To
NV-EA Mr Hahn NV-EA Mr Gabor

From
NC-E/A

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As an annex, we are sending you the

Assessment report 19ADECR048

for the

Crafter panel van with roof air-conditioning system of types AC 3000 and AC 4000

from

Auto Cool Ind. 1986 Ltd. (IL)

– Also applicable to respective MAN TGE vehicles –

van Cayzeele NC-E/A:

Annex

21.05.2019

Distribution list:

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Assessment report for obtaining a letter of no objection
Crafter with roof air conditioning system of types AC 3000 and AC 4000
Auto Cool Ind. 1986 Ltd. (IL) Report no. 19ADECR048

The vehicle was appraised in week 15 locally at the body builder's site.

1 General information

1.1 Vehicle:

Registration number	–
VIN:	WV1ZZZSYZK9014695
Model:	SYN2Z
EC type approval:	e1*2007/46*1616
Motor:	(R4), 2 l / 130 kW TDI
Gearbox:	8-speed automatic gearbox
Tyres:	205/75R16C 113/111 R
Miscellaneous:	Crafter 50 panel van L5

1.2 Body builder / retrofitter:

Name:	Auto Cool Ind. 1986 Ltd. (IL)
Street:	Ben Zion Gallis 51
Location:	4914502
Country:	Israel
Tel.:	972-39342080
Internet:	Autocool.co.il

1.3 Weights:

Measured kerb weight (without driver, tank empty, without spare wheel):			Gross vehicle weight rating (acc. to type plate):		
Front axle	–	kg	Front axle	2,200	kg
Rear axle	–	kg	Rear axle	3,500	kg
Total	–	kg	Total	5,000	kg

There was no possibility to weigh the vehicle locally, nor is it possible in Israel to obtain trade plates or similar temporarily to drive to a weighbridge.

1.4 Brief description of the body/conversion

The basis for the conversion is a Crafter panel van. The Crafter presented to us for the conversion is equipped with the following features (PR no., description):

- 07T, registration as 5.0t
- 0E6, long wheelbase with large overhang
- 1D0, without towing bracket
- 6K3, Front Assist (for distance-controlled cruise control ACC up to 160 km/h)
- 7H0, without speed limiting system
- 7MP, exhaust emissions concept, EURO VI
- 8GU, 140 A alternator
- J0V, 420 A (70Ah) battery
- QL7, heat reflective glass
- ZK1, "Climatic" air conditioning system
- ZHF, rear wing doors with windows

The scope of conversion to a Crafter with roof air conditioning system includes the following points (short description):

- Cut-outs in the roof in the area of installation of the roof air conditioning system
- Routing of air conditioning hoses to the engine compartment
- Installation of air conditioning system and control system
- Wiring of the electrical components

2 Results

For the letter of no objection assessment, we had the letter of no objection application, pictures, fitting instructions and a UNECE R10 expert opinion (electromagnetic compatibility) available. The letter of no objection assessment was carried out based on the submitted documents and the on-site assessment.

Since there is the option of passing on the scope of the conversion to third parties with the OEM's letter of no objection, only the conversion of the roof air conditioning systems is considered.

The other conversion components for creation of a motor bus are not part of this letter of no objection.

2.1 Roof air conditioning system AC 3000 and AC 4000

Depending on the country of registration and the climatic conditions prevailing there, it may be necessary to install a further air conditioning system in addition to the standard air conditioning system in Crafter panel vans converted for passenger transport. Depending on the size of the interior, e.g. Crafter L3-L5, air-conditioning systems of different sizes can be selected. The variants mentioned here in the letter of no objection are the AC 3000 and AC 4000. The smaller system with a cooling output of 10 kW is operated directly on the production air conditioner compressor, with corresponding inlets and outlets for the refrigerant lines. A solution similar to the PR number 6AB is available ex works which, however, does not require an additional condenser (as opposed to the AC 3000 system of the body builder). The larger system (cooling capacity of 17 kW) is operated via an additional air conditioner compressor, which has the PR number 2AB.

Before both air conditioning systems are installed on the roof at the rear of the Crafter, holes must be made for the air outlets, coolant lines and the central electrics. Reinforcement measures are required to carry the additional weight of the systems on the roof (weight of AC 4000 = 58 kg, weight of AC 3000 = 34.5 kg). For the larger system, the reinforcement profiles are mounted on the roof (where the system is divided into two modules, the actual air conditioning system and the condenser). For the smaller system, the reinforcement profiles are designed for the installation under the roof.

The cover hoods can be manufactured individually according to customer requirements. Standard cover hoods are also available.

