



Field Study

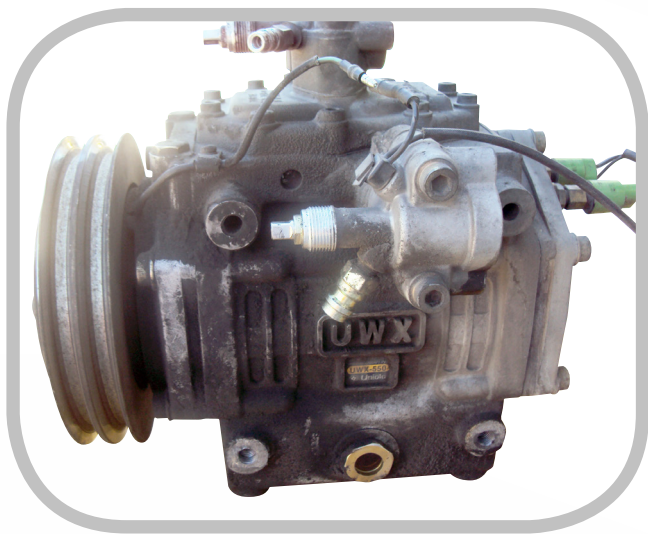
UWX550 compressor

March 2011

Cat. No. T1103

Introduction

The purpose of this field test is to examine the performance, durability and coupling integrity of a Unicla UWX550 compressor retrofitted to a used air-conditioning system, and to demonstrate the capabilities of Unicla UWX series compressors in bus and coach applications.



Summary

After three years of operation and during a major service of the air-conditioning system, some aluminium particles were found in the receiver drier filter. The particles were believed to be from the compressor, so it was removed in order to conduct complete a pull-down inspection.

After dismantling, the major compressor components were found to be in excellent condition. In particular the pistons, thrust bearings, shoe discs and swashplate were showing quite low wear factors, so it was concluded that these components – as the working assembly of the compressor – were capable of much further operation in the field.

Some slight scoring of the oil pump gear housing in the rear cap was found, plus some scoring of the thrust bearing washers. The pump housing was the most likely the source of the small metal particles found in the receiver drier filter, but the thrust bearings and oil pump operation were otherwise still within specification.

Description

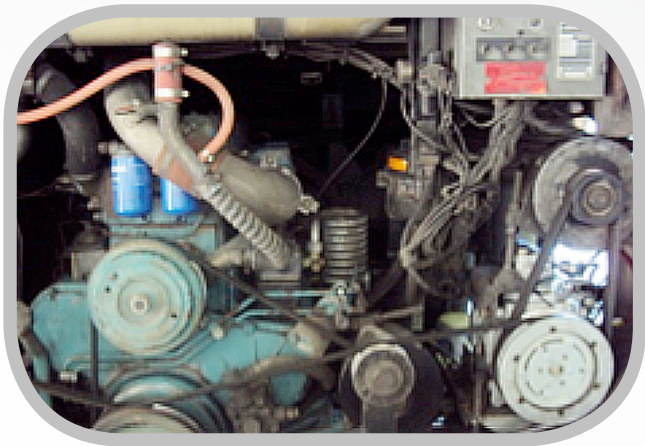
The coach is a 1995 Scania K113 coach installed with a Nippon Denso unit operating in Queensland Australia, transporting tourists mainly between the Gold Coast and Brisbane with typical conditions being prolonged stop-start traffic and standing under idle.

The vehicle had already travelled 741,932 kilometres when the new Unicla UWX550 compressor was installed to replace an existing Denso 10P50C unit.

Vehicle owner Murrays Logistics on the Gold Coast completed the installation on 1st October 1997. Details are as follows:



Vehicle make and model	Scania K113c
Body type	50-seat touring coach
A/C system	Denso with R134a refrigerant – 32 kW capacity
Compressor type	Unicla UWX550 with 210 mm BBB clutch – Serial No. 295018



Engine bay.

