UWX Series Compressor Installation Training

For the Professional Technician

UNICLA Cat No. R2001.Rev.1-02112020

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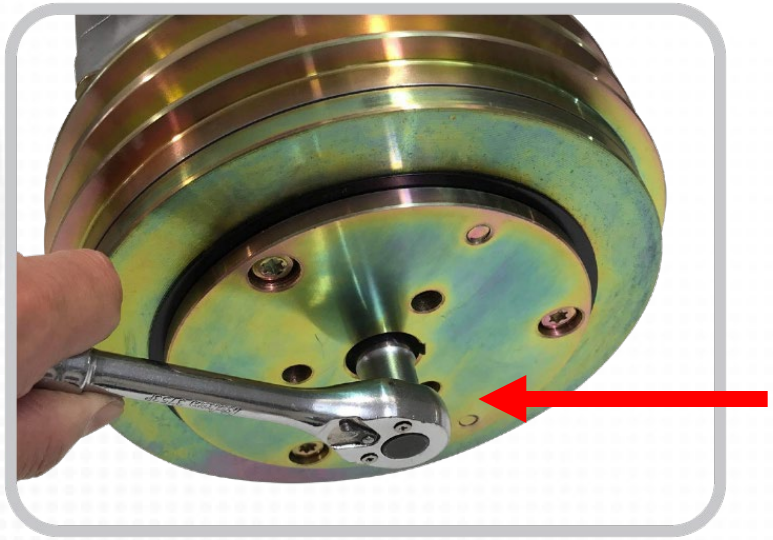
1. INITIAL HANDLING

Removing transit gas

Before mounting, remove the dust cap from the discharge service valve and gently release the gas. **Take care not to let oil escape.**

Initial lubrication

Using a 14 mm socket, rotate the compressor armature 4-5 revolutions to ensure proper lubrication to the working assembly components.



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2. SYSTEM CLEANLINESS

Contamination

Solid particle contamination will cause direct compressor damage and starvation due to blocked system filters and screens.

Chemical contamination can reduce solubility/miscibility of refrigerants and oils, reduce oil viscosity, and cause acid etching and sludge formation.

Flushing

Individual component flushing is strongly recommended in systems where solid particle contamination has occurred during the system assembly process.

The compressor, TX valve, pressure control valves, receiver driers/accumulators and mufflers/pulsation dampers **must not be flushed**.

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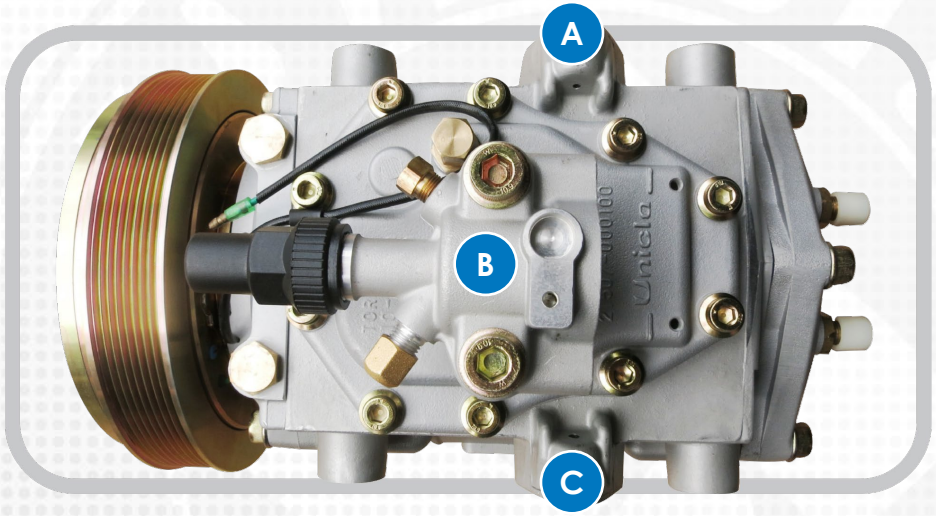
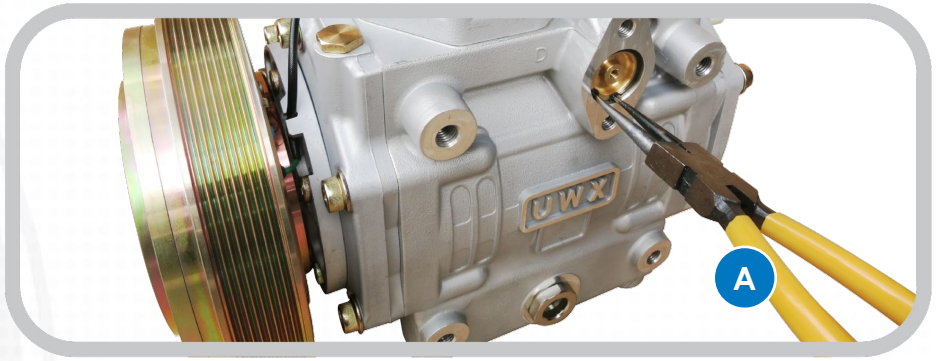
3. FITTING THE DISCHARGE HOSE MANIFOLD

1 **Choose either left or right hand port position for discharge manifold**
Remove shipping caps from manifold



- **A** Discharge port (left side)
- **B** Manifold valve (suction port)
- **C** Discharge port (right side)

2 **Remove snap ring from port plug**



- **A** Snap ring pliers

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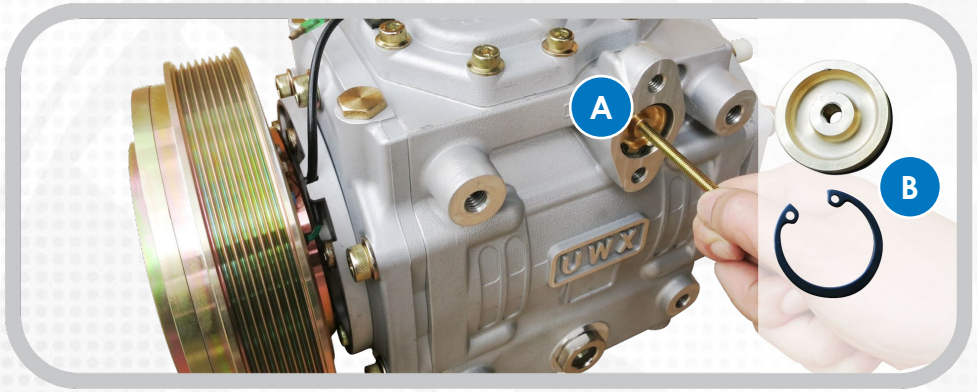
3. FITTING THE DISCHARGE HOSE MANIFOLD

