

This is how to achieve the correct tightening torque – even if you are using inserts with an extension

When you tighten fasteners using inserts whose extension length S deviates from the standard length S_F , it is necessary to recalculate the setting/display value for the torque wrench in use.

Caution! If adapters are combined with inserts or special tools, use the sum of the extensions = ΣS . Where the special tool is angled to the side, W_K will have to be determined empirically.

$$W_K = \frac{M_A \cdot L_F}{L_K} \left[\frac{\text{N} \cdot \text{m} \cdot \text{mm}}{\text{mm}} \right]$$

$$W_K = \frac{M_A \cdot L_F}{L_F - S_F + S \text{ (or } \Sigma S \text{)}}$$

M_A = desired tightening torque

W = reading/setting $W = M_A$

W_K = adjusted reading or setting value $W_K \neq M_A$

L_F = functional length (see dimension table for torque wrenches)

L_K = adjusted functional length
 $L_K = L_F - S_F + S \text{ (or } \Sigma S \text{)}$

S = extension of STAHLWILLE inserts or special tools (see dimension table for inserts)

S_F = standard extension (see dimension table for torque wrenches)

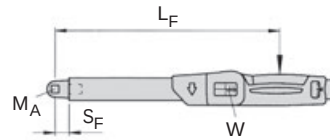
ΣS = total of all extensions of the attached inserts
 $S_{\text{adapter}} + S_{\text{insert}} + \dots$

Normal situation

Torque wrench No 730N/10 combined with square drive insert tool No 734/5 and socket size 13 mm.

Required tightening torque for the screw $M_A = 40 \text{ N} \cdot \text{m}$

Dimension table for torque wrenches: $L_F = 336 \text{ mm}$, $S_F = 17.5 \text{ mm}$
Dimension table for square drive insert tools: $S = 17.5 \text{ mm}$



No adjustment to setting value required on torque wrench.

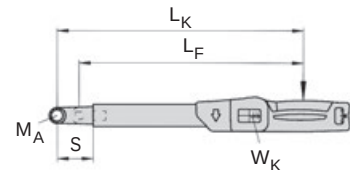
→ $S = S_F$
→ $W = M_A$

Example 1: adjusted setting value (1 insert tool)

Torque wrench No 730N/20 combined with ring insert tool No 732/40 size 36 mm

Required tightening torque for the screw $M_A = 190 \text{ N} \cdot \text{m}$

Dimension table for torque wrenches: $L_F = 424.5 \text{ mm}$, $S_F = 25 \text{ mm}$
Dimension table for ring insert tools: $S = 28 \text{ mm}$



And this is what it looks like in the catalogue:

730N Service MANOSKOP® torque wrenches with mount for insert tools													
- mount for interchangeable insert tools - QuickRelease safety lock - can be applied for either clockwise or anticlockwise tightening by turning the inserts over - display deviation value ± 3% (size 2; a/2 4 %)													
Code	size	functional	functional	functional	functional	Fine scale	mm	b	h	L	L _F	S _F	470
50181102	2	4-20 N·m	40-180 ft·lb	1 N·m	10 in·lb	0.2 N·m	28	23	275	226	17.5	737	
50181005	5	10-50 N·m	7-37 ft·lb	5 N·m	1 ft·lb	0.25 N·m	28	23	330	280.5	17.5	831	
50181010	10	20-100 N·m	15-75 ft·lb	10 N·m	2.5 ft·lb	0.5 N·m	28	23	386	336	17.5	988	
50181012	12	25-130 N·m	20-95 ft·lb	10 N·m	2.5 ft·lb	0.5 N·m	28	23	421	379	25	1128	
50181020	20	40-200 N·m	30-150 ft·lb	10 N·m	5 ft·lb	1 N·m	28	23	467	424.5	25	1264	
50181040	40	80-400 N·m	60-300 ft·lb	20 N·m	10 ft·lb	2 N·m	28	23	607	564.5	25	1655	
50181065	65	130-650 N·m	100-480 ft·lb	50 N·m	20 ft·lb	2.5 N·m	30.6	25.6	890	848	25	3231	
50181365	11/65	130-650 N·m	100-480 ft·lb	50 N·m	20 ft·lb	2.5 N·m	30.6	25.6	911	900	55	3504	
50181080	80	160-800 N·m	120-600 ft·lb	100 N·m	25 ft·lb	5 N·m	32.28	30.6	1178	1167	55	4825	
50181100	100	200-1000 N·m	150-750 ft·lb	100 N·m	25 ft·lb	5 N·m	32.28	30.6	1363	1352	55	5000	
50581102	a/2	40-180 in·lb	3-15 ft·lb	10 in·lb	0.5 ft·lb	2 in·lb	28	23	275	226	17.5	737	
50581005	a/5	90-450 in·lb	7-37 ft·lb	50 in·lb	1 ft·lb	2.5 in·lb	28	23	330	280.5	17.5	831	

