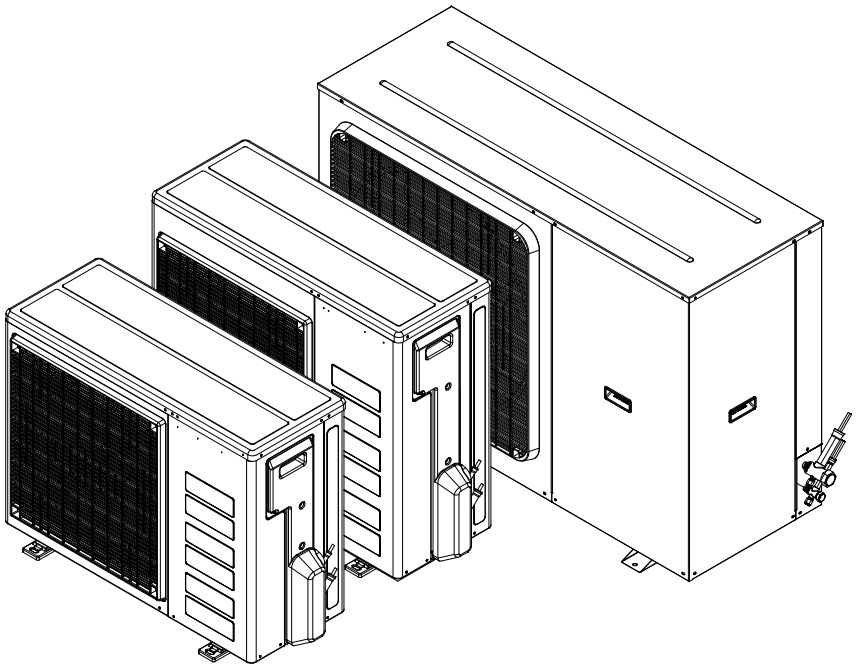
DAIKIN	SEES **AIR COOLED SPLIT COMMERCIAL CONDENSING UNIT**
INSTALLATION, TECHNICAL, MAINTENANCE	**IOM NO:** T-CU11-OCT22-0

RJ0110030013877

Medium Temperature



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IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This guideline is intended for users to ensure safe installation, operation, and maintenance of DAIKIN SEES condensing units. This guideline is not intended to replace the system expertise available from the system manufacturers.

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:

WARNING

Warning! Risk of serious injury or death to person!

NOTICE

Notice! Risk of damage to equipment!

CAUTION

Caution! Danger which can lead to serious damages!

Contents

Product Features

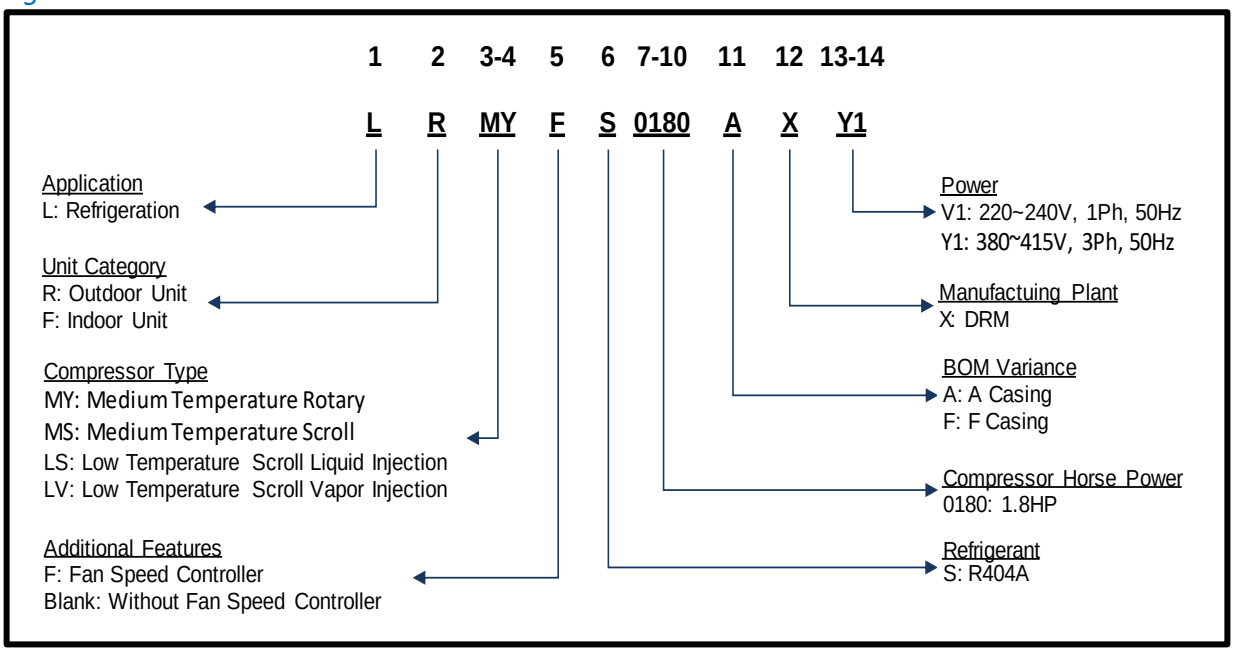
Daikin condensing unit is a partly completed machinery which need to incorporate with indoors, to provide cooling for refrigerated goods. The unit comprise of single fixed speed compressor and condenser in a fully enclosed powder coated housing.

Standard features for all medium model:

- Panasonic rotary compressors
- Panasonic scroll compressors
- Aluminium – copper condenser coil
- Vertical liquid receiver with fusible plug (stop valve on receiver outlet only applicable to model: LRMSS0400/500/600FXY1)
- Fitted with brazed type liquid line drier & sight glass
- Low pressure switch (adjustable for pump down) – default: auto reset
- High pressure safety switch (manual reset cartridge type)
- Liquid and suction services valves on external of unit
- IPX4 rated control panel
- Fuse protection for 1phase controller and fan motor
- Overload and high discharge temperature protection (Only applicable to model: LRMYS0180/250AXY1)
- Acoustic compressor jacket (Only applicable to model: LRMYS0180/250AXY1)
- Acoustic insulation on compressor compartment (Only applicable to model: LRMSS0400/500/600FXY1)
- Robust weatherproof housing
- Approved refrigerants: R404A, R448A & R449A (Data for R448A & R449A will be provided upon request)

Model Name

Figure 1: Nomenclature

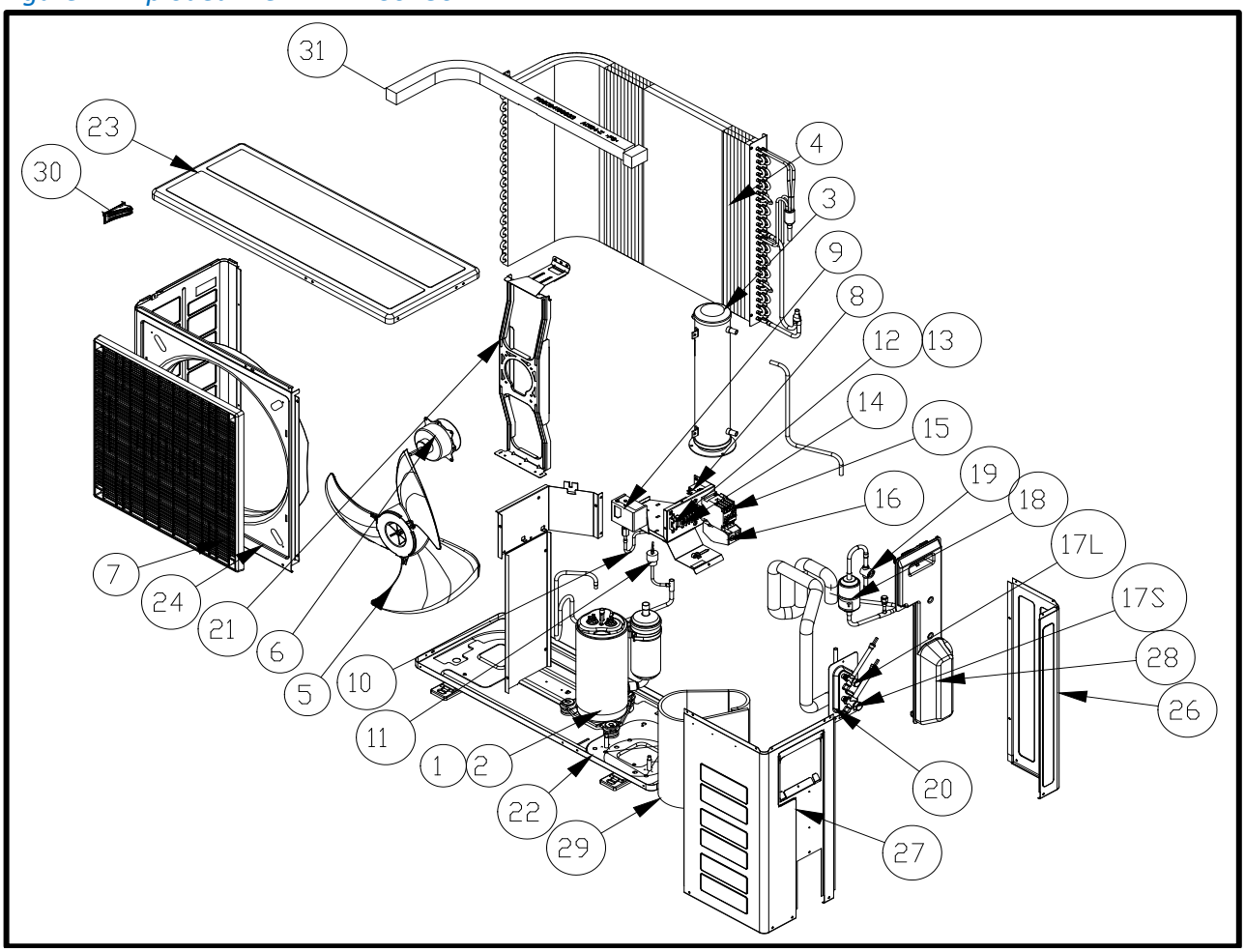


Exploded Views

Table 1: Exploded View Indicator

Item	Description
1	COMPRESSOR
2	COMPRESSOR OIL
3	LIQ. RECEIVER
4	CONDENSER
5	FAN PROPELLER
6	FAN MOTOR
7	FAN GUARD
8	FAN CAPACITOR
9	PRESSURE SWITCH LOW
10	LOW PRESSURE TAPPING
11	PRESSURE SWITCH HIGH
12	FUSE
13	FUSE HOLDER
14	TERMINAL BLOCK
15	CONTACTOR
16	OVERLOAD RELAY
17	VALVE SERVICE
18	FILTER DRIER
19	SIGHT GLASS
20	BRACKET SERVICE VALVE
21	BRACKET FAN MOTOR
22	PANEL BASE
23	PANEL TOP
24	PANEL FAN
25	PANEL LEFT - REAR
26	PANEL RIGHT - REAR
27	PANEL FRONT - RIGHT
28	VALVE COVER ASSEMBLY
29	COMPRESSOR JACKET
30	HANDLE
31	FOAM EPS COIL TOP
32	BRACKET LIQUID PIPE

