Action code: WHEN CONVENIENT

Tightening Torque L21/31

SL12-557/NSM
February 2012

Concerns
Owners and operators of MAN Diesel & Turbo four-stroke diesel engines.
Type: L21/31 GenSet

Dear Sirs

In description 500.40, edition 11, dated 04.02, the torque for nozzle tip nut, pos 221-1, was incorrectly stated to be 300 Nm (MH).
In description 500.40, edition 11, dated 04.28, the torque has been changed to the correct value which is 140 Nm (MH).

If the nozzle tip nut is tightened at 300 Nm, there is a risk that it may crack and damage the thread.

Please make sure that the description in the Instruction Book, contains 500.40, edition 11, dated 04.28 and that the correct tightening torque is applied at the next assembly.

We enclose the newest description for insertion in your Instruction Book.

Yours faithfully

Mikael C. Jensen
Vice President
Engineering

Jens Christensen
Manager
Operation

Enclosure:
Description 500.40 edition 43

MAN Diesel & Turbo
H. Christoffersensvej 6
4960 Holeby
Denmark
Phone: +45 54 69 31 00
Fax: +45 54 69 30 30
mandieselturbo-hol@mandieselturbo.com

www.mandieselturbo.com

MAN Diesel & Turbo
Niels Juels Vej 15
9900 Frederikshavn
Denmark
Phone: +45 96 20 41 00
Fax: +45 96 20 40 30
mandieselturbo-frh@mandieselturbo.com

MAN Diesel & Turbo
Branch of MAN Diesel & Turbo SE,
Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV, Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

L21/31

Lubricant

M	Lubricating paste up to 200°C	Coefficient of friction 0.08 - 0.12
MH	High temperature lubricating paste above 200°C	Coefficient of friction 0.08 - 0.12
O	Oil	

Tab. 1.

Pressure limitation of the hydraulic high pressure pump to be set to 50 bar above hydraulic oil pressure for tightening.
Hydraulic oil pressure for untightening max. 5% above hydraulic oil pressure for tightening.

Note: When tightening bolts to a specified torque, only use the specified lubricants.
For component temperatures up to 200°C, e.g. Molykote Pasta D or Optimoly Paste White-T.
For component temperatures above 200°C, e.g. Molykote Paste HSC or Copa Slip.

Screw Connection	Oil pressure Bar	Screw-in moment	Tightening torques (Nm) torsions angle (°) - lubricant	Working Card	Plate	Item
012 Cylinder Crankcase						
012-1 Cap main bearing/ Cylinder crankcase	1. step 2. step / 400 3. step / 1200 Δl = 2.6-3.1	Nut	MH	**510-01.05**	**51101**	**182, 086, 194**
012-1 Cap main bearing/ Cylinder crankcase	1. step 2. step / 400 3. step / 1200 Δl = 0.6-0.8	180-M	MH	**510-01.05**	**51101**	**456, 086, 194**
012-2 Crossrod/Cylinder crankcase	1. step 2. step / 400 3. step / 1200 Δl = 0.4-0.6	Hand-M	MH	**510-01.05**	**51101**	**216, 228**
012-3 Crankcase/ Cylinder head	1. step 2. step / 100 3. step / 1200 Δl = 2.4-2.6	Hand fixed	MH	**505-01-55**	**51101**	**062, 086**
012-4 Crankcase/ Fuel injection pump			85-M	**514-01.05**	**51101**	**277, 289**
020 Crankshaft						
020-1 Crankshaft/Counterweight	1. step 2. step / 100 3. step / 1200 Δl = 0.6-0.8	120-M			**51001**	**082, 094**

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Screw Connection	Oil pressure Bar	Screw-in moment	Tightening torques (Nm) torsions angle (°) - lubricant	Working Card	Plate	Item
026 Turning Gear						
026-1 Spur gear/Shaft			1 step 260-M		**51325**	**179**
027 Vibration Damper						
027-1 Gear wheel/Damper/ Crankshaft	1. step / 100 2. step / 1200 ΔI = 0.7-1.0		M		**51004**	**053, 041**
030 Connecting Rod						
030-1 Connecting rod cover/ Connecting rod bearing body	1. step 2. step / 600 3. step / 1200 ΔI = 0.3-0.5	Hand-M	M	**506-01.25**	**50601**	**152, 164**
030-2 Connection rod shaft/ Connecting rod bearing body	1. step / 100 2. step / 1200 ΔI = 0.25-0.31		M	**506-01.25**	**50601**	**188, 211**
034 Piston						
034-1 Piston				**506-01.10**	**50601**	**176**
056 Mounting of Fuel Injection Valve						
056-1 Clamp / Cylinder head			65-M	**514-01.10**	**51402**	**153, 177**
101 Camshaft (Valve camshaft)						
101-1 Camshaft part piece / Bearing disk			85-M	**507-01.00**	**50705**	**266**
101-2 Bearing plate			35-M			
101 Camshaft (Injection camshaft)						
101-3 Camshaft part piece/ Bearing disc			85-M	**507-01.00** **507-01.05**	**50705**	**266**
101-4 Spur gear / Bearing disc			85-M	**507-01.00** **507-01.05**	**50705**	**266**