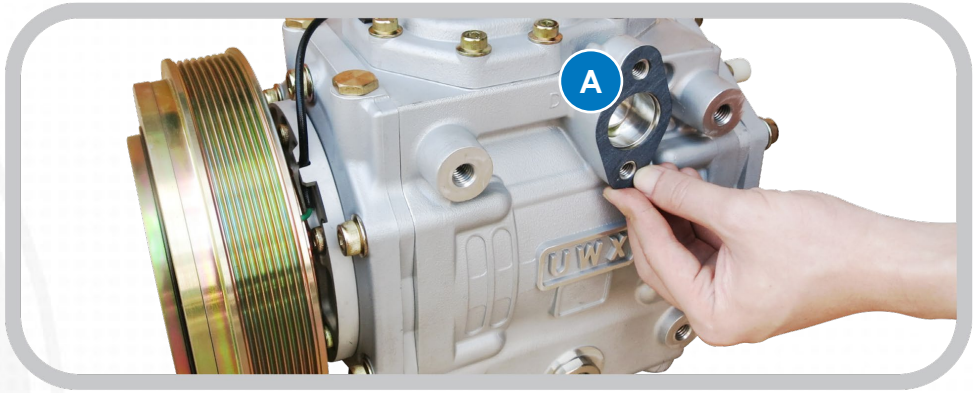
3 Remove the port plug



A Screw an M6 x L65 bolt into the port plug and use it to pull out the plug

B Removed parts: Plug and snap ring

4 Install the gasket



A Gasket

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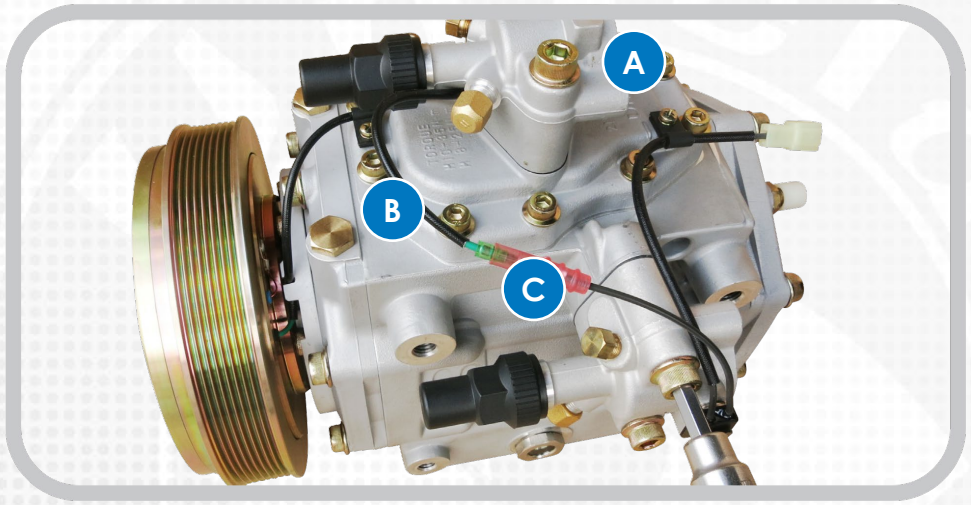
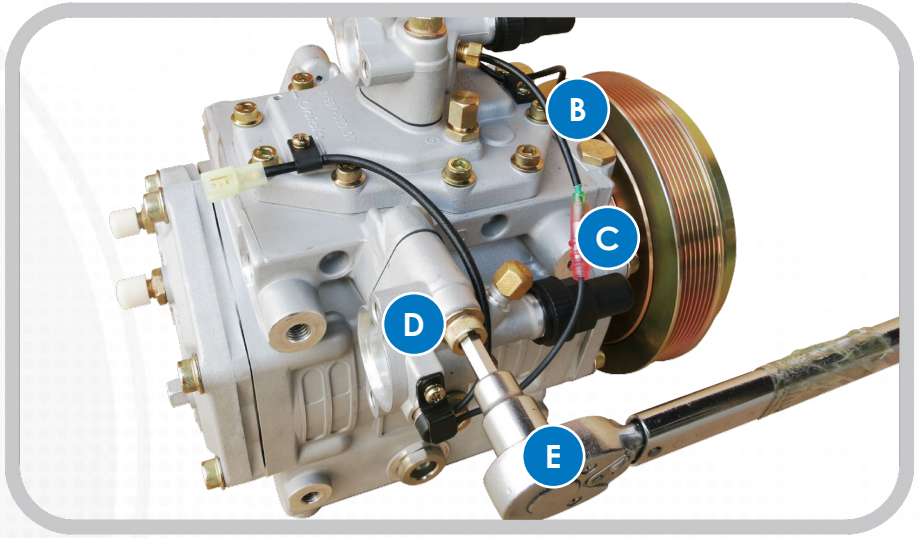
3. FITTING THE DISCHARGE HOSE MANIFOLD

5 **Install manifold valve** (on right or left side)





- **A** Clamp fixed
- **B** Clutch wire
- **C** Sensor wire
- **D** M10 x L60 bolt (x2)
- **E** Tighten to 34.3 Nm (350 kg/cm)

WARNING: Do not directly connect the power cord to the clutch wire.

