SERVICE BULLETIN

SB1207

ADDRESSEES	: ABC Customer Care and Parts Source Owners and operators of coaches listed under 'Application'
COACH/BUS MODEL	: T and C coaches w/ Cummins engine
BULLETIN TYPE	: Product Improvement
SECTION/CHAPTER	: Section 3 – Drive train Chapter 2.22 Air intake system
DATE	: October 08, 2007
SUBJECT	**: Turbocharger – compressor discharge elbow change**
TERMS & CONDITIONS	: No claims will be accepted with reference to this Bulletin.

APPLICATION:

The product improvement subject of this Bulletin can be retrofitted to following units:

Model	Engine	VIN T2140	VIN T2145
T2100	Cummins	40148 → 40160	44301 → 44331

Model	Engine	VIN
C2045	Cummins	45440, 45458 → 45500, 46001 → 46007, 46008 → 46085

DESCRIPTION:

1. The turbine and compressor housings (1 and 3, Figure 1) are attached to the turbocharger bearing housing (2, Figure 1) by means of V-band clamps (arrows, Figure 1).

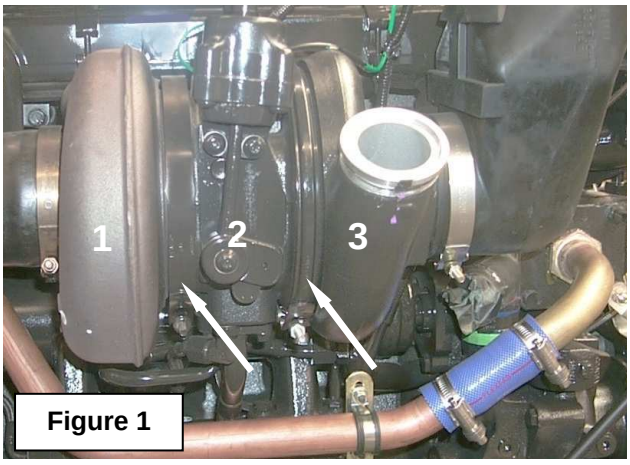


Figure 1

Description continued on next page.

2. When the engine is under full load, thermal expansion can cause the clamps to stretch, resulting in a reduced clamping force on the housing mounting flanges.
   If the clamping force is reduced to below the design clamping force, the discharge pressure can exert sufficient leverage on the discharge elbow to make the bearing housing and the compressor housing to which it is attached, rotate upward.
   In severe cases the elbow may rub against the engine compartment closing panel, resulting in damage to the elbow (see Figure 2).

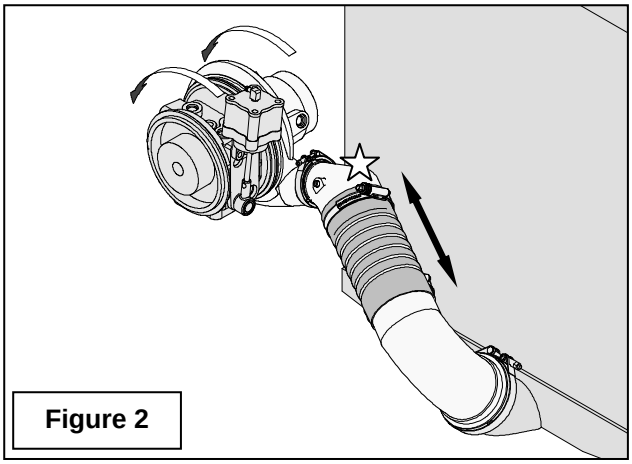


Figure 2

3. To address this issue, a new, shorter 135° disch arge elbow now replaces the larger old 90° item. The new configuration considerably reduces the torque that the discharge pressure can apply to the turbo compressor and bearing housing assemblies.
   The accompanying turbo compressor to charge air cooler piping has been adapted to suit.

4. A new closing panel, separating the engine compartment from the charge air cooler/battery compartment, has also been cut into production to suit the installation changes.

5. These product improvements have been cut into production as from units:

Model	Engine	VIN
T2140	Cummins	40161 →
T2140		44332 →
C2045		46086 →

6. Customers who experience the above-described issue or who want to upgrade their coaches to the latest configuration may purchase the parts and install them as described in this Bulletin.

Continued on next page.

PARTS AND PRODUCTS:

T2100 Series – Parts to be recovered after disassembly

VH reference	Description	Qty.
VH 10753168	Flex hose, connecting discharge elbow to charge air cooler lower elbow	1
VH 10617357	Hose clamp, constant torque, for VH 10753168	2
VH 10599083	V-band clamp, connecting discharge elbow to compressor manifold	1
VH 10873428	Seal, O-ring, discharge elbow to compressor manifold flange	1
VH 10572496	V-band clamp, connecting lower elbow to charge air cooler manifold	1
VH 10854597	Seal, O-ring, elbow VH 11005304 to charge air cooler manifold flange	1
VH 10792787	U-clamp, guillotine type, charge air cooler lower connecting elbow	1
VH 10581374	Bush, rubber	4
VH 10581372	Washer, flat, 1-1/4’ (30 mm)	2
VH 10581371	Spacer, flanged	2
VH 660203301	Nut, M10 x 1.5, grade 8	4
VH 10898594	Panel assembly, turbocharger closing	1

T2100 Series - New parts to be installed

VH reference	Description	Qty.
VH 11005471	Elbow, compressor discharge	1
VH 10812817	Tie rod, chassis anchor to bracket VH 11029398, threaded M10 x 1.5, 18-1/2’ (470 mm) long	1
VH 11029398	Bracket, angle, elbow VH 11005304 mounting	1
VH 11005304	Elbow, charge air cooler lower connecting	1
VH 11028746	Panel assembly, turbocharger compressor closing	1

C2045 - Parts to be recovered after disassembly

VH reference	Description	Qty.
VH 10753168	Flex hose, connecting discharge elbow to charge air cooler lower elbow	1
VH 10617357	Hose clamp, constant torque, for VH 10753168	2
VH 10599083	V-band clamp, connecting discharge elbow to compressor manifold	1
VH 10873428	Seal, O-ring, discharge elbow to compressor manifold flange	1
VH 10572496	V-band clamp, connecting lower elbow to charge air cooler manifold	1
VH 10854597	Seal, O-ring, elbow VH 11005304 to compressor manifold flange	1
VH 10792787	U-clamp, charge air cooler lower connecting elbow mounting bracket	1
VH 10581374	Bush, rubber	4
VH 10581372	Washer, flat, 1-1/4’ (30 mm)	2
VH 10581371	Spacer, flanged	2
VH 660203301	Nut, M10 x 1.5, grade 8	4
VH 10991820	Panel assembly, turbocharger closing	1

C2045 - New parts to be installed

VH reference	Description	Qty.
VH 11005471	Elbow, compressor discharge	1
VH 11014085	Tie rod, chassis anchor to bracket VH 11012379, threaded M10 x 1.5, 18-7/8’ (480 mm) long	1
VH 11012379	Bracket, angle, elbow VH 11005304 mounting	1
VH 11005304	Elbow, charge air cooler lower connecting	1
VH 11018934	Panel assembly, turbocharger compressor closing	1

- Parts may be purchased through regular channels.
- Parts and products disposition: discard according to applicable environmental regulations.

PROCEDURE: To upgrade the turbo compressor to charge air cooler piping

1. General:

- This job should be executed by an experienced automotive technician.
- For more information refer to the service literature that comes with the coach, to the updated Spare Parts Manual sections that have been attached to this Bulletin, and to the Cummins ISM Troubleshooting and Repair Manual.
- If you do not have the expertise to perform present procedure, do not hesitate to go to your nearest ABC Customer Care & Parts Source service center.

2. Special tools, equipment or services:

- This job requires the use of a 3/8' drive torque wrench ranging from 30 to 200 in.lbf.

3. Preparations:

- Park the coach on a level surface with the front wheels straight.
- Apply the parking brake and shut down the engine.
- Switch off all systems and turn off the battery master switch.
- Put a "DO NOT OPERATE" tag on the instrument panel.
- Read the entire procedure before beginning to work.

CAUTION: When working in the engine compartment, turn the starter motor inhibitor switch to "starter motor disabled" for the steps, which do not require engine operation.

CAUTION: Observe safe shop practices at all times.

4. To remove the old style piping connecting the turbo compressor housing to the charge air cooler:

1) Undo and remove the U-clamp nuts (1, Figure 3) securing the charge air cooler lower connecting elbow (2, Figure 3) to the angle bracket and to the tie rod.
Recover the guillotine-type U-clamp and nuts.

