

OSA 159RKSH & OSA 159RKTH (c/w UC7 Controller)

Reverse Cycle R410A Split System Outdoor Unit

Installation & Maintenance

GENERAL

OSA 159RKSH – single phase version

OSA 159RKTH – three phase version

This OSA 159RK Outdoor Unit must be installed in accordance with all national and local safety codes.

Options

1. TZT-100 Room Temperature Controller
2. Vertical discharge grille (2 required).
3. Wall mounting brackets.
4. Anti-vibration mounts (rubber).
5. Drain connection adaptors - right angle.

INSTALLATION

Positioning

Refer to dimension diagram below for minimum clearances. Position the unit so that prevailing winds do not blow onto the exhaust to slow the fan, and one unit does not exhaust toward the inlet of another unit. A generous clearance in front of the fan will

improve performance in extreme conditions. The surroundings must not induce immediate recirculation of air from the front to the back of the unit. The optional vertical discharge grille can be used to deflect prevailing winds and reduce clearances.

Mount either free standing or on a wall using the optional mounting brackets available.

Free Standing :

Fasten the unit down to a firm flat horizontal base using the four holes provided in the mounting rails.

When the unit is being installed on a roof it is recommended that the unit is installed on a substantial structure with vibration isolating springs or rubber mounts (optional extra) beneath the unit. These items are not supplied with the unit.

Wall Mounting Option:

Complete wall mounting instructions are supplied with the optional wall mounting kit.

Drain

Four drain holes are provided in the base. Three plastic bungs are supplied (loose) should you want to direct the condensate and/or rain water to one of the holes provided. Drain connection adaptors (25/13) are available as an optional extra.

REFRIGERATION PIPING

General

The OSA 159 is shipped with a refrigerant charge sufficient for a 10 m line length. The matched indoor unit is shipped with a holding charge of nitrogen. OSA 159 units have shut-off service valves and swaged assemblies. Two loose pipe extensions are supplied to enable a choice of exit – side or rear; both require brazing.

Recommended Pipe Sizes

Suction pipe : 22 mm OD
Liquid pipe : 13 mm OD

Line Lengths

The standard unit allows for a line length of:
- up to 60m with a 22mm suction pipe and 13mm liquid pipe, or
- up to 15m with a 16mm suction pipe and 10mm liquid pipe.

No extensions.

