

Installation & Service Manual

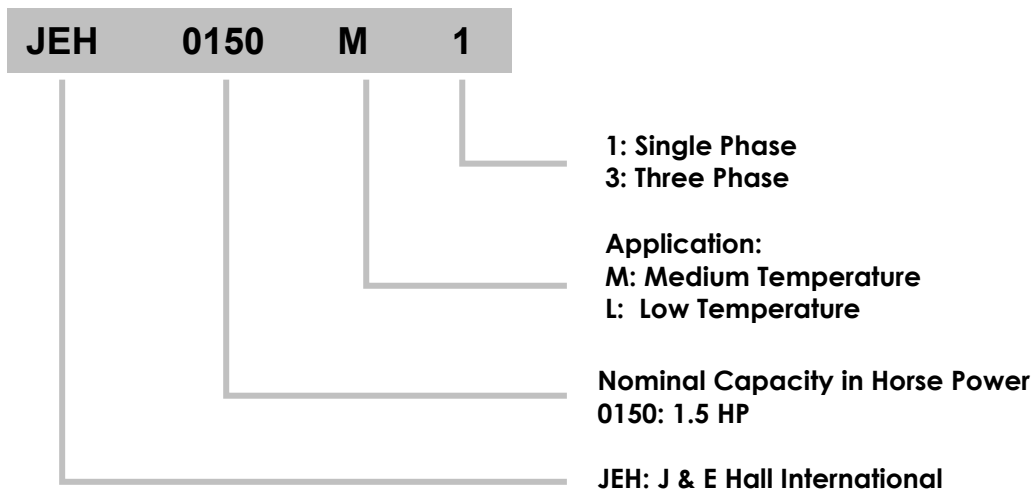
Low noise commercial condensing units



Contents

Contents	2
Nomenclature.....	3
Standard Product Configuration	3
Specifications.....	4
General	4
Unit Weights & Dimensions.....	4
Noise Levels	5
Outline Drawings for Models: JEH 0150, JEH 0175, JEH 0225, JEH 0300	5
Outline Drawings for Models: JEH 0350, JEH 0400, JEH 0500.....	6
Outline Drawings for Models: JEH 0725, JEH 0825, JEH 1000.....	6
Performance Data: medium temperature.....	7
Performance Data: low temperature	8
Electrical	9
Wiring Configuration for Models: JEH 0150-M-1, JEH 0175-L-1, JEH 0225-M/L-1, JEH 0300-M-1	9
Wiring Configuration for Models: JEH 0150-M-3, JEH 0175-L-3, JEH 0225-M/L-3, JEH 0300-M-1	10
Wiring Configuration for Model: JEH 0300 -M-3	11
Wiring Configuration for Models: JEH 0350-L-3, JEH 0400- M/L-3, JEH 0500M-3, JEH 0600-M-3, JEH 0675-M-3	12
Wiring Configuration for Models: JEH 0725-M-3, JEH 0825-M/L-3, JEH 1000-M-3	13
Health & Safety	14
General Information	14
Installation.....	15
Unit Site Location.....	15
Installation Clearance	15
Field Piping	16
Leak Detection.....	17
Pressure Testing.....	17
Safety Pressure Switch Settings	17
High Pressure Safety	17
Low Pressure Safety	17
Vacuum – Moisture Removal	18
Service & Maintenance.....	19

Nomenclature



Standard product configuration

- IP55 rated control panel
- Mains electrical isolator
- Hermetic compressor
- Compressor Rotalok valves
- Gomax hose
- Compressor contactor
- Liquid receiver with fusible plug
- Drier
- Sight glass
- Non return valve
- Oil separator fitted as standard on all low temperature models
- Crankcase heater
- Manual high & auto low pressure safety switch with Gomax hose
- Acoustic lining
- Compressor jacket

Specifications

General

Condensing Unit Model	Compressor			Condenser		Connections		Receiver Volume
	Type	Swept Volume (m3/h)	Oil Charge (dm3)	Coil Rows	Air Flow (cfm)	Suction (inch)	Discharge (inch)	Litres
JEH-0150-M-1	MTZ18	5.26	0.95	1	1200	1/2	3/8	4.5
JEH-0225-M-1	MTZ28	8.29	0.95	2	1200	1/2	3/8	4.5
JEH-0300-M-3	MTZ36	10.6	0.95	2	1400	5/8	1/2	4.5
JEH-0400-M-3	MTZ50	12	1.8	2	1400	7/8	3/4	6.5
JEH-0500-M-3	MTZ64	18.6	1.8	2	3500	7/8	3/4	6.5
JEH-0600-M-3	MTZ72	21.04	1.80	3	3500	7/8	3/4	7.1
JEH-0675-M-3	MTZ81	23.63	1.80	3	3500	1 1/8	3/4	7.1
JEH-0825-M-3	MTZ100	29.80	3.90	2	6474	1 1/8	3/4	14.0
JEH-1000-M-3	MTZ125	37.49	3.90	2	6474	1 1/8	3/4	14.0
JEH-0175-L-1	LTZ22	8.3	0.95	1	1200	5/8	1/2	4.5
JEH-0225-L-1	LTZ28	12	0.95	2	1200	5/8	1/2	4.5
JEH-0350-L-3	LTZ40	16.7	1.8	2	1400	7/8	3/4	6.5
JEH-0400-L-3	LTZ50	23.7	1.8	2	3500	1 1/8	3/4	6.5
JEH-0725-L-3	LTZ88	37.49	3.90	2	6474	1 1/8	3/4	14.0
JEH-0825-L-3	LTZ100	47.25	3.90	2	6474	1 1/8	3/4	14.0

