Installation, dismounting and reassembly

Mechanical Locking Assemblies

Index

SEL keyless locking device advantages compared to conventional systems

A hub-shaft connection is critical in the design of a mechanical transmission as an unsuitable choice could cause serious damage to the machine or system and result in economic loss. They must take several parameters into account:

– assessing application loads: torque, bending moment, axial force, radial force. Stresses that may occur simultaneously;
– alternating loads, sudden starts and stops, very rapid acceleration;
– fatigue limits of the coupling components;
– suitable material use;
– frequent installation and removal requirements;
– fretting corrosion.

Failing hub-shaft connections could cause high economic damages due to:

– downtime and subsequent production loss;
– damage to other parts of the system;
– material damage to persons or property.

Traditional hub-shaft locking systems include:

– feather keys
– key
– spline coupling
– interference coupling: forced

We assess the features of the traditional systems:
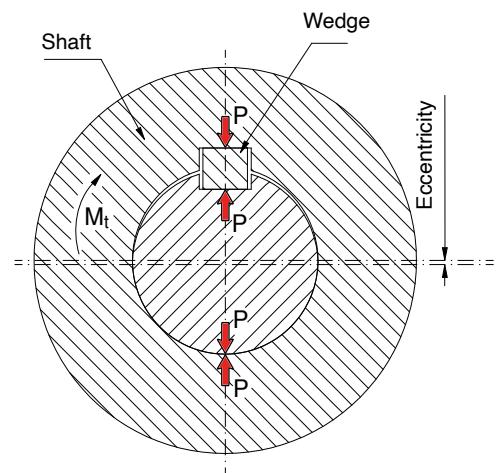
Feather keys
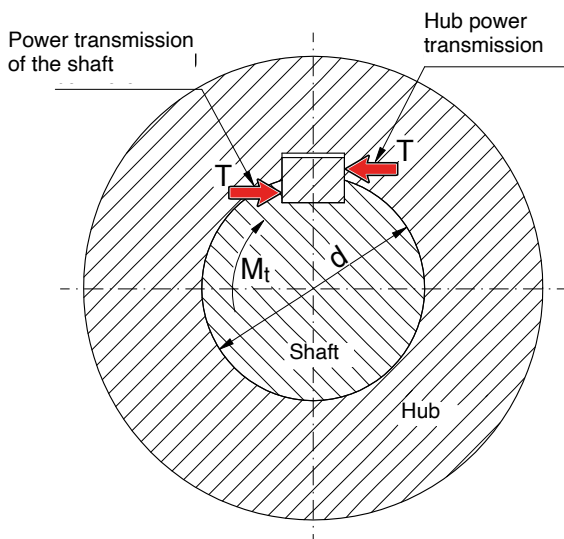
Feather key connections are the most commonly used, we consider some of the disadvantages:

– high concentration of stress on the shaft and hub due to the
– high pressure generated on the keyway sides;
– micro-movements caused by the lack of even contact can cause fretting corrosion making it difficult to remove;
– not recommended for alternating loads. Over time, the pressure generated on the keyway sides can widen it and cause the shaft or hub to break. Not recommended in damp environments;

– the lack of contact over the hub-shaft surface may lead to oxidation, making it difficult to remove;
– cannot take axial loads;
– not recommended for transmissions that require zero backlash;
– significant decrease in shaft strength due to the keyway;
– difficult axial and angular positioning.

Keyways

Keyway connections have the same disadvantages as feather key couplings and also cause significant hub-shaft concentricity error.

Splined profile
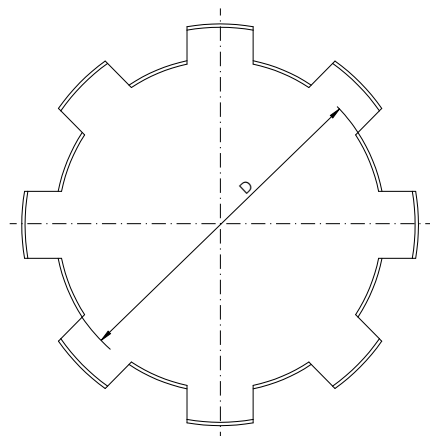
This coupling has the following disadvantages:

– fretting corrosion from the lack of contact making it difficult to remove;
– significant decrease in shaft strength;
– increased cost as it is difficult to make;
– play between shaft and hub;
– difficult angular and axial positioning;
– not recommended in damp or dusty environments.
– Lack of contact may impair removal.