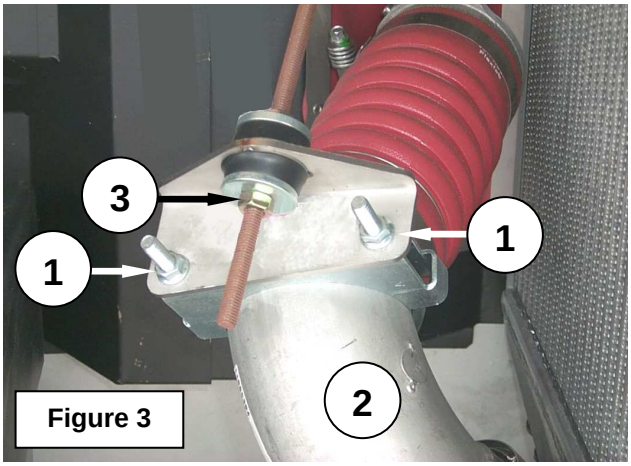


Figure 3

2) Undo and remove the outer nuts and mounting hardware both at the angle bracket end of the tie rod and at the chassis anchor bracket end (3, Figure 3 and Figure 4 - C2045 shown).

Remove the tie rod and the angle bracket.
Recover all tie rod mounting hardware.

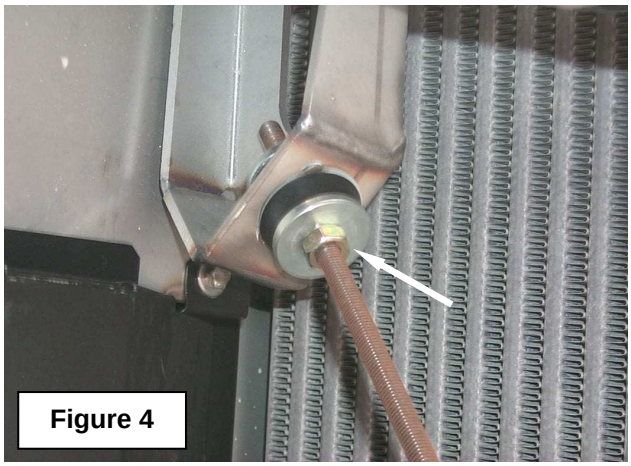


Figure 4

3) Slacken the V-band clamp securing the lower connecting elbow to the charge air cooler intake manifold so that the elbow can be withdrawn (Figure 5).
Remove the elbow and the O-ring seal from the manifold.
Recover the V-band clamp and O-ring.
Cap the charge air cooler manifold to prevent the ingress of dirt into the induction system.

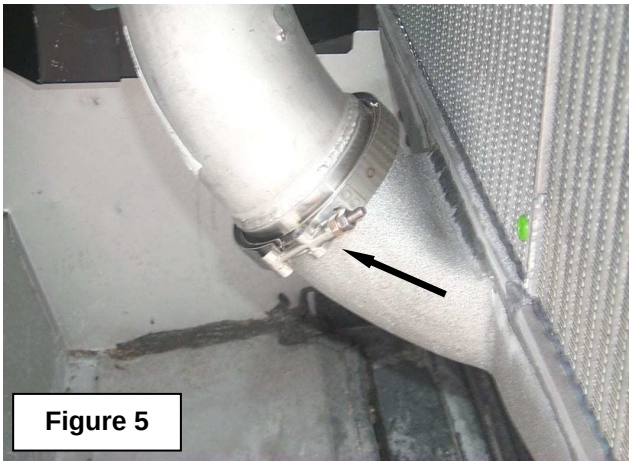


Figure 5

4) Slacken the flex hose clamps (1 and 2, Figure 6).
Detach the lower charge air cooler connecting elbow from the flex hose.
Detach the flex hose from the turbo compressor discharge elbow.
Recover the flex hose and clamps.

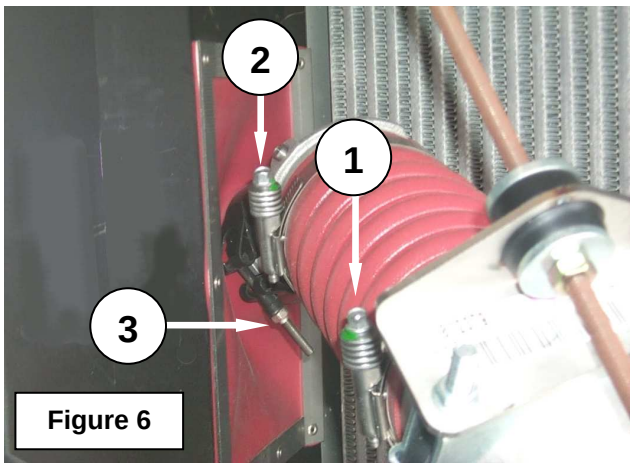


Figure 6

5) Slacken the discharge elbow V-band clamp (3, Figure 6).

6) Figure 7 shows a typical discharge elbow installation.
Remove the V-band clamp (2, Figure 7), the old discharge elbow (1, Figure 7), and the O-ring seal (3, Figure 7) from the turbocharger compressor discharge manifold.
Recover the V-band clamp and O-ring. Cap the compressor discharge manifold to prevent the ingress of dirt into the induction system.

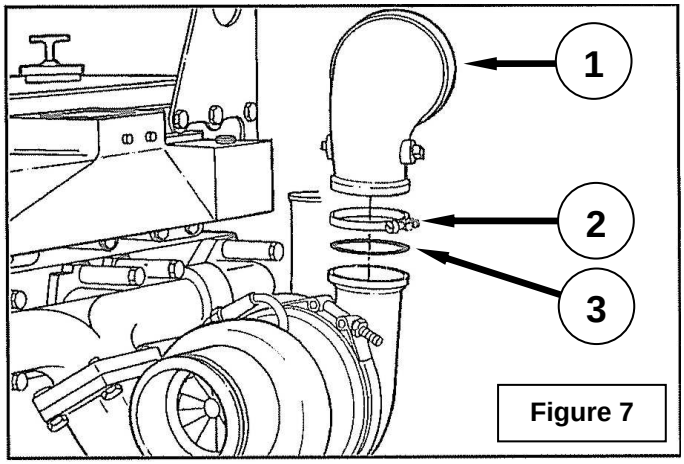


Figure 7

7) Take note of the engine compartment closing panel installation.
Starting with #1 panel (1, Figure 8), undo and remove the retaining bolts and washers.
Figure 9 shows some installation details.
Remove both #1 and #2 panels.
Recover #1 closing panel and all fasteners. #2 closing panel will be replaced by a new one.

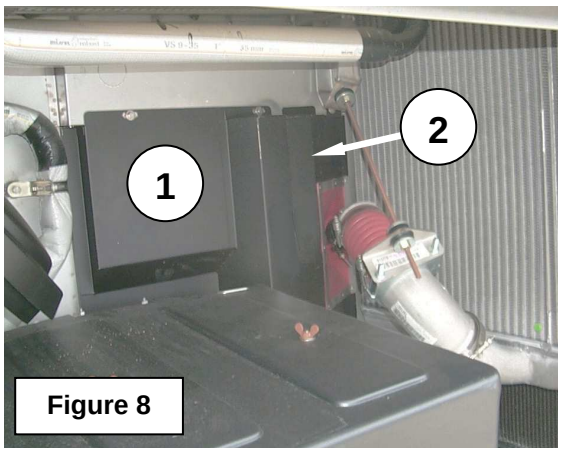


Figure 8

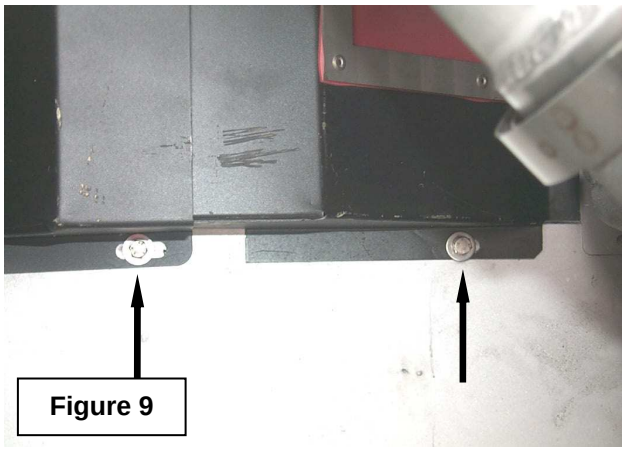


Figure 9

5. <u>To adjust the housing position and install new spec piping between the turbo compressor housing and the charge air cooler using new and recovered parts</u>:

1) Slacken the air intake hose clamp (Figure 10) to allow rotation of the compressor housing while trial fitting the new piping.

2) Slacken the compressor housing V- band clamp (Figure 11) so that it sits loose on the mounting flanges.

3) Check that the bearing housing is properly positioned.
The variable geometry actuator on the bearing housing should be in a vertical position relative to the engine (Figure 13).
The turbocharger oil return line should not be under strain nor should it be rubbing against

a coolant pipe, if fitted (Figure 14). A minimum gap of 3/8 inch (9 mm) between the flex hose and the copper tubing is required.

