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OMIS, VILNA

Disc screens and Crushers

Datasheets for electrical components and instructions for mechanical components

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Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49__4__ Sizes 01 to 3

(B.4.14.1.EN)

Please read these Operational Instructions carefully and follow them accordingly!

Ignoring these Instructions may lead to malfunctions or to clutch failure, resulting in damage to other parts.

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Safety Regulations

These Installation and Operational Instructions (I + O) are part of the clutch delivery.
Please keep them handy and near to the coupling at all times.



It is forbidden to start use of the product until you have ensured that all applicable EU directives, directives for the machine or system into which the product has been installed have been fulfilled.
At the time these Installation and Operational Instructions go to print, the EAS[®]-clutches accord with the known technical specifications and are operationally safe at the time of delivery.
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the ATEX directive.

CAUTION



- ☐ If the EAS[®]-clutches are modified.
- ☐ the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- ☐ Cover all moving parts to protect against seizure, dust or foreign body impact.
- ☐ The clutches may not be put into operation without a limit switch unless *mayr*[®] has been contacted and has agreed otherwise.

To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and initial operation of the device.

These Safety Regulations are user hints only and may not be complete!

Safety and Guideline Signs

CAUTION



Danger of injury to personnel and damage to machines.



Please Observe!
Guidelines on important points.



According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

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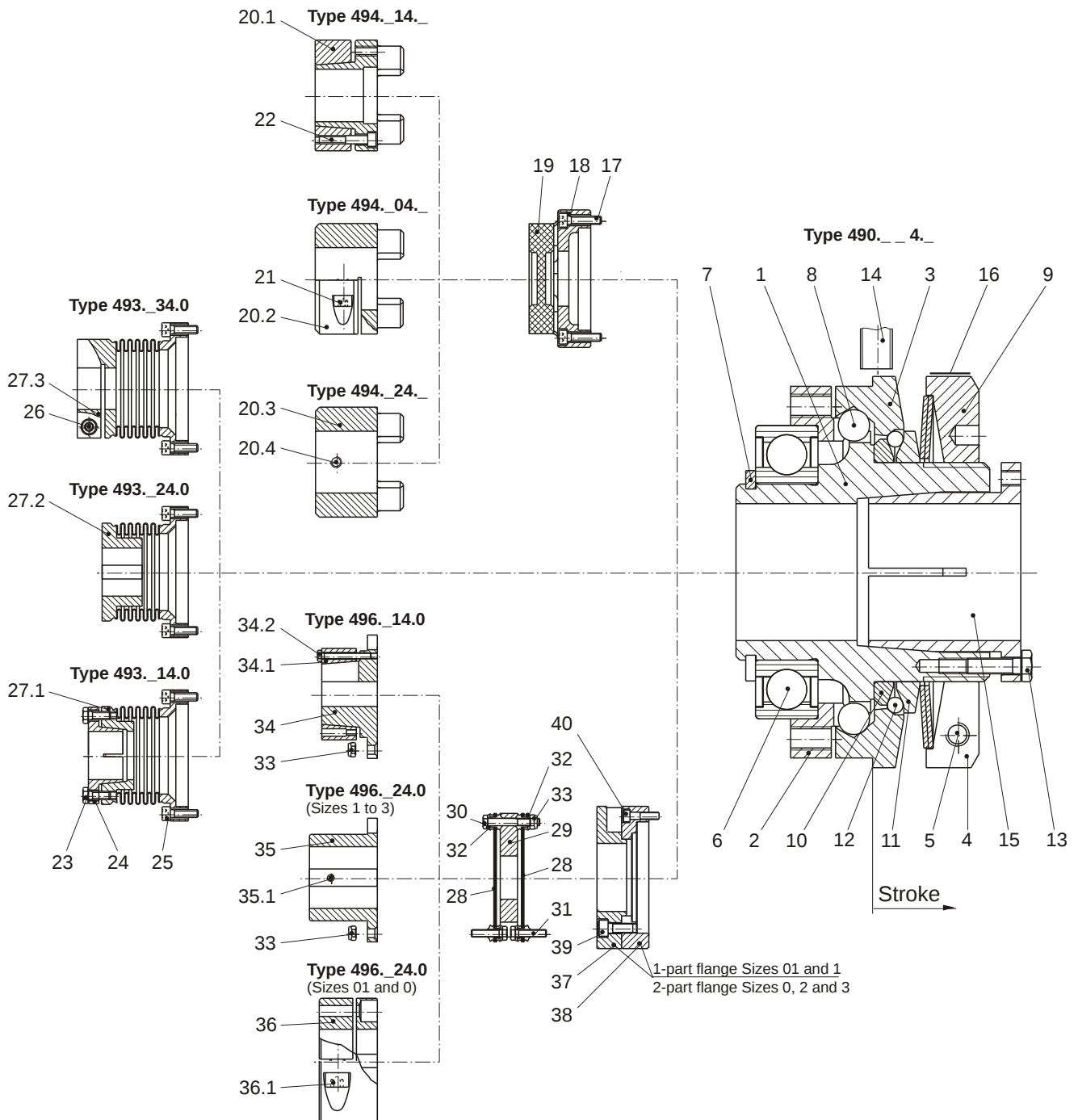