SEL1100, SEL1310, SEL1330, SEL1340 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ. The values in the table are calculated with µ 0.12.
– Insert the locking to the correct position between the hub and the shaft, until surface of the spacer ring comes into contacts with the front surface of the hub.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
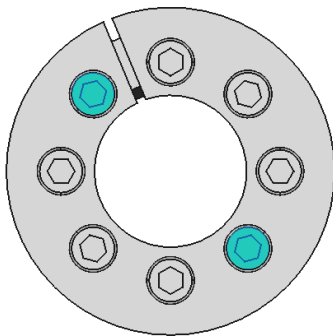– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)

Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal gradually threads and tighten them in a 'criss-cross' sequence until the front cone is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table.
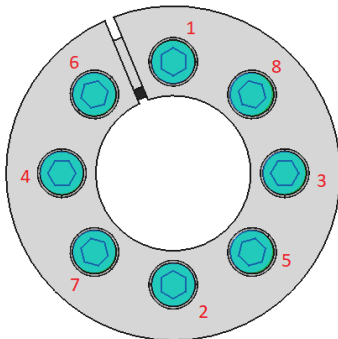
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions, making sure that none of the inner ring extraction threads are on the cut of the outer ring cone.

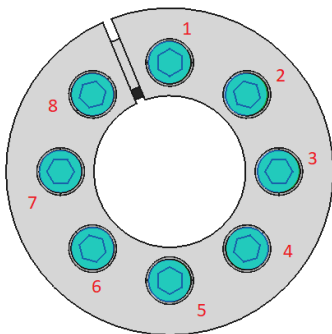| Table for determining the M_s value	
Screw size	**Tightening torque 100% M_s [Nm]** **Quality of the screws 12.9**
M2,5	1.2
M3	2.2
M4	4.9
M5	10
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690
M22	930
M24	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL4500 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ. The values in the table are calculated with µ 0.12.
– Mount the shaft, hub and locking device in the desired position.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
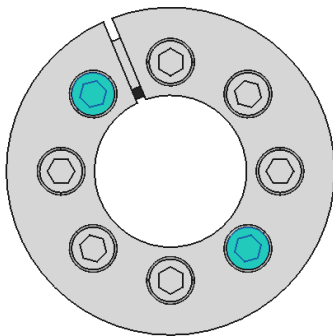– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)

Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal gradually threads and tighten them in a 'criss-cross' sequence until the front cone is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table.
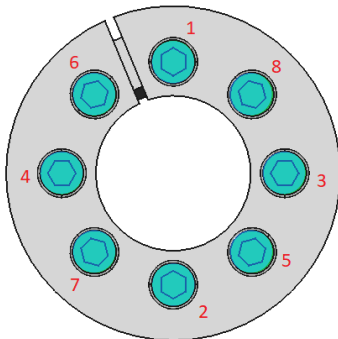
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions, making sure that none of the inner ring extraction threads are on the cut of the outer ring cone.