Height Separation Limits

Outdoor Unit above Indoor Unit : 20 m
Outdoor Unit below Indoor Unit : 20 m

Vertical Risers

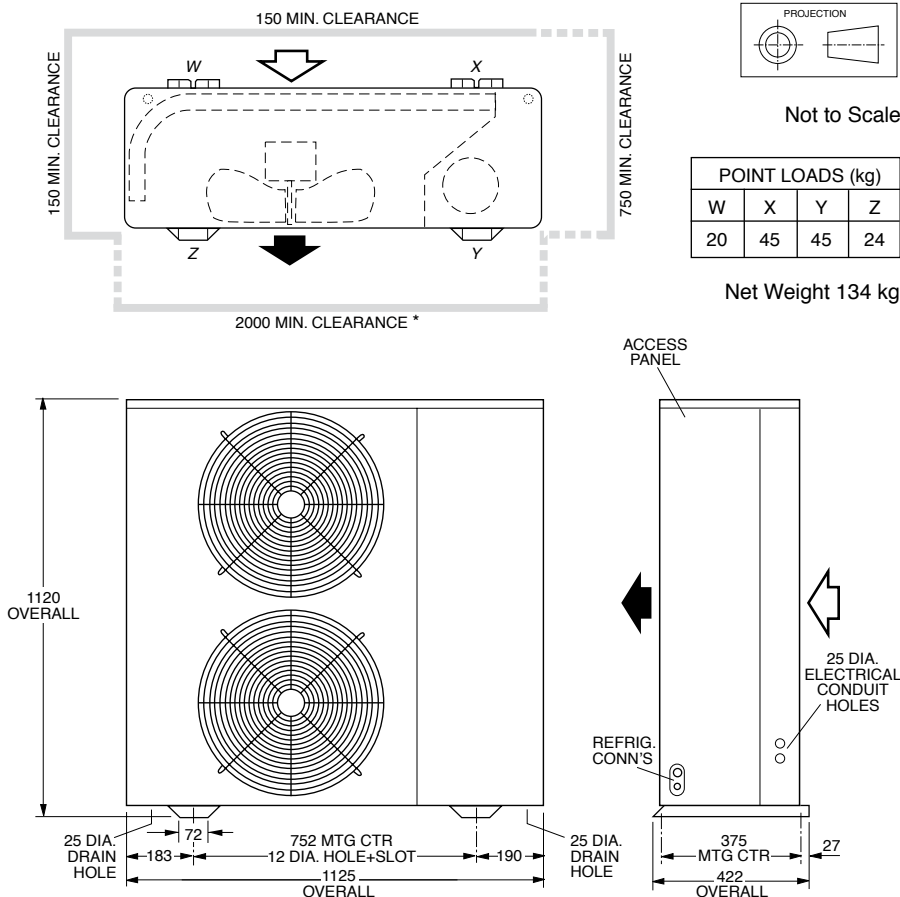
If the outdoor unit is to be installed above the indoor unit, then the suction riser should be trapped at the bottom of the vertical rise and then again at 8 m (maximum) intervals. This is to ensure oil return to the compressor. The trap to be a 'swan neck' curve in the pipe, with no change in the pipe size.

Piping

1. Use clean sealed refrigeration grade piping and accessories designed specifically for R410A.
2. Cut pipe with a pipe cutter ONLY.
3. Use long radius bends (2x pipe dia.).
4. Insulate the suction (gas) line and seal all insulation joints.
5. Bi-flow type filter dryer may be fitted in the liquid line.
6. Include a process point in the interconnecting pipework.
7. Ensure open pipe ends are sealed until the final connection is made.
8. Immediately before removing brazed pipe connection's seal, reduce holding charge between connection points and service valves to atmospheric pressure.

Warning: Failure to do so may cause injury.

Dimensions (mm)



* 600 min with optional Vertical Discharge Grille

Charging

The unit is supplied with refrigerant HFC-410A (R410A) sufficient for up to 10 m of pipework between the indoor and outdoor units; refer wiring diagram specification table for amount. Add 60 g of HFC-410A per metre above 10 m.

Procedure:

1. Evacuate Indoor Unit and interconnecting pipework to a pressure of 500 microns and hold for 15 mins.
2. Add refrigerant, if needed, via the Schraeder connection on the smaller of the Outdoor Unit's two service valves.
3. Open the service valve at the Outdoor Unit to allow refrigerant to flow throughout the system.
4. Leak check all brazed and fitted joints.

IMPORTANT :

Step 8 of the 'Start Up Procedure' requires you to check that the superheat on the suction line (where it enters the Outdoor Unit) is between 3°C – 5°C on cooling cycle with an indoor air temperature in the range 21° – 27°C and outdoor air temperature in the range 24° – 35°C. If the conditions of the day do not allow this, use the heating cycle or other heat source to raise the indoor air temperature to about 24°C. Return to cooling cycle and blank off the outdoor coil to raise the head pressure to 400 psig (2760 kPag). Alter charge up or down to establish correct superheat.

WARNING:

This unit is designed for use ONLY with the refrigerant HFC-410A. The use of other refrigerants is NOT authorised or approved by the manufacturer and may cause operational problems such as poor performance and efficiency, loss of capacity, degradation of materials and refrigerant leaks. **The use of flammable or explosive materials as a refrigerant creates the additional risks of fire and explosion which may result in property damage, personal injury or death.**

Oil Charge

For line lengths in excess of 40 m, Emkarate RL22CF polyolester oil (or similar) should be added to the refrigerant at the rate of 10 ml/m of suction piping. **Note:** Do not use mineral oil.