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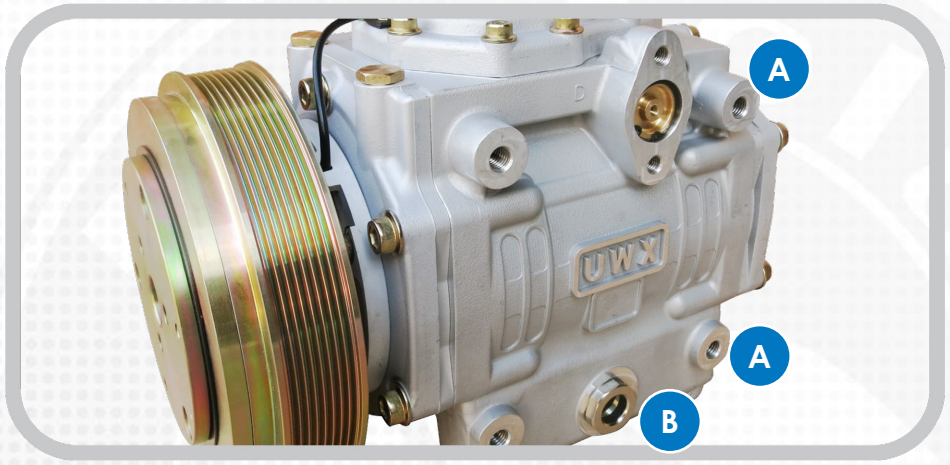
4. MOUNTING POINTS AND ANGLE

Mounting points

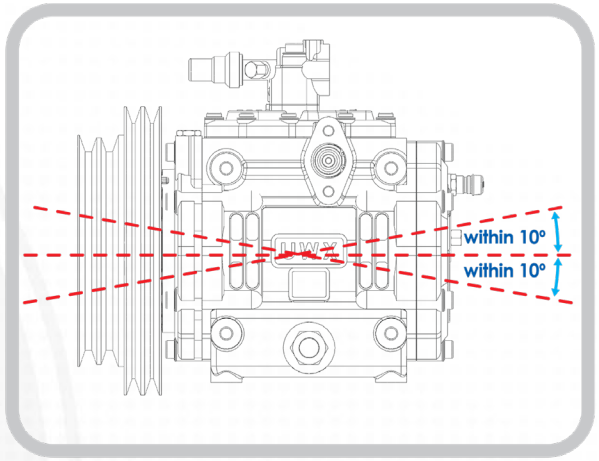


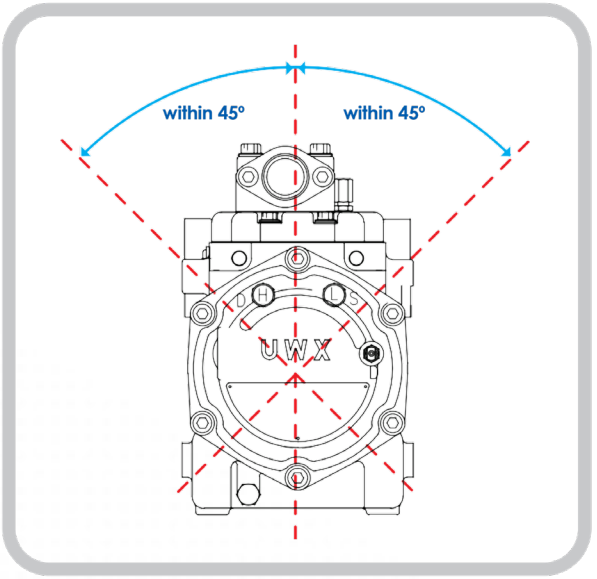
A The side mounting: M12 x P (2x4) = 1.75

B The bottom mounting: M12 (z4) x P = 1.75

Compressor should be mounted on its bracket from all points located at the bottom at least one side where the discharge manifold is not fitted.

Mounting angle





Limits for angles to mount UWX compressors is 10 degrees from the horizontal plane and 45 degrees from vertical.

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5. SYSTEM OIL QUALITY REQUIREMENT

The correct amount of oil must exist in the system.
To achieve the correct oil/refrigerant ratio refer to this chart. The amounts added are additional to the factory oil charge (I litre) already in the compressor sump.

Total refrigerant in system	Oil quantity to add – if suction line < 6 metres in length	Oil quantity to add – if suction line > 6 metres in length
5.0 kg	Nil	500 cc
5.5 kg	100 cc	650 cc
6.0 kg	200 cc	800 cc
6.5 kg	300 cc	950 cc
7.0 kg	400 cc	1100 cc
7.5 kg	500 cc	1250 cc
8.0 kg	600 cc	1400 cc

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6. OIL TYPE AND GRADE

Each compressor is fitted with either Unicla PAG oil (Unidap 7) or Unicla POE oil (Unidap 6 or 3).

The preference to use PAG or POE oil is a decision Unicla will leave to system integrators, and either is suitable air-conditioning systems with medium evaporator temperatures.

Unicla recommends low viscosity POE oil (Unidap 3) for low temperature refrigeration applications.

Compressor model	Refrigerant	Oil type (Unicla)	Viscosity @ 40°C	Viscosity @ 100°C	Application	Low side saturation	Oil separator
UWX	R134a	Unidap 7	48.01	10.51	Air-conditioning	>0°C	Optional
UWX	R134a	Unidap 6	65.50	9.30	Air-conditioning	>0°C	Optional
UWXF	R404a	Unidap 3	32.50	5.80	Refrigeration	< -15°C	Required

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6. OIL TYPE AND GRADE

If Unidap oil is not available, refer to the following chart for a suitable alternative:

Unicla oil type	Alternative
Unidap 6	POE 68
Unidap 7	PAG 56
Unidap 3	POE 32

Recommended alternatives for Unicla Lubricant.