Figure 2: Exploded View LRMYS0180AXY1



Exploded View

Figure 3: Exploded View LRMYS0250AXY1

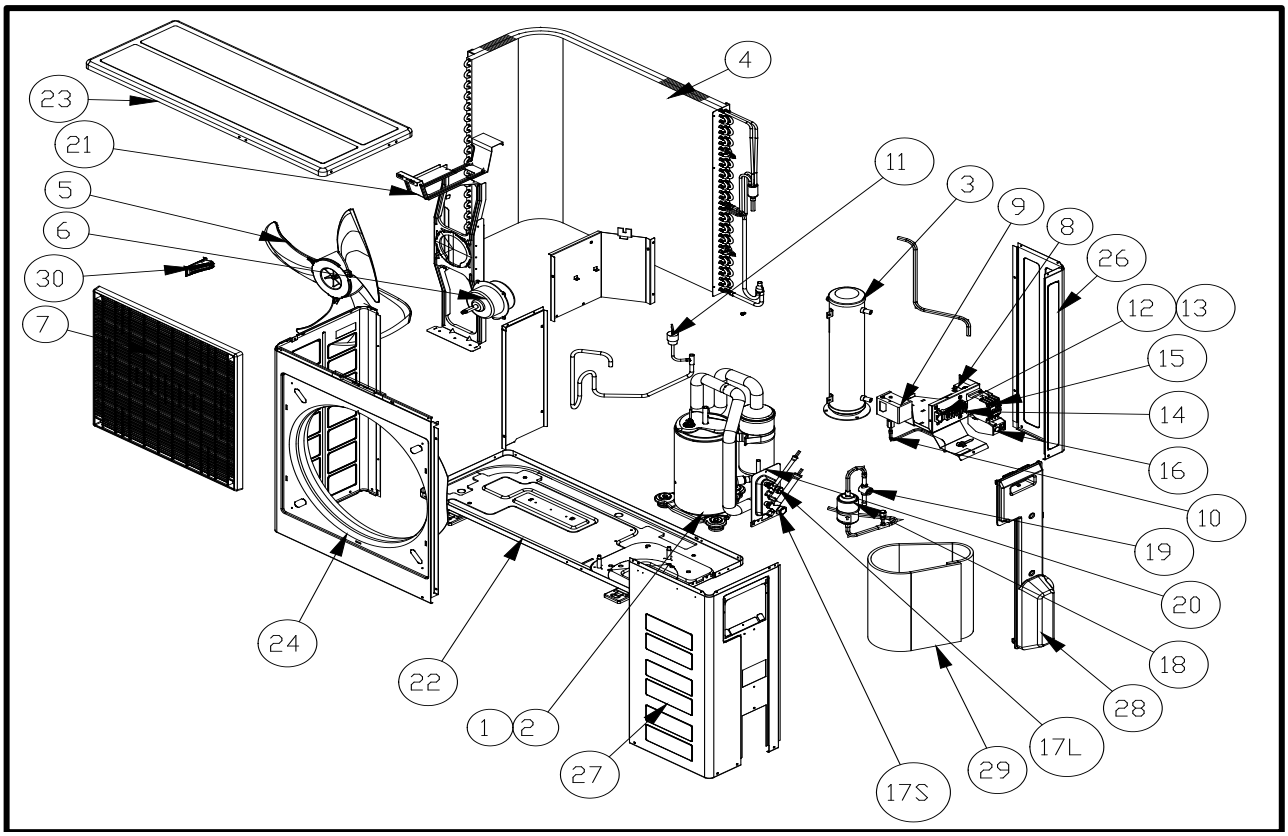
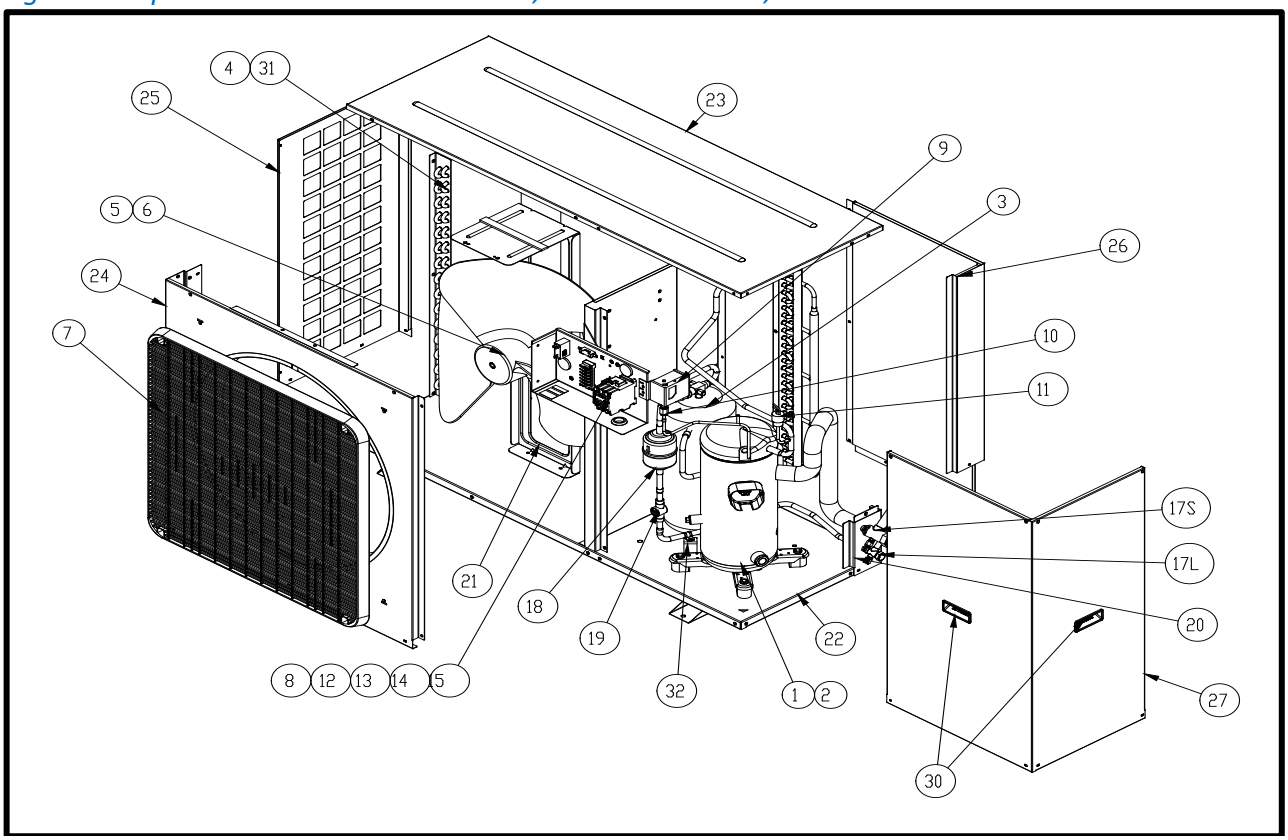


Figure 4: Exploded View LRMSS0400FXY1; LRMSS0500FXY1; LRMSS0600FXY1



Specifications

Table 2: Unit Data

Casing	Model	Compressor				Electrical Data						Connections		Liquid Receiver	Coil Volume	Air flow
		Model	Displacement	Charge Limit	Oil charge	Compressor				Fan		Liquid	Suction			
			(cm^3/rev)	(kg)	(L)	NC (A)	MOC (A)	MCC (A)	LRC (A)	Qty.	FLC (A)	Inch	Inch	(L)	(L)	(m^3/h)
2	LRMYS0180AXY1	KSVB28P14AA	28.2	1.25	0.7	2.9	5.0	5.0	20	1	0.4	3/8"	1/2"	2.4	1.62	1874
	LRMYS0250AXY1	JSVB39P14AA	38.6	2.1	1.1	3.8	6.5	6.5	26	1	0.5	3/8"	5/8"	2.4	1.97	2548
3	LRMSS0400FXY1	3CB067SA0M	66.8	4.8	1.7	5.9	8.8	11.8	48	1	1	1/2"	7/8”	7.6	4.2	4280
	LRMSS0500FXY1	3CB084SA0M	84.4	4.8	1.7	7.1	10.2	15.3	61	1	1	1/2"	7/8”	7.6	4.2	4280
	LRMSS0600FXY1	3CB100SA0M	99.8	4.8	1.7	8.2	11.7	16.1	67	1	1	1/2"	7/8”	7.6	4.07	3910