Fig. 1

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49...4... Sizes 01 to 3

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Parts List

Parts List (Only use *mayr*[®] original parts)

Parts for Type 490.-:	
Item	Name
1	Hub
2	Pressure flange
3	Thrust washer
4	Adjusting nut
5	Cap screw
6	Deep groove ball bearing
7	Locking ring
8	Steel ball
9	Cup spring
10	Supporting ring
11	Thrust ring
12	Steel ball
13	Hexagon head screw
14	Limit switch ¹⁾
15	Cone bushing
16	Type tag
Additional parts for Type 494.-:	
Item	Name
17	Cap screw ²⁾
18	Connection flange
19	Elastomeric element ³⁾
20.1	Shrink disk hub
20.2	Clamping hub
20.3	Key hub
20.4	Set screw
21	Cap screw
22	Cap screw

Additional parts for Type 493.-:	
Item	Name
23	Hexagon head screw
24	Cone bushing
25	Cap screw ²⁾
26	Cap screw
27.1	Steel bellows with flange and hub for cone bushing
27.2	Steel bellows with flange and key hub
27.3	Steel bellows with flange and clamping hub
Additional parts for Type 496.-:	
Item	Name
28	Disk pack
29	Connection plate
30	Hexagon head screw
31	Hexagon head screw
32	Washer
33	Hexagon nut
34	Shrink disk hub
34.1	Shrink disk
34.2	Hexagon head screw
35	Key hub
35.1	Set screw
36	Clamping hub
36.1	Cap screw
37	Connection flange
38	Intermediate flange
39	Cap screw
40	Cap screw ²⁾



¹⁾ The limit switch Item 14 is not part of the standard scope of delivery

²⁾ Secure the cap screws Items 17, 25 and 40 with Loctite 243

³⁾ Elastomeric element colours (hardness): red (98 Sh A), yellow (92 Sh A), green (64 Sh D)

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49 _ . _ 4 _ Sizes 01 to 3

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General Technical Data

Table 1

Size	Limit torque for overload M_G				Max. speed [rpm]
	Type 490.5_4_ [Nm]	Type 490.6_4_ [Nm]	Type 490.7_4_ [Nm]	Type 490.8_4_ [Nm]	
01	5 – 12,5	10 – 25	20 – 50	25 – 62,5	8000
0	10 – 25	20 – 50	40 – 100	50 – 125	7000
1	20 – 50	40 – 100	80 – 200	100 – 250	6000
2	40 – 100	80 – 200	160 – 400	200 – 500	5000
3	80 – 200	160 – 400	320 – 800	400 – 1000	4000

Table 2

Size	Thrust washer stroke (Fig. 1; Item 3) on overload [mm]	Bore from – to	
		Hub (1) with cone bushing (15) $\varnothing d$ [mm]	Hub (1) with keyway $\varnothing d_p$ [mm]
01	2,0	10 – 20	12 – 20
0	2,6	15 – 25	15 – 25
1	3,2	22 – 35	22 – 30
2	3,8	32 – 45	28 – 40
3	4,5	35 – 55	32 – 50