ELECTRICAL REQUIREMENTS

Electrical work must be done by a qualified electrician. The outdoor unit must be wired directly from a distribution board by means of a circuit breaker or H.R.C. fuse, and a mains isolator provided - preferably close to the Outdoor Unit.

Note: DO NOT USE REWIRABLE FUSES.

Standard units are suitable for use with thermostats with either manual Heat/Cool selection or automatic changeover subject to the contact ratings of the thermostats. Refer to **temperzone** for recommended thermostats.

If the matched ISD indoor unit is supplied without a temperzone SAT-2 Controller, then

connect the 25m coil sensor lead (supplied that ISD) as per the wiring diagram.

It is recommended electricians run a spare wire between Outdoor Unit and Indoor Unit in case 'Indoor Fan Off During De-Ice' becomes a requirement. Leave this spare wire unconnected until required. (Not required when using **temperzone** SAT-2 or TZT-100 Controller). Refer indoor unit's wiring diagram.

A 24 hour power supply to the crankcase heaters is required, otherwise the warranty is void.

SYSTEM CHECK TESTS

1. Leave the remote switch in the off position and close the mains isolating switch.
A four hour delay period is required to allow the crankcase heater to drive any liquid refrigerant out of the compressor oil.
2. Check that all fan motors are free running.
3. *OSA 159RKT only.* Check for correct rotation of the compressor. If rotation is incorrect the compressor will not pump and will draw minimal current. To correct motor rotation, change the phasing at the main power terminal.
4. Check that the thermostat is correctly wired to the unit and is set at the desired temperature.
5. If applicable, check that the indoor coil sensor lead is correctly wired to the unit.
6. Check that the air filters, if any, have been correctly installed.
7. Check any supply air diffuser dampers are open.

START UP PROCEDURE

Use the supplied Commissioning Sheet to help you complete the following procedure:

1. Switch on the unit after the four hour delay period for the crankcase heater has expired.
2. Check the supply voltage.
3. Measure the current draw on the compressor motor and on each fan motor. Check all readings against the specified values - particularly the indoor fan amps if the unit is installed in a free blow application.
4. Fit gauges and measure the suction and discharge pressures.
Important: Gauges must be designed specifically for use with R410A.
5. Test the operation of the high pressure safety control by switching off the outdoor unit's fan.
6. Test the operation of the reversing valve by running the unit in both the heating and cooling mode.
7. Check that the air flow over the outdoor unit's coil is adequate and that the fan is running smoothly.
8. Check the superheat - refer charging procedure.
9. Check the supply air flow at each outlet.
10. Touch up any outdoor unit paintwork damage to prevent corrosion.

UNIT CONTROLLER (UC7)

The Unit Controller provides system protection functions such as coil frost protection, de-icing, high head pressure and low suction pressure cut-out. It also protects against rapid cycling of the compressor(s) and loss of refrigerant. Various methods of head pressure control (or limiting) are employed in temperzone units. The particular method used varies from model to model, but is also handled by the Unit Controller. In combination, these features deliver optimised performance across a wide operating temperature range.

As a result of the UC's control of these inter-related functions, the outdoor fans may take some time to start rotating after each compressor start. They may also run on when the compressor stops. The fans will stop during a de-ice cycle and the speed will vary either smoothly, or in steps, in order to protect against excessively low or high head pressure.

Refer to UC7 Controller label on the unit or www.temperzone.biz for operation & fault diagnostics information.

MAINTENANCE

Weekly For First Four Weeks

1. Check indoor unit air filters (if fitted) and vacuum or wash clean as necessary.
2. Check condensate drain for free drainage.
3. Check compressor compartment for oil stains indicating refrigerant leaks.
4. Check tightness of electrical connections.

