUTION

If case fan power is not isolated then staff should wear hair nets and no jewellery or loose clothing. The fan is protected by wire grill but the possibility exists for items to be caught.

2. Remove all price tickets and any foreign materials from the case.
3. Clean glass or mirrored surfaces with a clean soft cloth and mild glass cleaner.
4. Wipe LED lights with a dry cloth.
5. Wipe down the exterior and interior of the case, paying particular attention to the perforations in the rear panels and the air return grille with a clean soft cloth and mild soapy water.
6. Wipe over with clean dry cloth.
7. Remove the base trays, wash with mild soapy water and rinse.
8. Remove any foreign material from the base of the case.
9. Carefully flush the waste drain with a bucket of water and allow the base to drain.
10. Replace base trays, turn on lights and cleaning switch.
11. Allow the case to attain correct working temperature (approximately 30 minutes) and restock the shelves.

Six Monthly Maintenance

A thorough cleaning and maintenance check should be carried out on a six monthly basis by qualified and approved refrigeration and electrical engineers. The following procedures should be undertaken as a minimum.



CAUTION

Cases should be electrically isolated before carrying out any work that may affect or expose electrical components.

1. Remove and clean the pan decks.
2. Remove any foreign material from the base of the case.
3. Check drainage connections and clean the drain trap.
4. Check that all case panels, glass and trims are secure and undamaged.
5. Check for rust or paint damage.
6. Clean the air grilles on the cases.
7. Ensure all cable connections, including screw terminals, earth leads and straps, are secure.
8. Ensure insulation to all electrical components, including solenoid valves, fans, controls, earth terminals and lights, are sound.
9. Carry out electrical safety tests, including earth continuity and insulation resistance.
10. Ensure that the correct fuse rating and type is fitted for all circuits.
11. Clean the evaporator coil and check it for damage.
12. Ensure that there are no refrigerant leaks.

With case power turned on:

13. Check that all fans, valves, lights and controls are working correctly.
14. Ensure light RCDs (if fitted) are working.

Operation Servicing

No servicing of Hussmann cases, is to be undertaken by store staff. Please contact your service contractor for all maintenance queries.

Troubleshooting

ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
Product temperature is higher than requirement.	Store condition is warmer or more humid than climate class 3 (25°C/60%RH).	Check store air conditioner operation.
	Refrigeration plant is not running or operating at inappropriate settings or conditions.	Check for compressor rack if it is running. If rack is running and other possible reasons are eliminated then call refrigeration mechanic to check plant operation.
	Evaporator pressure is not set correctly.	Check suction pressure settings at the case and if required adjust as per case specification.
	Insufficient or no air flow appears at the case air curtain.	Check if case fans are turned on or operating correctly. If any doubt of fan operation contact technician.
		Check if coil is frozen up. If frozen then check defrost settings as per the manufacturers guideline or set to suite the store operating condition. A colder store may require longer defrost duration. A humid store may need more frequent defrost.
	Case shelf arrangement has been deviated significantly from original specified setup.	Re-do the shelf arrangement as per the original specification.
	Air Return is blocked by merchandise.	Remove merchandise to behind the load limit.
None of above.	Contact Hussmann.	
ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
Products are freezing up.	Store condition is too cold compared to design climate class 3	Check store air conditioner operation. If store condition can not be lifted, then adjust cabinet evaporator pressure and defrost strategy to suite.
	Case evaporator pressure is lower than specification.	Adjust cabinet evaporator pressure to suite.
ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
Cabinet exterior is sweating.	Store humidity is high.	Check store air conditioner operation
	Insufficient ventilation.	Check case ventilation under and at rear of the case. A fan kit may be needed. KITS: (Option Extra – ref Page 21) Case to Wall: 2500: 96A15-035 3750: 96A15-036.
	Icon Controller settings (if fitted).	Check settings.
	Case SST.	SST set too low.
ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
LED are not working.	No power supply.	Check supply is “on” and light switch is working.
	LED fittings.	Call technician to check and replace in necessary.
	LED failed.	Replace LED.

