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**REPAIR MANUAL**  
**GRADER**  
**845DHP**  
**865VHP/865AWD**  
**885/885AWD**  
**TIER 3**

71114197 NA

Issued 01 July 08



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# REPAIR MANUAL

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GRADER

845DHP

865VHP/865AWD

885/885AWD

TIER 3

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This unit first became available 07-2008			
REVISION HISTORY			
Issue	Issue Date	Applicable Machines	Remarks
First Edition	01July 08	845DHP-865VHP-865AWD-885-885AWD Tier 3 Grader	71114197 NA

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**845DHP  
865VHP & 865VHP(AWD)  
885 & 885(AWD)  
GRADER  
Repair Manual  
71114197**

**Table of Contents**

Description	Section Number	Publication Form Number
<b>General</b>		<b>Tab 1</b>
Section Index - General		<b>6-46520</b>
Standard Torque Specifications	1001	6-46530
Fluids and Lubricants 845DHP, 865VHP, 865VHP/AWD, 885, 885AWD	1002	6-46540
Metric Conversion Chart	1003	6-46550
Service Tools	1005	6-46560
Loctite Product Chart		8-98902
<b>Engine</b>		<b>Tab 2</b>
Section Index – Engines TIER 3		6-46441
For Engine Repair, See the Engine Service Manual	2000	6-46551
Charge Air Cooler	2001	6-46560
<b>Fuel System</b>		<b>Tab 3</b>
Section Index - Fuel System	3001	6-46590
<b>Electrical</b>		<b>Tab 4</b>
Section Index - Electrical		6-42221
Removal and Installation of Starter and Alternator	4001	6-42321
Electrical Diagram Only models w / o traction	4002	6-46621
Electrical Diagram Only AWD models	4003	6-42331
Battery	4004	<b>6-42330</b>
Alternator 80 Ampere	4008	6-42361

<b>Steering</b>		<b>Tab 5</b>
Section Index - Steering		6-46660
Front Wheel, Axle and Wheel Lean	5002	6-46681
Steering Control Valve(845DHP, 865VHP, 865VHP/AWD, 885, 885AWD)	5003	6-46691
Steering Priority Valve(845DHP,865VHP,865VHP/AWD, 885, 885AWD)	5004	6-46701

<b>Power Train</b>		<b>Tab 6</b>
Section Index - Power Train		<b>6-46741</b>
Transmission Specifications, Pressure Checks and Troubleshooting	6002	6-46751
((845DHP - 865VHP - 865VHP AWD - 885 - 885AWD)		
Transmission	6003	6-75350
(845DHP - 865VHP - 865VHP AWD - 885 - 885AWD)		
Front Drive Axle (865VHP/AWD and 885 AWD)	6007	6-46760
Transmission Gear Box (Wheel Reductor) for Front Drive Axle (865VHP/AWD and 885 AWD)	6008	6-46770
Front Axle (845DHP/ 865VHP/ 885)	6009	6-46780
Rear Axle GRAZIANO 845DHP(OPT)(865VHP and 865VHP/AWD)	6010	6- 46781
Rear Axle GRAZIANO (885 and 885 AWD)	6011	6-46790
Rear Axle GRAZIANO (845DHP)	6012	6-46791
Tandem for rear axle Graziano (845DHP, 865VHP, 865VHP/AWD, 885, 885AWD)	6013	6-46795
Tandem Flange Adjustments (845DHP, 865VHP, 865VHP/AWD, 885, 885AWD)	6014	6-46800

<b>Brakes</b>		<b>Tab 7</b>
Section Index – Brakes		6-46810
Hydraulic Brake Troubleshooting	7002	6-46831
Brake Pedal Valve System	7003	6-46841

<b>Hydraulics</b>		<b>Tab 8</b>
Section Index - Hydraulics		<b>6-46813</b>
Removal and Installation of Hydraulic Components	8001	6-46872
Wheel Drive Hydraulic Pump and Motor for Front Drive Axle (865VHP/ AWD and 885 AWD)	8003	6-46880
Hydraulic Schematics (865VHP and 885 AWD)	8004	6-46870

**Mounted Equipment****Tab 9**

Section Index - Mounted Equipment		6-96940
Air Conditioning Troubleshooting and system, check for systems with HFC 134A Refrigerant	9002	6-46950
Air Conditioner System Service	9003	6-46960
Removal and Installation of Air Conditioning Components for Systems with HFC 134A Refrigerant	9004	6-46971

Rear Ripper	9007	6-47011
Frame, Articulation Joint, Circle and Scarifier	9008	6-47001
Front Blade and Counterweight	9009	6-47021
ROPS Cab	9010	6-47031
Cab Glass Installation	9011	6-47041