Six Monthly

1. Check the tightness of all fan and motor mountings.
2. Check tightness of electrical connections.
3. Check that fan motors are free running.
4. Check suction and discharge operating pressures.
5. Replace indoor unit air filters (if fitted).
6. Check condensate drain for free drainage.

Yearly

1. Check all refrigerant piping for chafing and vibration.
2. Check the operation of electric heaters if fitted.
3. Check air supply at all diffusers.
4. Check for excessive noise and vibration and correct as necessary.
5. Check for insulation and duct damage and repair as necessary.
6. Remove lint and dust accumulation from outdoor coil fins.
7. Touch up any outdoor unit paintwork damage to prevent corrosion.

This pamphlet replaces the previous issue no. 3648 dated 08/14.
OSA 159RKT wiring revision B.

Pipe Length Capacity Loss

On Cooling Cycle Due to Pressure Drop

Note : Loss percentages are approximations only, due to piping variations. No allowance made for vertical piping.

Pipe Size (mm)		Performance Loss per additional 10m beyond first 5m.	Additional Pipe Length to allow per Suction Pipe Bend Long 90° Radius (2 x pipe dia.)
Liquid	Suction		
10	16	4.0 %	0.30 m
13	22	2.1 %	0.50 m

Capacities - Nett to AS/NZS 3823

OSA 159RKS	ISD 159K	ISU 159K
Cooling -	kW	14.85
Heating - Reverse Cycle	kW	14.67
Electrical Input		
Cooling -	kW	4.87
Heating - Reverse Cycle	kW	3.99
E.E.R. (Cooling)	kW/kW	3.14
A.E.E.R. (Cooling)	kW/kW	3.12

Electrical

Supply required 1Ph 200-252V ~ 50Hz
Including voltage fluctuation limits

Compressor type - Scroll	
Compressor (1Ph) run amps rated conditions A	20
Compressor (1Ph) starting amps	42
Compressor capacitor run	MFD
Compressor capacitor start	MFD
Oil type : Polyolester (P.O.E.)	189-227

IPM Indoor Fan Motor (1Ph)	kW	1.25	0.23 x2
Indoor fan motor (1Ph) Full load amps	A	6.50	1.5 x2

OFM Outdoor fan motor (1Ph) Full load amps	A	1.43
Outdoor motor capacitor	MFD	5 x2
Running amps (Total)	A	24
Max running amps (Total)	A	33
Control circuit breaker	A	I0
24VDC 24 Volt circuit breaker	A	2
Unit Weight - Nett	kg	134

Unit precharge (10 metre line length) 5.55 Kg (R410A Refrigerant)
Base charge unit 4.95 Kg Plus 60 grams per metre line length. Subtract 800 grams for ISU.
(based on dia 12.7 liq line & dia 22 gas line).
Add additional oil, 10ml per metre over 40 metre line length.

CAP Capacitor	HFCR High 1/D Fan Relay Coil
CCB Control Circuit Breaker	Med 1/D Fan Relay
CCH Crank Case Heater	MFCR Med 1/D Fan Relay Coil
CM Compressor Motor	Low 1/D Fan Relay
CR Compressor Relay 24 v Control	LFCR Low 1/D Fan Relay Coil
CRC Compressor Relay Coil 24V	LP Low Pressure Control
CSR Compressor Start Relay	OFM Outdoor Fan Motor
CSRRC Compressor Start Relay Coil	RCV Reverse Cycle Valve
FRB Fault Relay Board	SS Soft Starter
HP High Pressure Control	SR Start Relay
HRC Heating Relay Coil	TFC Triac Fan Controller
HFR High 1/D Fan Relay	TR Transformer
	UC7 Unit Controller 7

Temperature Sensor

Sensor	Color
DL Discharge	Red
SL Suction	Blue
AMB Ambient	Black
DEI Deice	Blue
OC O/D Coil	Yellow
TC T/D Coil	Yellow