Table (1) General Troubleshooting

Controller trouble shooting

If the remedial actions does not solve the issue, please contact technician for assistance

ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
Controller is off	Circuit breaker tripped due to short circuit	Close the circuit breaker and check if tripping again. Contact service team
	System overload protection	Check the load on the controller. The maximum external load is 16A
ISSUE	POSSIBLE REASON	REMEDIAL ACTIONS
Temperature reading abnormal	Sensors loose connection	Reconnect the sensor and check the connectivity of terminal block
	Sensor breakdown	Unplug the sensor and test according to the sensor specification- available from PED sheet. If broken replace the sensors
Error Message(for Multiple controllers sharing pressure transducer)	POSSIBLE REASONS	REMEDIAL ACTIONS
dPP	The local transducer read a wrong value. The pressure is out of the bounds of the pressure transducer P5C(type of transducer) is mismatched with the pressure transducer	This error message may occur during the start-up of the system. Wait several minutes for system refrigerant balance. otherwise checking the rating of the transducer or P5C parameters, or changing the transducer
rPF	Unable to read the virtual pressure on slave case controller	Check the status of the on board GREEN LED: if this LED is OFF the LAN is not working, otherwise check the remote transducer
Error message/Alarm	POSSIBLE REASON	REMEDIAL ACTIONS
noL	Keyboard is not able to communicate with the XM668D or XM678D	Verify the connection or call for service
P1, P2, P3, P4, P5, P6	Sensor break down, value out of range or sensor incorrectly configured.	Check the sensors rating, condition and replace if necessary
HA	Room temperature exceed the highest room threshold temperature	Check the room temperature condition or room temperature sensor
LA	Room temperature exceed the highest room threshold temperature	Check the room temperature condition or room temperature sensor
Had	Defrost temperature exceed the highest room threshold temperature	Check the defrost condition or defrost temperature sensor
Lad	Defrost temperature exceed the lowest room threshold temperature	Check the defrost condition or defrost temperature sensor
HAF	Fan temperature exceed the highest room threshold temperature	Check the Fan running condition or Fan temperature sensor
LAF	Fan temperature exceed the lowest room threshold temperature	Check the Fan running condition or Fan temperature sensor
dA	Door open alarm activated	Close the door
EA	Generic Alarm from customised digital input	Check the customised digital input functionality
CA	Severe alarm of regulation lock from customised digital input	Check the customised digital input functionality
PAL	Pressure switch lock is activated	Check the pressure switch
LOP	System reaches lowest operating pressure threshold	Check the refrigerant charge Check the pressure transducer
MOP	System reaches highest operating pressure threshold	Check the refrigerant charge Check the pressure transducer
LSH	Superheating reaches lowest superheat alarm threshold	Contact technician
HSH	Superheating reaches highest superheat alarm threshold	Contact technician
rtC	Clock setting lost	Reset the clock
rtF	Clock damaged	Contact technician
EE	EEPROM serious problem	Contact Emerson technician
Err	Error with upload/download parameters	Contact Emerson technician
End	Parameters correctly transferred	N/A

Table (2) Controller Troubleshooting

Appendixes

Appendix 1 **Wiring diagrams** – Supplied with each case.

Appendix 2 **Product Engineering Datasheet** – Supplied with each case.

Appendix 3 **Setting Table** – Supplied with each case.

Appendix 4 **Attaching case ends**

Case ends are normally fitted in the factory; however, they occasionally need to be attached to a case on-site. Use this procedure when an end attaches to a single case and when it is common to two cases.

Ensure that correct and appropriate manual handling techniques are applied when fitting a patch end.

Cases must be sealed before attaching case ends. To seal cases, refer to sealing case joins on page 9.