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6. OIL TYPE AND GRADE

The compressor label will designate the compressor **model** and **oil type**

POE type

PAG type

UWXF type

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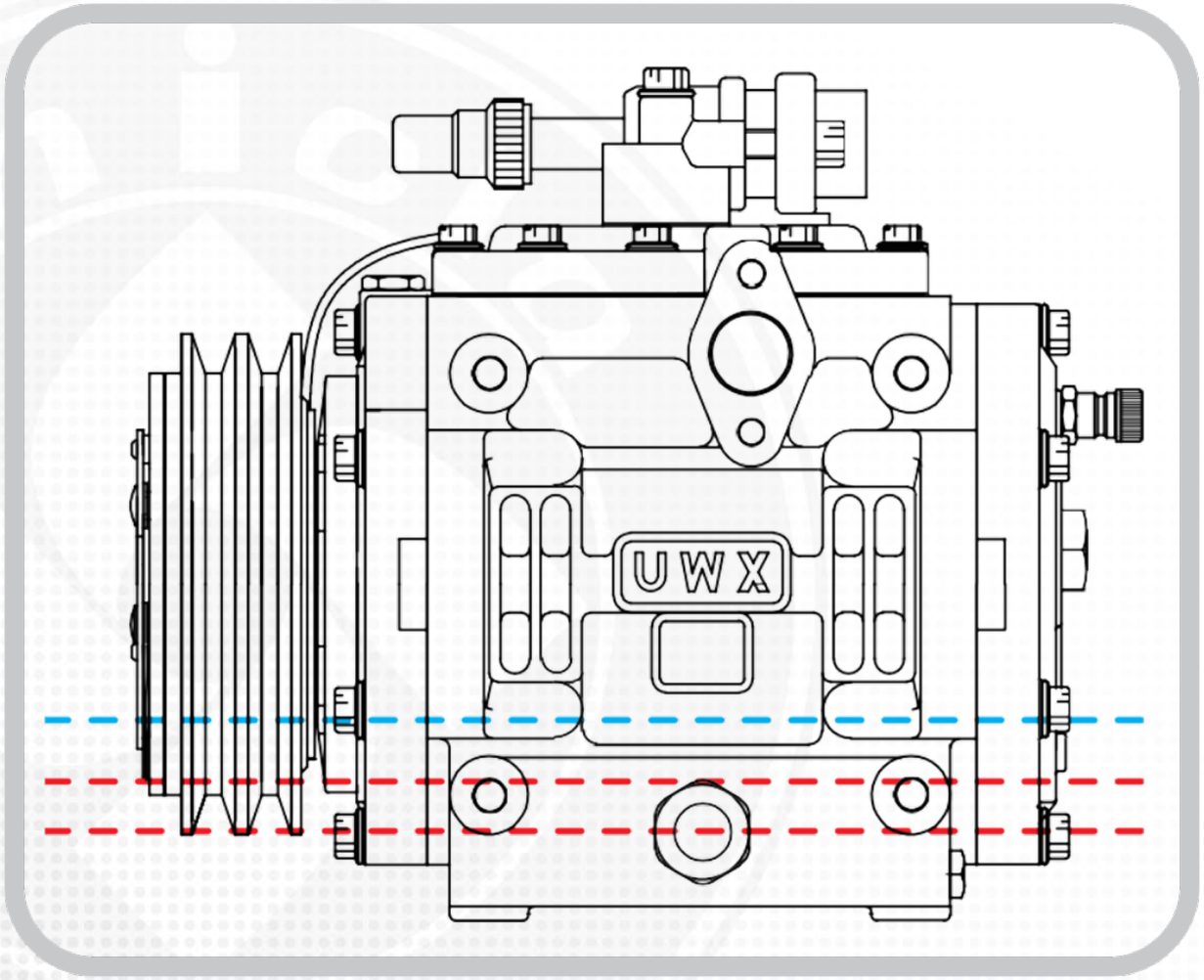
7. COMPRESSOR OIL LEVEL



700 cc - 1000 cc to top of sump **(Normal)**
400 cc to top of sight glass **(Low)**
200 cc to centre of sight glass **(Low)**

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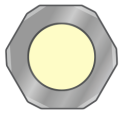
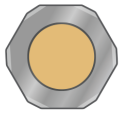
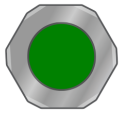
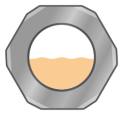
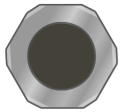
8. COMPRESSOR SIGHT GLASS VISUALISATION & DIAGNOSIS

Use the following chart to check both immediately after commissioning and at future regular intervals during service.

To check use an LED torch and illuminate the rear sight glass.

Visual	Sight glass	Oil	Operation	Recommendation
	Normal > high point	Normal - clear and transparent	OK	**Nil**
	Normal > high point	Possible slight moisture contamination or high temperature operation	OK	**Monitor oil condition and change if necessary**
	Normal > high point	Green slime: Copper hydroxide present	OK	**Monitor oil condition and change if necessary**
	Oil level low < half point	Normal: Clean and transparent, dark section is oil foam rather than contamination	Oil flow or level is low	**Check suction pressure and system oil quantity**
	Oil level low < half point	Normal: Clean and slight orange or red colour	Oil flow or level is low and running at high temperature	**Check suction pressure and system oil quantity**
	Oil level < low point	Not visible	Oil flow or level is critically low: Damage to compressor will occur. Suction pressure is most likely at 1.0 bar (14 psi) or less and must be rectified	**Cease system operation and check suction pressure and system oil quantity**
	Normal > high point	Black and cloudy: Severely contaminated	Compressor will fail	**Cease system operation. Clean and flush system, replace compressor oil**
	Oil level < high point	Dark black: Severely contaminated and has black sludge	Compressor will fail	**Cease system operation. Clean and flush system, replace compressor oil**

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9. RECOMMENDED SUCTION LINE PIPE SIZE

Suction pipe size recommendations for Unicla 440/550/660 series compressors.

UWX440/550/660 compressors	3 m Pipe length			6 m Pipe length			10 m Pipe length			12 m Pipe length			18 m Pipe length		
RPM	Temp Diff (K)	Press Diff (kPa)	Pipe size mm (inch)	Temp Diff (K)	Press Diff (kPa)	Pipe size mm (inch)	Temp Diff (K)	Press Diff (kPa)	Pipe size mm (inch)	Temp Diff (K)	Press Diff (kPa)	Pipe size mm (inch)	Temp Diff (K)	Press Diff (kPa)	Pipe size mm (inch)
1000	0.55	5.7	22 (7/8)	0.29	3	26 (1 1/8)	0.48	5	28 (1 1/8)	0.58	6	28 (1 1/8)	0.87	8.9	28 (1 1/8)
1500	0.29	3	28 (1 1/8)	0.58	6	28 (1 1/8)	0.98	10	28 (1 1/8)	0.41	4.2	35 (1 3/8)	0.61	6.3	35 (1 3/8)
2000	0.29	3	28 (1 1/8)	0.94	9.6	28 (1 1/8)	0.54	5.6	35 (1 3/8)	0.65	6.7	35 (1 3/8)	0.99	10.1	35 (1 3/8)
2500	0.64	6.5	28 (1 1/8)	0.44	4.5	35 (1 3/8)	0.74	7.6	35 (1 3/8)	0.89	9.1	35 (1 3/8)	0.56	5.7	41 (1 5/8)

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10. COMPRESSOR SPEED

Unicla speed recommendation for UWX440, UWX550 and UWX660 compressors.
This **must** be strictly followed at all times.