TFC SW2 (DIP S/W) settings

DIP	On/Off
1,2,3,4	Off
5,6,7,8,9,10,11,12,13,14,15,16	Off

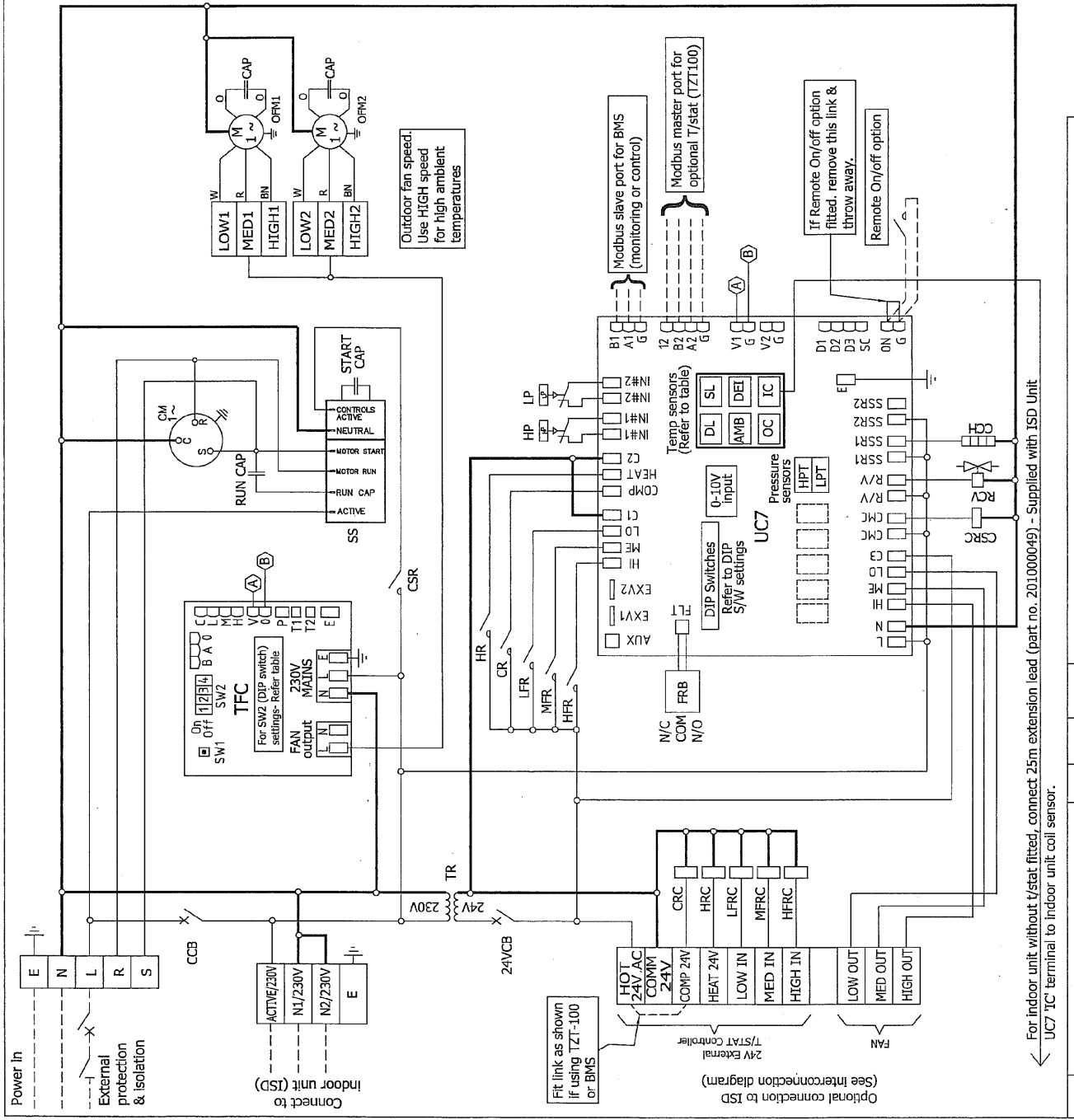
UC7 DIP switch settings

UC7 DIP switch	On/Off
4	On
1,2,3,5,6,7,8,9,10,11,12,13,14,15,16	Off

OSA 159RKS CW UC7
Wiring schematic

temperzone

Plot date	19-02-13	Drawn S.p.H.	10-10-12	Drawing No.	291-000-317	Revision	B
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For indoor unit without T/stat fitted, connect 25m extension lead (part no. 201000049) - Supplied with ISD Unit
UC7 IC terminal to indoor unit coil sensor.

Client wiring -----

www.temperzone.biz
for client wiring diagrams

ISSUE	MODIFICATION	ECN	DATE	APRVD	S.D.H.	M3444/01-04-14	---
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Capacities - Nett to AS/NZS 3823	OSA 159RKTTH
Cooling -	ISD 159K
Heating - Reverse Cycle	TSU 159K
Electrical Input	kW 14.70
Cooling -	kW 13.90
Heating - Reverse Cycle	kW 4.65
E.E.R. (Cooling)	kW 4.73
A.E.E.R. (Cooling)	kW/kW 3.86
	kW/kW 3.159
	kW/kW 3.141
Electrical	
Supply required 3Ph 342-436V ~ 50Hz	
Including voltage fluctuation limits	
Compressor Type : Scroll	
Compressor (3Ph) run amps rated conditions A/Phi	6.8
Oil Type : Polyolester (P.O.E.)	MFD 8 x3
Indoor Fan Motor (1Ph)	kW 1.25
Indoor fan motor (1Ph) Full load amps	A 6.50
Outdoor fan motor (1Ph) Full load amps	A 1.43
Outdoor motor capacitor	MFD 5 x2
Running amps (Total)	A 9.4 / 6.7 / 6.7
Max running amps (Total)	A 13
Control circuit breaker	A 10
24VCB 24 Volt circuit breaker	A 2
Unit Weight - Nett	kg 134