Unit weights & dimensions

Unit Model	Unpacked Length (mm)	Unpacked Width (mm)	Unpacked Height (mm)	Unpacked Nett Weight (kg)	Packed Length (mm)	Packed Width (mm)	Packed Height (mm)	Packed Gross Weight (kg)
JEH-0150-M-1	1032	402	645	105				111
JEH-0225-M-1	1032	402	645	112				118
JEH-0300-M-3	1032	402	645	112				118
JEH-0400-M-3	1248	460	837	155				163
JEH-0500-M-3	1248	460	837	155				163
JEH-0175-L-1	1032	402	645	109				115
JEH-0225-L-1	1032	402	645	114				120
JEH-0350-L-3	1248	460	837	159				167
JEH-0400-L-3	1248	460	837	159				167
JEH-0600-M-3	1248	460	837	159				167
JEH-0675-M-3	1248	460	837	159				167
JEH-0825-M-3	1155	457	1406	200				
JEH-1000-M-3	1155	457	1406	200				

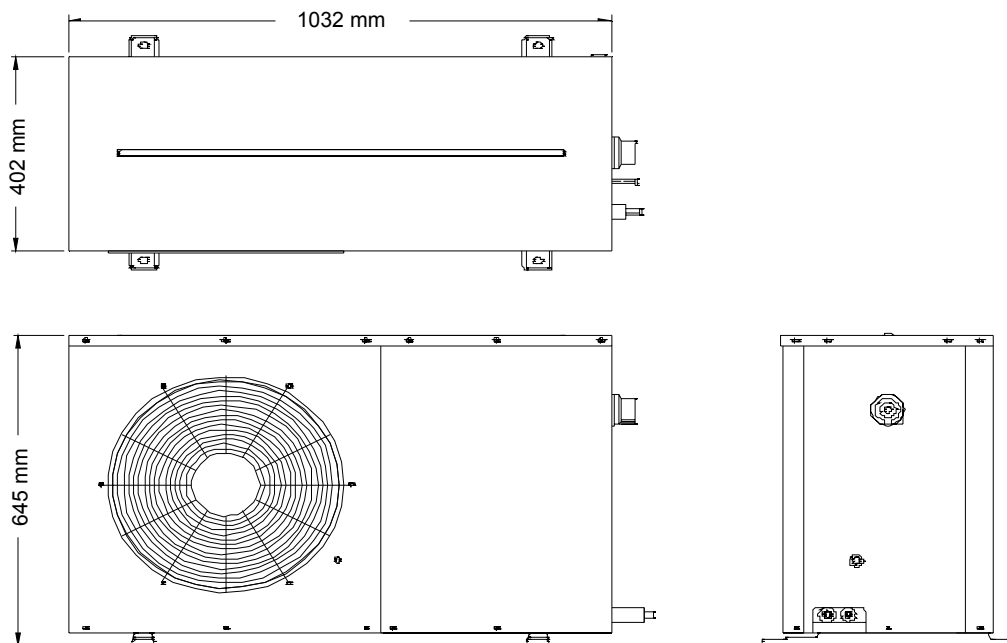
Noise levels

Small Casing Unit	33.8db(A)
Large Casing Unit	35.5db(A)
Twin Fan Casing Unit	45.7db(A)

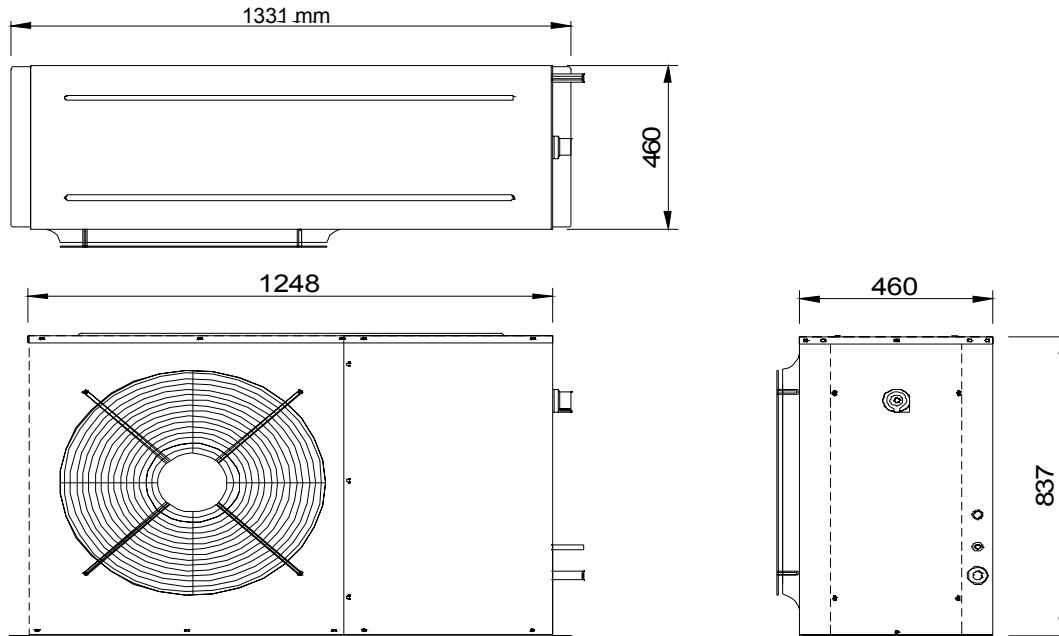
Noise Levels given are corrected db(A) at 10m in a free field.

