

1 Standard tightening torques for screws

Table 1 shows standard tightening torques for shaft bolts with a metric thread and a hexagon head. A friction factor of $\mu_{ges} = 0.12$ is required and achieved by coating with anti-corrosion grease or special chlorinated paraffin-based lubricant.

Table 1: Standard tightening torques for screws


 ATTENTION: Tightening torques specified below only apply to component drawings from RPS with a reference to this document! For components without this reference, a separate verification of the corresponding moment is required!							
	Screws made of						
	non-alloy and alloyed steel according to EN ISO 898-1			corrosion-resistant stainless steel A2 / A4 according to DIN EN ISO 3506-1			Copper-nickel alloy CU5 (CuNi1Si) according to DIN EN 28839
	R_{p 0,2 min} =						
	240 N/mm ²	300 N/mm ²	640 N/mm ²	210 N/mm ²	450 N/mm ²	600 N/mm ²	540 N/mm ²
	Property class						
	4.6 / 4	5.6 / 5	8.8 / 8	50	70	80	
Srew thread							
M5	-	-	-	-	5	-	-
M6	-	-	-	-	6	9	8
M8 ¹	8	10	23	7	16	22	20
M10 ¹	15	20	46	15	32	43	39
M12 ¹	25	38	80	26	56	75	68
M16 ¹	60	90	195	63	135	180	165
M20 ¹	120	180	390	130	280	370	330
M22	175	265	570	-	405	535	-
¹ see. DIN EN 50119: Railway application – Fixed installation – Electric traction overhead contact lines Beuth Verlag, Berlin, January 2014.							

Table 1 depends on the type of screw connection and is just allowed for a full tensioned bolted connection. As an example for an unsuitable screw connection see **Figure 1**.

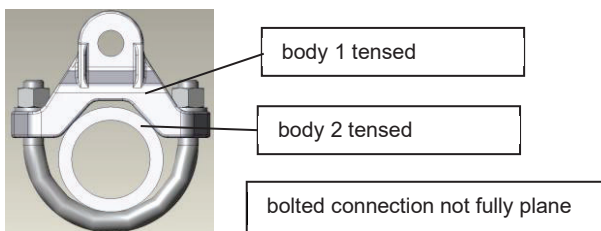


Figure 1: non-full tensioned bolted connection

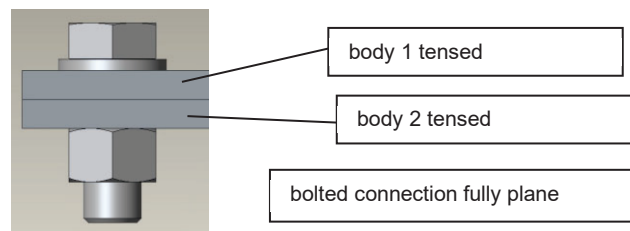


Figure 2: full tensioned bolted connection

2 Deviating tightening torques

Components with different tightening torques are shown in **Table 2**. Possible reasons for these exceptions could be

- deviating screws than described in **chapter 1**, and
- the type of screw connection.

Table 2: Components represent various exceptions

Material-No.	Ebs-Drawing	Name	Type of screw	Tightening torque
3EGF001348	Ebs 05.96.20	Drop bracket Ø=42-55mm RE 250	M16 A2-70 shackle u-bolt	75 Nm
3EGF001351	Ebs 05.96.24-1 A	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm
3EGF001352	Ebs 05.96.24-1 B	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm
3EGF001385	Ebs 05.96.39 A	cantilever bracket short	M16 A2-70 shackle u-bolt	70 Nm
3EGF001388	Ebs 05.96.40 A	swivel	M16 A2-70 shackle u-bolt	70 Nm
3EGF001390	Ebs 05.96.44 A	eye - clamp	M16 A2-70 shackle u-bolt	70 Nm
3EGF001391	Ebs 05.96.44 B	eye - clamp e	M16 A2-70 shackle u-bolt	70 Nm
3EGF001398	Ebs 05.96.56-1	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm
3EGF001399	Ebs 05.96.56-1	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm
3EGF001411	Ebs 05.96.65 A	Messenger wire swivel support clamp	M16 A2-70 screw	70 Nm
3EGF012899	Ebs 05.96.39 B	cantilever bracket long	M16 A2-70 shackle u-bolt	70 Nm
3EGF014134	Ebs 05.96.40 D	swivel	M16 A2-70 shackle u-bolt	70 Nm
3EGF014281	Ebs 05.96.40 C	swivel	M16 A2-70 eye clamp u-bolt	70 Nm
3EGF014308	Ebs 05.96.40 B	swivel	M16 A2-70 shackle u-bolt	70 Nm
3EGF016610	Ebs 05.69.45 A	eye - clamp	M16 A2-70 shackle u-bolt	70 Nm
3EGF016611	Ebs 05.69.45 B	eye - clamp	M16 A2-70 shackle u-bolt	70 Nm
3EGF019650	Ebs 05.96.24-4 A	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm
3EGF019651	Ebs 05.96.24-4 B	eye - clamp	M12 A2-70 shackle u-bolt	35 Nm

Tightening torques for components with an uncommon screw and/or screw connection that are not listed in **Table 2** must be requested from RPS before execution