To attach a case end

1. Carefully run a knife around the inside rim of the end trim, taking care not to scratch the case end surface, and remove the case end membrane.
2. To assist in screwing in the Lag screws, drill a 6mm hole in the mounting positions shown, using the 10mm diameter fixing hole location. Ensure you do not drill completely through the End. see Fig (19)

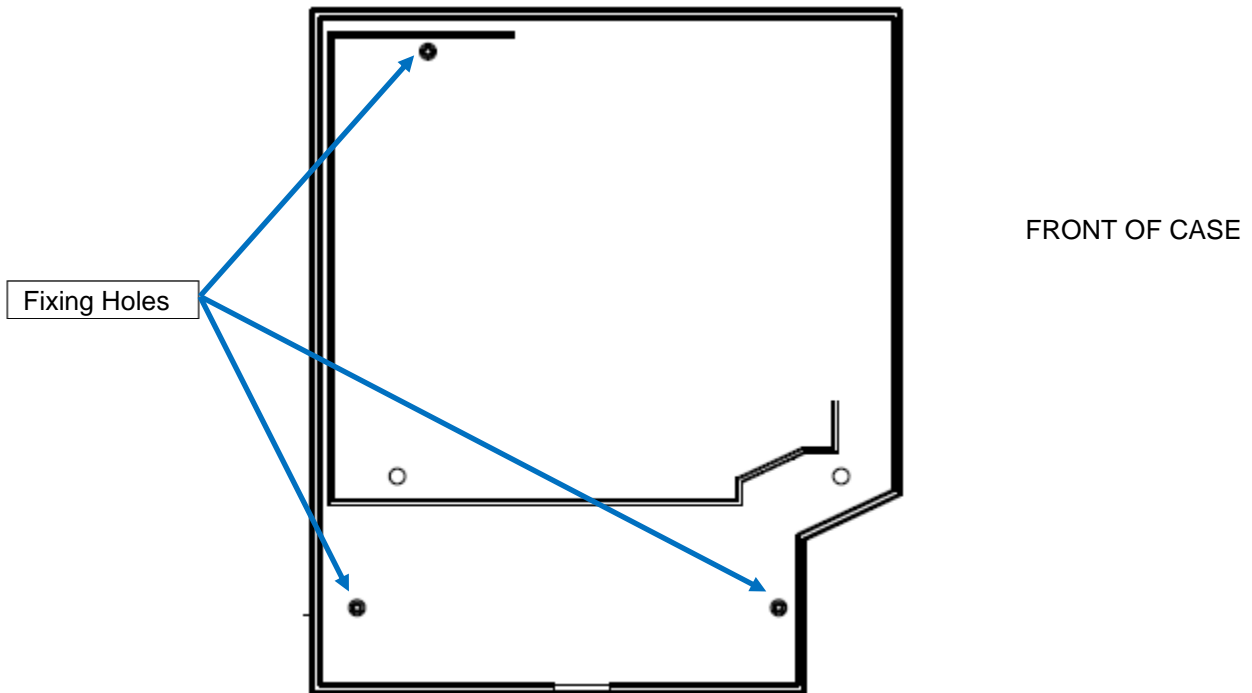


Fig (19) Drill hole locations
(Inside Right hand End shown)

3. If the end is common to 2 cases, repeat step 2 for the other side of the case end.
4. Insert 2 hex nuts onto one of the lag screws, lock nuts together and drive screw through the hole at the top of the case end until the lag is fully embedded in the end.
5. Remove the nuts from the lag screw and repeat step 4 for the remaining holes.
6. Pull up the case ends lightly against the case.
7. Adjust the case so that the end fits comfortably around the canopy and the top of the case and is level, from front to back with the case roof.
8. Secure the case end with the lag screws and bolts
9. Apply either black or white silicon (depending on the interior colour of the case) all the way along the inside joins between the case end and end frame. see Fig (20)