Outline drawings

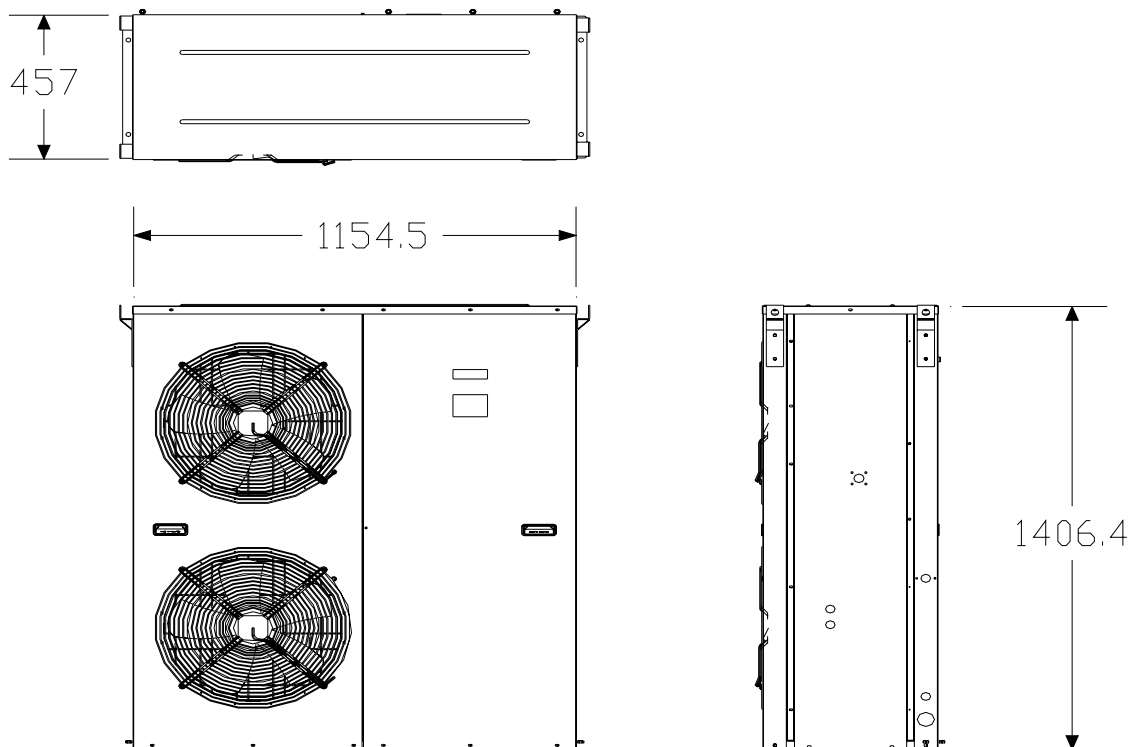
Models: JEH 0150-M-1/3, JEH 0175-L-1/3, JEH 0225-M/L-1/3, JEH 0300-M-1/3



Models: JEH 0350-L-3, JEH 0400-M/L-3, JEH 0500-M-3, JEH 0600-M-3,
JEH 0675-M-3



Models: JEH 0725-L-3, JEH 0825-M/L-3, JEH 1000-M-3



Performance data – medium temp

MODEL	TE	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
	TA	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F
JEH-0150-M-1,R404A JEH-0150-M-3,R404A	27	-	-	-	563	874	1258	1751	2347	3072	3943
	32	-	-	-	458	734	1078	1516	2052	2702	3488
	38	-	-	-	332	566	862	1234	1698	2258	2942
JEH-0225-M-1,R404A JEH-0225-M-3,R404A	27	-	-	-	1233	1750	2396	3155	4076	5150	6413
	32	-	-	-	1028	1500	2086	2780	3616	4600	5758
	38	-	-	-	782	1200	1714	2330	3064	3940	4972
JEH-0300-M-1,R404A JEH-0300-M-3,R404A	27	-	-	-	1734	2357	3155	4119	5295	6703	8370
	32	-	-	-	1494	2062	2780	3654	4720	5998	7520
	38	-	-	-	1206	1708	2330	3096	4030	5152	6500
JEH-0400-M-3,R404A	27	-	-	-	2293	3197	4346	5796	7578	9728	12316
	32	-	-	-	1938	2752	3786	5086	6698	8648	11006
	38	-	-	-	1512	2218	3114	4234	5642	7352	9434
JEH-0500-M-3,R404A	27	-	-	-	2840	4123	5684	7573	9810	12458	15531
	32	-	-	-	2390	3568	4994	6718	8760	11178	13996
	38	-	-	-	1850	2902	4166	5692	7500	9642	12154
JEH-0600-M-3,R404A	27	-	-	-	3417	4826	6533	8614	11080	13987	17385
	32	-	-	-	2872	4166	5728	7624	9880	12542	15660
	38	-	-	-	2218	3374	4762	6436	8440	10808	13590
JEH-0675-M-3,R404A	27	-	-	-	4045	5606	7501	9778	12488	15681	19403
	32	-	-	-	3507	4940	6672	8751	11229	14155	17576
	38	-	-	-	2861	4140	5676	7519	9718	12324	15384
JEH-0825-M-3,R404A	27	-	-	-	4342	6161	8427	11216	14589	18635	23421
	32	-	-	-	3672	5326	7382	9906	12974	16660	21036
	38	-	-	-	2868	4324	6128	8334	11036	14290	18174
JEH-1000-M-3,R404A	27	-	-	-	6101	8437	11303	14795	18993	23987	29860
	32	-	-	-	5216	7342	9948	13120	16938	21492	26860
	38	-	-	-	4154	6028	8322	11110	14472	18498	23260

TE Evaporating temperature
 TA Ambient Temperature
 TD 10K
 P.F Cooling Capacity (W), +/- 5%
 Rating Condition Superheat 10K, Subcooling 0K