4) If the bearing housing needs to be repositioned, carefully tap-back the tamperproof provision from the turbine housing V-band clamp nut (Figure 12) using a large screwdriver. Slacken the turbine housing V-band clamp so that it sits loose on the mounting flanges.

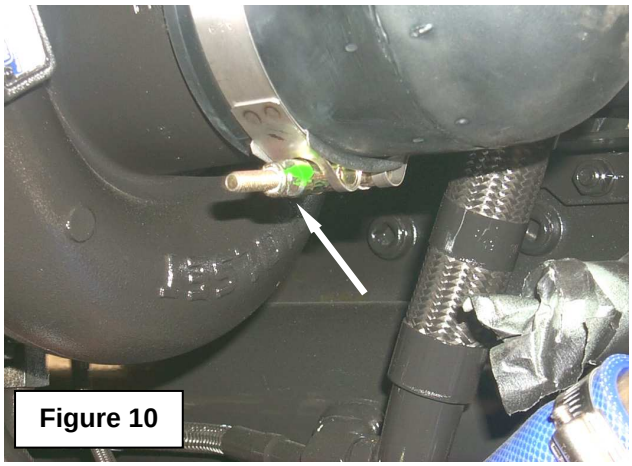


Figure 10

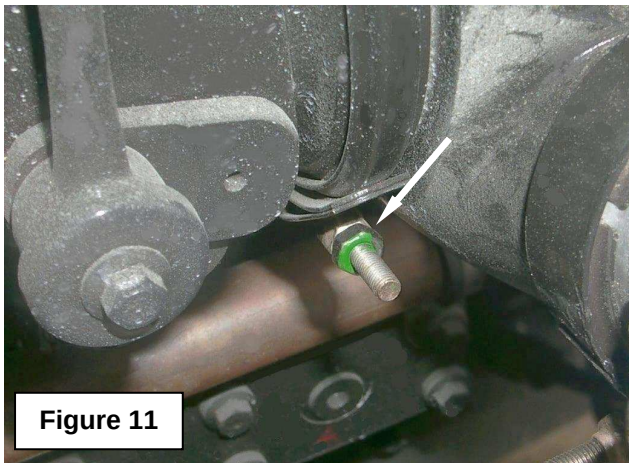


Figure 11

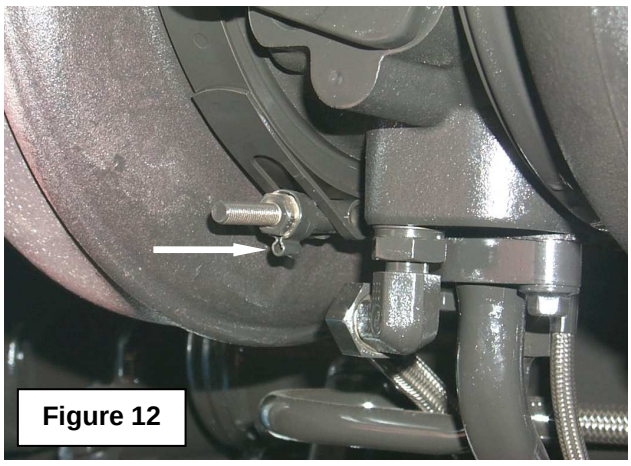


Figure 12

5) Referring to Figures 13 and 14:

Adjust the bearing housing so that the variable geometry actuator is in a vertical position relative to the engine.
Make sure the turbocharger oil return line is not under strain nor is it rubbing against a coolant pipe (if fitted).

A minimum gap of 3/8 (9 mm) inch between the flex hose and the copper tubing is required.
Tighten the V-band clamp to a torque of 75 in.lbf (8.5 Nm).
Make sure the V-clamp is seated properly before it is tightened.
Reinstall the tamperproof provision over the V-band clamp nut.

<u>CAUTION</u>: Do not over-torque the turbine housing V-band clamp. If the V-band clamp is overtorqued it will provide less clamp load to the turbine housing and bearing housing flanges, which can result in damage to the turbocharger.

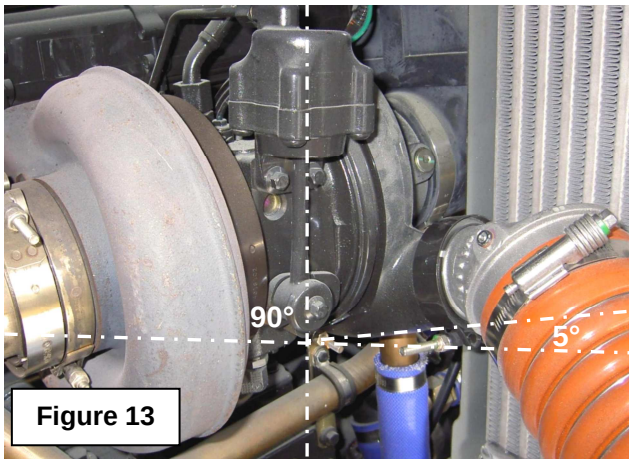


Figure 13

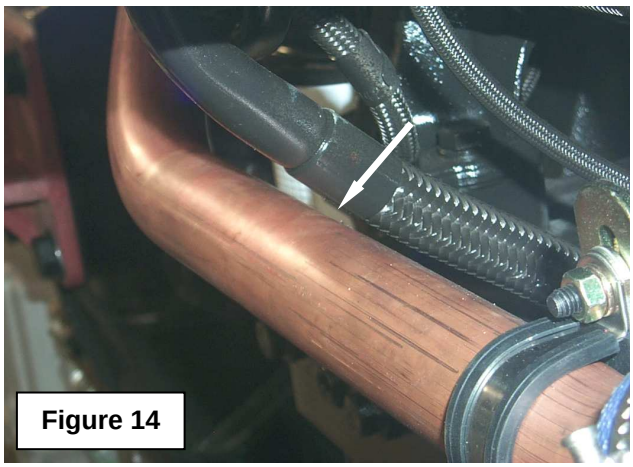


Figure 14

6) Rotate the compressor housing to an angle suitable to accept the new piping.
Recommended starting position of the manifold is 5° from the horizontal (Figure 13).

7) With the exception of the new tie rod, tie rod mounting hardware, and the new angle bracket, loosely assemble the new piping using new and recovered components and hardware as illustrated in Figure 15.

8) Uncap the compressor housing and charge air cooler manifolds.
Trial fit and connect the new assembly for a loose fit that allows adjustment of the components.
Install the recovered O-ring seal between the turbocharger compressor manifold and the new discharge elbow.
Install the recovered O-ring seal between the lower connecting elbow and the charge air cooler mounting manifold.
Do not tighten any clamps.

<u>CAUTION</u>: A strain-free installation of the assembly is essential to ensure system performance.

9) Rotate the compressor housing, the new discharge elbow and the new charge air cooler lower connecting elbow so that the mounting flanges run parallel to one another.
Also make sure that the flex hose runs straight and in-line with the two elbows it connects.