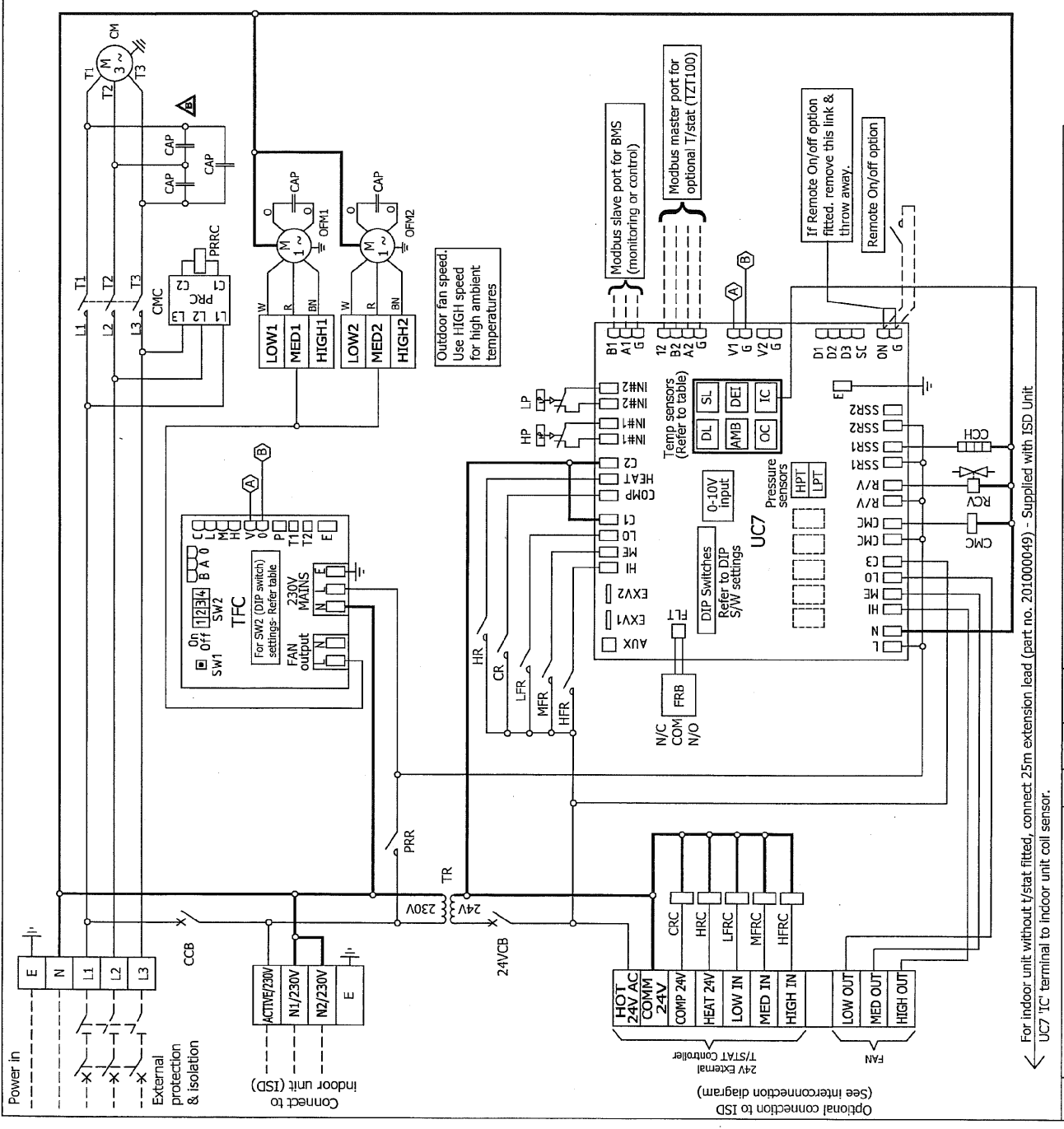
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Add additional oil, 10ml per metre over 40 metre line length.	
CAP Capacitor	MFR Med 1/2 Fan Relay
CCB Control Circuit Breaker	MFR Med 1/2 Fan Relay Coil
CCH CrankCase Heater	LFR Low 1/2 Fan Relay
CM Compressor Motor	LFR Low 1/2 Fan Relay Coil
CMC Compressor Contactor	LP Low Pressure Control
CMCC Compressor Contactor Coil	OFM Outdoor Fan Motor
CR Compressor Relay 24 V Control	PRC Phase Rotation Control
CRC Compressor Relay Coil 24v	PRR Phase Rotation Relay Coil
Fault Relay Board	PRRC Phase Rotation Relay Coil
HP High Pressure Control	RCV Reverse Cycle Valve
HRC Heating Relay	TFC Trifac Fan Controller
HFR Heating Relay Coil	TR Transformer
HFR High 1/2 Fan Relay	UC7 Unit Controller 7
HFR High 1/2 Fan Relay Coil	

UC7 DIP switch settings	
DIP switch	On/Off
4	On
1,2,3,5,6,7,8,9,10,11,12,13,14,15,16	Off

Temperature Sensor	
Sensor	Color
DL Discharge	Red
SL Suction	Blue
AMB Ambient	Black
DEI Deice	Blue
OC O/D Coil	Yellow
IC I/D Coil	Yellow

Title	
OSA 159RKTTH CW UC7	
Wiring schematic	
TFC SW2 (DIP S/W) settings	On/Off
DIP	On/Off
1,2,3,4	Off

Plot date	25-06-15	Drawn S.D.H.	Drawn date	10-10-12	Revision
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 UC7 IC terminal to indoor unit coil sensor.

Note: Specifications are subject to change without notice due to the manufacturer's ongoing research and development programme.