Compressor series	Ideal operation speed (rpm)	Maximum continuous rpm	Maximum momentary rpm
440/550/660	1200 - 2500	3000	4500

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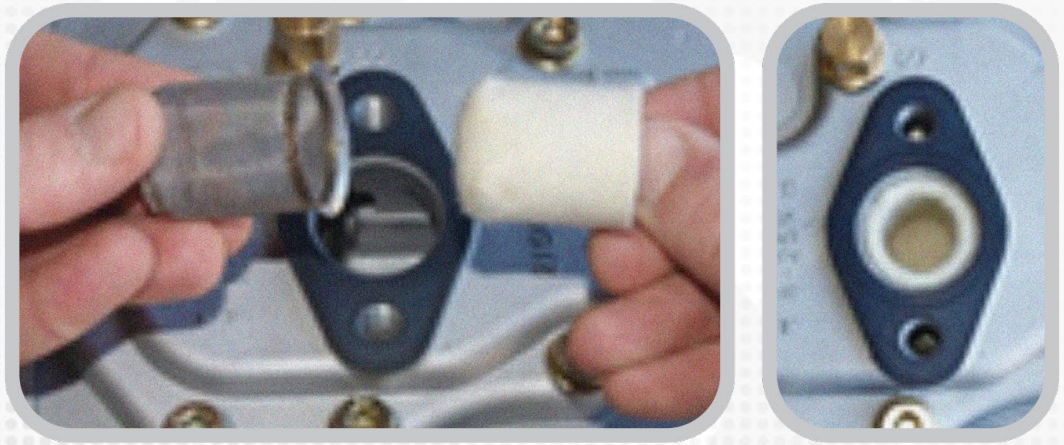
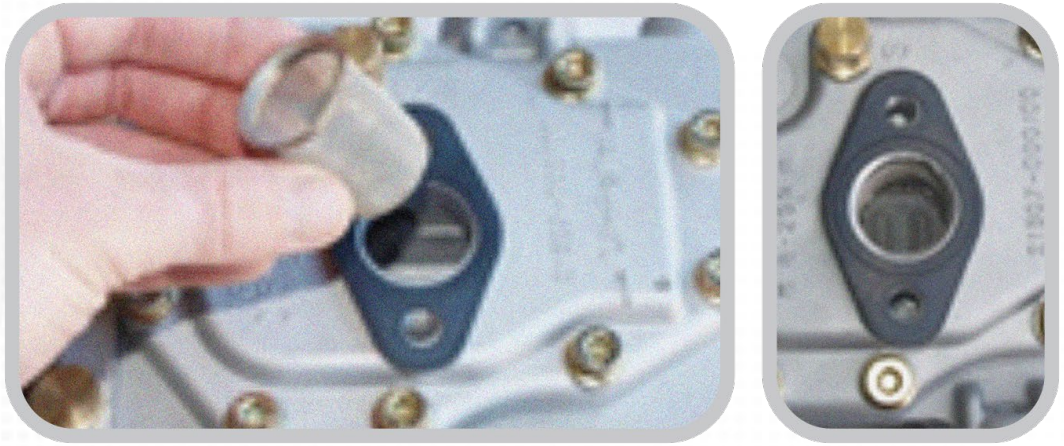
11. INLINE SUCTION MESH SCREEN AND FILTER INSERT

The Unicla inline mesh screen and filter insert should be used whenever there is risk of debris and fine particles entering the compressor through the suction line.

Unicla Suction Filter Insert



Unicla Suction Mesh Screen



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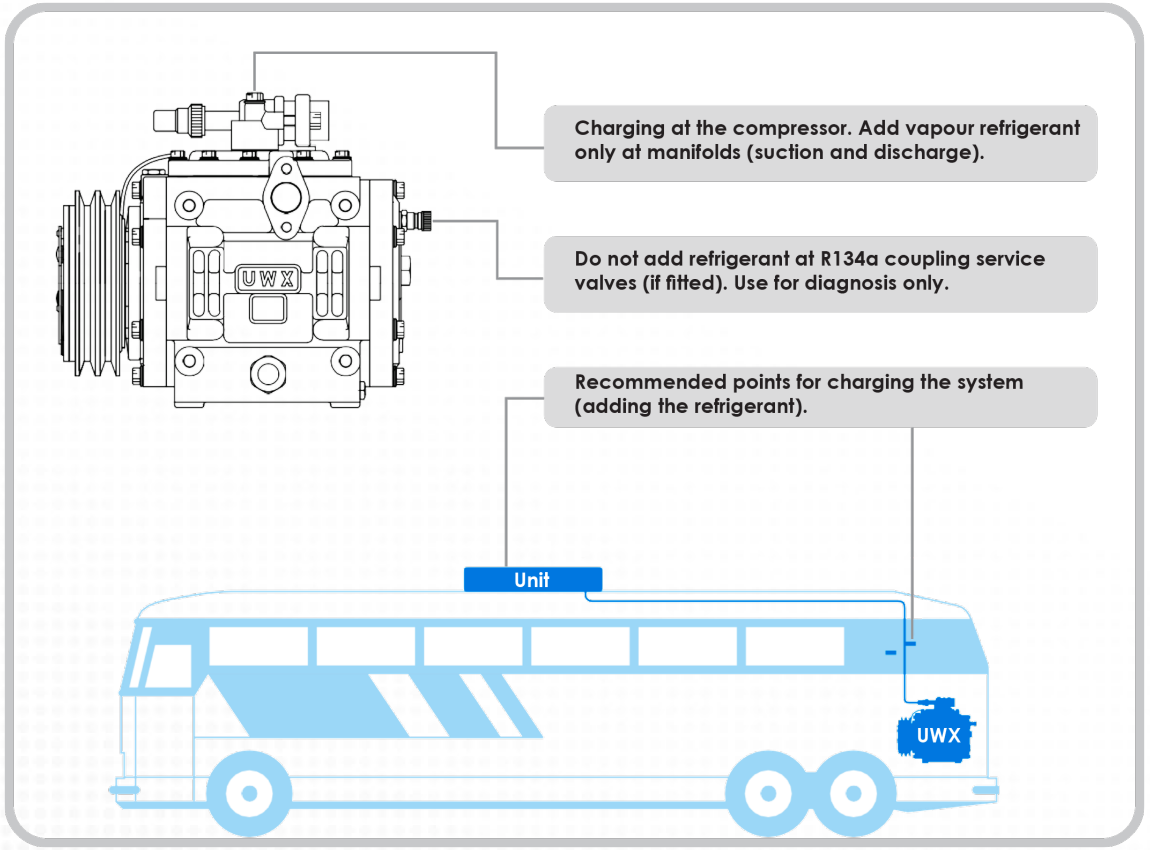
12. UNICLA OIL INJECTOR

Used to add additional system oil during the evacuation or refrigerant charging process.