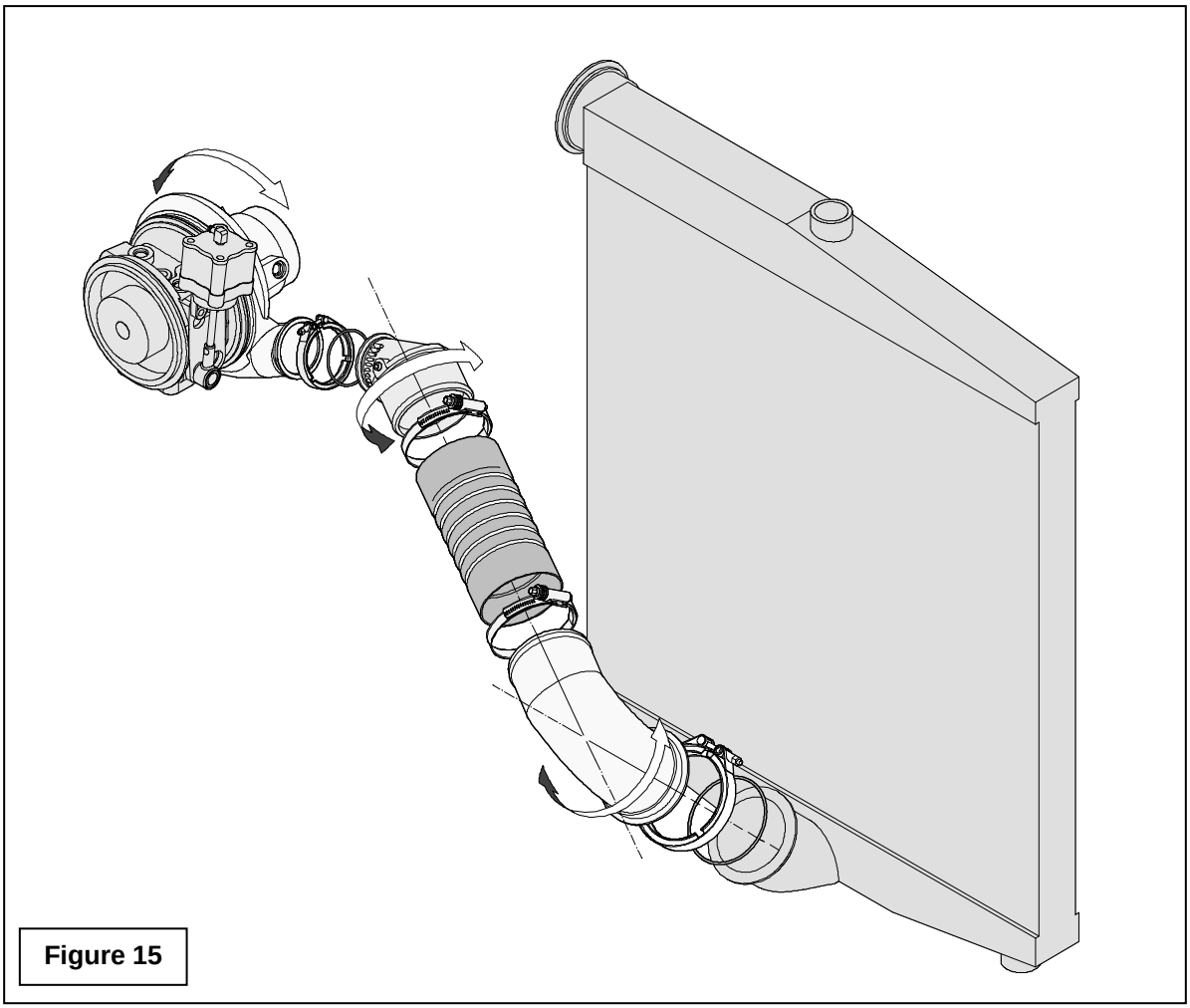


Figure 15

10) With the actual installation resembling the installation shown in Figure 15 as close as possible, draw reference lines on all interconnecting parts to mark their position relative to one another.
This way these parts can be reassembled correctly later in the procedure.

11) Finger tighten the flex hose clamps and remove the new piping assembly to allow installation of the closing panels.
Recover the O-ring seals.
Re-cap the compressor housing and charge air cooler manifolds.

<u>CAUTION</u>: Do not over-torque the compressor housing V-band clamp. If V- band clamp is overtorqued it will provide less clamp load to the compressor housing and bearing housing flanges, which can result in damage to the turbocharger.

12) Tighten the compressor housing V-band clamp nut (Figure 11).
Make sure the V-band clamp is seated properly before it is tightened.
Torque value 75 in.lbf (8.5 Nm).

13) Tighten the air intake elbow hose clamp (Figure 10) to a torque of 80 in.lbf (9 Nm).

14) Referring to the notes previously taken during removal, install the new #2 engine compartment closing panel first.
Finish closing panel installation by refitting the old # 1 panel.
Tightening torque for the fasteners: 80 in.lbf (9 Nm).

15) Uncap the compressor housing and charge air cooler manifolds.
Reinstall the new piping assembly using the O-ring seals and the recovered mounting hardware.
Referring to the marks made on the interconnecting components, ensure that they all line up properly, as was determined previously during trial fitment.
Adjust as required.

16) Tighten the discharge elbow V- band clamp (3, Figure 6) to a torque of 75 in.lbf (8.5 Nm).
Make sure the elbow is seated properly before the V-clamp is tightened.

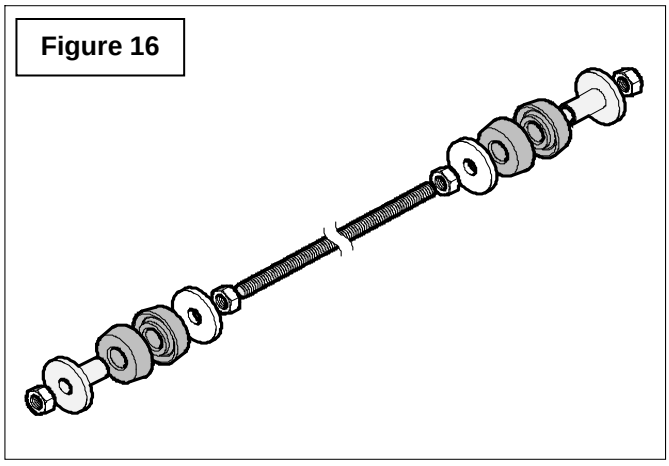
17) Tighten the flex hose constant torque clamps to 70 in.lbf (8 Nm).

18) Tighten the lower connecting elbow to charge air cooler manifold clamp to 75 in.lbf (8.5 Nm).
Make sure the elbow is seated properly before the V-band clamp is tightened.

19) Loosely fit the angle bracket and the guillotine clamp around the new charge air cooler lower connecting elbow using the clamp nuts.

20) Partly assemble the new tie rod and tie rod mounting hardware as shown in Figure 16.
Do not install the outer hardware yet.
Install the assembly between the chassis anchor bracket (Figure 5) and the angle bracket loosely fitted in the previous step.

Figure 16



21) Complete the tie rod installation with the remaining (outer) hardware (Figures 3 and 16).
Rotate and adjust the angle bracket and clamp to be parallel to the chassis anchor bracket.
Adjust the tie rod length with the inner nuts.
Tighten the tie rod outer nuts with one wrench to a torque of 30 ft.lbf (40 Nm) while holding the inner nuts with a second wrench.
Tighten the guillotine clamp nuts to a torque of 30 ft.lbf (40 Nm).

Procedure complete.

DISCLAIMER:

The procedures contained herein are not exclusive. Van Hool cannot possibly know, evaluate, or advise the transportation industry of all conceivable ways in which a procedure may be undertaken or of the possible consequences of each such procedure. Other procedures may be as good, or better, depending upon the particular circumstances involved.
Each carrier who uses the procedures herein must first satisfy itself thoroughly that neither the safety of its employees or agents, nor the safety or usefulness of any products, will be jeopardized by any procedure selected.

SERVICE INFORMATION:

Service Bulletins are issued to supplement or supersede information in the Van Hool manuals. Note Service Bulletin number, date and subject on the register at the end of the relevant chapter(s). File Service Bulletin separately for future reference.

ATTACHMENTS:

Attachment 1: T2100 Series – old charge air cooler piping part 1
Attachment 1: T2100 Series – old charge air cooler piping part 2

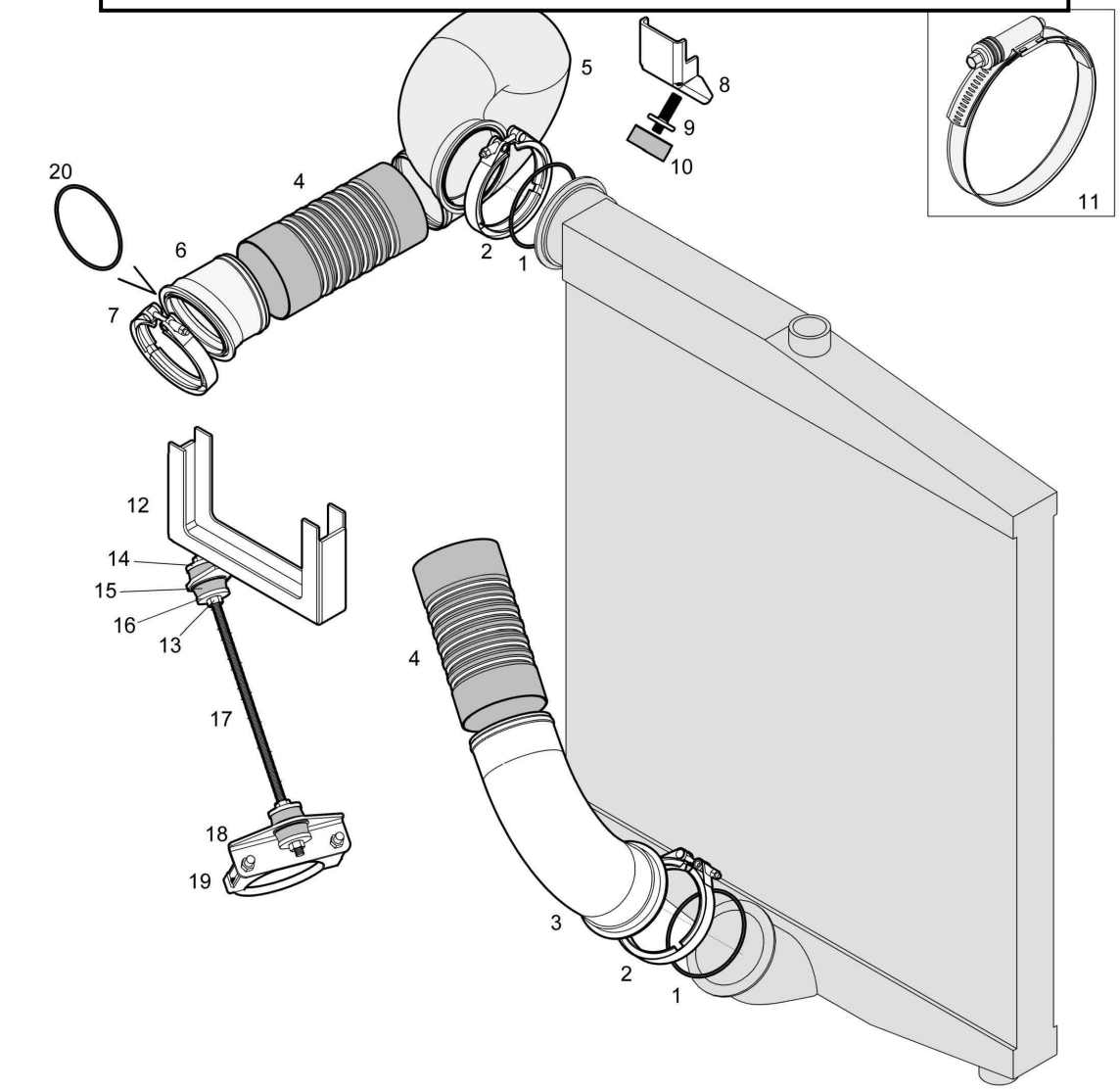
Attachment 2: T2100 Series – new charge air cooler piping part 1
Attachment 2: T2100 Series – new charge air cooler piping part 2