Table 3

Size	Type 49 _ . 5_4_		Type 49 _ . 6_4_		Type 49 _ . 7_4_		Type 49 _ . 8_4_	
	Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % M_G [mm]	Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % M_G [mm]	Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % M_G [mm]	Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % M_G [mm]
01	12,5	4,4	25	3,7	50	2,2	62,5	1,4
0	25	4,7	50	3,8	100	1,8	125	0,8
1	50	5,1	100	4,0	200	1,5	250	0,3
2	100	6,6	200	5,3	400	2,5	500	1,1
3	200	5,0	400	3,1	800	-0,4	1000	-2,1

Table 4

Size	Max. permitted bearing loads				Permitted ambient temperature
	Axial forces [N]	Radial forces [N]		Transverse force torques ⁴⁾ [Nm]	
		1-bearing design	2-bearing design		
01	650	650	1000	5	-20 °C to +80 °C
0	1000	1000	1500	10	-20 °C to +80 °C
1	1500	1500	2250	20	-20 °C to +80 °C
2	2400	2400	3600	30	-20 °C to +80 °C
3	4200	4200	6300	40	-20 °C to +80 °C

⁴⁾ Torques, which put strain on the deep groove ball bearing due to the non-centric axial forces having an effect on the pressure flange.

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Table 5

Size	Screw tightening torques [Nm]													
	Item 5	Item 13	Item 17	Item 21	Item 22	Item 23	Item 25	Item 26	Item 30	Item 31	Item 34.2	Item 36.1	Item 39	Item 40
01	3	4	2,7	10	6	3	2,7	10	8,5	8,5	6	33	-	5
0	5	4	5,5	25	6	5	5,5	18	8,5	8,5	6	33	17,4	10
1	9	4	9,5	25	10	9,5	9,5	18	8,5	8,5	6	-	-	17,4
2	9	8	15	70	25	17	15	43	14	14	8,5	-	42	17,4
3	15	12	42	120	30	17	37,5	87	35	35	10	-	83	42

Technical Data Type 493...4.0

Table 6

Size	Shaft misalignment steel bellows coupling Type 493.-			Nominal torque T_{KN} steel bellows coupling Type 493.- [Nm]	Bores steel bellows side		
	Axial ΔK_a [mm]	Radial ΔK_r [mm]	Angular ΔK_w [°]		Type 493...14... [mm]	Type 493...24... [mm]	Type 493...34... [mm]
01	0,4	0,15	2	50	9 – 20	9 – 20	12 – 25
0	0,6	0,15	2	100	12 – 25	12 – 25	15 – 32
1	0,8	0,20	2	200	15 – 35	15 – 35	25 – 42
2	1,0	0,25	2	350	22 – 42	22 – 42	30 – 45
3	1,0	0,30	2	600	32 – 50	32 – 50	35 – 55

Table 7

	Transmittable torques [Nm] on clamping hubs frictional locking (Type 493_34.0) - dependent on bore - suitable for tolerance constellation H7/h6																					
Size	Ø 12	Ø13	Ø 14	Ø 15	Ø 16	Ø 17	Ø 18	Ø 19	Ø 20	Ø 21	Ø 22	Ø 23	Ø 24	Ø 25	Ø 26	Ø 27	Ø 28	Ø 29	Ø 30	Ø 31	Ø 32	Ø33
01	21	23	24	25	25	25	25	25	25	25	25	25	25	25	-	-	-	-	-	-	-	-
0	-	-	-	38	40	43	45	47	49	50	50	50	50	50	50	50	50	50	50	50	50	-
1	-	-	-	-	-	-	-	-	-	-	-	-	-	63	65	67	69	71	73	75	77	79
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	133	136	140	144
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Size	Ø 34	Ø 35	Ø 36	Ø 37	Ø 38	Ø 39	Ø 40	Ø 41	Ø 42	Ø 43	Ø 44	Ø 45	Ø 46	Ø 47	Ø 48	Ø 49	Ø 50	Ø 51	Ø 52	Ø 53	Ø 54	Ø 55
01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	82	83	85	87	89	91	93	95	97	-	-	-	-	-	-	-	-	-	-	-	-	-
2	147	151	155	158	162	166	169	173	176	180	183	187	-	-	-	-	-	-	-	-	-	-
3	-	250	256	262	268	274	280	286	292	298	304	309	315	321	327	332	338	344	349	350	350	350

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Technical Data Type 494...4...