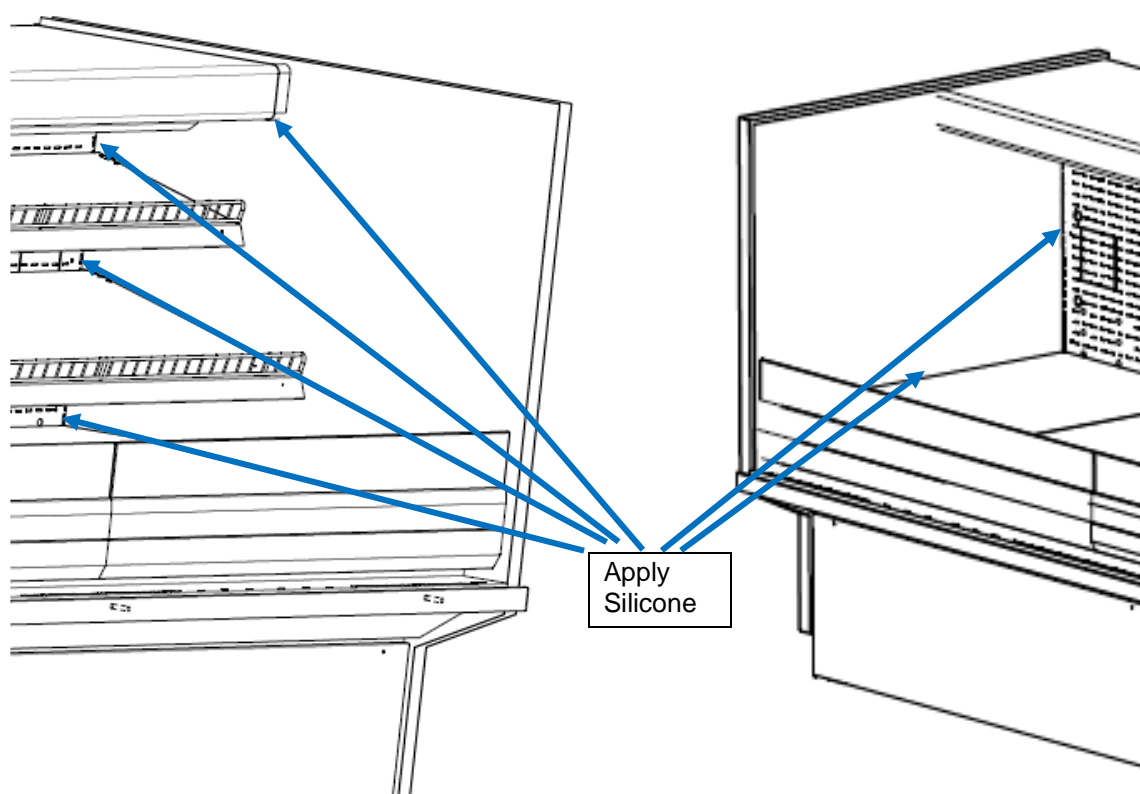


Fig (20) Silicon ends to case

10. Applying slight pressure, run your finger along the length of the silicon.
11. Remove all remaining packaging material from the case end and case and trim
12. Attach the end kickplate and, if required, silicon seal to the floor.

Appendix 5 Risk analysis

HAZARD	CONTROL MEASURES
Electrical - Replacement of electrical components	Request a service call. Electrically isolate cases before works
Ergonomic - Moving/ positioning/ adjusting cases	Staff must be trained in the correct procedures for setting up cases and ergonomic practices. PPE must be worn
Falling - Connecting sensor probe wiring during installation	Use of barriers & fall arrest systems as appropriate & in accordance with State & Territory Legislation. Safe working at heights
Entanglement - Contact with fans when cleaning	Electrically isolate cases before work is carried out. Staff training,
Cuts and stabbing - Potential for cuts from broken fluorescent tube or during tube replacement	Electrically isolate cases. Staff not to replace tubes. Call service provider. PPE must be worn.
Electrical - Potential for electric shock when cleaning electrical fittings and components	Electrically isolate cases before work is carried out. Staff training, RCD. Keep electrical connections dry at all times.
Falling - Climbing on shelves	Staff must be trained in OH&S procedures. MUST not climb on shelves or cases.
Crushing - Hands or fingers may become pinched or crushed during the positioning of base trays, shelves & stock	Staff must be trained in the correct procedures for setting up cases and ergonomic practices
Slipping - Drain may leak or become blocked causing water spillage	Visual Inspection and regular maintenance. Request service call when necessary.
Cuts and stabbing - Potential for cuts caused by damaged or missing parts	Visual Inspection and regular maintenance. Request service call when necessary. PPE must be worn when handling broken or damaged parts.
Ergonomic - Stretching during the cleaning of the case and positioning of stock and shelves leading to strains and sprains	Staff must be trained in the correct procedures for cleaning cases & ergonomic practices. Cleaning tools which reduce the need for stretching should be used.
Slipping - Surfaces may become slippery due to spillage from the case during operation or cleaning	Visual Inspection. Appropriate remedial action.
Cuts and stabbing - Potential for cuts caused by sharp edges & evaporator coil during cleaning	PPE must be worn by staff
Cuts and stabbing - Cleaning cold glass surfaces with hot water	Staff must be trained in the correct procedures for cleaning cases and ergonomic practices
Crushing - fingers, hands or body between doors	Operators to always open and close doors using handles provided, ensuring the area is clear of other persons.
Electrical - electrical connections in cases	Electrically isolate cases before work begins. Must be carried out by a service provider. Staff training.