Attachment 3: C2045 – old charge air cooler piping part 1
Attachment 3: C2045 – old charge air cooler piping part 2

Attachment 4: C2045 – new charge air cooler piping part 1
Attachment 3: C2045 – new charge air cooler piping part 2

N°

Attachment 1: T2100 Series – old charge air cooler piping part 1



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
1	2	10854597	O-ring	Junta tórica	
2	2	10572496	Clamp	Abrazadera	
3	1	10885832	Pipe	Tubo	
4	2	10753168	Sleeve: silicone	Manguito: silicona	Ø100-100 L= 225mm
5	1	10914387	Pipe	Tubo	
6	1	10914391	Pipe	Tubo	
7	1	10904642	Clamp	Abrazadera	
8	1	10914386	Bracket	Soporte	
9	1	10856967	Stud	Pasador	
10	1	10857032	Stop	Tope	
11	4	10617357	Screw clamp	Abrazadera	Ø95-Ø118mm MAT: IN
12	1	10885961	Bracket	Soporte	
13	4	660203301	Nut	Tuerca	DIN 934 M10x1,50 k.=8.8
14	2	10581371	Bush	Casquillo	
15	4	10581374	Silentbloc	Silentbloc	
16	2	10581372	Ring	Anillo	
17	l.=400	660640605	Bar	Barra	M10 x1,5 MAT:IN
18	1	10885978	Bracket	Soporte	
19	1	10792787	Clamp	Abrazadera	Ø=4"

VANHOOL

Air intake system

Sistema de admisión

2006-10-13

0222.04-3021

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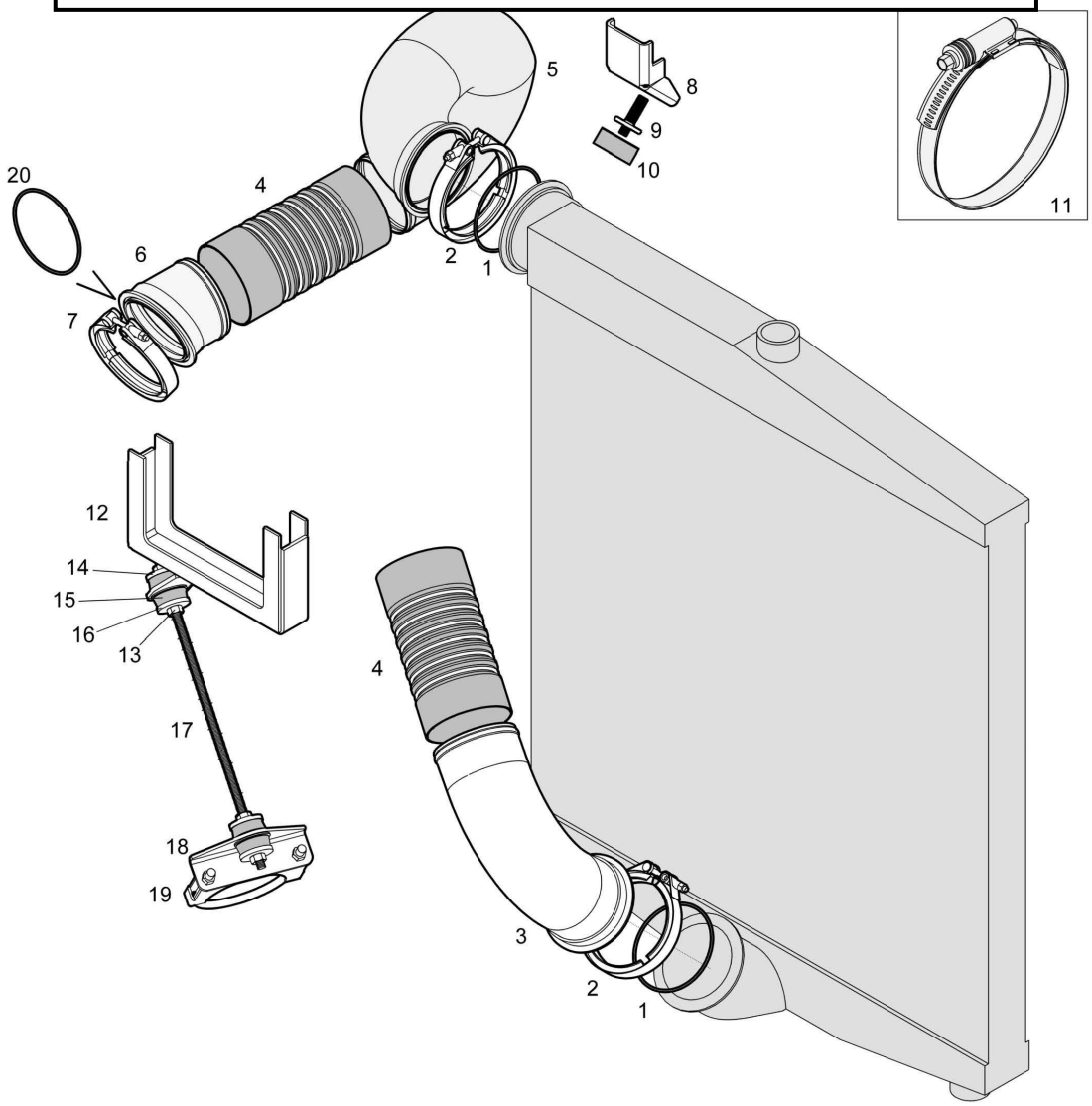
Attachment 1: T2100 Series – old charge air cooler piping part 2



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
20	1	10904640	O-ring	Junta tórica	

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Air intake system
Sistema de admisión