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Figure 1: Roof air conditioning system AC 3000 without cover (image from BB)

Figure 2: AC 3000 with standard cover (image from BB)

Figure 3: Inner roof reinforcement for AC 3000

Figure 4: Air outlet of AC 3000

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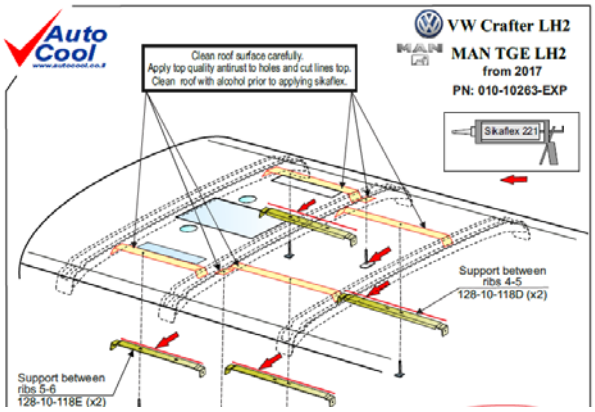

Figure 5: Cut-outs and reinforcements in roof for AC 3000 (image from BB)

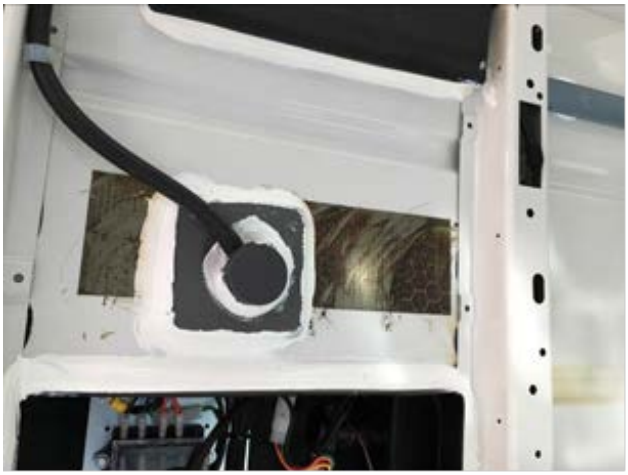

Figure 6: Condensation drain line AC 3000

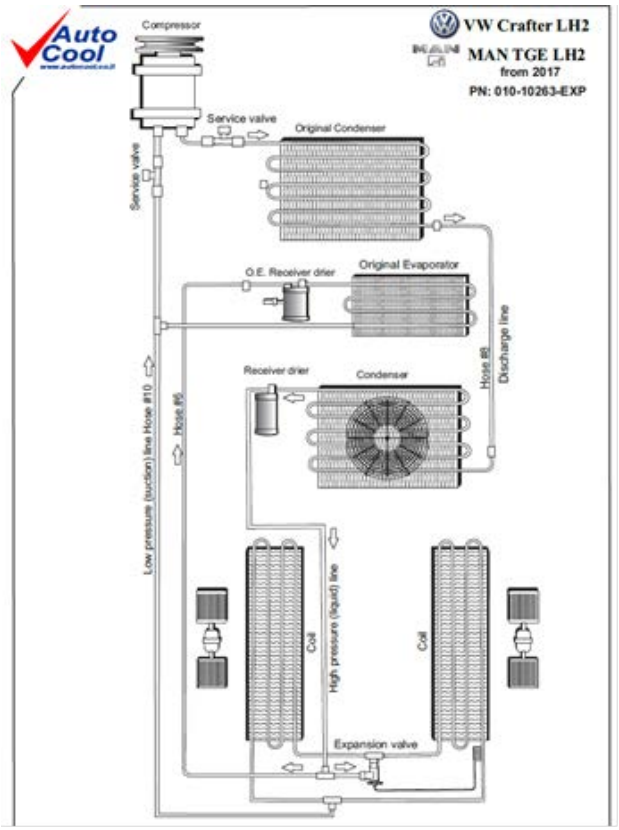

Figure 7: Hydraulic diagram for AC 3000 (image from BB)