Table (3) Risk analysis

Appendix 6 Electronic Expansion valve specification

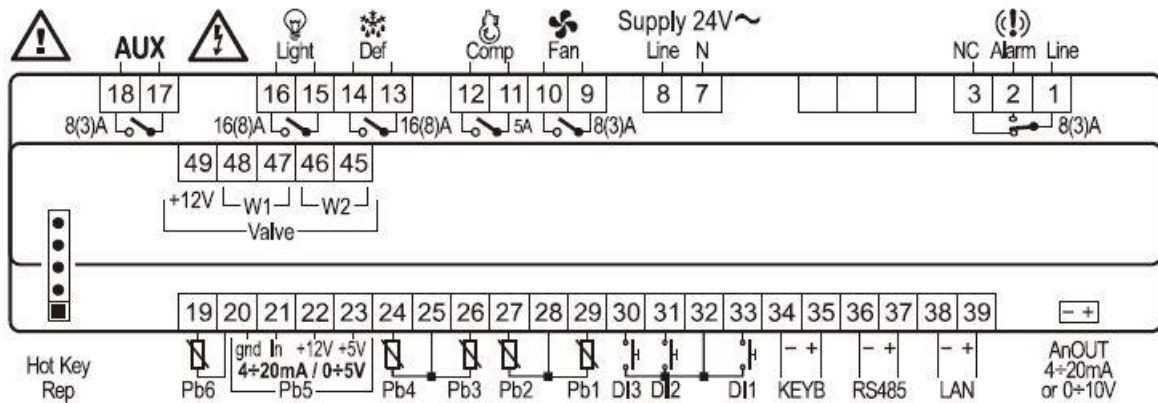
Hussmann use electronic expansion valve for DM Eversion series. The Electronic expansion valve specification are list in Table (3)

Refrigerant Compatibility	R404, R507, R134A, R407F
Maximum Operating Pressure	CE approval: 60 barg: 60 bar (870psi). UL approval: 45bar (652 psi)
Refrigerant temperature	-40T70°C
Room Temperature	-30T70°C
Phase Current	450mA
Drive frequency	50Hz-150Hz
Phase resistance(25 °C)	36ohm+-10%
IP Rating	IP65
Step angle	15°
Linear advance	0.03mm(0.0012inches)
Connection	4 wires AWG(18/22)
Complete closing steps	500
Control Steps	480

Table (4) Specification for EEV

Appendix 7 Controller

Dixell XM678D controller from Emerson are used for all DM series.



FEATURES	DESCRIPTION
Temperature range	Medium – Low
Max no. of parallel connections	8
No. of Relay outputs	6
Expansion valve	EEV
Max no. of analogue inputs	6
Max no. of digital inputs	3
Program tool	Hotkey (X-REP compatible)
Serial output	RS485 (ModBUs Compatible) RTC (Optional)

Appendix 8 Warranty

The information in this manual is for “Qualified Persons Only”. It is **NOT** an Installation Guide for “**NON Qualified Persons**”.

To obtain warranty information or other support, contact your nearest Hussmann representative.

Please include the following:

- Customer site location.
- Cabinet model & serial number of product.
- Reason for warranty.