2006-10-13
0222.04-3021

Attachment 2: T2100 Series – new charge air cooler piping part 1

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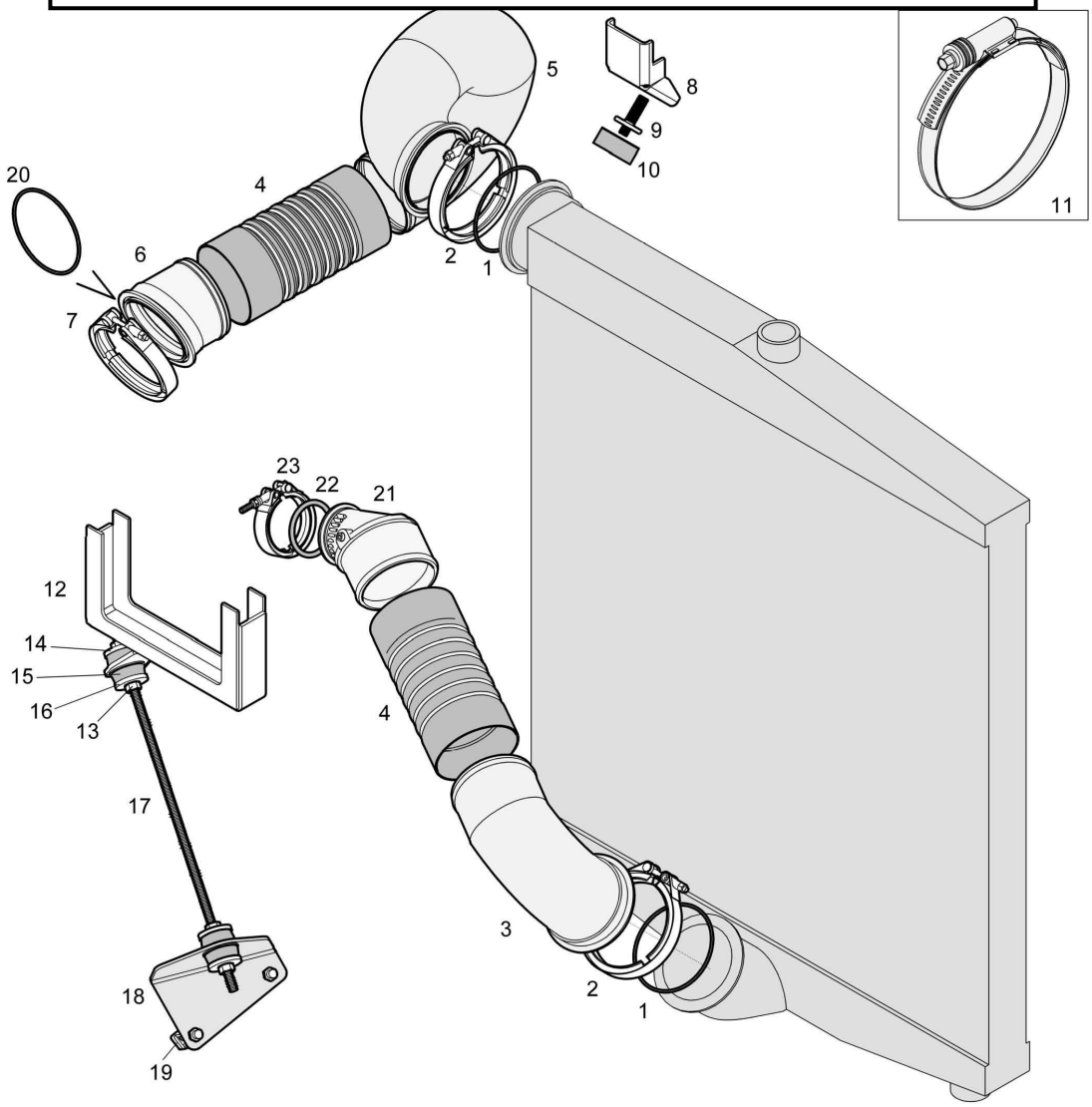

Pos.	Q.	Ref.N°	Description	Denominación	Spec.
1	2	10854597	O-ring	Junta tórica	Ø105x3
2	2	10572496	Clamp	Abrazadera	Ø124mm
3	1	11005304	Pipe	Tubo	
4	2	10753168	Sleeve: silicone	Manguito: silicona	Ø100-100 L= 225mm
5	1	10914387	Pipe	Tubo	
6	1	10914391	Pipe	Tubo	
7	1	10904642	Clamp	Abrazadera	
8	1	10914386	Bracket	Soporte	
9	1	10856967	Stud	Pasador	
10	1	10857032	Stop	Tope	
11	4	10617357	Screw clamp	Abrazadera	Ø95-Ø118mm MAT: IN
12	1	10885961	Bracket	Soporte	
13	4	660203301	Nut	Tuerca	DIN 934 M10x1,50 k.=8.8
14	2	10581371	Bush	Casquillo	
15	4	10581374	Silentbloc	Silentbloc	
16	2	10581372	Ring	Anillo	
17	l.=470	660640605	Bar	Barra	M10 x1,5 MAT:IN
18	1	11029398	Bracket	Soporte	
19	1	10792787	Clamp	Abrazadera	Ø4"

VANHOOL

Air intake system
Sistema de admisión

2007-06-20

0222.04-3029

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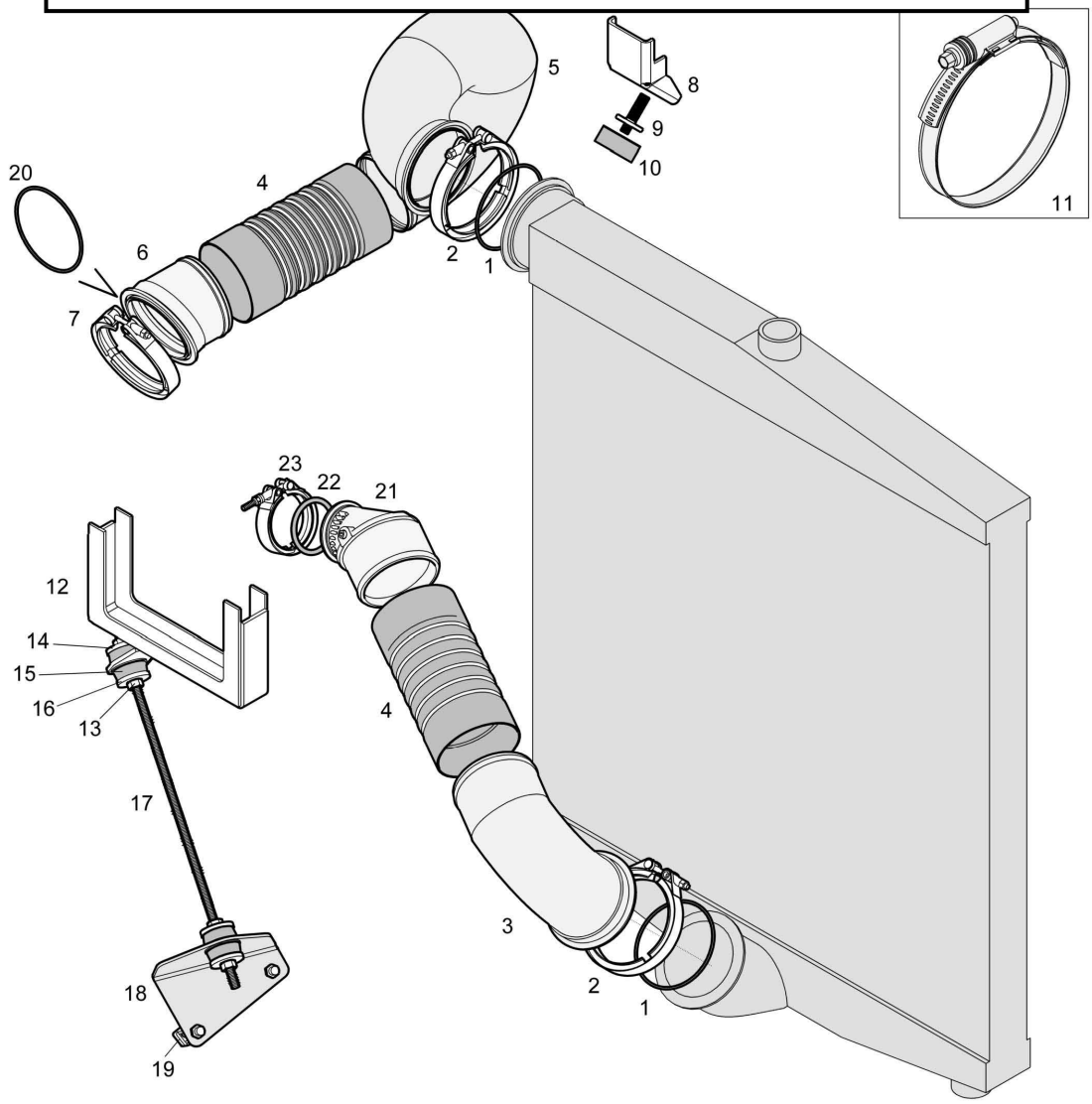
Attachment 2: T2100 Series – new charge air cooler piping part 2



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
20	1	10904640	O-ring	Junta tórica	
21	1	11005471	Pipe	Tubo	
22	1	10873428	O-ring	Junta tórica	MAN
23	1	10599083	Clamp	Abrazadera	

VANHOOL

Air intake system

Sistema de admisión

2007-06-20

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Attachment 3: C2045 – old charge air cooler piping part 1