Oil type: FV68S
NC = Nominal Current rated at -10^{0}C Te /+32^{0}C Ta
MOC = Maximum Operating Current
MCC = Maximum Continuous Current (current drawn by compressor before internal protector trip)
LRC = Lock Rotor Current
FLC = Full Load Current

Table 3: Unit Sound Data and Dimension

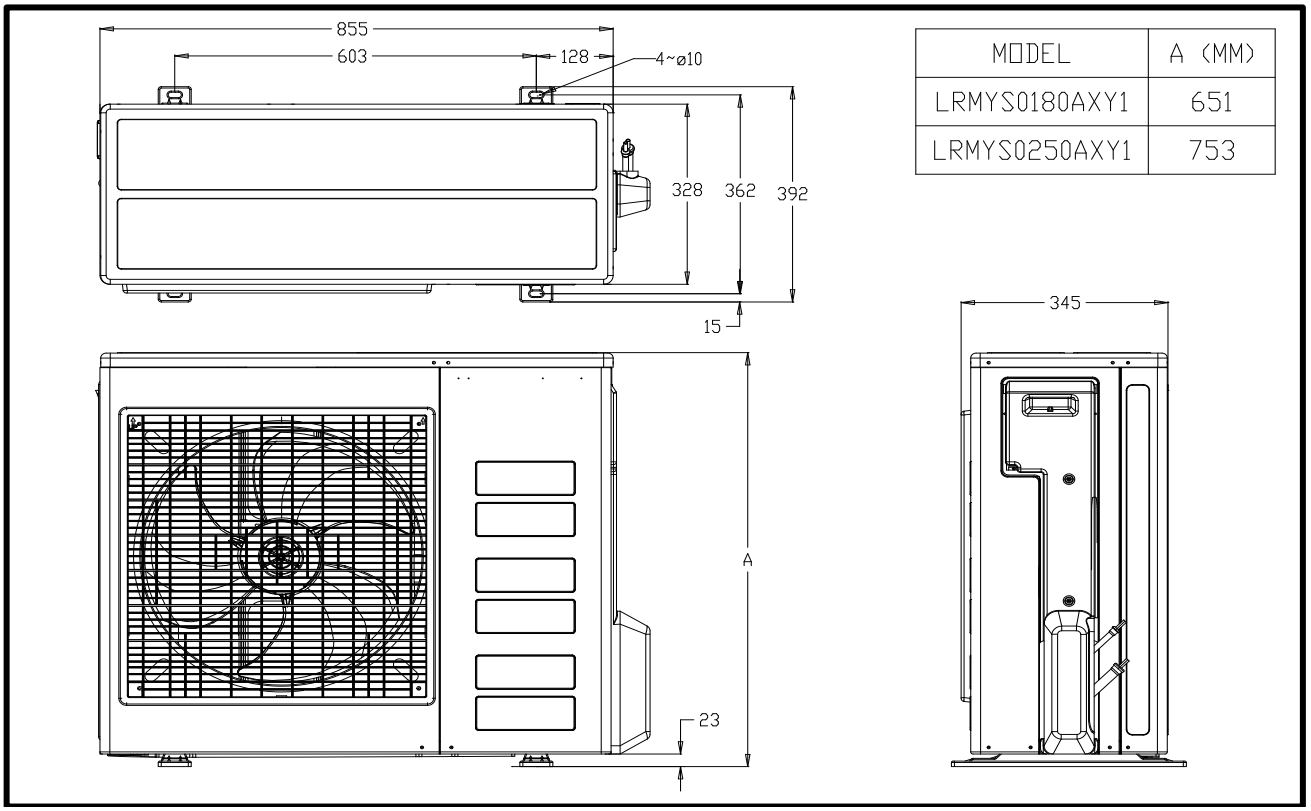
Model	SPL @ 10m dB(A)	Overall Dimensions (mm)			Mounting Dimensions (mm)		Dry Weight	Gross Weight
		Width	Depth	Height	Width	Depth	(kgs)	(kgs)
LRMYS0180AXY1	27	855	318	651	603	362	45	49
LRMYS0250AXY1	28	855	318	753	603	362	55	59
LRMSS0400FXY1	34	1349	544	870	945	500	104	126
LRMSS0500FXY1	35	1349	544	870	945	500	106	128
LRMSS0600FXY1	35	1349	544	870	945	500	112	134

Sound Pressure Level (SPL) measured in an anechoic room at -10°C Te /+32°C Ta MT conditions. Alternative conditions may produce different results.

Specifications

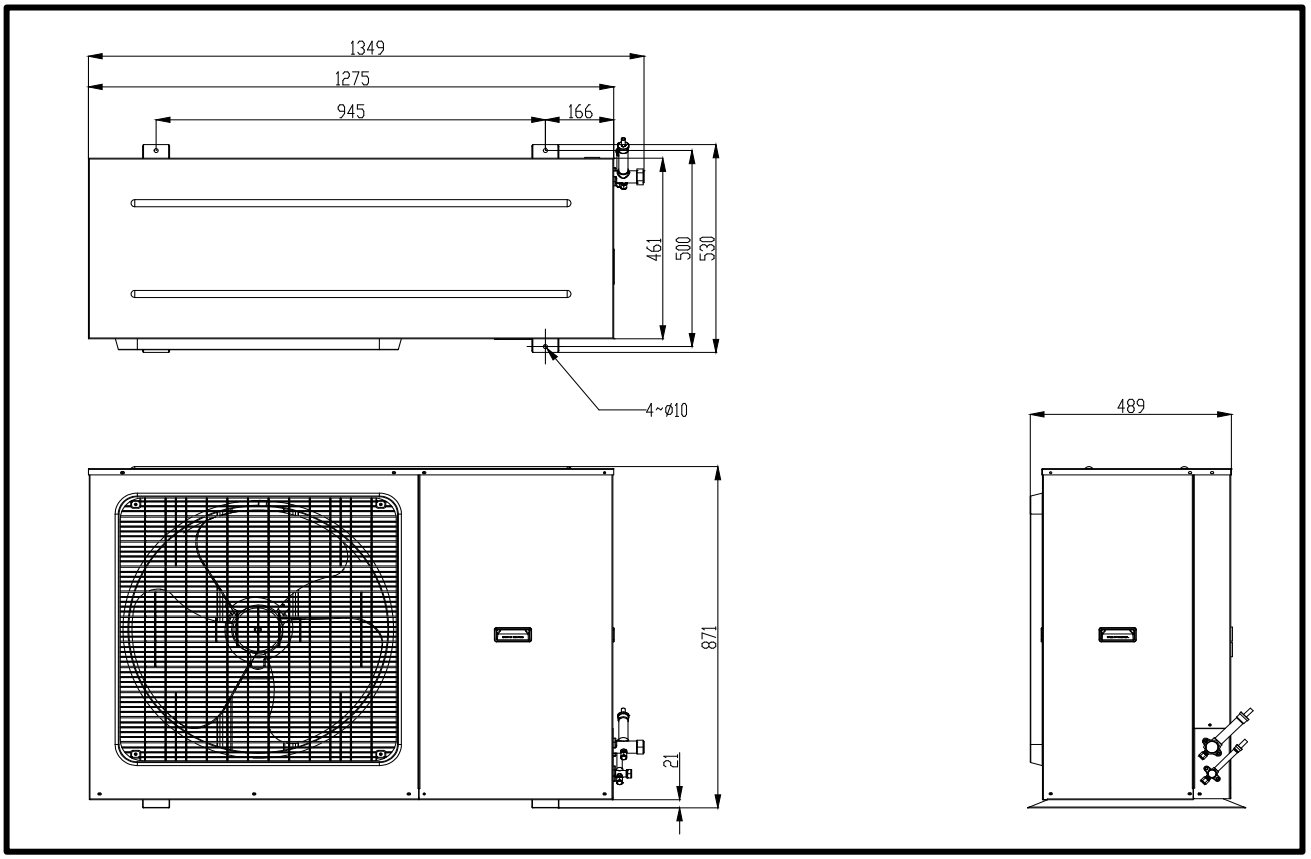
Outline Drawings

Figure 5: Outline Drawing LRMYS0180AXY1; LRMYS0250AXY1



MODEL	A (MM)
LRMYS0180AXY1	651
LRMYS0250AXY1	753

Figure 6: Outline Drawing LRMSS0400FXY1; LRMSS0500FXY1; LRMSS0600FXY1



Specifications

Performance Data

The performance data shown in Table 4 is rated at suction superheat 10K, sub cooling 0K. Different rating condition will produce different cooling capacity.