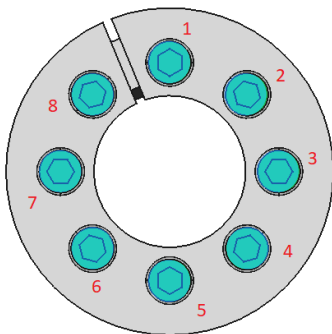| Table for determining the M_s value	
Screw size	Tightening torque 100% M_s [Nm] Quality of the screws 12.9
M2,5	1.2
M3	2.2
M4	4.9
M5	10
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690
M22	930
M24	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.
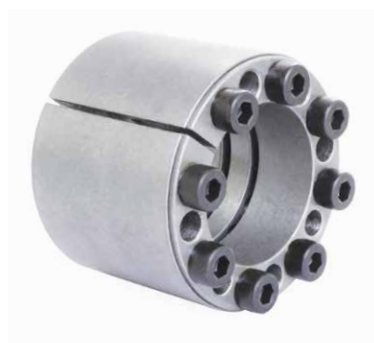
2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL4510, SEL4520, SEL4000 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ. The values in the table are calculated with µ 0.12.
– Mount the shaft, hub and locking device in the desired position.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)
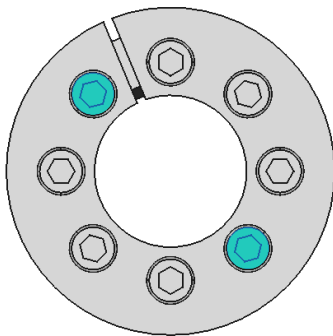
Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal threads and tighten them in a 'criss-cross' sequence until the front cone is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening
– Insert the screws into the extraction threads of the outer ring's central flange and tighten them in a 'criss-cross' sequence until the rear tapered bush is fully removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table. torque indicated in the table.
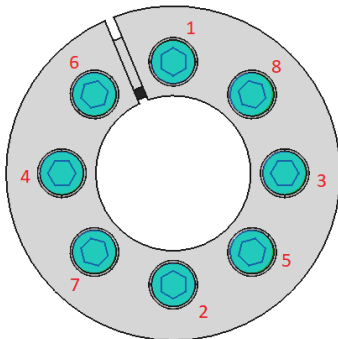
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions, making sure that none of the inner ring extraction threads are on the cut of the outer ring cone.

Table for determining the M_s value	
Screw size	Tightening torque 100% M_s [Nm] Quality of the screws 12.9
M2,5	1.2
M3	2.2
M4	4.9
M5	10
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690
M22	930
M24	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL1300, SEL1390, SEL3500, SEL180 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ. The values in the table are calculated with µ 0.12.
– Mount the shaft, hub and locking device in the desired position.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)

Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal threads and tighten them in a 'criss-cross' sequence until the locking device is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table;

Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions, making sure that none of the inner ring extraction threads are on the cut of the outer ring cone.
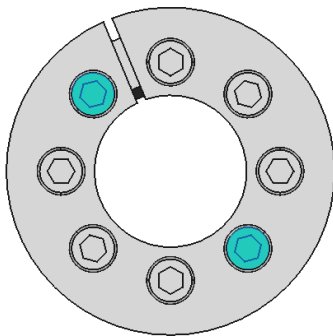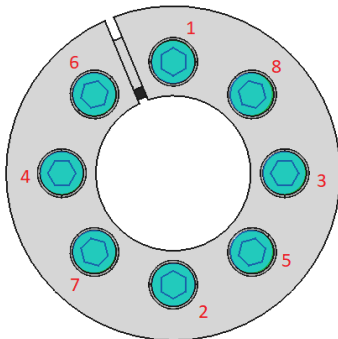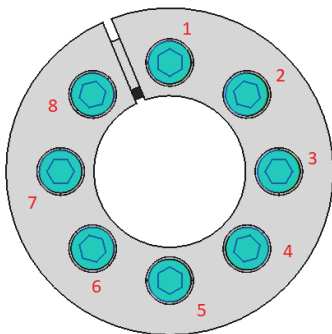
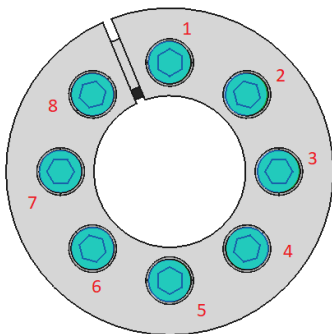| Table for determining the M_s value	
Screw size	Tightening torque 100% M_s [Nm] Quality of the screws 12.9
M2,5	1.2
M3	2.2
M4	4.9
M5	10
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690
M22	930
M24	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL1320 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ. The values in the table are calculated with µ 0.12.
– Mount the shaft, hub and locking device in the desired position.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
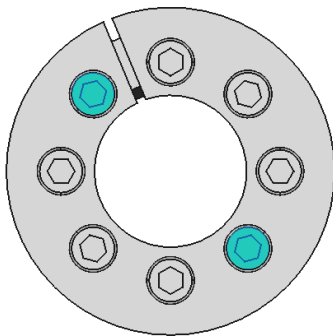– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)

Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal gradually threads and tighten them in a 'criss-cross' sequence until the front cone is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table.
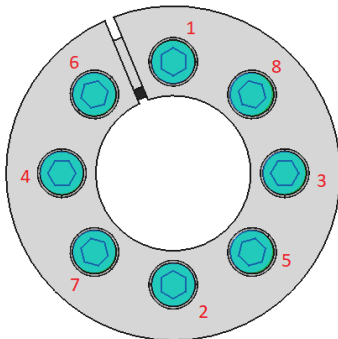
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions, making sure that none of the inner ring extraction threads are on the cut of the outer ring cone.
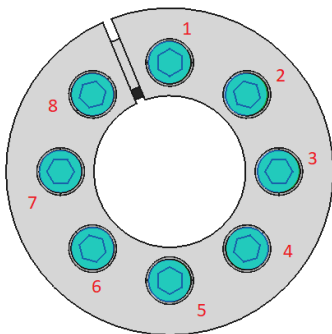
Table for determining the M_s value	
Screw size	Tightening torque 100% M_s [Nm] Quality of the screws 12.9
M6	14
M8	35
M10	70
M12	125
M14	190

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL160 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide- based oils or greases that reduce the coefficient of friction μ. The values in the table are calculated with μ 0.12.
– Mount the shaft, hub and locking device in the desired position.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)
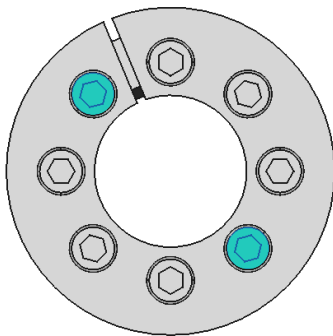
Removal instruction

– Gradually loosen the clamping screws.
– Remove the clamping screws and insert them into the special extraction threads on the inner ring flange.
– Insert the screws into the front tapered bush removal gradually threads and tighten them in a 'criss-cross' sequence until the front cone is completely removed. Do not tighten the screws to a value greater than the 100% M_s tightening torque indicated in the table.

Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction μ.
– Reassemble the components, following the initial installation instructions.

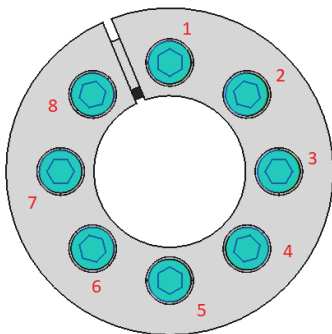| Table for determining the M_s value	
Screw size	**Tightening torque 100% M_s [Nm]** **Quality of the screws 12.9**
M2,5	1.2
M3	2.2
M4	4.9
M5	10
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690
M22	930
M24	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL2500 locking device - self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide- based oils or greases that reduce the coefficient of friction μ. The values in the table are calculated with μ 0.12.
– Tighten the ring nut to the tightening torque M_s indicated in the table
– Lock the ring nut using the appropriate locking toothed washer.

Removal instruction

– Unlock the ring nut from the locking toothed washer.
– Loosen the ring nut until the clamping set is fully unlocked.

Reassembly instruction

– Check all the surfaces are clean and show no obvious signs of deformation or seizing. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Clean and oil all surfaces and threads. Check the ring nut and washer have not been deformed.
– Oil the screws and assemble the locking device as as originally supplied, following the initial installation instructions.