13. REFRIGERANT CHARGING

To avoid oil being pushed or washed away from the sump of the compressor consider the following:

- Add refrigerant and oil at highest point
- If this is not possible, then add at service points in suction and discharge lines away from the compressor
- If refrigerant must be added at the compressor, only refrigerant vapour is to be added at the discharge and suction manifold valves (see diagram)
- DO NOT add refrigerant at the R134a coupling service valves (if fitted)



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14. THERMAL AND PRESSURE CHECKS AFTER COMMISSIONING

Three main checks of the compressor are required:

Suction line validation

Establish the correct flow of refrigerant and oil back to the compressor.

Discharge line validation

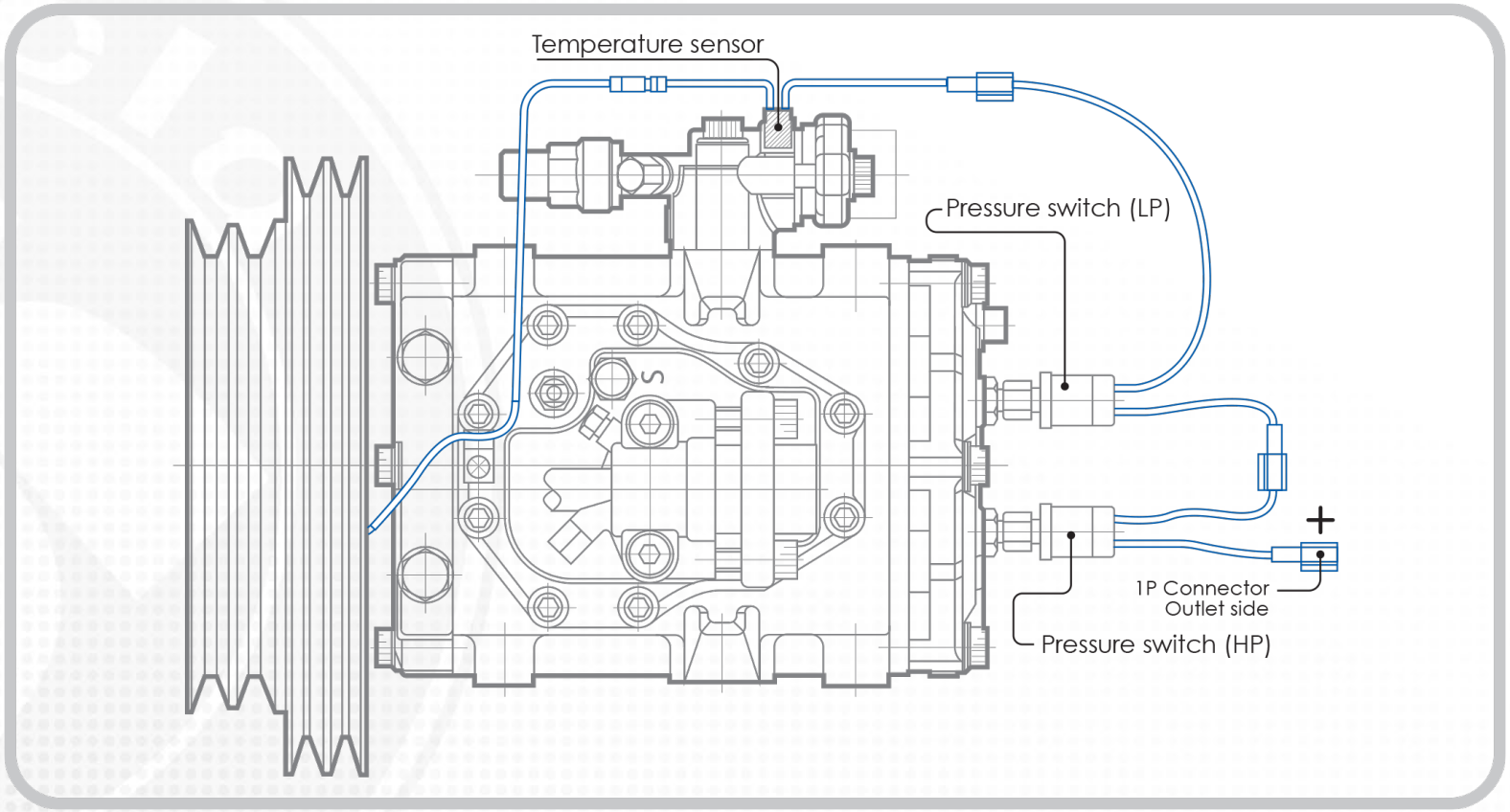
Establish if high side pressure and temperature is within specifications for correct compressor operation.

Condenser performance check

Analyse normally acceptable high side (discharge) pressures and discharge line temperatures for given ambient conditions.

15. PRESSURE SWITCHES

Unicla recommends pressure switches are installed on UWX compressors in the configuration shown here.