- Te: Evaporating Temperature (^{0}C)
- Ta: Ambient Temperature (^{0}C)
- CC: Cooling Capacity (W)
- PC: Power Consumed (W)
- COP: Coefficient of Performance (W/W)
- Data presented in accordance with BS EN13215:2016

Table 4: R404A Medium Temperature Performance Data

MODEL	Ta \ Te		-20	-15	-10	-5	0	5	10
LRMYS0180AXY1	27	CC	1646	2373	3100	3828	4555	5283	6010
	27	PC	1208	1260	1312	1364	1416	1468	1520
	27	COP	1.36	1.88	2.36	2.81	3.22	3.60	3.95
	32	CC	1461	2091	2720	3350	3979	4609	5238
	32	PC	1362	1410	1458	1506	1554	1602	1650
	32	COP	1.07	1.48	1.87	2.22	2.56	2.88	3.17
	38	CC	1394	1951	2507	3064	3621	4177	4734
	38	PC	1384	1458	1531	1605	1679	1753	1826
	38	COP	1.01	1.34	1.64	1.91	2.16	2.38	2.59
	43	CC	1293	1777	2261	2746	3230	3715	4199
	43	PC	1430	1520	1610	1700	1790	1880	1970
	43	COP	0.90	1.17	1.40	1.62	1.80	1.98	2.13
	46	CC		1658	2095	2532	2968	3405	
	46	PC		1579	1674	1769	1863	1958	
	46	COP		1.05	1.25	1.43	1.59	1.74	
LRMYS0250AXY1	27	CC	2462	3459	4455	5452	6448	7445	8442
	27	PC	1611	1684	1756	1829	1901	1974	2046
	27	COP	1.53	2.05	2.54	2.98	3.39	3.77	4.13
	32	CC	2347	3255	4164	5072	5980	6888	7796
	32	PC	1716	1804	1892	1979	2067	2155	2242
	32	COP	1.37	1.80	2.20	2.56	2.89	3.20	3.48
	38	CC	2209	3011	3814	4616	5418	6220	7022
	38	PC	1840	1943	2046	2149	2251	2354	2457
	38	COP	1.20	1.55	1.86	2.15	2.41	2.64	2.86
	43	CC	2094	2808	3522	4236	4949	5663	6377
	43	PC	1940	2050	2160	2270	2380	2490	2600
	43	COP	1.08	1.37	1.63	1.87	2.08	2.27	2.45
	46	CC		2686	3347	4007	4668	5329	
	46	PC		2140	2270	2400	2530	2660	
	46	COP		1.26	1.47	1.67	1.85	2.00	

Continued

MODEL	Ta \ Te		-20	-15	-10	-5	0	5	10
LRMSS0400FXY1	27	CC	5801	6791	7943	9291	10876	12745	14952
	27	PC	2797	2931	3077	3234	3400	3572	3747
	27	COP	2.07	2.32	2.58	2.87	3.20	3.57	3.99
	32	CC	5301	6214	7270	8507	9965	11692	13739
	32	PC	3033	3178	3335	3503	3679	3862	4048
	32	COP	1.75	1.96	2.18	2.43	2.71	3.03	3.39
	38	CC	4747	5584	6543	7661	8980	10548	12417
	38	PC	3346	3504	3674	3855	4044	4238	4436
	38	COP	1.42	1.59	1.78	1.99	2.22	2.49	2.80
	43	CC		5113	6003	7035	8250	9696	
	43	PC		3800	3981	4172	4371	4576	
	43	COP		1.35	1.51	1.69	1.89	2.12	
	46	CC		4853	5709	6694	7851		
	46	PC		3988	4176	4373	4578		
	46	COP		1.22	1.37	1.53	1.71		
LRMSS0500FXY1	27	CC	7157	8296	9580	11003	12564	14268	16122
	27	PC	3237	3516	3807	4101	4389	4664	4921
	27	COP	2.21	2.36	2.52	2.68	2.86	3.06	3.28
	32	CC	6488	7557	8792	10181	11721	13410	15253
	32	PC	3643	3907	4177	4444	4704	4950	5179
	32	COP	1.78	1.93	2.10	2.29	2.49	2.71	2.94
	38	CC	5759	6759	7939	9286	10791	12453	14270
	38	PC	4201	4433	4665	4892	5110	5315	5507
	38	COP	1.37	1.52	1.70	1.90	2.11	2.34	2.59
	43	CC		6169	7307	8615	10085		
	43	PC		4919	5109	5294	5472		
	43	COP		1.25	1.43	1.63	1.84		
	46	CC		5847	6961	8245	9692		
	46	PC		5230	5392	5549	5700		
	46	COP		1.12	1.29	1.49	1.70		
LRMSS0600FXY1	27	CC	8185	9497	11125	13024	15164	17529	20114
	27	PC	3967	4251	4545	4842	5131	5403	5653
	27	COP	2.06	2.23	2.45	2.69	2.96	3.24	3.56
	32	CC	7511	8758	10298	12086	14092	16296	18692
	32	PC	4417	4697	4986	5275	5555	5818	6060
	32	COP	1.70	1.86	2.07	2.29	2.54	2.80	3.08
	38	CC	6762	7952	9399	11065	12917	14936	17110
	38	PC	5023	5293	5568	5842	6105	6353	6582
	38	COP	1.35	1.50	1.69	1.89	2.12	2.35	2.60
	43	CC		7346	8729	10301	12032		
	43	PC		5839	6098	6353	6599		
	43	COP		1.26	1.43	1.62	1.82		
	46	CC		7012	8361	9881			
	46	PC		6189	6435	6678			
	46	COP		1.13	1.30	1.48			

Application Guidelines

NOTICE

Eensure that the refrigeration system which adopt this condensing unit MUST integrated with pump down features (solenoid valve installed at condensing unit liquid line outlet and energized by room thermostat). Failure to fulfill this requirement cause liquid compression and as consequence reduce lifetime of compressor.

Table 5: Application Envelope

Operating Limits	Recommendation
Discharge gas temperature	105^0C maximum for rotary compressor 115^0C maximum for scroll compressor
Evaporator outlet superheat	Above 6K (to avoid liquid flood back)
Suction gas superheat at compressor inlet	Not more than 20K
Voltage supply	Min: 360V, Max: 440V
Phase asymmetry	+/- 2%
Frequency	50Hz +/- 1%
Outdoor ambient	Min: 20^0C, Max: Refer Performance Data

Suction line shall be insulated to avoid:

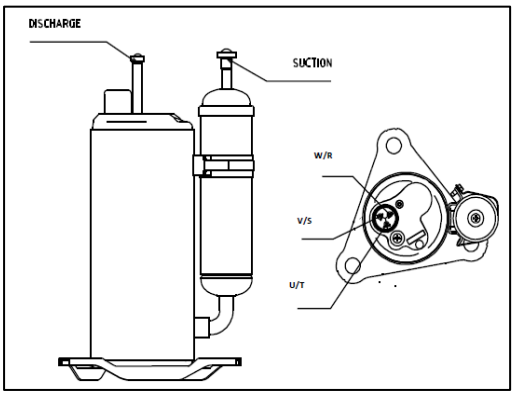
- High superheat during high ambient condition that can create high discharge temperature.
- Too low superheat during low ambient condition that can condense refrigerant inside suction line.

Compressor

Rotary Compressor

CAUTION

The rotary compressor inside DAIKIN condensing unit is a high-pressure dome compressor, with 2 poles 3phase AC motor. The pressure inside the shell of compressor is a high (discharge) pressure and have high temperature. Care must be taken when orientate the power supply cables to the compressor. Never touch the power supply cable to body of compressor, unless heat resistant cables are used.



When replace rotary compressor, follow sequence below for removing seal caps from the compressor:

i. Place the compressor in vertical position
ii. Remove seal cap from discharge tube and then
iii. Remove seal cap from suction tube

Phase Sequence and Reverse Rotation Protection

NOTICE

3 phase scroll and rotary compressor require proper phase sequence to secure correct rotation direction and therefore compression. The phase sequence must be secured between incoming power supply and compressor.

Three phase scroll and rotary compressor motors are designed to run only in one direction. The correct rotation of a three-phase compressor motor depends on the connection of the three incoming phases to the unit. Correct rotation can be determined by a drop in suction pressure and a rise in discharge pressure when the compressor is energized.

Application Guidelines

Running the compressor for a short period of time in reverse direction will have no negative impact but prolonged running in reverse direction may cause premature failure. To reverse the rotation of a three-phase scroll compressor, shut off the incoming power supply to the unit, swap connection of any two of the three incoming phases at the unit's terminal block, reapply power to the unit and following compressor restart, recheck operating pressures.

For three phase systems, reverse rotation module in the system control unit is recommended in preventing three phases compressor from running in the reverse rotational direction.

Voltage Imbalance

When the compressor is starting, the high starting current will cause drop of voltage. There is a possibility that compressor fail to start if the starting voltage is too low. Thus, each phase voltage measured at the terminal of three phase scroll/rotary compressor should be ±2% of the average of all phases.

Overload and Overheating Protection

For rotary 3 phase compressor: the compressor is protected by internal thermostat with specification (cut out = 110±4^{o}C, cut in = 95±5^{o}C). The internal thermostat connected to external overload protector, to disconnect all three phases at contactor in case of overtemperature and overcurrent.

Overheating could be due to compressor working at high compression ratio (low evaporating and high condensing pressure); loss/ inadequate charge; or condenser fan not working. Time must be allowed for the compressor to cool down before the thermostat to reset.

For scroll compressor, an internal line break motor protector is located at the center of the Y of the motor windings (motor located in low pressure dome), to disconnect all three phases in case overcurrent or overtemperature condition. The protector is the automatic reset device containing snap action bimetal switch which reacts to a combination of motor current and motor windings temperature. When internal motor protector has tripped, it will take 30 to 40 minutes to reset and then the compressor will restart.

On a field application, when the internal motor protector has tripped, the compressor will stop while each of 3 terminals is still energized, to which either the customer or serviceman may regard the compressor as fail down. Therefore, the above-mentioned situation should be taken into consideration.

Over Pressure Protection

All Daikin condensing units are fitted with adjustable auto reset low pressure switch and manual reset cartridge type high pressure switch.

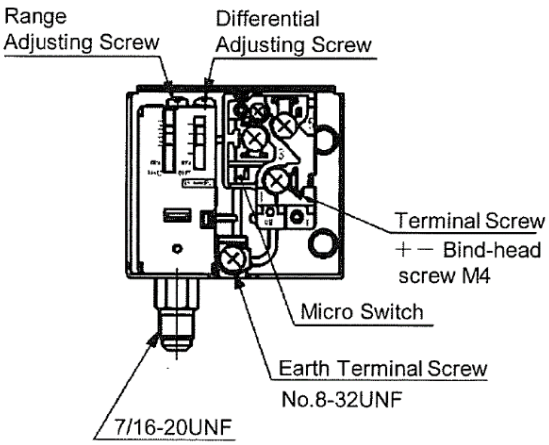
Low Pressure Switch

The low-pressure safety switch protects the compressor against deep vacuum operation or loss of refrigerant conditions, to avoid internal arcing at the electric terminal and the damage of compressor.