Torque values, categorized by size		
Ring nut		Ring nut tightening torque
Type	Thread	M_s [Nm]
KM4	M20x1	95
KM5	M25x1,5	160
KM6	M30x1,5	220
KM7	M35x1,5	340
KM8	M40x1,5	480
KM9	M45x1,5	680
KM10	M50x1,5	870
KM11	M55x2	970
KM12	M60x2	1100
KM13	M65x2	1300
KM14	M70x2	1600
KM15	M75x2	2000

SEL300 clamping element

Installation instruction

– Clean the inner and outer contact surfaces of the locking device, shaft and hub contact surfaces thoroughly. Remove any traces of oil from the contact surfaces of the components.
– Mount the shaft, hub and locking device in the desired position.
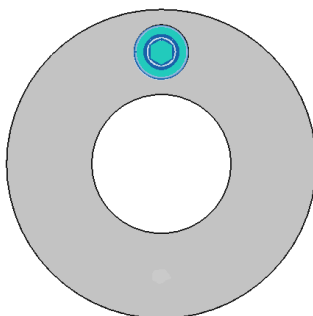– Tighten the screw to 100% of the screw tightening torque value Ms indicated in the table. (figure 1)

Table for determining the M_s value	
Screw size	Tightening torque 100% M_s [Nm] Quality of the screws 10.9
M6	18
M8	42

Removal instruction

– Loosen the clamping screw. No additional operations are necessary.

Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Clean the surfaces of the locking device and reassemble the components, following the initial installation instructions.

Screw tightening sequence

1 Tighten the screw untill 100% Ms is reached.

SEL3000 locking device - not self-centering

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Do not use molybdenum disulphide- based oils or greases that reduce the coefficient of friction μ. The values in the table are calculated with μ 0.12.
– Mount the shaft, hub and locking device in the desired position. Mount the flange and screws.
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– Tighten all screws to 50% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
– Tighten all screws to 100% of the screw tightening torque value M_s indicated in the table in a 'criss-cross' sequence. (figure 2)
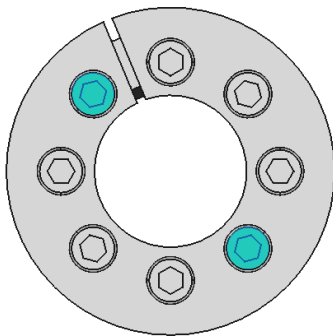– In continuous sequence, tighten all screws until 100% M_s is reached. (figure 3)

Removal instruction

– Gradually loosen the clamping screws until the rings are fully removed.
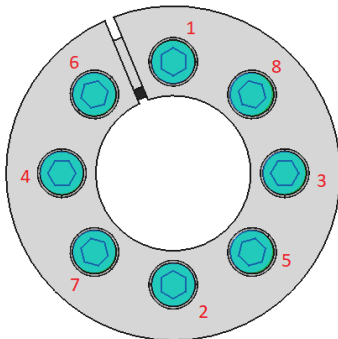
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction μ.
– Reassemble the components, following the initial installation instructions.

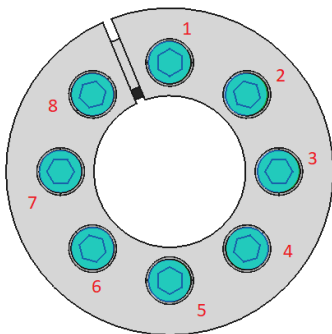| Table for determining the M_s value			
Screw size	8.8	10.9	12.9
M2.5	0.76	1	1.2
M3	1.3	1.9	2.2
M4	2.9	4.1	4.9
M5	6	8.5	10
M6	10	14	17
M8	25	35	41
M10	49	69	83
M12	86	120	145
M14	135	190	230
M16	210	295	355
M18	290	405	485
M20	410	580	690
M22	550	780	930
M24	710	1	1.200

Screw tightening sequence

1   Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2   Tighten all screws in a 'criss-cross' sequence to 50% (first step) and 100% (second step) of the screw tightening torque value M_s indicated in the table (the numbers in the drawing provide an example of the sequence to follow, which may vary depending on the number of screws).

3   In continuous sequence, tighten all screws until 100% M_s is reached.

SEL2000, SEL5000 clamping elements

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly. Mount the shaft, hub and locking device in the desired position. Do not use molybdenum disulphide-based oils or greases on diameter d_w surfaces. The values shown in the table are calculated for diameter surfaces dw when dry only, not oiled. The diameter d surface can be oiled.