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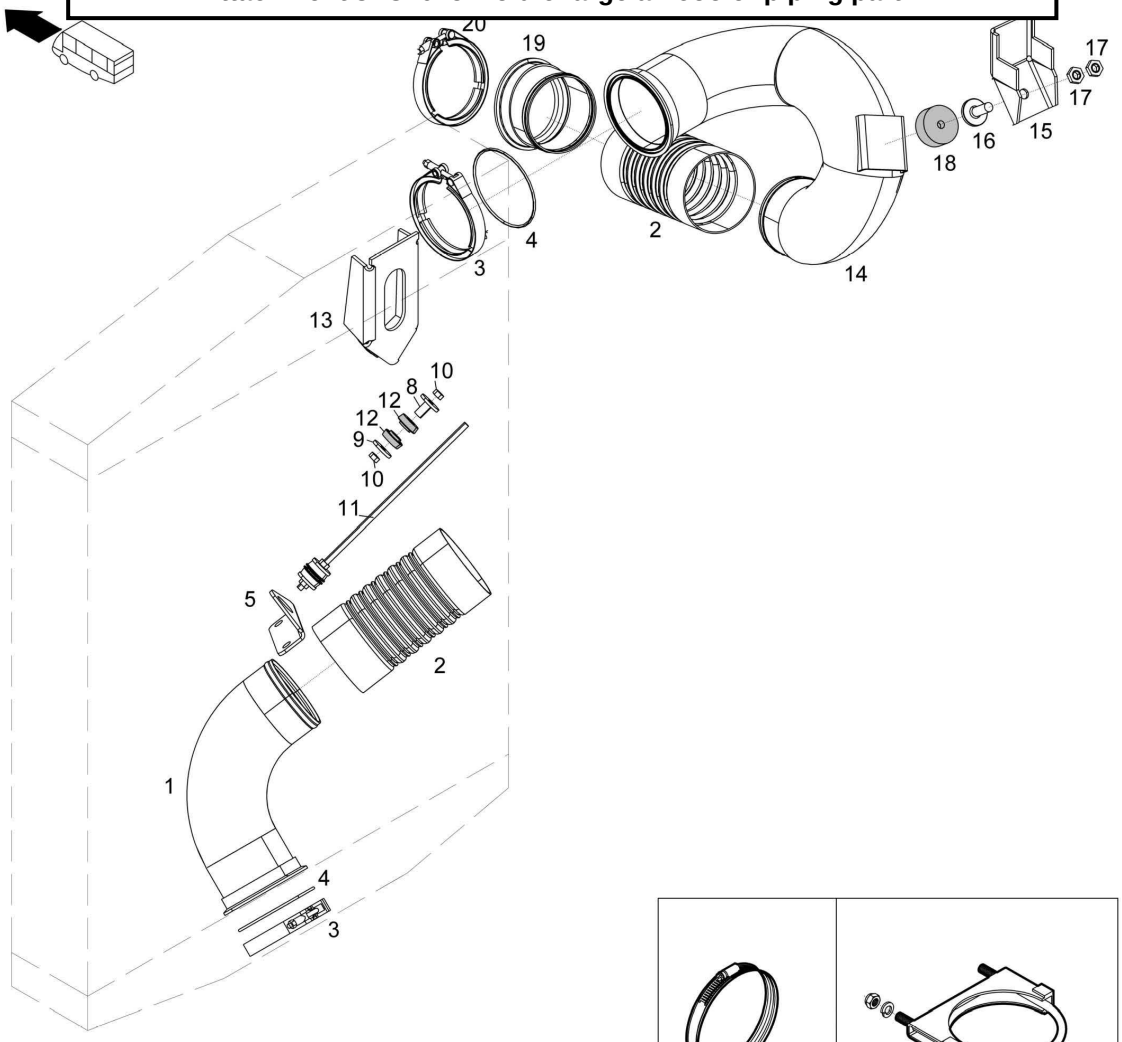


Pos.	Q.	Ref.N°	Description	Denominación	Spec.
1	1	10899498	Pipe	Tubo	
2	2	10753168	Sleeve: silicone	Manguito: silicona	Ø100-100 L= 225mm
3	1	10572496	Clamp	Abrazadera	
4	2	10854597	O-ring	Junta tórica	
5	1	10863471	Bracket	Soporte	
6	1	10792787	Clamp	Abrazadera	Ø=4"
7	4	10617357	Screw clamp	Abrazadera	Ø95-Ø118mm MAT: IN
8	2	10581372	Ring	Anillo	
9	2	10581371	Bush	Casquillo	
10	4	660203301	Nut	Tuerca	DIN 934 M10x1,50 k.=8.8
11	385mm	660640605	Bar	Barra	M10 x1,5 MAT:IN
12	4	10581374	Silentbloc	Silentbloc	
13	1	10908959	Bracket	Soporte	
14	1	10900282	Pipe	Tubo	
15	1	10856448	Bracket	Soporte	
16	1	10856967	Stud	Pasador	
17	2	10504317	Nut	Tuerca	DIN 439 M12
18	1	10857032	Stop	Tope	
19	1	10856159	Pipe	Tubo	

VANHOOL

Air intake system

Sistema de admisión

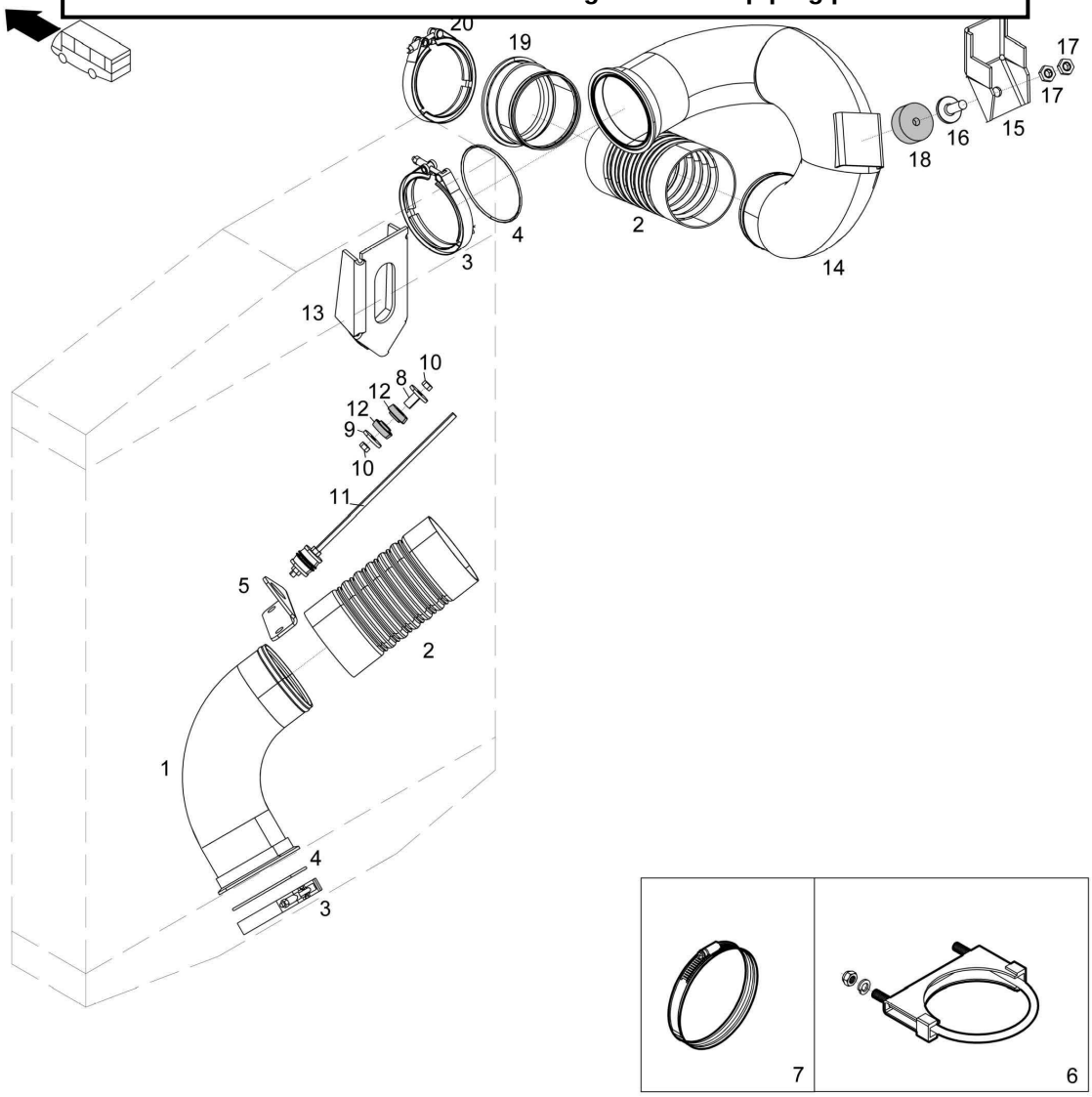
Cummins

2006-12-08

0222.04-3014

Attachment 3: C2045 – old charge air cooler piping part 2

N°



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
20	1	10904642	Clamp	Abrazadera	