Select Refrigerant Factor For Medium / High Temp ONLY			
Factor	R134a	R404a	R407c
	0.63	1	0.90

Performance data – low temp

MODEL	TE	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
	TA	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F	P.F
JEH-0175-L-1,R404A JEH-0175-L-3,R404A	27	379	604	901	1304	1790	2392	-	-	-	-
	32	314	514	766	1114	1540	2072	-	-	-	-
	38	-	406	604	886	1240	1688	-	-	-	-
JEH-0225-L-1,R404A JEH-0225-L-3,R404A	27	668	966	1383	1919	2581	3402	-	-	-	-
	32	488	806	1178	1654	2246	2982	-	-	-	-
	38	-	614	932	1336	1844	2478	-	-	-	-
JEH-0350-L-3,R404A	27	1025	1495	2116	2936	3978	5279	-	-	-	-
	32	900	1270	1806	2526	3448	4614	-	-	-	-
	38	-	1000	1434	2034	2812	3816	-	-	-	-
JEH-0400-L-3,R404A	27	1490	2266	3199	4358	5805	7551	-	-	-	-
	32	1290	1906	2734	3778	5080	6666	-	-	-	-
	38	-	1474	2176	3082	4210	5604	-	-	-	-
JEH-0725-L-3,R404A	27	1846	3015	4399	6188	8448	11233	-	-	-	-
	32	1636	2490	3734	5358	7418	9978	-	-	-	-
	38	-	1860	2936	4362	6182	8472	-	-	-	-
JEH-0825-L-3,R404A	27	2782	4303	6102	8362	11134	14513	-	-	-	-
	32	2362	3548	5182	7242	9794	12908	-	-	-	-
	38	-	2642	4078	5898	8186	10982	-	-	-	-

TE Evaporating temperature
 TA Ambient Temperature
 TD 10K
 P.F Cooling Capacity (W), +/- 5%
 Rating Condition Superheat 10K, Subcooling 0K

Important Note:

On some applications the use of a Suction Accumulator may be required.

Warnings:

1. The use of an expansion valve with maximum operating pressure (MOP) or a starting regulator is compulsory.
2. Use only R404a specified components (e.g. filter drier, TXV).
3. The factory fitted crankcase heater must be permanently energized (self regulating PTC).

Source: Maneurop

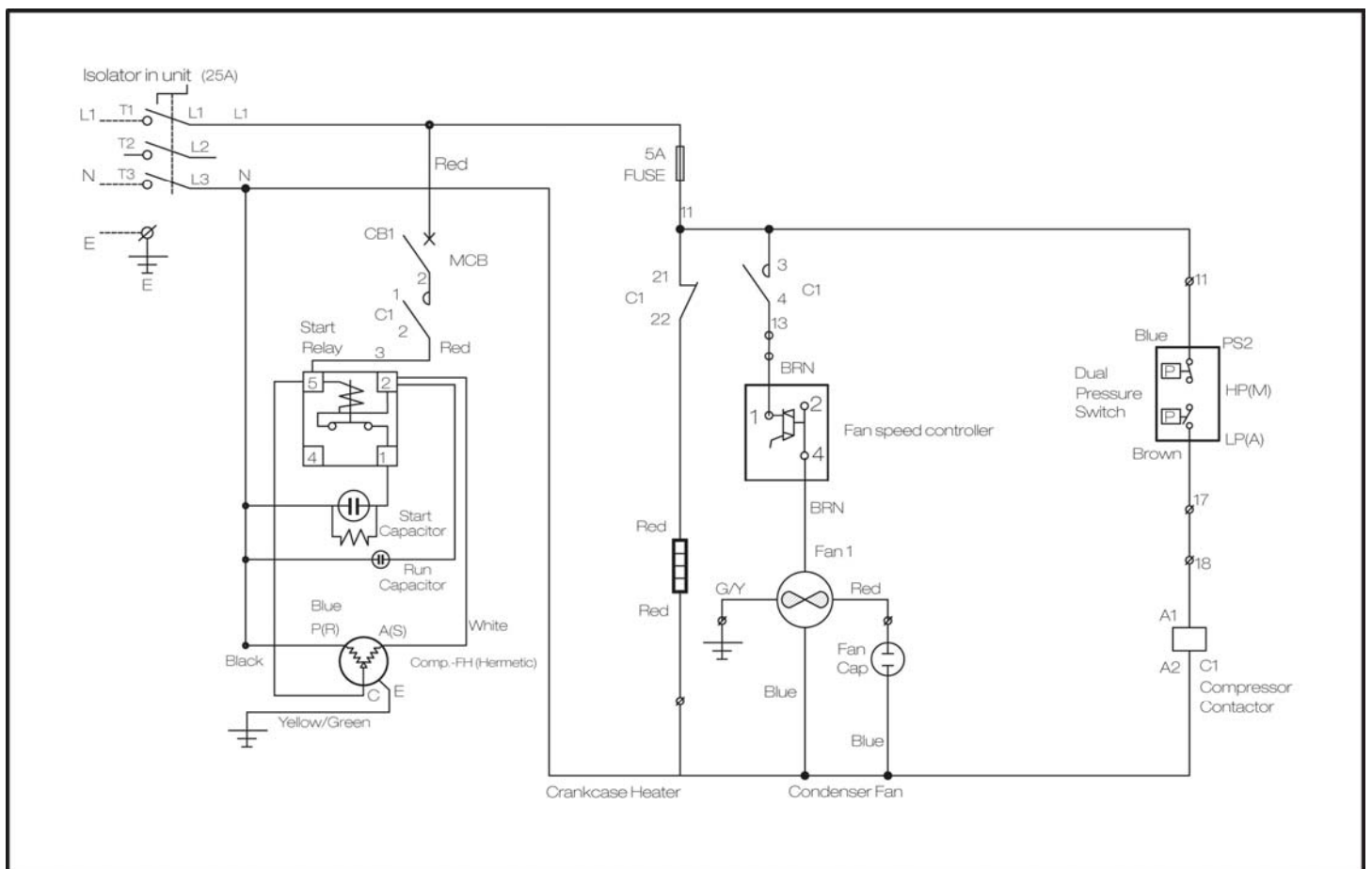
Electrical

Important Note:

All wiring and connections to the condensing unit must be made in accordance with all local codes of practice

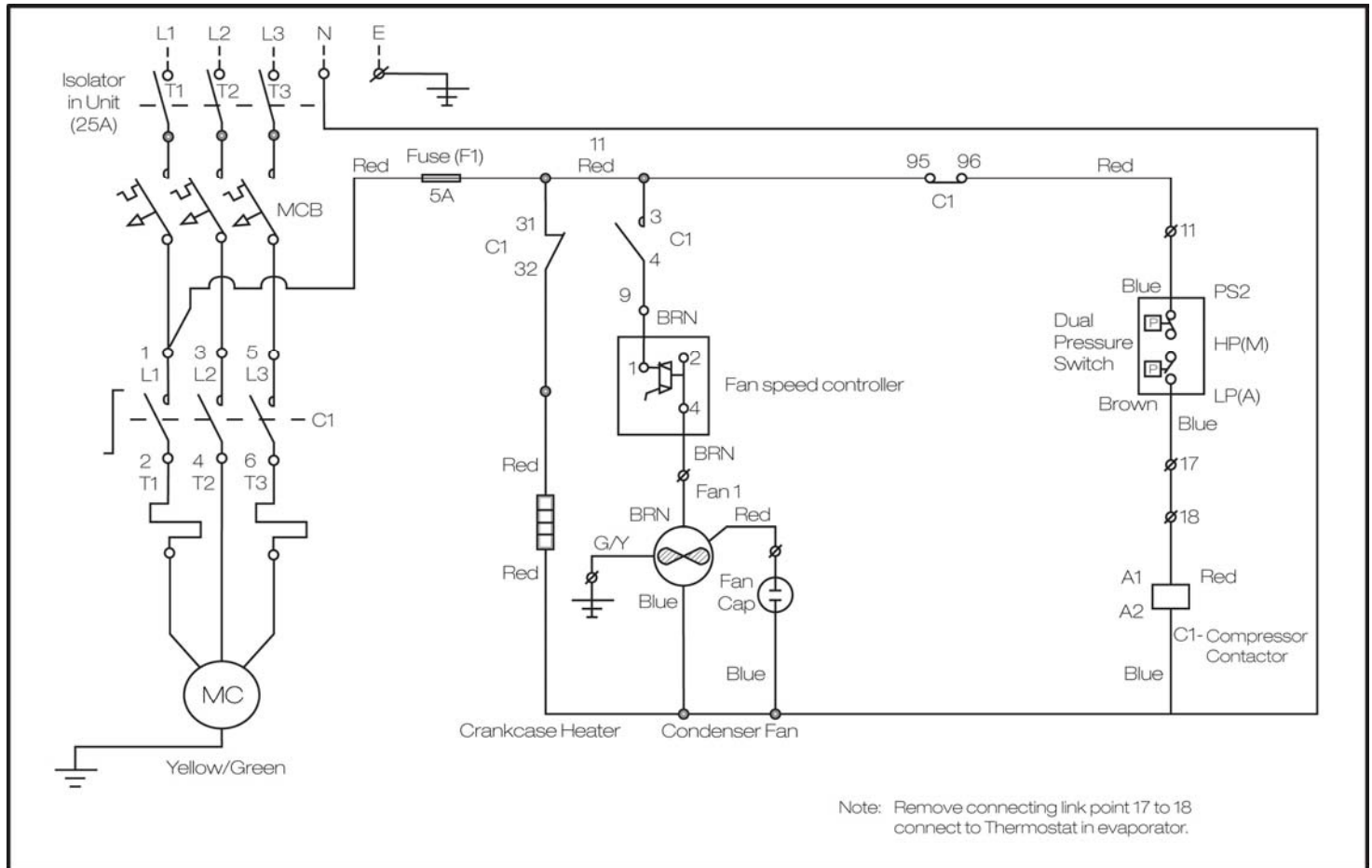
Wiring configuration for models:

JEH 0150-M-1, JEH 0175-L-1, JEH 0225-M /L -1, JEH-0300-M-1



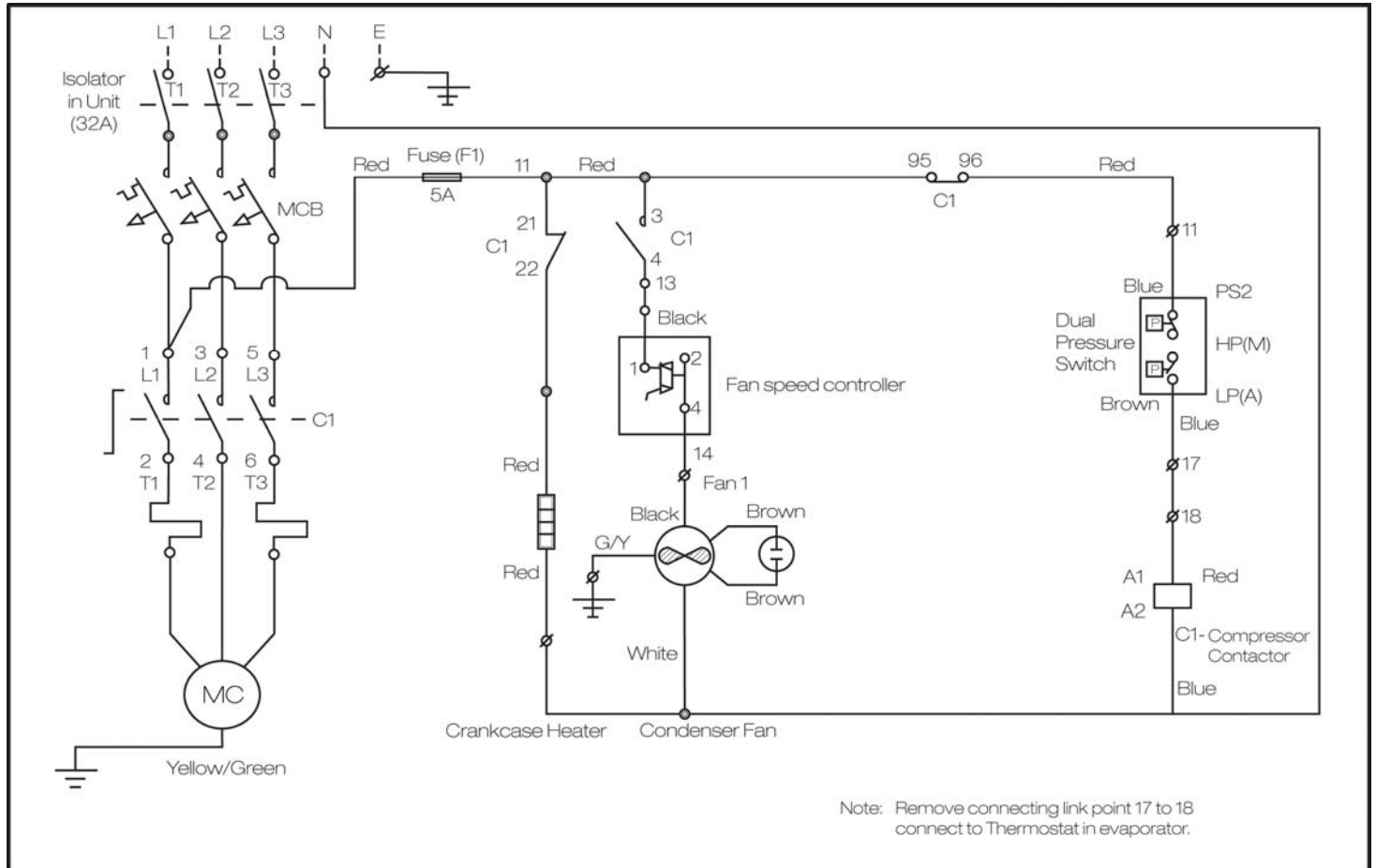
Wiring configuration for models:

JEH 0150-M-3, JEH 0175-L-3, JEH 0225-M /L -3, JEH 0300-M-3

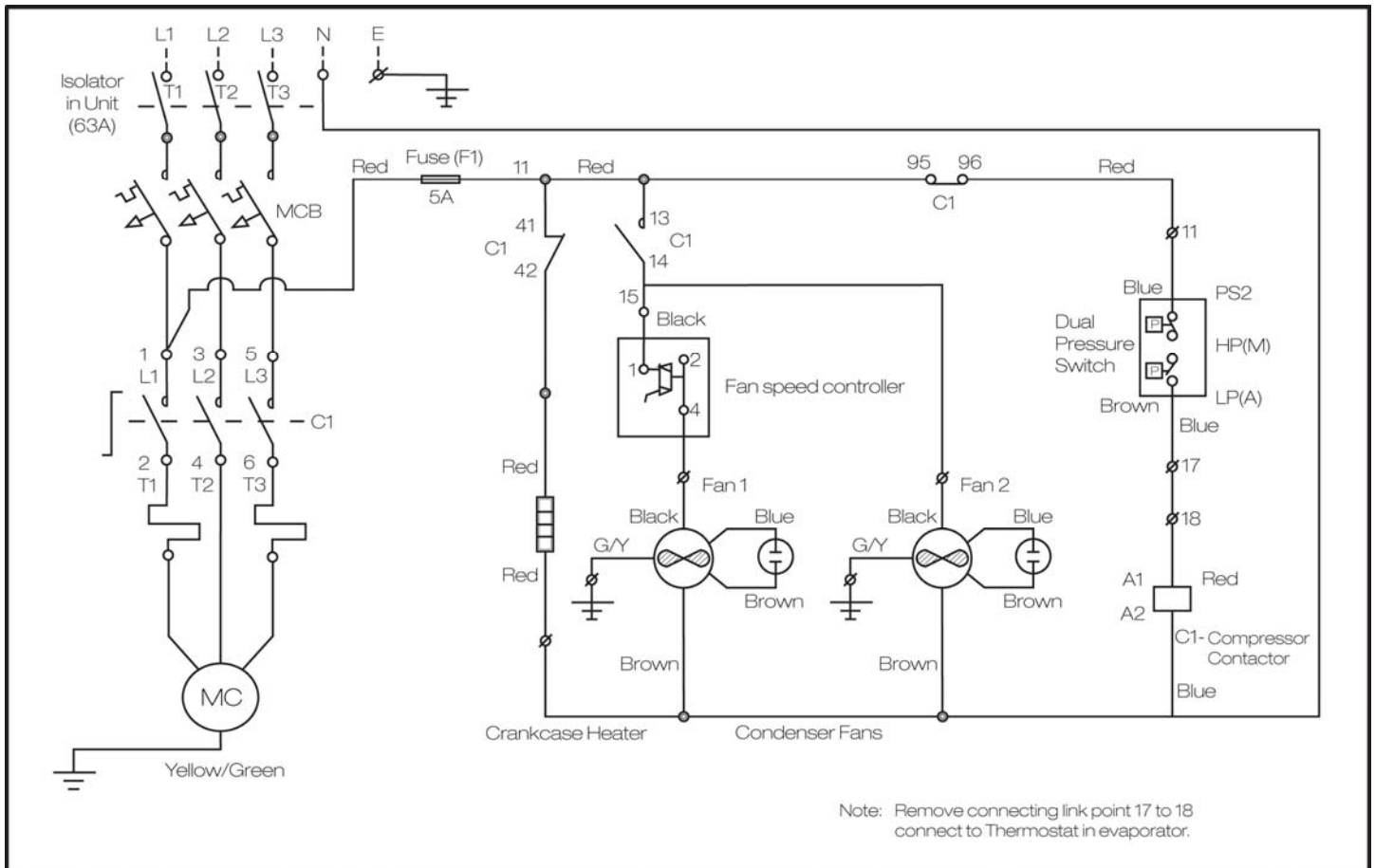


Wiring configuration for models:

JEH 0350-L-3, JEH 0400-M/L-3, JEH 0500-M-3, JEH 0600-M-3,
JEH 0675-M-3



Wiring configuration for models: JEH 0725-L-3, JEH 0825-M/L-3, JEH 1000-M-3



Health and Safety

Important Note:

Only a qualified refrigeration engineer who is familiar with refrigeration systems and components, including all controls should perform the installation and start-up of the system. To avoid potential injury, use care when working around coil surfaces or sharp edges of metal cabinets. All piping and electrical wiring should be installed in accordance with all applicable codes, ordinances and local by-laws.

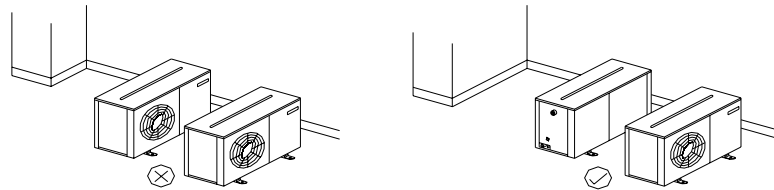
General information

- Ensure the unit received is the correct model for the intended application
- Ensure refrigerant, voltage, MWP, FLC, RLA are all suitable for the proposed application
- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment
- The condensing unit contains moving machinery and electrical power hazards which may cause severe injury or death. Disconnect and shut off power before installation or service of the equipment
- Refrigerant release into the atmosphere is illegal. Proper evacuation, handling and leak testing procedures must be observed at all times
- Units must be earthed and no maintenance work should be attempted prior to disconnecting the electrical supply
- The electrical covers and condenser fan guard must remain fitted at all times.
- Use of the condensing units outside of the design conditions and the application for which the units were intended may be unsafe and be detrimental to the unit, regardless of short or long term operation
- The condensing units are not designed to withstand loads or stresses from other equipment or personnel. Such extraneous loads or stress may cause failure/leak/injury
- In some circumstances, a suction accumulator (not supplied) component may be required, it offers protection against refrigerant flood back during operation. It helps protect against off-cycle migration by adding internal free volume to the low side of the system
- Tests must be conducted to ensure the amount of off-cycle migration to the compressor does not exceed the compressor's charge limit
- Wherever possible the system should be installed to utilize a pump down configuration
- After installation, the system should be allowed to run for 3 – 4 hours. The oil level should be checked after 3 – 4 hours run time and topped up as necessary. The oil level should be visible at least $\frac{1}{2}$ - $\frac{3}{4}$ up the compressor oil sight glass. For details of the oil requirements, please refer to page 14 in the service and maintenance section

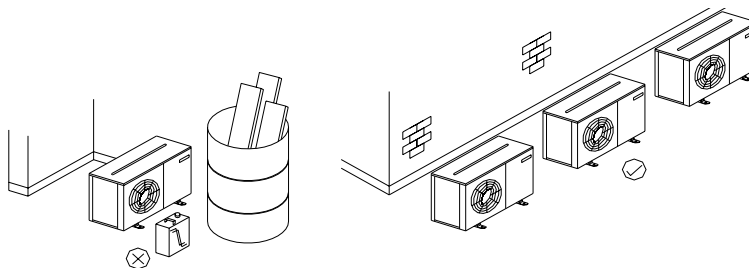
Installation

Unit site location

- In order to achieve maximum cooling capacity, the installation location for the condensing unit should be carefully selected
- Install the condensing unit in such a way so that hot air distributed by the condensing unit cannot be drawn in again (as in the case of short circuit of hot discharge air). Allow sufficient space for maintenance around the unit



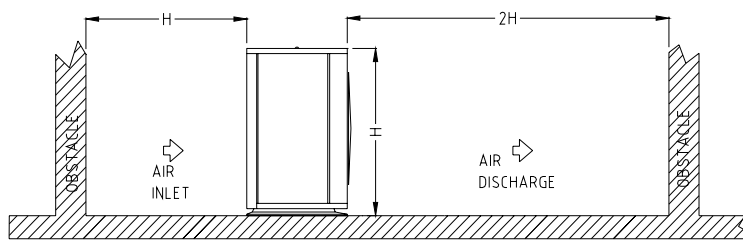
- Ensure that there is no obstruction to air flow into or out of the unit. Remove obstacles which block air intake or discharge