Mount the locking device on the hub "d" and insert the shaft into the bore "d_w".
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– In continuous sequence, gradually and in several steps tighten all screws until 100% M_s is reached. (figure 2)

Removal instruction

– Gradually loosen the clamping screws until the locking device is released, do not completely remove the screws.
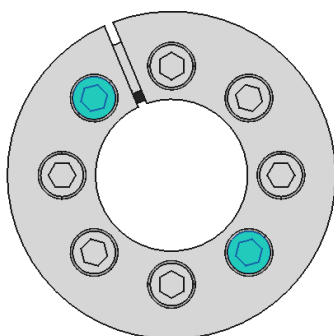
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction µ.
– Reassemble the components, following the initial installation instructions.
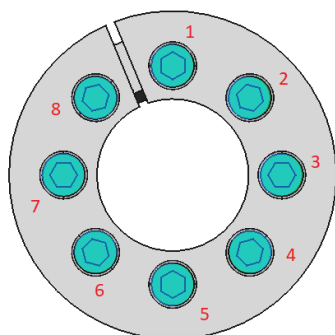
Table for determining the M_s value		
Screw size	**Tightening torque 100% M_s [Nm]**	
	Quality of the screws 10,9	Quality of the screws 12.9
M2,5	1	1.2
M3	1.9	2.2
M4	4.1	4.9
M5	8.5	10
M6	14	17
M8	35	41
M10	69	83
M12	120	145
M14	190	230
M16	295	355
M18	405	485
M20	580	690
M22	780	930
M24	1000	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.
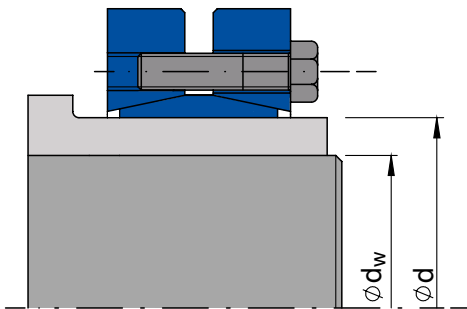
2 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL6010, SEL6020, SEL6030, SEL6030 12.9 clamping elements

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly. Mount the shaft, hub and locking device in the desired position. Do not use molybdenum disulphide-based oils or greases on diameter d_w surfaces. The values shown in the table are calculated for diameter surfaces dw when dry only, not oiled. The diameter d surface can be oiled.

– Mount the locking device on the hub "d" and insert the shaft into the bore "d_w".
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– In continuous sequence, gradually and in several steps tighten all screws until 100% M_s is reached. (figure 2)
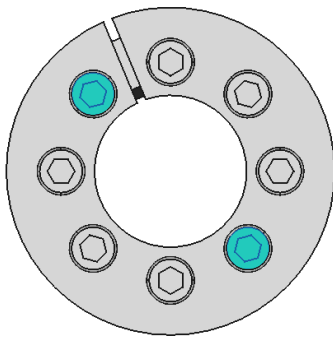
Removal instruction

– Gradually loosen the clamping screws until the locking device is released, do not completely remove the screws.

Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction of 0.04 μ.
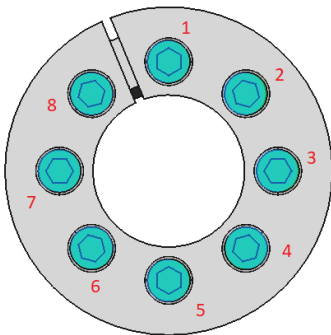– Reassemble the components, following the initial installation instructions.