Vehicle and air-conditioning unit history

Upon commissioning the Unicla UWX550 compressor on 1st October 2007, the coach immediately commenced normal work as a tourist coach in the Brisbane-Gold Coast region. Typical operating parameters for the air-conditioning system were as follows:

*Note: The Denso AC system is TXV with evaporator pressure regulation constant between 0°C and 2.0°C

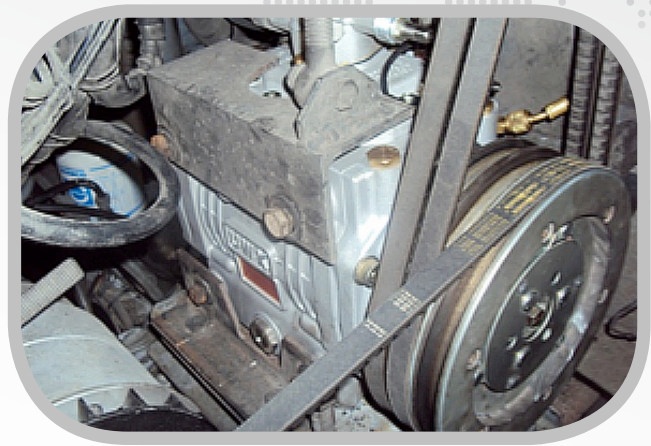
**Hot day
(28-35°C)**

Suction pressure 200 kPa / Discharge pressure 1400 kPa

Cool day

Suction pressure 200 kPa / Discharge pressure 1100 kPa

The average temperature differential of return air to supply air ranged from 10.0°C to -15.0°C.



Custom compressor mount bracket and 3B clutch pulley.

The following services and repairs were undertaken:

17th September 2008

786,325 km: Minor service, replace control switches and two evaporator fan motors.

26th May 2009

818,126 km: Minor service, replace discharge hose.

11th April 2010

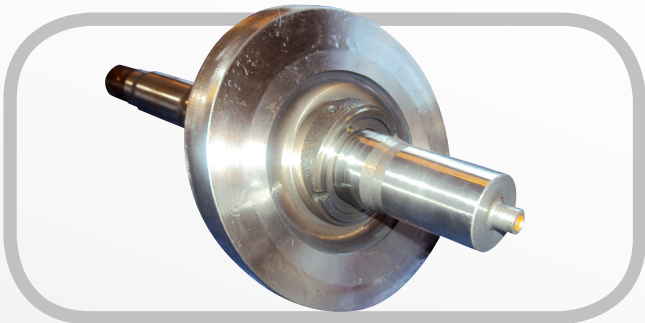
861,971 km: Minor service, replace two condenser fan motors.

The compressor was removed on 17th August 2010 at 880,192 km and returned to Unicla for inspection.

Results

Swashplate

Clearance: 0.05 mm (Standard: 0.020 – 0.022) This enlarged clearance (endplay) was due to normal wear on the contacting surfaces between cylinder and thrust washer. Only some slight scoring was found on the front thrust washers. This would not affect the running operation and durability of the compressor, or create any abnormal vibration or noise.



Shoe discs

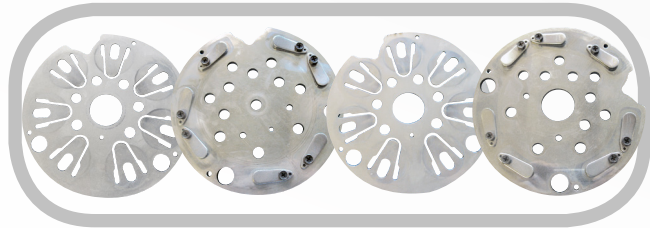
The sliding sides of the shoe discs were in good condition and within specification for their age. There was no damage to other parts of the discs and they could continue to function normally.

Clearance	1	2	3	4	5	6	7
	0.031	0.030	0.039	0.036	0.033	0.030	0.031



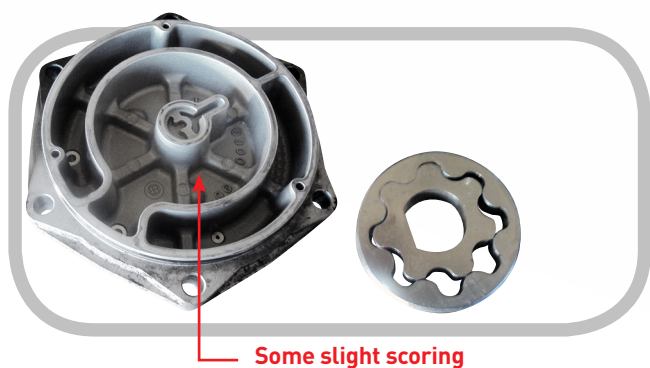
Valve plates

All valve plates were in excellent working order. There was no sign of excessive temperature or pressure during operation, with only some slight scoring on the discharge plate for the oil pump gear.