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## SECTION INDEX

### GENERAL

Standard Torque Specifications	1001
Fluids and Lubricants	1002
Metric Conversion Chart	1003
Service Tools	1005
Loctite Product Chart	8-98902

# **Section 1001**

**STANDARD TORQUE SPECIFICATIONS**

**FLUIDS AND LUBRICANTS**


## TABLE OF CONTENTS


TORQUE SPECIFICATIONS - DECIMAL HARDWARE .....	3
TORQUE SPECIFICATIONS - METRIC HARDWARE .....	4
TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS .....	5
TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS .....	6

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**TORQUE SPECIFICATIONS - DECIMAL HARDWARE**

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

<b>Grade 5 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983


<b>Grade 8 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827


**NOTE:** Use thick nuts with Grade 8 bolts.

## TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used.

<b>Grade 8.8 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Inches	Newton metres
M4	24 to 36	3 to 4
M5	60 to 72	7 to 8
M6	96 to 108	11 to 12
M8	228 to 276	26 to 31
M10	456 to 540	52 to 61
Size	Pound-Feet	Newton metres
M12	66 to 79	90 to 107
M14	106 to 127	144 to 172
M16	160 to 200	217 to 271
M20	320 to 380	434 to 515
M24	500 to 600	675 to 815
M30	920 to 1100	1250 to 1500
M36	1600 to 1950	2175 to 2600

<b>Grade 10.9 Bolts, Nuts, and Studs</b>		
		
Size	Pound-Inches	Newton metres
M4	36 to 48	4 to 5
M5	84 to 96	9 to 11
M6	132 to 156	15 to 18
M8	324 to 384	37 to 43
Size	Pound-Feet	Newton metres
M10	54 to 64	73 to 87
M12	93 to 112	125 to 150
M14	149 to 179	200 to 245
M16	230 to 280	310 to 380
M20	450 to 540	610 to 730
M24	780 to 940	1050 to 1275
M30	1470 to 1770	2000 to 2400
M36	2580 to 3090	3500 to 4200

### Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

# **Section 2001**

## **CHARGE AIR COOLER SYSTEM**

**845DHP**

**865VHP - 865AWD**

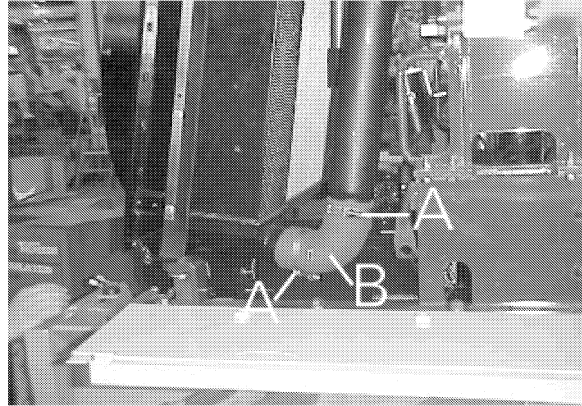
**885VHP - 885AWD**

200 1 - 4

## Charge Air Cooler

### Removal of the air cooler to turbocharger outlet piping

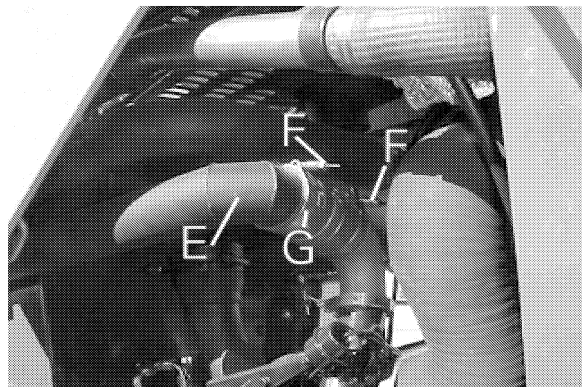
- 1 - Remove clamps (A)
- 2 - Remove hose (B)



- 3 - Remove bolt (C) and remove clamp (D)



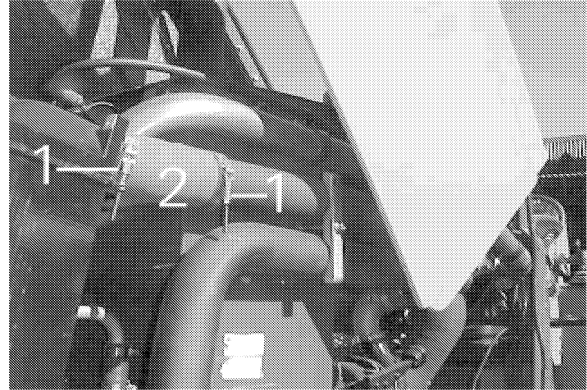
- 4 - Remove clamps (F) then remove tube (E) and hose (G).