	Table for determining the M_s value	
Screw size	**Tightening torque 100% M_s [Nm]**	
	Quality of the screws 10,9	Quality of the screws 12.9
M2,5	1	1.2
M3	1.9	2.2
M4	4.1	4.9
M5	8.5	10
M6	14	17
M8	35	41
M10	69	83
M12	120	145
M14	190	230
M16	295	355
M18	405	485
M20	580	690
M22	780	930
M24	1000	1.200

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.
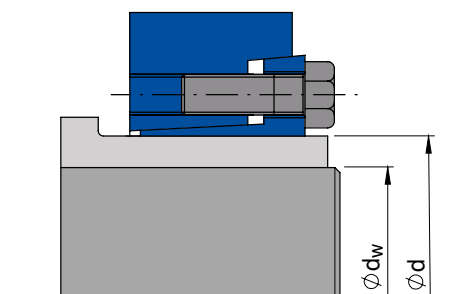
2 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL6210, SEL6220, SEL6230, SEL6810, SEL6830 clamping elements

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly. Mount the shaft, hub and locking device in the desired position. Do not use molybdenum disulphide-based oils or greases on diameter d_w surfaces. The values shown in the table are calculated for diameter surfaces dw when dry only, not oiled. The diameter d surface can be oiled.

– Mount the locking device on the hub "d" and insert the shaft into the bore "d_w".
– Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub. (figure 1)
– In continuous sequence, gradually and in several steps tighten all screws until 100% M_s is reached. (figure 2)
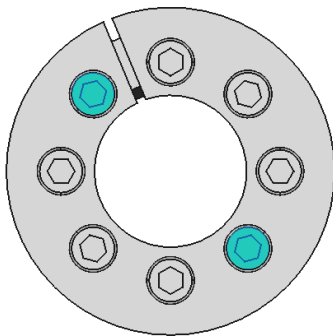
Removal instruction

– Gradually loosen the clamping screws until the locking device is released, do not completely remove the screws.
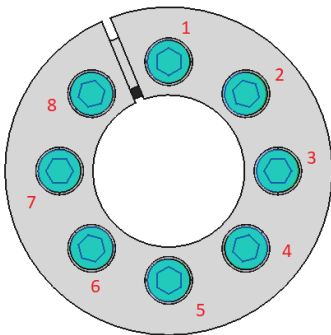
Reassembly instruction

– Carefully clean all the components of the locking device and check the condition of the surfaces. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Re-apply mineral oil on all internal and external surfaces, including all threads. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction of 0.04 µ.
– Reassemble the components, following the initial installation instructions.

Table for determining the M_s value		
Screw size	**Tightening torque 100% M_s [Nm]**	
	Quality of the screws 10,9	Quality of the screws 12.9
M5	8.5	-
M6	12	-
M8	30	-
M10	59	70
M12	100	121
M14	160	195
M16	250	300
M20	490	570
M24	840	980
M27	1.250	1.450
M30	1.640	1.970
M33	2.210	2.400

Screw tightening sequence

1 Tighten two diametrically opposed screws until the locking device surfaces make contact with the shaft and hub.

2 In continuous sequence, tighten all screws until 100% M_s is reached.

SEL2500L clamping element

Installation instruction

– The locking device is supplied ready to assemble. Clean the shaft contact surfaces thoroughly and apply oil. Mount the shaft, hub and locking device in the desired position. Do not use molybdenum disulphide-based oils or greases that reduce the coefficient of friction μ. The values in the table are calculated with μ 0.12.
– Tighten the ring nut to the tightening torque Ms indicated in the table
– Lock the ring nut using the appropriate locking toothed washer.

Removal instruction

– Unlock the ring nut from the locking toothed washer.
– Loosen the ring nut until the clamping set is fully removed.

Reassembly instruction

– Check all the surfaces are clean and show no obvious signs of deformation or seizing. In case of scratches or localized deformations, we recommend replacing the locking assembly with a new unit.
– Clean and oil all surfaces and threads. Check the ring nut and washer have not been deformed.
– Oil the screws and assemble the locking device as originally supplied.

Torque values, categorized by size		
Ring nut		Ring nut tightening torque
Type	Thread	M_s [Nm]
KM4	M20x1	95
KM5	M25x1,5	160
KM6	M30x1,5	220
KM7	M35x1,5	340
KM8	M40x1,5	480
KM9	M45x1,5	680
KM10	M50x1,5	870
KM11	M55x2	970
KM12	M60x2	1100
KM13	M65x2	1300

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