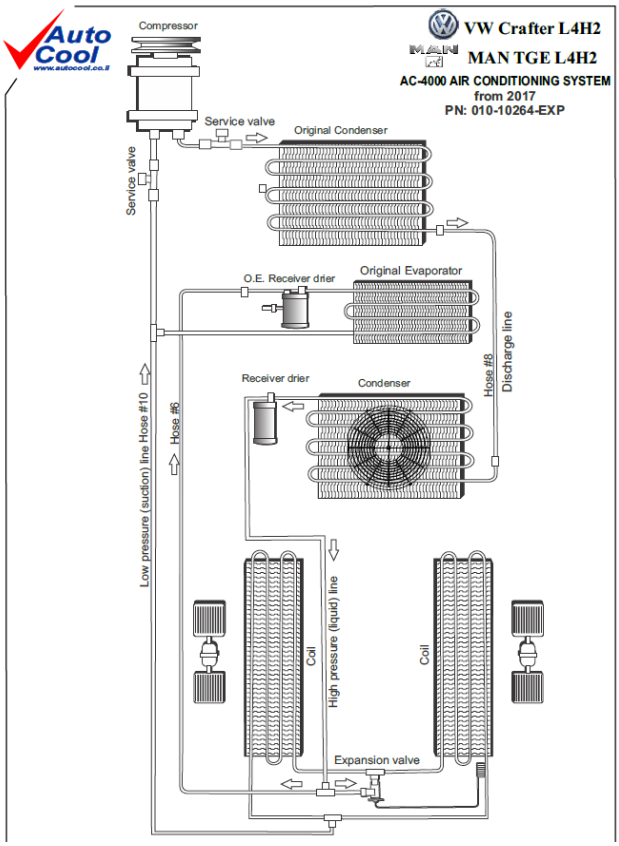

Figure 8: Hydraulic diagram for AC 4000 (image from BB)

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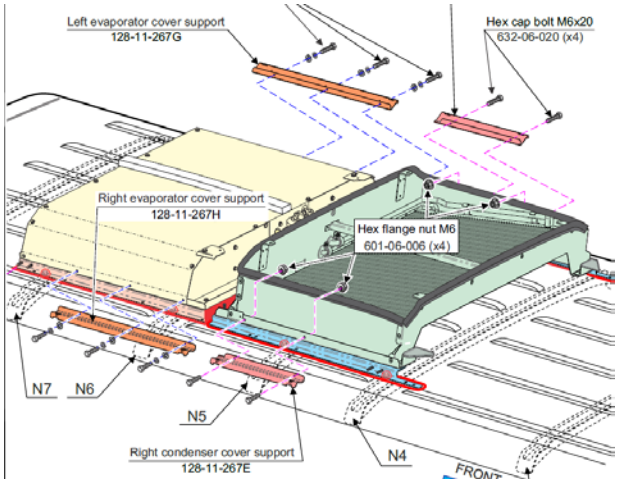

Figure 9: Installation of AC 4000 on Crafter roof in 2 modules

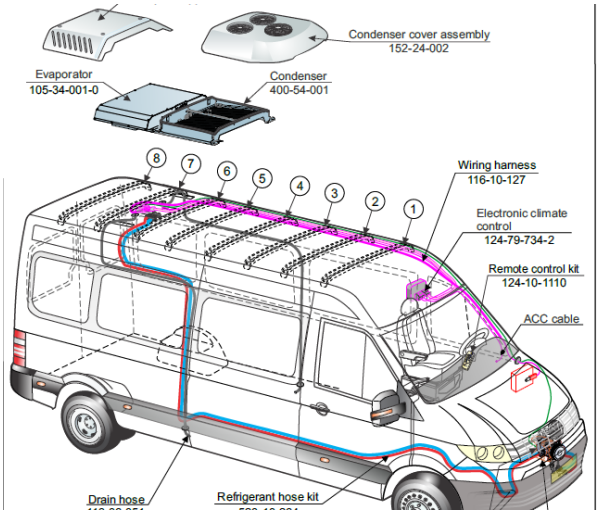

Figure 10: Overview of installed components for AC 4000 (image from BB)

Notes/recommendations

Damage caused to the roof structure by the additional weight of roof air conditioning system is the responsibility of the body builder. Damage to the air conditioner compressor that could result from the conversion is also the responsibility of the body builder, see also section 7.4.5.3 “Retrofitting an air conditioning system” in the Crafter Body Builder Guidelines.

2.2 Electrical system

The main power consumers are the fans that transport the cooled air into the passenger compartment and the fans that ventilate the condenser.

The control units of the air conditioning systems are accessible from the passenger compartment via the previously made holes in the Crafter roof. The AC 3000 is controlled via the standard controls of the base vehicle. Only the fan on the second evaporator of the AC 3000 is controlled via a rotary switch on the lower instrument panel. The AC 4000 system is autonomous as of the first cooling circuit of the Crafter and is operated via its own AutoCool control system.

The main fuses of the systems are installed directly in the distribution panel in the engine compartment (50 A for AC 3000 and 70 A for AC 4000).

