

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.

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

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

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
 $L_K = L_F - S_F + S$ (or ΣS)

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

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

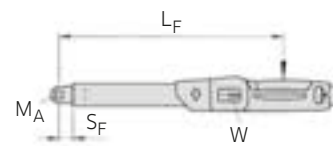
ΣS = total of all extensions of the attached inserts
 $S_{\text{adapter}} + S_{\text{insert}} + \dots$

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.

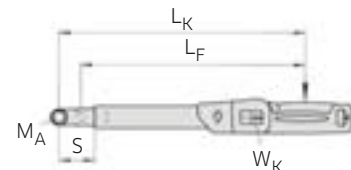
→ $S = S_F$
→ $W = M_A$

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 Basic wrenches with tool carrier for insert tools									
Code	size	Functional length L_F	Standard extension S_F	Adjusted functional length L_K	Fine scale	mm	b	h	ϕ
50181002	2	2-20 N·m	20-180 in·lb	1 N·m	10 in·lb	0.2 N·m	9x12	28	23
50181005	5	10-50 N·m	7-37 ft·lb	5 N·m	1 ft·lb	0.25 N·m	9x12	28	23
50181010	10	20-100 N·m	15-75 ft·lb	10 N·m	2.5 ft·lb	0.5 N·m	9x12	28	23
50181012	12	25-130 N·m	20-95 ft·lb	10 N·m	2.5 ft·lb	0.5 N·m	14x18	28	23
50181020	20	40-200 N·m	30-150 ft·lb	10 N·m	5 ft·lb	1 N·m	14x18	28	23
50181040	40	80-400 N·m	60-300 ft·lb	20 N·m	10 ft·lb	2 N·m	14x18	28	23
50181065	65	130-650 N·m	100-480 ft·lb	50 N·m	20 ft·lb	2.5 N·m	14x18	30.6	25.6
50181365	1/65	130-650 N·m	100-480 ft·lb	50 N·m	20 ft·lb	2.5 N·m	22x28	30.6	25.6
50181080	80	160-800 N·m	120-600 ft·lb	100 N·m	25 ft·lb	5 N·m	22x28	30.6	25.6
50181100	100	200-1000 N·m	150-750 ft·lb	100 N·m	25 ft·lb	5 N·m	22x28	30.6	25.6
50581002	a/2	20-180 in·lb	1.5-15 ft·lb	10 in·lb	0.5 ft·lb	2 in·lb	9x12	28	23
50581005	a/5	90-450 in·lb	7-37 ft·lb	50 in·lb	1 ft·lb	2.5 in·lb	9x12	28	23
50581010	a/10	180-900 in·lb	15-75 ft·lb	100 in·lb	2.5 ft·lb	5 in·lb	9x12	28	23
50581020	a/20	350-1800 in·lb	30-150 ft·lb	100 in·lb	5 ft·lb	10 in·lb	14x18	28	23
50581040	a/40	60-300 ft·lb	800-3600 in·lb	20 ft·lb	100 in·lb	2 ft·lb	14x18	28	23

* recommended ratchet insert tool No 735/40HD

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

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

→ $S \neq S_F$
→ $W \neq M_A$

732/40 Ring insert tools							
Code	ϕ mm	mm	b mm	h mm	S mm	ϕ mm	ϕ mm
58224013	13	14x10	22.5	11	25	130	130
58224014	14	14x10	23	11	25	123	123
58224015	15	14x10	24	11	25	128	128
58224016	16	14x10	25.5	12	25	133	133
58224017	17	14x10	27	12	25	135	135
58224018	18	14x10	29	13	25	134	134
58224019	19	14x10	30.5	13	25	138	138
58224021	21	14x10	33	15	25	144	144
58224022	22	14x10	34.5	15	25	145	145
58224024	24	14x10	37.5	15	25	153	153
58224027	27	14x10	42.5	17	25	162	162
58224028	28	14x10	45.5	19	25	175	175
58224030	30	14x10	46	19	25	182	182
58224032	32	14x10	47.5	19	25	181	181
58224034	34	14x10	52	19	28	210	210
58224036	36	14x10	54	19	28	203	203
58224041	41	14x10	60	20	30*	240	240

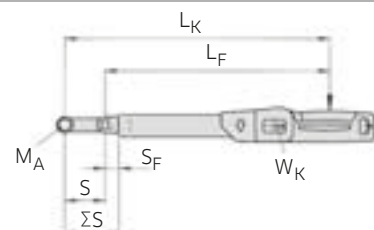
* Caution! Modified settings on torque wrench (refer to note on page 187).

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 $W_K = 21.7 \text{ N} \cdot \text{m}$

→ $\Sigma S \neq S_F$
→ $W \neq M_A$