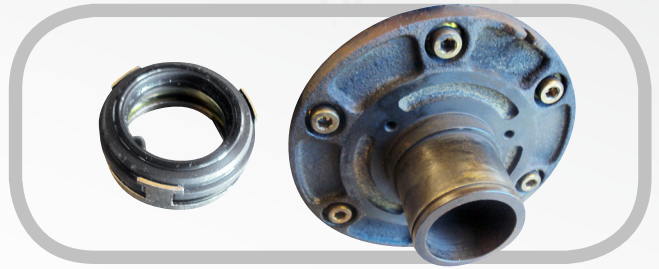
Rear cap and oil pump

The rear cap and oil pump were both in good condition, with the rear cap showing some slight scoring in the oil pump chamber.



Front nose cone and shaft seal

Both in good condition with no abnormalities.

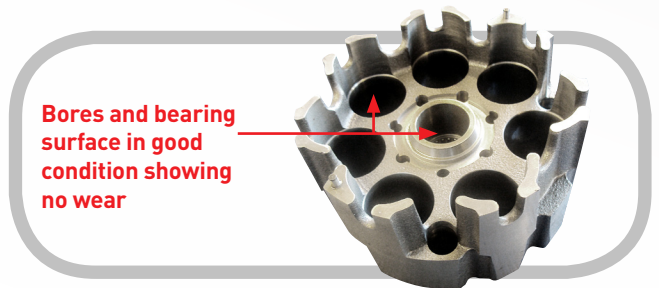


Clutch

Used a special 3B section pulley that was re-fitted to the bus and not available for inspection.

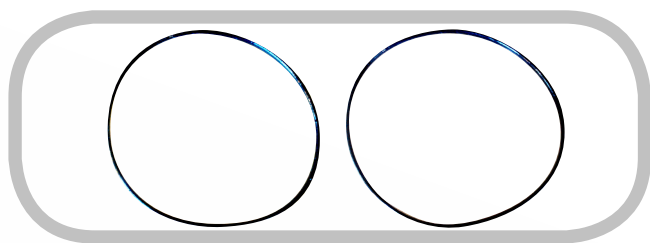
Cylinder housing

Showing no excessive wear on bores and bearing surfaces.



Front and rear cap O-ring

Both in good condition with no abnormalities.



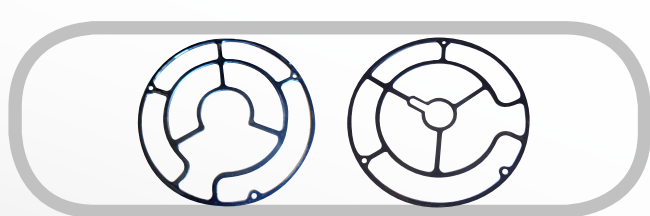
Pistons and ball bearings

All in good condition with no sign of excessive wear or chaffing.



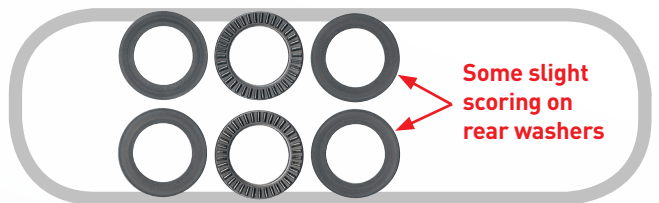
Front and rear gaskets

Both in good condition with no abnormalities.



Thrust bearings and spacers

Showing normal wear with some slight scoring in the rear washers.



Conclusion

The major components of the compressor were still in excellent condition for this duration of operation. In particular the pistons, thrust bearings, shoe discs and

swashplate were showing low to medium wear factors, and it was concluded that these components – as the working assembly of the compressor – were capable of much further operation in the field.



Unit 1109, 11/F., Manhattan Centre,
8 Kwai Cheong Road, Kwai Chung, N.T., Hong Kong
Ph: +852 2422 0180 | Fax: +852 2422 0680

For further information visit www.unicla.hk

Other references:

Unicla General Service Information [Cat.No.B0901]

Unicla Compressor Selection Criteria [Cat.No.B0902]