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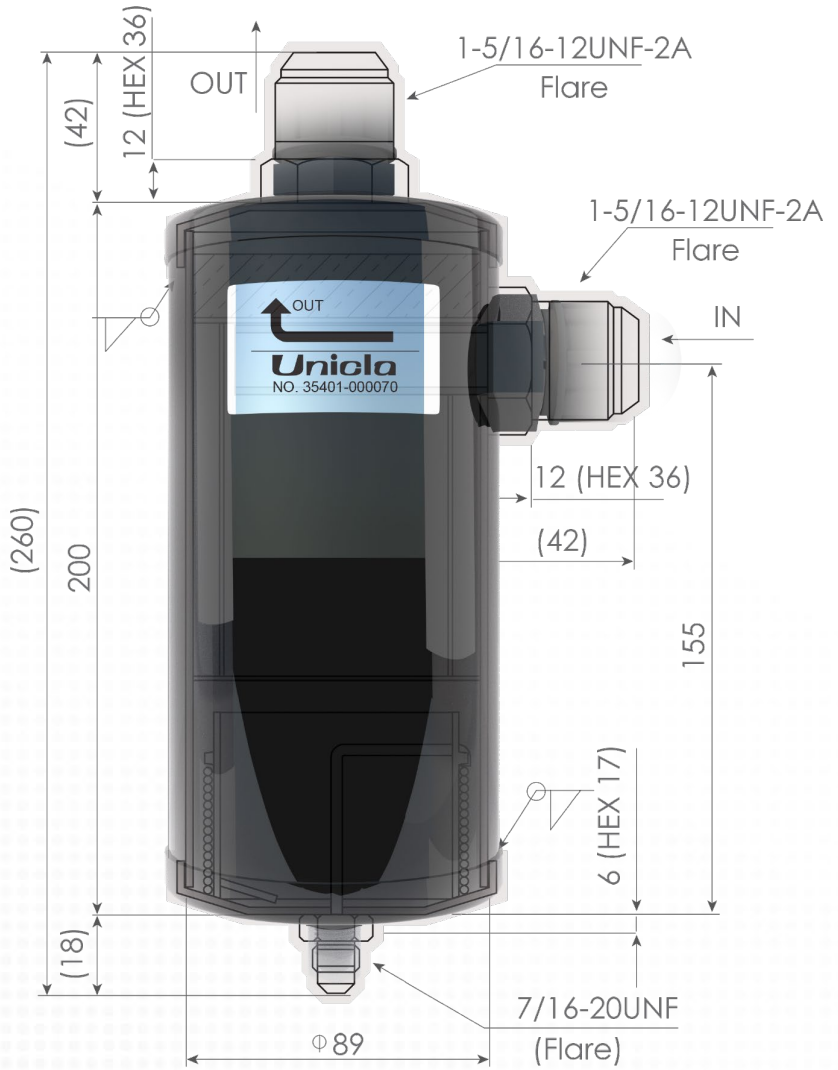
16. OIL SEPARATORS

An oil separator is recommended in systems when:

- The oil return to the compressor is potentially lower than it should be
- Is at risk from a design feature in the system
- Adverse conditions created by system operation



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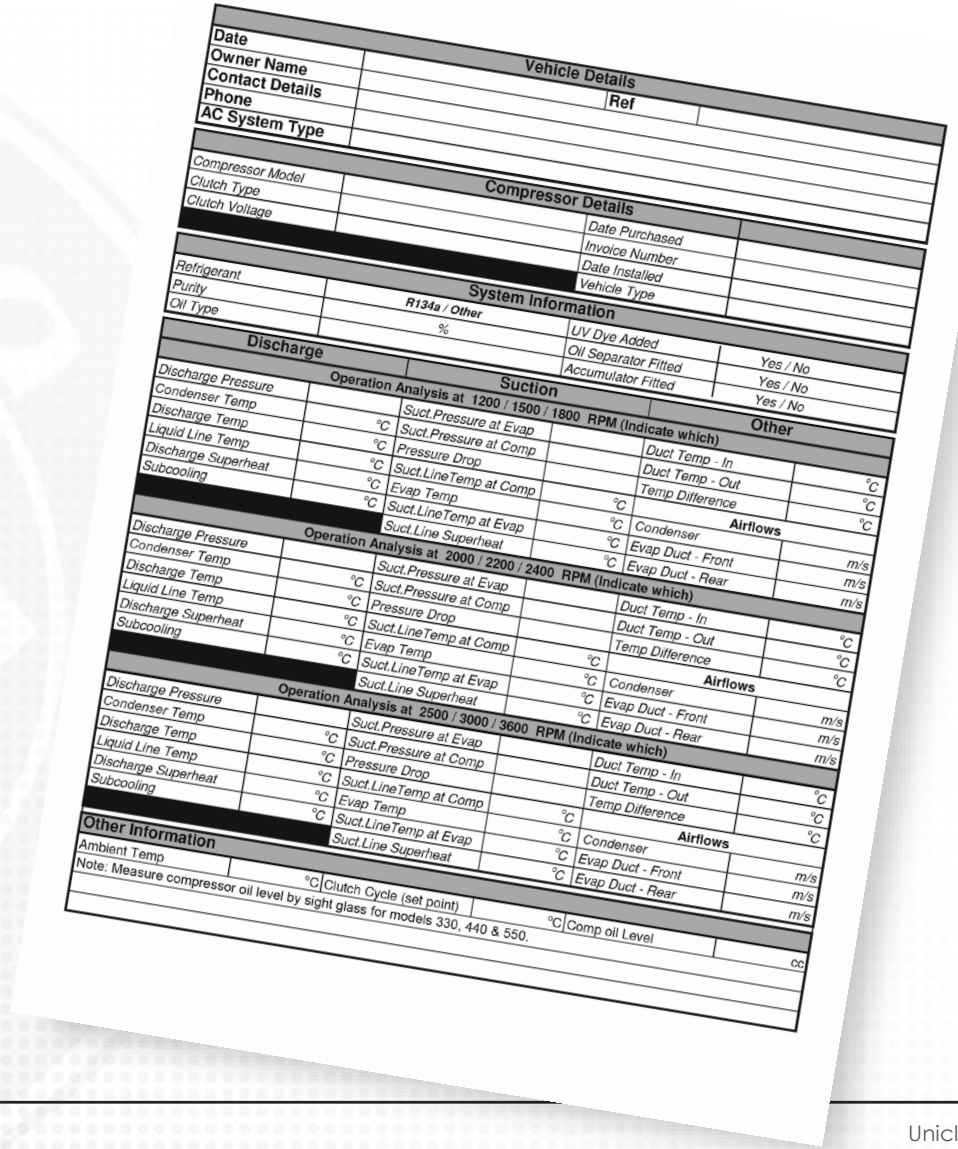
17. COMPRESSOR OPERATION ANALYSIS REPORT

To determine the performance of a Unicla UWX compressor in a specific application, the following Compressor Operation Analysis Report will assist in the collection of the necessary data.