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Screw Connection	Oil pressure Bar	Screw-in moment	Tightening torques (Nm) torsions angle (°) - lubricant	Working Card	Plate	Item
101-5 Axial bearing plate/ Cylinder crankcase			35-M	**507-01.00** **507-01.05**	**50705**	**266**
111 Valve Bridge						
111-1 Valve bridge / Settting screws			100-M	**508-01.00**	**50502**	**071, 154**
111 Rocker arm						
111-2 Rocker arm / Setting screws			100-M	**508-01.00**	**50502**	**071, 083**
200 Fuel Injection Pump with drive						
200-1 Valve support / Pump element			1. step 25-O 2. step 50-O 3. step 70-O	**514-01.05/06**	**51401**	**398**
200-2 Valve Support / Pump casing			60-O	**514-01.05/06**	**51401**	**421**
200-3 Sealing plug / Pump casing			120-O	**514-01.05/06**	**51401**	**386**
221 Fuel Injection Valve						
221-1 Support body / Nozzle body MAN (Tier II) Nico, L'Orange (Tier I)			 170-MH 140-MH	**514-01.10**	**51402**	**045**
221-2 Lock nut for setting screw MAN (Tier II) Nico, L'Orange (Tier I)			 120-O 100-O	**514-01.10**	**51402**	**200, 224**
221-3 Blocking screw for setting screw		Loctite 0556 assembled	10-O			
289 Exhaust Pipe						
289-1 Pipe piece / Compensator			120-MH	**512-01.10**	**51202**	**036, 048**
289-2 Clamping strap / Cover			50-MH	**505-01.55**	**51202**	**097**
289 Exhaust Pipe before Turbocharger						
289-1 Compensator / line piece			120-MH	**512-01.10**		

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Screw Connection	Oil pressure Bar	Screw-in moment	Tightening torques (Nm) torsions angle (°) - lubricant	Working Card	Plate	Item
289-3 Compensator / Turbocharger, TCR 16			120-MH	**512-01.10**		
289-4 Compensator / Turbocharger, TCR 18			50-MH	**512-01.10**		
289-5 Compensator / Turbocharger, TCR 14			50-MH	**512-01.10**		
300 Lub Oil Pump with Attachment						
300-1 Pinion spindle/Spur gear			85-M	**515-01.00**	**51501**	**199**
310 Valve-insert/Valve-sleeve						
310-1 Valve sleeve/Cover			with Loctite 638 until it sits securely			
310-2 Valve insert/Valve sleeve			25-M			
350 Fresh Water Pump						
350-1 Water pump shaft/Spur gear			85-O	**516-10.00**	**51610**	**237**
350-2 Water pump shaft/Impeller			60-O	**516-10.00**	**51610**	**191**
434 Fuel Injection Pipe						
434-1 Delivery socket/ Fuel injection valve			60-O		**51404**	**083**
434-2 Delivery socket/ Fuel injection valve			20-O		**51404**	**058**
434-3 Fuel injection pipe/threaded piece Fuel injection pipe/fuel injection pump			110-O		**51404**	**117**
434 Connection socket						
434-4 Screw plug/connection socket		Loctite 0556 assembled	45		**51435**	**013**

Tightening of bolted connections by the torque

If bolted connections other than those listed above are to be tightened using a torque wrench, table 2 should be used for reference.
The following should be observed:

- The load acting on a bolted connection depends on the tightening torque applied, on the lubricant used, the finished condition of the surfaces and threads, and on the materials paired. It is, therefore, of great importance that all these conditions are met.

- Table 2 lists the tightening torques, when using different bolt strengths classes and applying either normal Molykote and high temperature Molykote grease or applying normal oil.

Thread nominal size	Tightening torque in Nm Bolt strength class			
	8.8		10.9	
	M/MH	O	M/MH	O
M 6	7	10	10	14
M 8	17	25	25	35
M 10	35	50	50	70
M 12	60	85	85	120
M 14	90	130	130	190
M 16	140	200	200	280
M 18	200	280	280	390
M 20	270	400	380	560

Table 2. Tightening torques for bolted connections