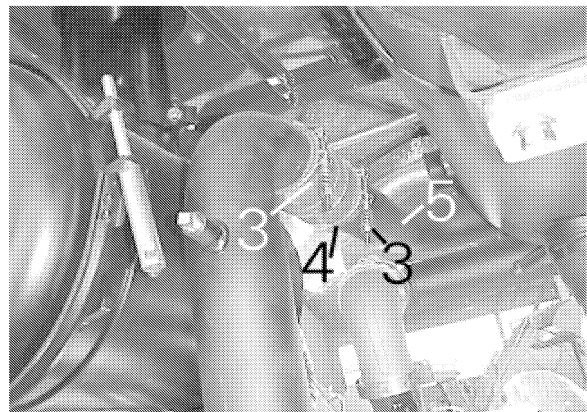
## Charge Air Cooler

### Air inlet to cooler pipe removal

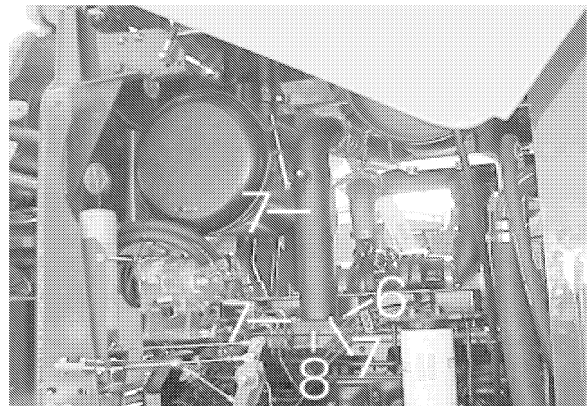
- 1 - Remove clamps (1)
- 2 - Remove hose (2)



- 3 - Remove clamps (3)
- 4 - Remove hose (4)
- 5 - Remove tube (5)



- 6 - Remove bolts (6)
- 7 - Remove tube (7)
- 8 - Remove gasket (8)

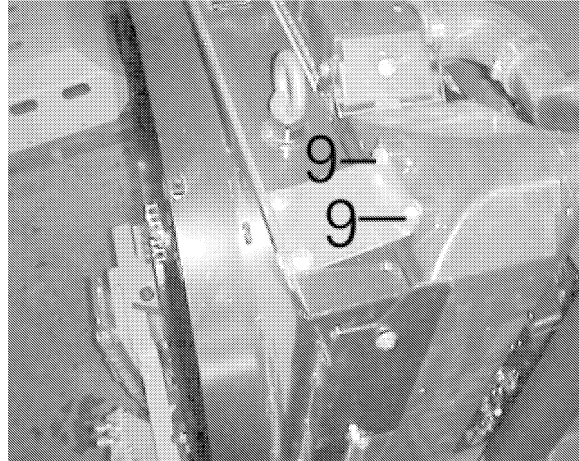


2001- 6

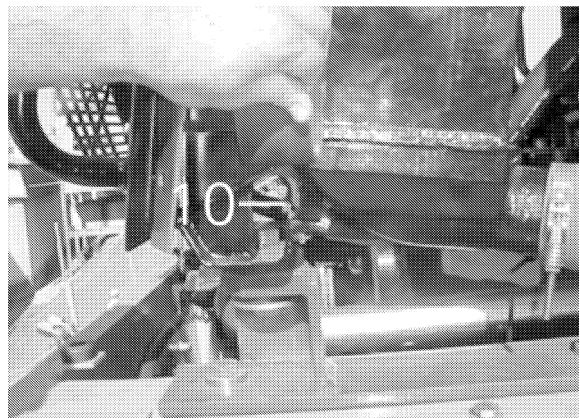
## Charge Air Cooler

### Air cooler removal

1 - Remove top bolts (9)



2 - Remove bottom bolts (10)



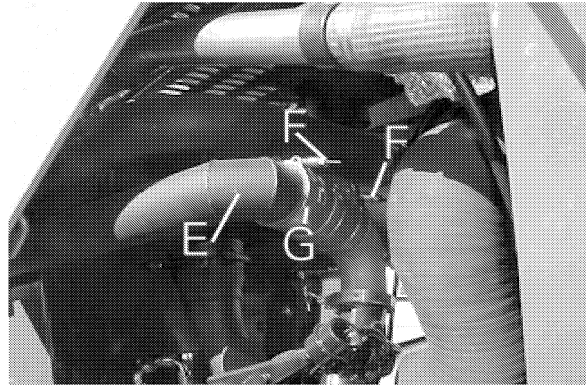
### Air cooler assembly.