VANHOOL

Air intake system

Sistema de admisión

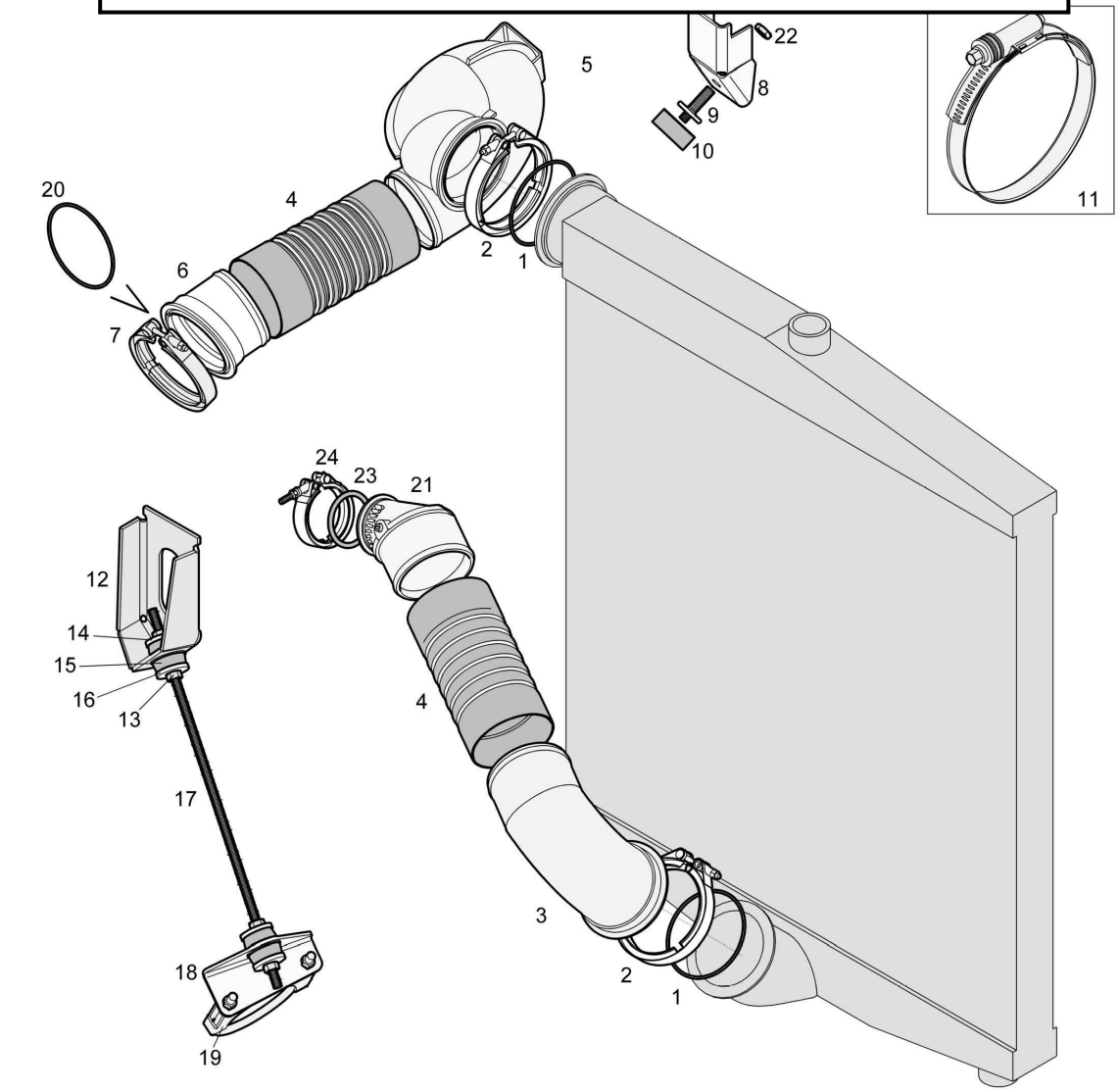
Cummins

2006-12-08

0222.04-3014

N°

Attachment 4: C2045 – new charge air cooler piping part 1



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
1	2	10854597	O-ring	Junta tórica	Ø105x3
2	2	10572496	Clamp	Abrazadera	Ø124mm
3	1	11005304	Pipe	Tubo	
4	2	10753168	Sleeve: silicone	Manguito: silicona	Ø100-100 L= 225mm
5	1	10900282	Pipe	Tubo	
6	1	10856159	Pipe	Tubo	
7	1	10904642	Clamp	Abrazadera	
8	1	10856448	Bracket	Soporte	
9	1	10856967	Stud	Pasador	
10	1	10857032	Stop	Tope	
11	4	10617357	Screw clamp	Abrazadera	Ø95-Ø118mm MAT: IN
12	1	10908959	Bracket	Soporte	
13	4	660203301	Nut	Tuerca	DIN 934 M10x1,50 k.=8.8
14	2	10581371	Bush	Casquillo	
15	4	10581374	Silentbloc	Silentbloc	
16	2	10581372	Ring	Anillo	
17	l.=480	660640605	Bar	Barra	M10 x1,5 MAT:IN
18	1	11012379	Bracket	Soporte	
19	1	10792787	Clamp	Abrazadera	Ø4"

VANHOOL

Air intake system

Sistema de admisión

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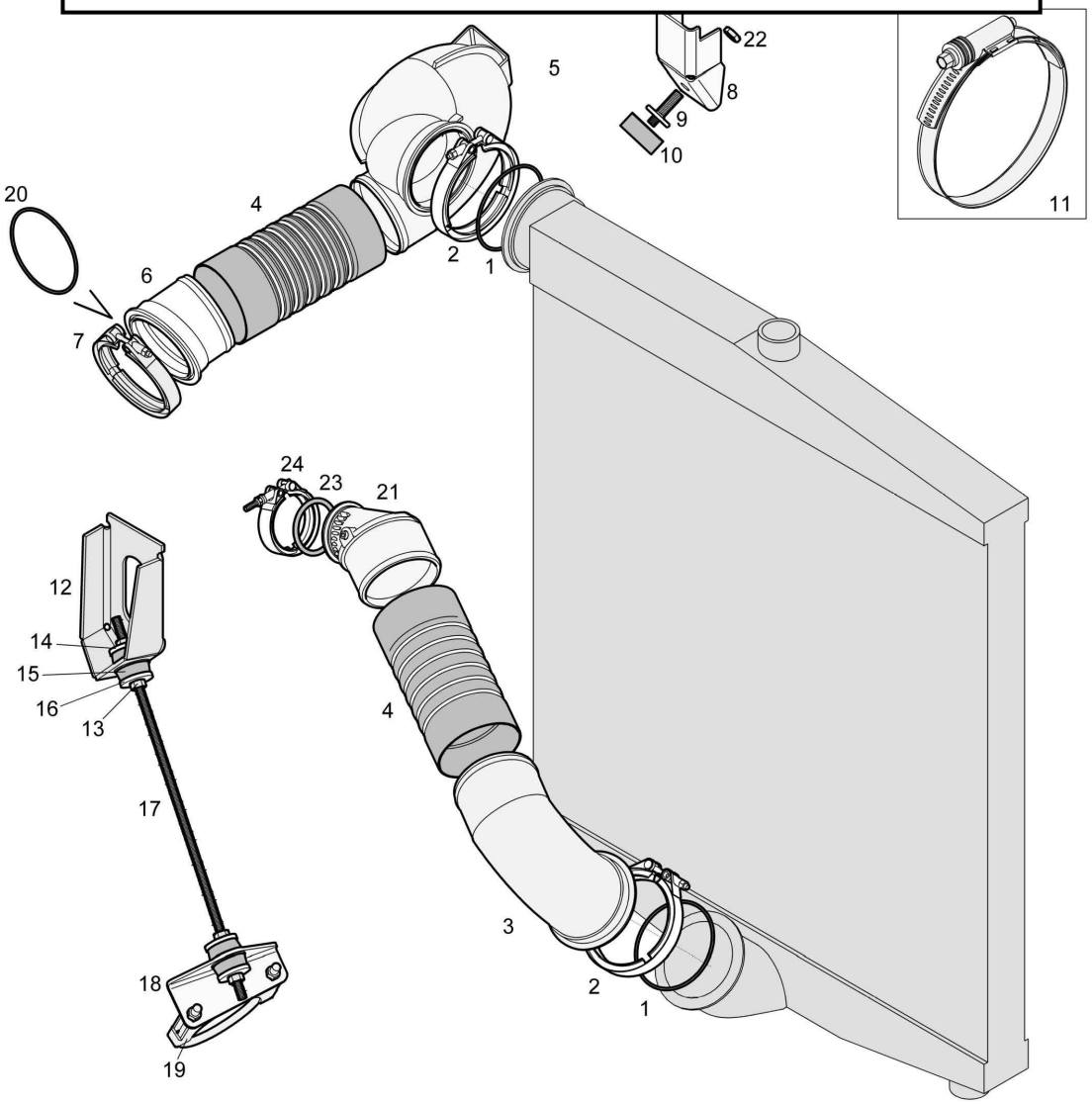
0222.04-3030

Attachment 4: C2045 – new charge air cooler piping part 2

N°



Pos.	Q.	Ref.N°	Description	Denominación	Spec.
20	1	10904640	O-ring	Junta tórica	
21	1	11005471	Pipe	Tubo	
22	1	10504317	Nut	Tuerca	DIN 439 M12
23	1	10873428	O-ring	Junta tórica	MAN
24	1	10599083	Clamp	Abrazadera	

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Air intake system

Sistema de admisión

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