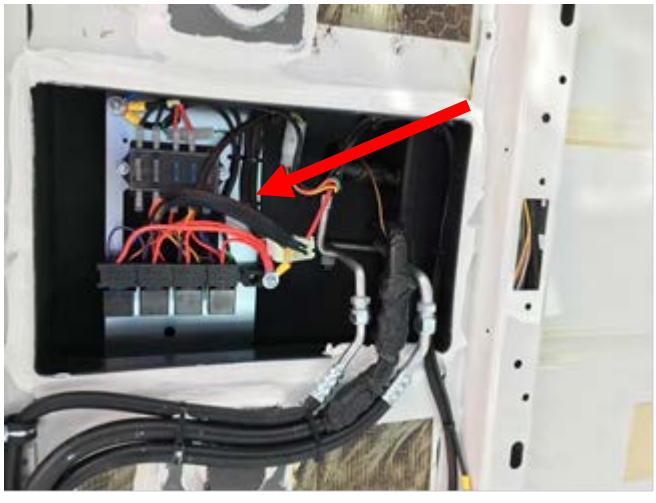

Figure 11: Control of AC 3000 air conditioning system

Figure 12: Rotary switch for AC 3000 fans

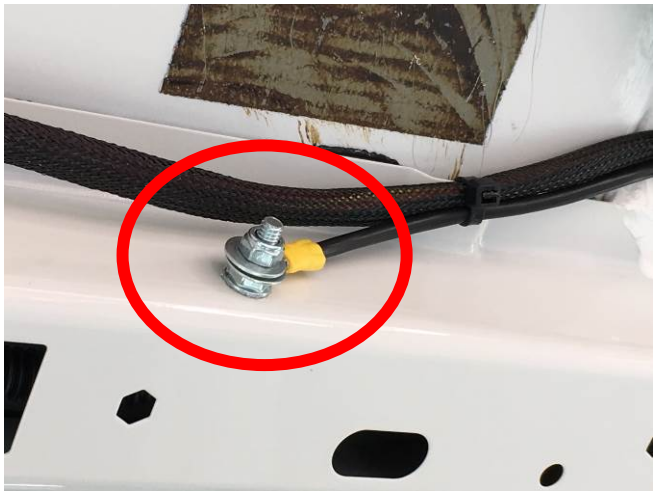

Figure 13: Earth connection to body (AC 3000)

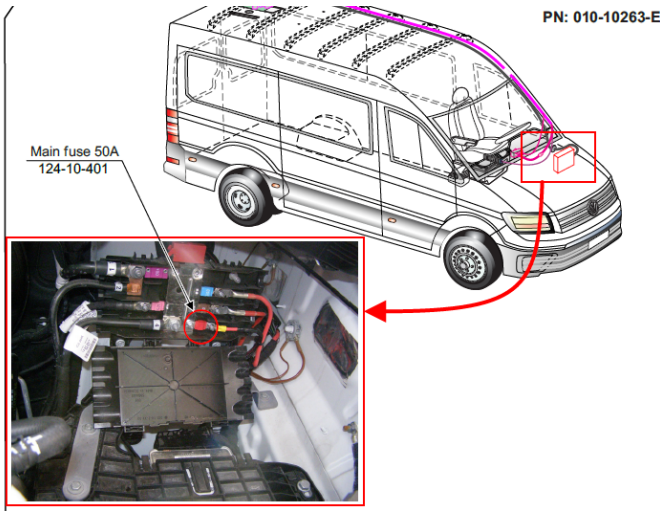

Figure 14: Main fuse in engine compartment in distribution box (image from BB)

Notes/recommendations

- **None**

3 Summary

Notes/recommendations

Damage caused to the roof structure by the additional weight of roof air conditioning system is the responsibility of the body builder. Damage to the air conditioner compressor that could result from the conversion is also the responsibility of the body builder, see also section 7.4.5.3 “Retrofitting an air conditioning system” in the Crafter Body Builder Guidelines.

There are no concerns about the conversion.

4 General information

This assessment by Volkswagen Commercial Vehicles is based exclusively on the documentation made available to us. We have examined only the aforementioned items and have found these to be unobjectionable (including the relevant modifications, where appropriate).
Letter of no objection assessments are compiled by Volkswagen Commercial Vehicles for such Volkswagen base vehicles, which are equipped with installations, conversions or attachments by body builders and offered as two invoice vehicles in the market.
Volkswagen Commercial Vehicles does not conduct any complete testing, own calculations or own tests with the assessed vehicles in connection with the letter of no objection assessment, but only conducts technical visual inspections. The letter of no objection assessment is not approval in the sense of a series approval of Volkswagen Commercial Vehicles' own products.
The respective body builder remains solely responsible for the road and operational safety as well as the durability of its installation, conversion or attachment as well as the converted overall vehicle, if its above properties are influenced by the conversion even in the event of a positive letter of no objection assessment by Volkswagen Commercial Vehicles.
The contracted company bears full responsibility for the professional execution of the conversions and modifications. This also applies to any damage caused to the base vehicle by the conversions. Volkswagen AG assumes no liability for any damage.
Furthermore, this letter of no objection applies only if the design, manufacturing and assembly technology used at the company responsible for carrying out the modifications is in line with the state of the art.
The current version of the Volkswagen body builder guidelines (online body builder guidelines: www.umbauportal.de) must be observed. Deviations from the body builder guidelines must be carefully and individually checked by the contracted company and presented to Volkswagen AG before the conversion is carried out.

i.A. A. Dohse