- 1 - Place air cooler in the correct position.
- 2 - Fit top bolts (9) and torque to 2,8 kfg.
- 3 - Fit bottom bolts (10) and torque to 2,8 kfg.

## Charge Air Cooler

### Assembly of air cooler outlet to turbocharger pipe

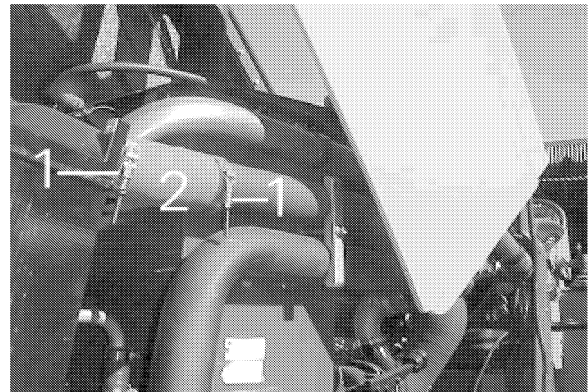
- 1 - Fit hose (B) to the cooler outlet opening. Then fit clamps (A) in place and fit tube (E) to hose (B). Adjust clamps until the clamp springs are fully compressed.
- 2 - Fit hose (A) to tube (E). Then fit hoses (F) in place and fit hose (G) to the turbocharger inlet tube. Adjust clamps until the clamp springs are fully compressed.



### Cooler air inlet pipe assembly.

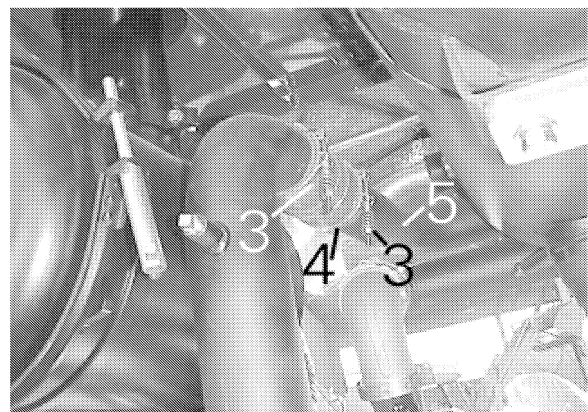
- 1 - Fit hose (2) to the cooler inlet opening. Then fit clamps (1) in place and fit tube (5).

Adjust clamps until the clamp springs are fully compressed.



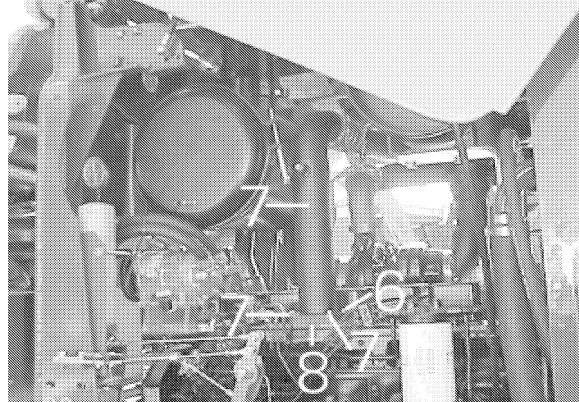
- 2 - Fit hose (4) to tube (5). Then fit clamps (3) in place and fit tube (7).

Adjust clamps until the clamp springs are fully compressed.

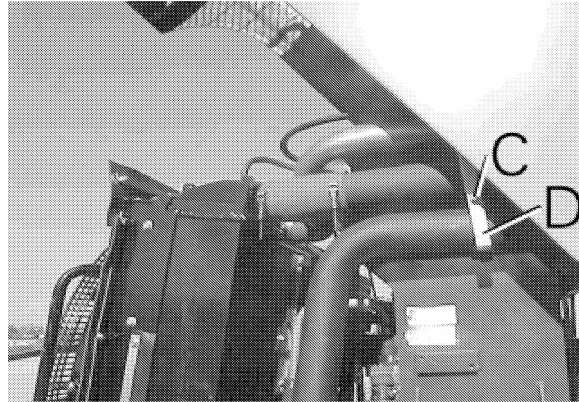


2001- 8

3 - Fit gasket (4) between tube (7) and engine cover.  
Then fit bolts (6) in place and torque to 2,8 kgf.



4 - Fit clamp (d) in place and torque bolts (C) to 2,8 kgf.





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## SECTION INDEX

### FUEL SYSTEM

Fuel system

3001

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