When low pressure occurs outside of compressor limit, the temperature in the compressor motor will rise rapidly. Sometimes, the low-pressure switch will react in priority to the action of the discharge thermostat or motor internal protector when huge amounts of refrigerant leaks in short time.

Application Guidelines

The low-pressure safety cut out should never be set below the settings as shown in the Table 6 and **THE SETTINGS MUST BE ADJUSTED TO SUIT THE APPLICATION BEFORE STARTING THE UNIT**.



Setting Procedure for Single Pressure Switch:

i. Cut in range: Turning the range adjusting screw (4) clockwise will decrease the cut-in pressure setting and vice versa.
ii. Differential range: Turning the differential adjusting screw (5) clockwise will increase the differential pressure setting and vice versa.

High Pressure Switch

Manual reset cartridge type high-pressure switch is integrated in the condensing unit to protect the compressor during blocked fan or fan failure conditions. After fault is removed and high side pressure drops below 22barg, reset by pressing the red button of the high-pressure switch.

Pump Down Recommendations

NOTICE

If pump down is used, the electrical circuitry should be arranged so that compressor restart is triggered by demand from thermostat rather than a reset low pressure switch.

The rotary/scroll compressor built in with a discharge valve to prevent high-pressure backflow into the low side. This check valve prevents system pressures from equalizing and pump down could be achieved. However, there is potential short cycling condition:

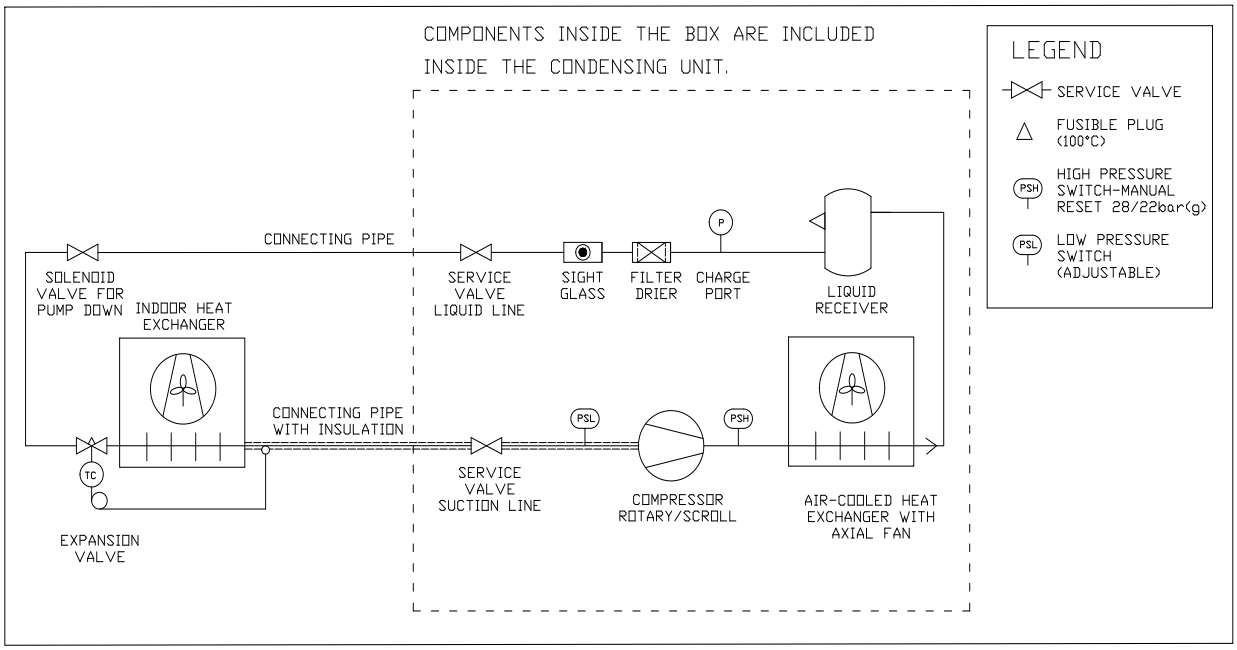
i. If the low-pressure switch differentiate pressure is too close, the possibility of short cycling will increase. Refer Table 6 for the recommended settings to limit the short cycling.
ii. If short cycling cannot be avoided for wiring where compressor restart triggered by low pressure switch, using a 3-minute time delay will limit the cycling of the compressor to an acceptable level.
iii. To eliminate the short cycling during defrost, the activation of compressor shall be triggered by demand from thermostat.

Table 6: High- and Low-Pressure Switch Settings

Application	**Refrigerant**	**Low Pressure Settings bar(g) (Auto Reset)**					**High Pressure Settings bar(g) (Manual Reset)**	
		Min. Cut Out	Factory Default		Pump Down System (Recommended)		Cut in	Cut Out
			Cut in	Differential	Cut in	Differential		
MT	R404A/R448A/ R449A	1.5	3	1	4	2.5	22	28

Application Guidelines

Figure 7: Piping Diagram for Pump Down System



Suction Accumulator

An accumulator is required if repeated flooded starts could occur, dilute the oil in the compressor causing inadequate lubrication and bearing wear.

A suction accumulator MUST added at suction line near to compressor for:

i. System with charge exceed compressor limit.
ii. Systems with defrost schemes or transient operations that allow prolonged, uncontrolled liquid return to the compressor.

Suction accumulator may not be required for system with room thermostat control with pump down (solenoid valve installed at liquid line), with the condition suction header of sufficient volume is made to prevent liquid migration to the compressor during off cycle.

Disharge Thermostat

The discharge temperature will rise rapidly if the compressor is running under the overload conditions or lack of refrigerant conditions.
For scroll compressor, the internal motor protector cannot protect the compressor against all the possible failures. Thus, it is recommended to install external discharge thermostat located on the discharge line within 100mm (4") of the compressor shell with cut out temperature not exceed 130^0C. The discharge thermostat should be installed on top side of the discharge tube and it also important be well insulated.

Crankcase Heaters

The refrigerant is usually gathering in coldest point within the system during OFF cycle and the compressor might become the right one where most of liquid refrigerant centralized.
Crankcase heater is required when the system charge exceed charge limit and require remain energized during the compressor off cycles. The initial start in the field is a very critical period for any compressor because all load-bearing surfaces are new and require a short break-in period to carry high loads under adverse conditions. Thus, the crankcase heater must be turned on a minimum of 12 hours before first time start, to prevent oil dilution and bearing stress on initial start-up.
A 35-Watts crankcase heater is recommended for scroll compressor model and should be well attached to the compressor shell.

Health and Safety

DAIKIN Condensing Unit has to be installed and commissioned by competent personnel, who are familiar with refrigeration systems and components including all controls. 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 standards and local laws.

General Information

Before Installation

- Ensure the units received are the correct models for the intended application.
- Ensure the refrigerant; electrical supply and maximum working pressure (MWP) are all suitable for the proposed application.
- Check there is no damage to the units. Any damage should be advised to the supplier immediately.
- Check that the proposed equipment locations are suitable and provide adequate support for the weight of the units.

Offloading and Lifting

- Whenever a condensing unit is lifted, it should be from the base and, where possible, all packing and protection is kept in position.
- If lifting equipment is required, ensure that it is suitable, certificated, and that the operatives are qualified to use it.
- When using a fork-lift or pallet truck to lift the unit, the two support points should be sufficiently apart to give stability when lifting and suitably placed to distribute the load on the forks.
- If slings are used, care should be taken to ensure that the slings do not crush the casework or coil.
- When lifting by crane, use spreader bars to prevent compressing the top of the equipment.
- Do not drop the unit. Should this inadvertently happen, it should be immediately unpacked and inspected for damage.
- Use the appropriate spreader bars/lifting sling with the holes and lugs provided.

During Installation and subsequent maintenance

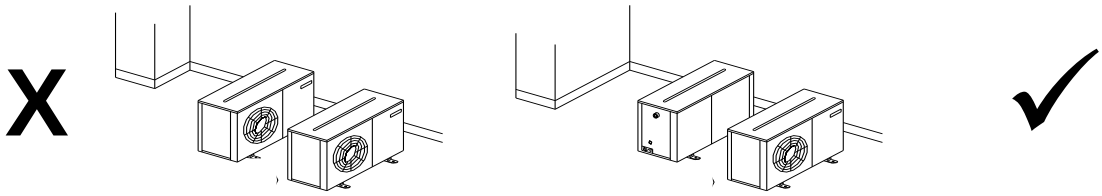
- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and experienced with this type of equipment.
- Safe working methods are identified, and operatives have suitable Personal Protective Equipment (PPE).
- Ensure the working area has adequate ventilation during brazing procedures.
- The units contain moving machinery and electrical power hazards, which may cause severe injury or death. Disconnect and shut off power and wait until the rotating blades stop before installation or service of the equipment.
- Refrigerant release into the atmosphere is illegal. Proper evacuation, recovery, handling, and leak testing procedures must be observed at all times.
- Units must be **grounded to the screw terminal labelled** 
- No maintenance work should be attempted prior to disconnecting the electrical supply.
- The fan guards must remain always fitted when put under operation.
- Use of the units outside of the design conditions and the application for which the units were intended may be unsafe and be detrimental to the units, regardless of short term or long-term operation.
- The units are not designed to withstand loads or stresses from other equipment or personnel. Such extraneous loads or stress may cause failure/leak/injury.
- The installer must fix the unit securely on installation using the M8 bolt holes in the unit feet to prevent instability from accidental contact or from exposure to the elements (example: wind).
- The units are not designed to operate with any restrictions such as heavy snowfall around them. Additional measures (such as shielding of the units) shall be implemented as required.