Table 8

Size	Bore lastic-side from – to			Nominal and maximum torques flexible backlash-free shaft coupling T_{KN} and $T_{K max.}$					
	Clamping hub Type 494...04... [mm]	Shrink disk hub Type 494...14... [mm]	Key hub Type 494...24... [mm]	Type 494...4.3 (yellow elastomeric element 92 Sh A)		Type 494...4.4 (red elastomeric element 98 Sh A)		Type 494...4.6 (green elastomeric element 64 Sh D)	
				T_{KN} [Nm]	$T_{K max.}$ [Nm]	T_{KN} [Nm]	$T_{K max.}$ [Nm]	T_{KN} [Nm]	$T_{K max.}$ [Nm]
01	15 – 28	15 – 28	8 – 28	35	70	60	120	75	150
0	19 – 35	19 – 38	10 – 38	95	190	160	320	200	400
1	20 – 45	20 – 45	12 – 45	190	380	325	650	405	810
2	28 – 50	28 – 50	14 – 55	265	530	450	900	560	1120
3	35 – 55	35 – 60	20 – 60	310	620	525	1050	655	1310

Table 9

Size	Transmittable torques [Nm] on clamping hubs frictional locking (Type 494...04... / $\varnothing d_3$) / on shrink disk hubs frictional locking (Type 494...14... / $\varnothing d_4$) – dependent on bore - suitable for tolerance constellation H7/h6 for clamping hubs and H7/g6 for shrink disk hubs																					
	$\varnothing 15$		$\varnothing 16$		$\varnothing 19$		$\varnothing 20$		$\varnothing 22$		$\varnothing 24$		$\varnothing 25$		$\varnothing 28$		$\varnothing 30$		$\varnothing 32$		$\varnothing 35$	
	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4
01	34	56	36	62	43	81	45	87	50	100	54	120	57	125	63	135	-	-	-	-	-	-
0	-	-	-	-	79	141	83	153	91	177	100	203	104	216	116	256	124	282	133	308	145	343
1	-	-	-	-	-	-	83	197	91	228	100	261	104	279	116	332	124	368	133	405	145	460
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	208	300	228	350	248	400	280	500
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	450

Size	$\varnothing 38$		$\varnothing 40$		$\varnothing 42$		$\varnothing 45$		$\varnothing 48$		$\varnothing 50$		$\varnothing 52$		$\varnothing 55$		$\varnothing 58$		$\varnothing 60$	
	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4
01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	-	373	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	158	513	166	547	174	577	187	617	-	-	-	-	-	-	-	-	-	-	-	-
2	315	600	340	680	365	730	404	790	442	850	470	880	-	-	-	-	-	-	-	-
3	390	500	420	600	455	720	505	850	560	1000	600	1180	640	1270	705	1353	-	1428	-	1471

Table 10

Size	Shaft misalignments flexible coupling Type 494.							Dimension "E" (Fig. 7) [mm]	Locking set screw (20.4) for hub (Item 20.3 / Fig. 1)	
	Axial ΔK_a [mm]	Radial ΔK_r			Angular ΔK_w				Thread	Tightening torque [Nm]
		92 Sh A [mm]	98 Sh A [mm]	64 Sh D [mm]	92 Sh A [°]	98 Sh A [°]	64 Sh D [°]			
01	1,4	0,14	0,10	0,07	1,0	0,9	0,8	18	M5	2
0	1,5	0,15	0,11	0,08	1,0	0,9	0,8	20	M6	4,1
1	1,8	0,17	0,12	0,09	1,0	0,9	0,8	24	M8	8,5
2	2,0	0,19	0,14	0,1	1,0	0,9	0,8	26	M8	8,5
3	2,1	0,21	0,16	0,11	1,0	0,9	0,8	28	M8	8,5

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Technical Data Type 496.__4.0