- The location must be well ventilated, so the unit can draw in and distribute plenty of air thus lowering the condensing temperature
- To optimize the unit running conditions, the condenser coil must be cleaned at regular intervals

Installation clearance

- The installation location should allow sufficient space for air flow and maintenance around the unit



Installation

Field piping

Important Note:

Line sizing should only be determined by qualified personnel. All local codes of practice must be observed in the installation of refrigerant piping

To ensure satisfactory operation and performance, the following points should be noted for field piping arrangements:

- Pipework routes must be as simple and as short as possible.
- Avoid low points on pipework where oil can accumulate.
- Suction gas velocity must be sufficient to ensure good oil return.
- Use only clean, dehydrated refrigeration grade copper tube with long radius elbows.
- Avoid flare type connections and take great care when brazing. Use only silver alloy rods.
- Run braze without over filling to ensure there is no leakage into the tube.
- To prevent oxidation, blow nitrogen through pipework when brazing.
- Install insulation on all suction lines and on all pipes penetrating walls.
- Adequately support all pipe work at a maximum of 2 meter intervals.
- In vertical pipework, the use of U-trap and double suction risers is often required. These suction risers must always be fitted with a U-trap at the bottom and a P-trap at the top and never be higher than 4m unless a second U-trap system is fitted.

Correct line sizing will minimize the pressure drop and maintain sufficient gas velocity for proper oil return.

Important Note:

One of the main factors affecting equipment reliability and compressor service life is refrigeration circuit contamination. During installation, circuit contamination can be caused by:

- Brazing & Welding Oxides
- Filings & Particles from de-burring pipework
- Brazing Flux
- Moisture & Air

Installation

Leak detection

- Perform a leak test of the system using nitrogen mixed with the refrigerant to be used
- Do not use CFC for leak testing the condensing unit which will be used with HFC refrigerants
- The use of leak testing fluids is not recommended as this may interact with the lubricants own additives

Pressure testing

- When running a pressure test, always use an inert, dry gas such as Nitrogen
- The pressure differential between the high and low side shall not exceed 24 bar (350 psig)
- Maximum test pressures are: **25 Bar (370 psig) on the Low Side.**
33 Bar (480 psig) on the High Side.

Safety pressure switch settings

The Danfoss KP15 HP/LP pressure switch fitted to JEH model condensing units with auto reset for Low Pressure and manual reset for High Pressure is **NOT** factory preset. Be sure that the high pressure setting does not exceed the receiver's maximum service pressure.

High pressure safety

The high pressure safety switch is required to stop the compressor should the discharge pressure exceed the values shown in the following table. The high pressure switch can be set to lower values depending on the application and ambient conditions

Refrigerant	R404a	R134a	R407c
HP Setting (bar g.)	28	20.2	28
HP Setting (psig)	400	300	400

Source: Maneurop

Low pressure safety

The low pressure safety switch protects the compressor against deep vacuum operation, a potential cause of failure due to internal arching.

The low pressure safety cut out should never be set below 0.1 bar (2 psig) as shown in the following table. For systems without pump-down the LP switch signal contact shall be used to energize a low pressure safety alarm.

Refrigerant	R404a	R134a	R407c
Cut Out (bar)	0.1	0.4	1
Cut In (bar)	1.2	1.2	2

Source: Maneurop

Installation

Important Note:

There must be no more than 12 starts per hour. A higher number reduces the service life of the compressor. If necessary, use an anti-short-cycle timer in the control circuit. A three minute time out is recommended

Vacuum – moisture removal

Important Note:

Moisture prevents proper functioning of the compressor and the refrigeration system

Air and moisture reduce service life and increase condensing pressure causing abnormally high discharge temperatures likely to destroy the oil's lubricating properties. The risk of acid formation is also increased by air and moisture and copper plating can be generated in this way. All these phenomena can cause mechanical and electrical failure.

Important Note:

Ensure that a good quality vacuum pump is used to pull a minimum vacuum of 250 microns (0.33 mbar)

Service & maintenance

Important Note:



Warning! – Disconnect the mains electrical supply before servicing or opening the unit

The condensing units are designed to give long life operation with minimum maintenance. However, they should be routinely checked and the following service schedule is recommended under normal circumstances:

The removal of the top, side and front panels ensures that all parts are accessible.

1. Compressor – Inspect at regular intervals

- Check for refrigerant leaks on all joints and fittings.
- Ensure that no abnormal noise or vibration is detected during test run.
- Check the compressor oil levels and top up if required. The oil level should be $\frac{1}{2}$ to $\frac{3}{4}$ way up the sight glass.

Compressor Type	Oil Type	Order Reference
MGZ (Medium Temp)	Ester 160 PZ	N23020042
LGZ (Low Temp)	Ester 160 Z	N23020043

2. Condenser Fan Motor & Blade – Clean and inspect at regular intervals

- Check for abnormal noise, vibration and fan imbalance.
- Ensure that the fan motor is clean and spins freely.
- Check that the condenser fan blade is clean and free from restriction.
- **Note:** The Fan Motor is pre-lubricated and factory sealed so no maintenance is necessary.

3. Condenser Coil – Clean and inspect at regular intervals.

- Check and remove the dirt and debris between the fins using a suitable chemical coil cleaner.
- Check and remove any obstacles which may hinder the airflow through the condenser coil.

4. Power Supply – Inspect at regular intervals.

- Check the running current and voltage for the condensing unit.
- Check the electrical wiring and tighten the wires onto the terminal blocks if necessary.



J & E Hall Limited
Hansard Gate
West Meadows
Derby, DE21 6JN
England

Tel: + 44 (0) 1332 253400
Fax: + 44 (0) 1332 371061
Email: helpline@jehall.co.uk
Web: www.jehall.com