Installation

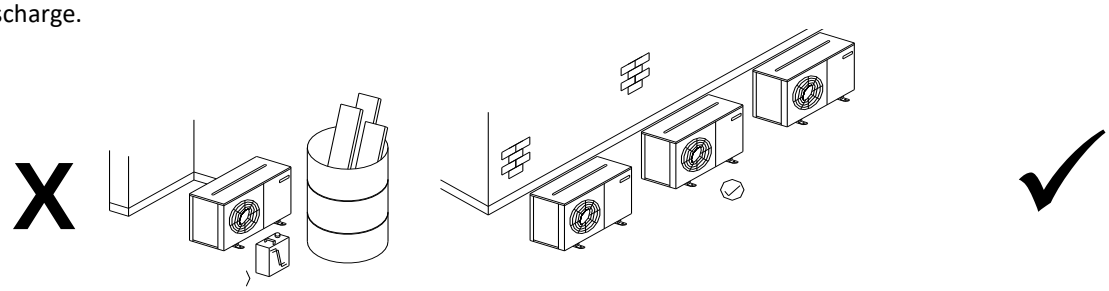
Unit location

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 ejected by the condensing unit cannot be drawn in again (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.



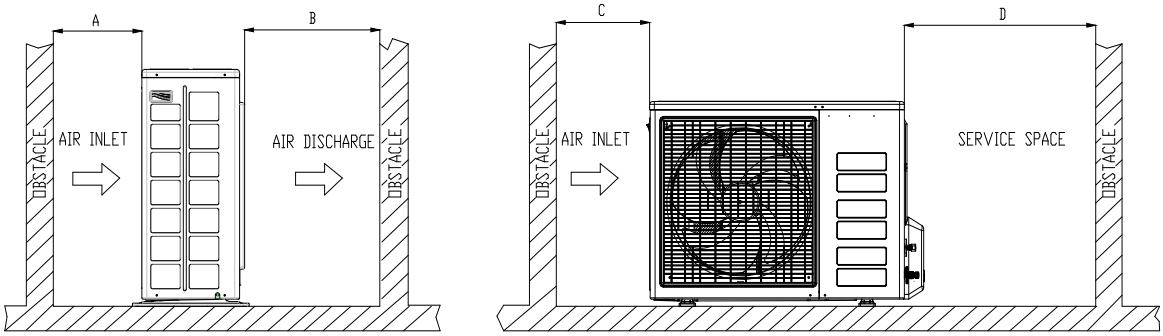
- The location must be well ventilated, so the condenser fan could draw in and distribute plenty of air thus lowering the condensing temperature and power consumption.
- Air leaving the condenser should avoid facing prevailing wind, which impede air flow and thus causing high condensing temperature.
- To optimize the unit running conditions, the condenser coil must be cleaned at regular intervals.
- The unit must be level in all directions.
- It is recommended to install the unit on rubber grommet or vibration dampers.
- Wall mounting on brackets is only suitable for models with single condenser fan.

NOTICE

Special attention should be given if unit installed near to the sea as this can reduce unit lifespan due to corrosion of metal parts.

Installation clearances

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



ALL MODELS	A	B	C	D
Minimum Distance	300 mm	1000 mm	300 mm	500 mm

Installation

Field Piping

NOTICE

Pipe sizing should only be determined by qualified personnel. Correct line sizing will minimize the pressure drop and maintain sufficient gas velocity for proper oil return. All applicable standards must be observed in the installation of refrigerant piping.

To ensure satisfactory operation and performance, the following points should be noted:

- 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 bends.
- 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 oxygen free nitrogen through pipework when brazing.
- Install insulation on all suction lines and on all pipes penetrating walls or passing through hot areas.
- Adequately support all pipe work at a maximum of 2meter intervals.
- Where the condensing unit is situated below the indoor unit (cold room evaporator / display case), the height difference between the two units should be no more than 6meter.
- 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.
- Additional oil may be required if piping length exceeds 25m or multiple oil traps are fitted. Check the oil level closely during commissioning and add oil as necessary. Add oil in small amounts. **Do not overfill the compressor!**
- Suction pipework should slope gently back towards the unit to assist oil return to the compressor. A fall of approximately 2 cm per meter of pipework is acceptable.
- Liquid lines should be sized to ensure a full supply of liquid refrigerant to the expansion device. Careful attention should be paid for sizing of liquid lines on large risers (maximum rise 6m).
- In some circumstances, a suction accumulator (not supplied) may be required. It offers protection against refrigerant flood back during operation and 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.
- An MOP expansion valve is recommended for all low temperature installations.
- The system should be installed to utilize a pump down configuration.
- Maximum recommended pipe length is 25m for rotary unit LRMYS0180/250AXY1; 50m for scroll unit LRMSS0400/500/600FXY1 from the closest indoors.

System Cleanliness

The presence of non-condensable substances and contaminants such as metal shavings, solder, and flux in the system, have a negative impact on compressor service life. Contaminants which is small enough to pass through the mesh screen could cause considerable damage within bearing assembly. The use pf highly hygroscopic PVE oil in the compressor requires that the oil be exposed to the atmosphere just as little as possible.

During installation, circuit contamination can be caused by:

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

NOTICE

One of the main factors affecting equipment reliability and compressor service life is refrigeration circuit contamination.

Installation

Pressure Testing

The condensing units are pressure tested in the factory prior to dispatch. All units come with a holding charge of oxygen free nitrogen. Remove the holding charge indication tag which is tied to service valve before installation.

Once the pipework installation is complete, it should be pressure tested for leaks prior to evacuation.
A pressure leak test should be carried out using oxygen free nitrogen (OFN). A calibrated nitrogen pressure regulator must always be used. Before starting any pressure testing, ensure the area surrounding the system is safe, inform relevant personnel and fit warning signs indicating high pressure testing. Also, use correct PPE as required.

Leak detection must be carried out using oxygen free nitrogen (OFN), or a mixture of nitrogen and refrigerant or nitrogen and helium. Never use other gasses such as oxygen, dry air or acetylene as these may form an inflammable mixture.

Always pressurize the system on high pressure side first then only low-pressure side, preferably in stages up to the maximum required pressure. Never exceed maximum test pressures shown in Table 7. Failure to obey the limit will cause premature failure on the pressure safety device.

Listen for any possible leaks and check all joints with bubble spray. If any leaks are discovered, release pressure slowly from both high pressure and low-pressure side until empty, repair leak and then restart pressure testing procedure. Never attempt to repair a leak on a pressurized system.

A strength test should also be incorporated (to installed pipework only) according to applicable standards.
Once testing has been completed satisfactorily, release the pressure from the system gradually and safely to external atmosphere.

Table 7: Maximum Test Pressures

High Side, barG/ psig	Low Side, barG/psig
28/405	19/275

Evacuation

Moisture prevents proper functioning of the compressor and the refrigeration system. Ensure that a good quality vacuum pump is used to pull a minimum vacuum of 250 microns (0.25 torr) measured at refrigeration system, and not at the vacuum pump gauge.

Once pressure testing has been completed, the system can now be evacuated to remove air and any moisture from the piping. It is recommended to evacuate on both high- and low-pressure side to achieve fast and uniform vacuum in the entire system. This can be done as follows:

- Ensure any nitrogen charge is safely released from the system.
- Connect a gauge manifold to the connections on the service valves on the condensing unit.
- Connect a vacuum pump and vacuum gauge to the system.
- Ensure all gauge manifold and service valves are open as required.
- Evacuate the system until vacuum is below 250 microns (0.25 torr).

Note: A triple evacuation procedure is recommended for all new systems or where moisture is suspected.

Once the system is isolated and the vacuum pump is switched off, any rise in pressure indicates that either there may be a leak in the system or moisture is still present. In this case, recheck the system for leaks, repair as necessary, and then restart the evacuation procedure. Once completed satisfactorily, the vacuum pump and vacuum gauge can be removed.

Installation

System Charging

Once system evacuation has been completed, the system could be charged with the approved refrigerant. Refrigerant must be charged with liquid on the high-pressure side to the extent possible, with the compressor in OFF condition and service valves must be closed. The service port on the receiver outlet rotolock valve (liquid line) can be used for initial charge.

If additional charge is needed, it should be added as liquid, in a controlled manner to the low side of the system with all service valves turn to OPEN position and compressor operating.

For the adjustment of refrigerant charge until the installation reaching a level of stable nominal working condition, slowly throttling liquid in through schrader valve on the suction service valve. Charge system until reaching suction superheat 6~12K at desired evaporating temperature. Suction superheat, suction, and condensing pressures (temperatures) should be monitored. During optimizing charging, ensure oil sight glass doesn't start foaming.

A proper refrigerant charge should secure stable condition at minimum and maximum heat load within the limits of the condensing unit's application envelope.

- Minimum heat load conditions, which occurred during winter. Condenser should not be flooded by liquid refrigerant, receiver and liquid line should be able to contain remaining charge at this condition.
- Maximum heat load conditions, which occurred during summer. All evaporators are working with maximum air/liquid flow via evaporators and refrigerant charge should be enough to feed to all evaporators.

NOTICE

Refrigerant charge by judging the liquid sight glass does not guarantee as 100% correct way.

System maximum charge is approximated = **(Receiver Volume + Internal volume of Liquid Line) * 0.9**

When the compressor operates under stabilized conditions, the oil level must be visible in the sight glass. Foam filling the oil sight glass indicates presence of large concentration of liquid to the compressor.

No additional oil is required for installation with good oil returns, line runs up to 25m. Additional oil might be required if lines exceeded 25m, with minimum oil level must not lower than ¼ of sight glass. Top-up the oil while compressor is idle, via suction schrader connector with a suitable pump.

Ensure an adequate liquid charge has been introduced to the high side of the system before starting to ensure a minimum operating pressure on the suction side of 0.5 bar is maintained, otherwise overheating of the scroll and rotary and subsequent damage may occur.

Never install a system in the field and leave it unattended with no charge, or with the service valves closed without securely locking out the system. This will prevent unauthorized personnel from accidentally operating the system and potentially running the compressor by operating the compressor without charge.