732/40 Ring insert tools									
Code	mm	mm	b	h	S	470			
58224013	13	16x18	22.5	11	25	130			
58224014	14	16x18	23	11	25	123			
58224015	15	16x18	24	11	25	128			
58224016	16	16x18	25.5	12	25	133			
58224017	17	16x18	27	12	25	135			
58224018	18	16x18	29	13	25	134			
58224019	19	16x18	30.5	13	25	145			
58224021	21	16x18	33	15	25	144			
58224022	22	16x18	34.5	15	25	145			
58224024	24	16x18	37.5	15	25	153			
58224027	27	16x18	42.5	17	25	162			
58224028	28	16x18	45.5	19	25	175			
58224030	30	16x18	46	19	25	182			
58224032	32	16x18	47.5	19	25	181			
58224034	34	16x18	52	19	28	210			
58224036	36	16x18	54	19	28	203			

$$W_K = \frac{M_A \cdot L_F}{L_F - S_F + S} = \frac{190 \text{ N} \cdot \text{m} \cdot 424.5 \text{ mm}}{424.5 \text{ mm} - 25 \text{ mm} + 28 \text{ mm}} = \frac{190 \text{ N} \cdot \text{m} \cdot 424.5 \text{ mm}}{427.5 \text{ mm}} = 188.7 \text{ N} \cdot \text{m}$$

Adjusted setting value $W_K = 188.7 \text{ N} \cdot \text{m}$
→ value to set 189 N·m

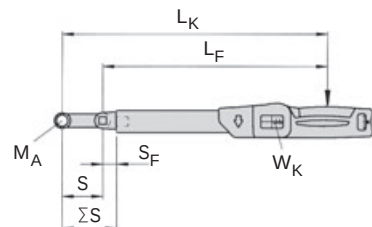
→ $S \neq S_F$
→ $W \neq M_A$

Example 2: adjusted reading (insert tool and adapter)

Torque wrench No 730N/10 combined with square drive insert tool No 734/5 and adapter No 447 size 10 mm

Required tightening torque for the screw $M_A = 25 \text{ N} \cdot \text{m}$

Dimension table for torque wrenches: $L_F = 336 \text{ mm}$, $S_F = 17.5 \text{ mm}$
Dimension table for square drive insert tools: $S_F = 17.5 \text{ mm}$
Dimension table for adapters: $\Sigma S = 50.8 \text{ mm}$



$$W_K = \frac{M_A \cdot L_F}{L_F - S_F + \Sigma S} = \frac{25 \text{ N} \cdot \text{m} \cdot 336 \text{ mm}}{336 \text{ mm} - 17.5 \text{ mm} + 17.5 \text{ mm} + 50.8 \text{ mm}} = \frac{25 \text{ N} \cdot \text{m} \cdot 336 \text{ mm}}{386.8 \text{ mm}}$$

Adjusted setting value $W_K = 21.7 \text{ N} \cdot \text{m}$

→ $\Sigma S \neq S_F$
→ $W \neq M_A$