Vehicle Details			
Date			
Owner Name		Ref	
Contact Details			
Phone			
AC System Type			

Compressor Details			
Compressor Model		Date Purchased	
Clutch Type		Invoice Number	
Clutch Voltage		Date Installed	
		Vehicle Type	

System Information			
Refrigerant	R134a / Other	UV Dye Added	Yes / No
Purity	%	Oil Separator Fitted	Yes / No
Oil Type		Accumulator Fitted	Yes / No

Operation Analysis at 1200 / 1500 / 1800 RPM (Indicate which)							
Discharge		Suction			Other		
Discharge Pressure		Suct.Pressure at Evap			Duct Temp - In		
Condenser Temp	°C	Suct.Pressure at Comp			Duct Temp - Out		°C
Discharge Temp	°C	Pressure Drop			Temp Difference		°C
Liquid Line Temp	°C	Suct.LineTemp at Comp		°C			°C
Discharge Superheat	°C	Evap Temp		°C	Airflows		
Subcooling	°C	Suct.LineTemp at Evap		°C	Condenser		
		Suct.Line Superheat		°C	Evap Duct - Front		m/s
				°C	Evap Duct - Rear		m/s

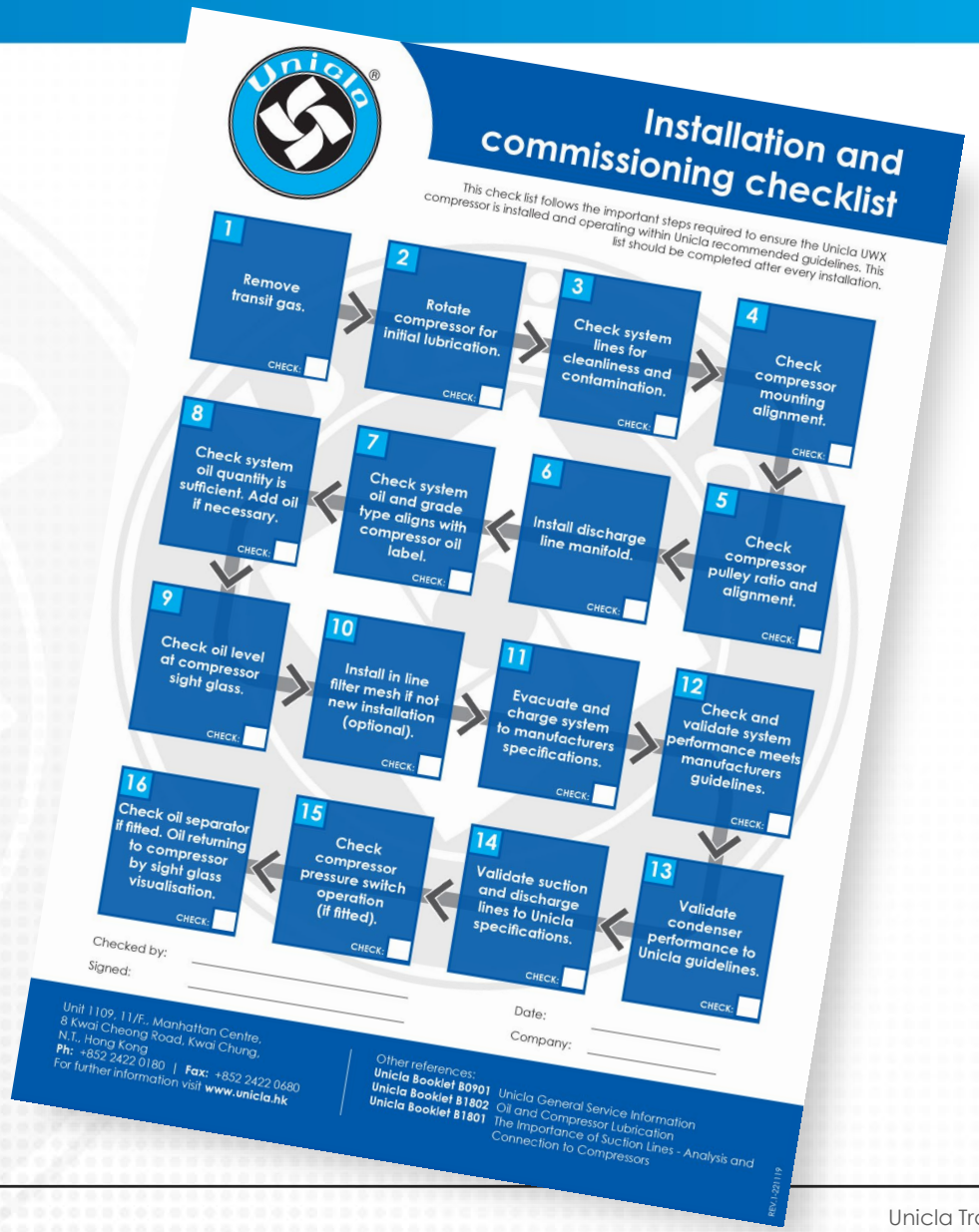
Operation Analysis at 2000 / 2200 / 2400 RPM (Indicate which)							
Discharge Pressure		Suct.Pressure at Evap			Duct Temp - In		m/s
Condenser Temp	°C	Suct.Pressure at Comp			Duct Temp - Out		°C
Discharge Temp	°C	Pressure Drop			Temp Difference		°C
Liquid Line Temp	°C	Suct.LineTemp at Comp		°C			°C
Discharge Superheat	°C	Evap Temp		°C	Airflows		
Subcooling	°C	Suct.LineTemp at Evap		°C	Condenser		
		Suct.Line Superheat		°C	Evap Duct - Front		m/s
				°C	Evap Duct - Rear		m/s

Operation Analysis at 2500 / 3000 / 3600 RPM (Indicate which)							
Discharge Pressure		Suct.Pressure at Evap			Duct Temp - In		m/s
Condenser Temp	°C	Suct.Pressure at Comp			Duct Temp - Out		°C
Discharge Temp	°C	Pressure Drop			Temp Difference		°C
Liquid Line Temp	°C	Suct.LineTemp at Comp		°C			°C
Discharge Superheat	°C	Evap Temp		°C	Airflows		
Subcooling	°C	Suct.LineTemp at Evap		°C	Condenser		
		Suct.Line Superheat		°C	Evap Duct - Front		m/s
				°C	Evap Duct - Rear		m/s

Other Information					
Ambient Temp	°C	Clutch Cycle (set point)	°C	Comp oil Level	cc
Note: Measure compressor oil level by sight glass for models 330, 440 & 550.					

18. INSTALLATION AND COMMISSIONING CHECKLIST

This check list follows the important steps required to ensure the Unicla UWX compressor is installed and operating within Unicla recommended guidelines.



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