Table 8: Internal Volume of Liquid Line

Liquid Line (Dimension)			Liquid Line (Volume)
OD (inch)	OD (mm)	ID (ID)	L/m
3/8	9.5	7.9	0.05
1/2	12.7	10.7	0.09
5/8	15.9	13.5	0.14
3/4	19.1	16.7	0.22

Installation

Electrical

NOTICE

The mains 3phase electrical supply to the condensing unit MUST fitted via a suitable motor rated circuit breaker or fuse, to provide short circuit protection to the condensing unit. A mains isolator MUST also be fitted to all condensing units unless site conditions or regulations dictate differently.

Daikin condensing units require a 400 Volt / 3 Phase / 50Hz supply, both of which must include a Neutral and an Earth. These systems are not suitable for any other supply voltages (other than specified in Table 5 and are not suitable for 60Hz supplies).
Table below is just a guideline for power supply cable sizes to the condensing unit for maximum length up to 30m. Installer might specify cable size different from this guideline, depending on the wire material and length, system design, ambient temperature, etc.

Table 9: Power Supply Wiring Sizes

Model	Cable size, mm^2 (from network to unit)	Maximum Fuse Rating (A)
LRMYS0180AXY1	2.5	15
LRMYS0250AXY1	2.5	15
LRMSS0400FXY1	4.0	20
LRMSS0500FXY1	4.0	20
LRMSS0600FXY1	4.0	25

Cables to the condensing unit should wherever possible be routed through the designated access (wire bush/valve cover) on the rear-right panel and the termination at control panel should be stress relieved by tie the incoming supply cable with the provided push releasable tie.

NOTICE

Ensure an adequate liquid charge has been introduced to the high side of the system before starting to ensure a minimum operating pressure on the suction side of 0.5 bar is maintained, otherwise overheating of the scroll and rotary and subsequent damage may occur. Refrigerant blend must be charged in liquid form to avoid change of chemical properties.

CAUTION

Never start the compressor under vacuum (do not operate the compressor with the low-pressure cut-out bypassing), as this will cause the rotating part to overheat very quickly causing premature failure.

CAUTION

Do not use a megohmmeter nor apply power to the compressor while the system under vacuum as this may cause internal damage to the compressor.

Installation

Wiring Diagrams

Figure 8: Wiring Diagram LRMYS0180AXY1; LRMYS0250AXY1

APP.	MODEL	C1 (uF)	SETTING TOR1 (A)
	LRMYS0180AXY1	3.0	4.5
	LRMYS0250AXY1	3.5	5.8

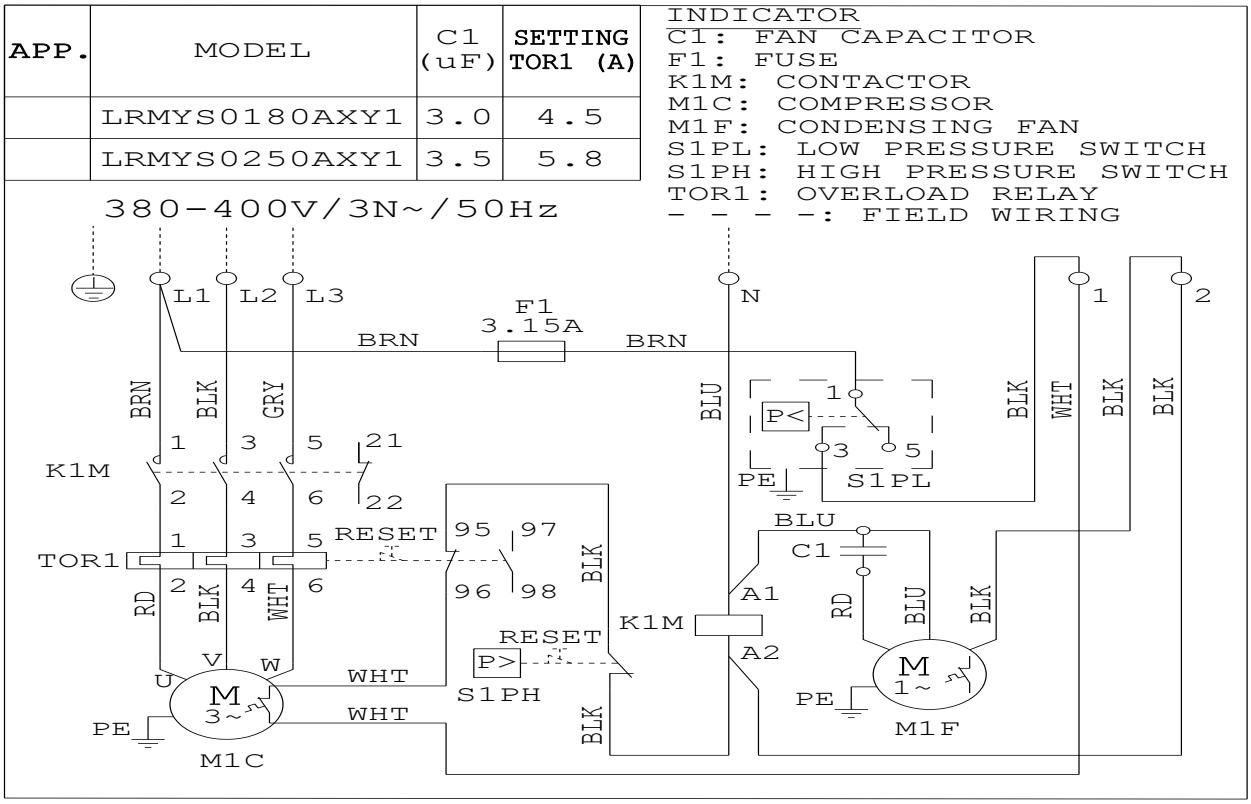
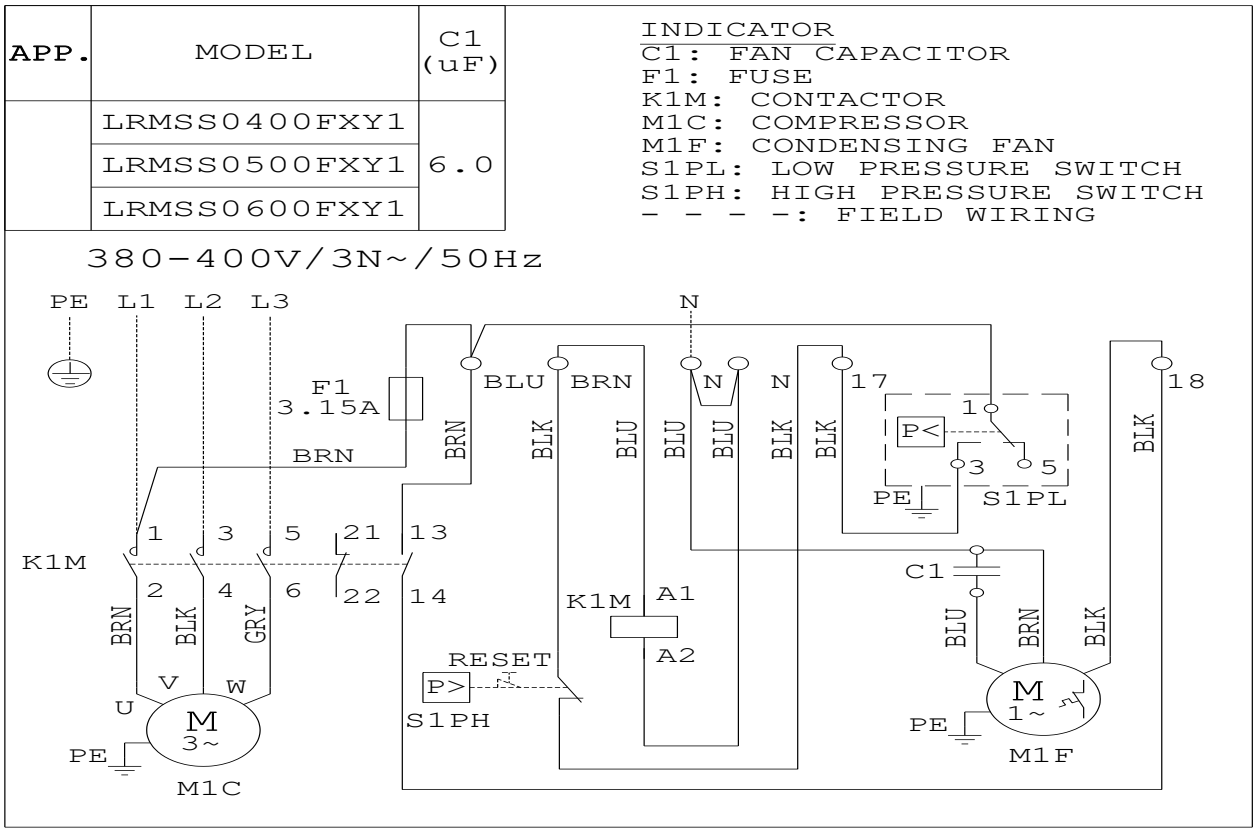


Figure 9: Wiring Diagram LRMSS0400FXY1; LRMSS0500FXY1; LRMSS0600FXY1

APP.	MODEL	C1 (uF)
	LRMSS0400FXY1	6.0
	LRMSS0500FXY1	
	LRMSS0600FXY1	



Commissioning

Pre startup checks

Before starting the condensing unit, the following checks should be carried out as a minimum:

- Check electrical supply is correct and all connections are sound.
- All moving parts are free, and guards fitted.
- Check all mechanical connections for tightness
- Compressor oil level satisfactory for model with oil sight glass.
- Overload relay set correctly.
- All valves in correct operating position.
- Initial refrigerant charge.
- Initial settings for low pressure switch – default settings from factory specified in Table 6.
- Crankcase heater (not provided) energized for a minimum of 12 hours before compressor first start-up.
- Gauge manifold connected to both low and high sides of system.

Running the Unit

- Run the unit and check compressor and condenser fan operation.
- Check system pressures and temperatures, liquid line sight glass, charge and running currents of motors to ensure correct operation.
- Check compressor suction superheat. This should be between 10K and 20K at normal operating conditions.
- Final adjustment of low-pressure switch.
- Allow the system to run for 3 – 4 hours. Check compressor oil level and top up with the correct oil type as required, see Table 2Table 2: Unit Data. Recheck the compressor oil level again after 24 hours operation.
- Carry out final leak test and ensure all panels/covers are fitted and screws tightened.
- Log all information along with the system model and serial numbers for future reference.
- Ensure that the customer / responsible person is provided with basic operating instructions and where electrical isolators are situated in case of emergency.

NOTICE

There must be no more than 10 compressor starts per hour. A higher number reduces the service life of the compressor and can cause carry-over of oil into the system. If necessary, use an anti-short-cycle timer in the control circuit. A minimum 3 minutes runtime after each start of the compressor and a 3 minutes idle time after each stop are recommended. Only during the pump down cycle may the compressor run for much shorter intervals.

System Operation

Once the system is correctly charged with refrigerant and the operating condition is stable, check that the compressor suction superheat is between 10~20K and that the compressor discharge temperature is between 50°C ~ 90°C. A suction superheat that is too low may indicate liquid refrigerant return to the compressor, whereas a suction superheat that is too high will not provide enough cooling effect for the compressor and will also cause high discharge temperatures. In either case, it is likely that compressor damage/failure will occur.

Service and Maintenance

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. Retighten the valve cap according to the Table: Tightening Torque.
   - Check for refrigerant leaks on all joints and fittings.
   - Check mountings for tightness and wear.
   - Check operation of crankcase heater.
   - Check electrical connections.
   - 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 ½ to ¾ way up the sight glass (where fitted).

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 and damage/imbalance.
   - Note: The fan motor is pre-lubricated, and factory sealed so no maintenance is necessary.

3. Condenser Coil – Clean and inspect at regular intervals.
   - Remove surface dirt, leaves etc. with a vacuum cleaner (preferably with a brush or other soft attachment rather than a metal tube), compressed air blown from the inside out, and/or a soft bristle (not wire!) brush. Do not impact or scrape the coil with the vacuum tube, air nozzle, etc.

4. Controls
   - Check settings and operation of pressure switch.
   - Check overload setting.

5. 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.

6. Refrigerant Charge
   - Check the refrigerant charge by ensuring that the system is operating correctly, the pressures are as expected and that the liquid line sight glass shows a full bore of liquid refrigerant.
   - Carry out a full leak test.

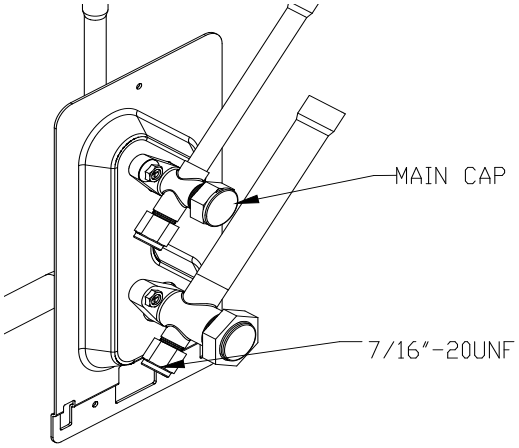
7. Unit decommissioning and disposal
   - At the end of the unit's useful life, a suitably qualified engineer should decommission it. The refrigerant and compressor oil are classed as hazardous waste and as such must be reclaimed and disposed of in the correct manner, including completion of waste transfer paperwork. The unit components must be disposed of or recycled as appropriate in the correct manner.

8. Warranty
   - The warranty as provided by Daikin on its products is subject to correct application, siting, and installation procedures together with subsequent recorded maintenance/servicing carried out in accordance with our recommendations. Failure to do so could result in the withdrawal of our warranty. Please go to our website for our detailed warranty terms and conditions: www.daikin.com.my

Service and Maintenance

Table 10:Tightening Torque

Model	Thread/Size (Tightening Torque (Nm))	
	Main Cap	Service Cap
LRMYS0180AXY1	Suction: M18*1.0mm (25-30 Nm) Liquid: M16*1.0mm (20-25 Nm)	7/16" - 20UNF (14-16 Nm)
LRMYS0250AXY1	Suction: M22*1.5mm (30-35 Nm) Liquid: M16*1.0mm (20-25 Nm)	
LRMSS0400FXY1	Suction: M33*1.5mm (42-47Nm) Liquid: M18*1.0mm (25-30 Nm)	
LRMSS0500FXY1		
LRMSS0600FXY1		



Check List

BEFORE START-UP

No.	Description	Check
1	Is the unit in good condition with holding gas and without any visible damage?	☐ Yes
2	Has the unit been transported in upward position?	☐ Yes
3	Is the crankcase oil level between 1/4 and 3/4 of the compressor sight glass (only applicable to scroll compressor)?	☐ Yes
4	Is the power supply on site in line with the unit specification?	☐ Yes
5	Is air short circuit and/or air blockage avoided?	☐ Yes
6	Is the installation location well ventilated?	☐ Yes
7	Is there sufficient space for air flow and maintenance?	☐ Yes
8	Is all the pre-charged nitrogen released before the field pipe connection started?	☐ Yes
9	Has nitrogen been blown through the pipes during brazing?	☐ Yes
10	Is there only 1 indoor unit connected to the CDU?	☐ Yes
11	Is solenoid valve installed along the liquid line of condensing unit (compulsory for all model to ensure no liquid compression)?	☐ Yes
12	Does the field piping has the same diameter as the pipes coming from the CDU?	☐ Yes
13	Is the suction pipe insulated?	☐ Yes
14	Does the bends have enough bending radius?	☐ Yes
15	Is the total pipe length less than 25m?	☐ Yes
16	Is the height difference between indoor and outdoor unit within the specifications?	☐ Yes
17	Are the oil traps in the vertical suction line correctly positioned?	☐ Yes
18	Does the CDU capacity matches the indoor unit capacity?	☐ Yes
19	Does the TXV capacity matches the indoor unit capacity?	☐ Yes
20	Did the TXV sensing bulb positioned at 4, 8 or 12 o'clock and wrapped with copper strip and insulated)?	☐ Yes
21	Is the Maximum Operating Pressure (MOP) type expansion valve being installed?	☐ Yes
22	Was inert, dry gas (e.g. Nitrogen) used for pressure testing?	☐ Yes
23	Could the leak test pressures be reached?	☐ Yes
24	Did the air tight maintained after at least 24 hours?	☐ Yes
25	Could the vacuum condition (< -0.1 barg for 2 hours) be reached?	☐ Yes
26	Did the pressure stayed stable for at least 1 hour, when turning off the vacuum pump?	☐ Yes
27	Is the low pressure switch set correctly?	☐ Yes
28	Is the overload relay for compressor set correctly (only applicable to LRMYS0180/250)?	☐ Yes
29	Is there an earth connection foreseen?	☐ Yes
30	Are all electrical terminal connections tight connected?	☐ Yes
31	Is the crankcase heater been energized for minimum 12 hours before initial start up?	☐ Yes
32	Is the refrigerant type correct for the intended use?	☐ Yes
33	Is adequate liquid charge to high side introduced into the system before starting compressor?	☐ Yes

Remarks: The system may only be started up if all questions can be answered with “Yes”.

Check List

DURING COMMISSIONING

No.	Description	Check
1	Is the suction pressure decreasing and the discharge pressure increasing?	☐ Yes
2	Is the compressor rotation correct (no abnormal noise and with compression)?	☐ Yes
3	Is the crankcase oil level between 1/4 and 3/4 of the scroll compressor sight glass? (after 3 or 4 hours of operation)	☐ Yes
4	Is the discharge temperature within the limits (between 50 °C and 90 °C)?	☐ Yes
5	Is the suction superheat within the limits (between 5K and 20K) during normal operation?	☐ Yes
6	Is the suction superheat within the limits (between 5K and 20K) after defrost operation?	☐ Yes
7	Is the running current below overload relay setting value (rotary model) or maximum operating current which printed on unit specfiication label?	☐ Yes
8	Is warm air blowing out from the condenser fan?	☐ Yes
9	Is the compressor On/Off cycle within the specification?	☐ Yes

Remarks: The system may only be handed over to user/owner if all questions can be answered with “Yes”.

Additional advice:

- Do not leave the system unattended until the system has reached its normal operating condition and the oil charge has properly adjusted itself to maintain the proper level in the sightglass.
- Check periodically the compressor performance and all the moving components during the first day of operation.
- Check the liquid line sight glass and expansion valve operation. If there is an indication that the system is low on refrigerant, thoroughly check the system for leaks before adding refrigerant.

SITE RECORDS

Customer name:		
Installer name:		
Installation date:		
Refrigerant type:		
Outdoor ambient temperature:		
Room thermostat setting:		
Outdoor	Model:	
	Serial Number:	
Indoor	Model:	
	Serial Number:	
TXV	Model:	
Field Piping	Pipe Length (m):	
	Position of outdoor:	Above / below indoor unit
	Height Differentiate:	
Low pressure switch settings	Cut In (barg):	
	Differential (barg):	
Suction Line	Temperature, Ts (^{0}C):	
	Pressure, Ps (barg):	
Liquid line	Temperature, Tc (^{0}C):	
	Pressure, Pc (barg):	
Compressor Current	Before Defrost (A):	
	After Defrost (A):	
Suction Superheat	Normal Operation (^{0}C):	
	After Defrost (lowest) (^{0}C):	
Subcool before TXV (^{0}C):		

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