Table 11

Size	Bore torsionally rigid side from – to			Nominal torque and peak torque torsionally rigid backlash-free shaft coupling T _{KN} and T _{KS}	
	Shrink disk hub Type 496.__14.0 [mm]	Key hub Type 496.__24.0 [mm]	Clamping hub with keyway Type 496.__24.0 [mm]	Type 496.__4.0	
				T _{KN} [Nm]	T _{KS} [Nm]
01	19 – 38	–	19 – 35	100	150
0	25 – 45	–	25 – 42	150	225
1	25 – 45	16 – 32	–	300	450
2	40 – 60	25 – 50	–	650	975
3	45 – 70	30 – 55	–	1100	1650

Table 12

	Transmittable torques [Nm] on shrink disk hubs frictional locking (Type 496_14.0) - dependent on bore - suitable for tolerance constellation H7/g6																			
Size	Ø 19	Ø 20	Ø 22	Ø 24	Ø 25	Ø 28	Ø30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 45	Ø 48	Ø 50	Ø 52	Ø 55	Ø 60	Ø 65	Ø 70
01	150	150	150	150	150	150	150	150	150	150	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	225	225	225	225	225	225	225	225	225	-	-	-	-	-	-	-
1	-	-	-	-	339	404	448	492	558	620	659	694	738	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	873	937	1036	1132	1195	1255	1338	1454	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	1268	1394	1480	1565	1691	1890	2065	2204

Table 13

Size	Max. permitted shaft misalignments torsionally rigid coupling Type 496.__4.0			Locking set screw (35.1) for hub (Item 35 / Fig. 1)	
	Axial $\Delta K_a^{5)}$ [mm]	Radial ΔK_r [mm]	Angular ΔK_w [°]	Thread	Tightening torque [Nm]
01	0,9	0,2	2,0	-	-
0	1,1	0,2	2,0	-	-
1	0,8	0,2	1,4	M5 (Ød _p ≤ 22) - M6 (Ød _p > 22)	2 / 4,1
2	1,1	0,25	1,4	M6	4,1
3	1,3	0,3	1,4	M8	8,5

⁵⁾ Only permitted as a static or virtually static value.

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Design

The EAS[®]-Compact[®] overload clutch is designed as a mechanically disengaging overload clutch according to the ball detent principle.

State of Delivery

The clutch is manufacturer-assembled and set to the torque stipulated in the order.
Unless the customer requests a particular torque setting when ordering, the clutch will be pre-set to approx. 70 % of the maximum torque.

Please check state of delivery!

Function

The clutch protects the drive line from excessively high, unpermitted torque impacts which can occur due to unintentional blockages.

After overload has taken place, the transmitting mechanism is completely disconnected. Only the bearing friction continues to have an effect.

This means that no re-engagement impacts or metallic sliding movements occur on the clutch torque transmission geometries when using this clutch variant.

In order to make the clutch ready for operation again after an overload occurrence, the clutch must be re-engaged.

When in operation, the set torque is transmitted backlash-free onto the output from the motor shaft via the EAS[®]-Compact[®] overload clutch (pressure flange (2)). If the set limit torque is exceeded (overload), the clutch disengages and remains disengaged.

The input and the output are separated residual torque-free. A limit switch (not included in delivery) can send a signal to switch off the drive.

After-acting masses can run free.

CAUTION



After overload occurrence, the clutch has no load-holding function.

Re-engagement



Re-engagement must only take place when the device is not running or at low differential speed (< 10 rpm).

EAS[®]-Compact[®] overload clutch re-engagement is carried out by applying axial pressure onto the thrust washer (3).
For this, different procedures are possible:

- ☐ Manually, using a plastic hammer or installation levers (Fig. 2) supported on the cup springs (9), e. g. two screwdrivers placed opposite each other.
- ☐ By using an engagement mechanism.
The engagement procedure can also be automated using pneumatic or hydraulic cylinders.

On both variants, it may be necessary to turn between the clutch input and output sides slightly.

The level of engagement force required is dependent on the set limit torque for overload, and can be roughly calculated using the following formula:

$$F_E = 2,5 \times M_G \text{ [N]}$$

F_E = Engagement force of the clutch [N].

M_G = Set limit torque for overload [Nm].

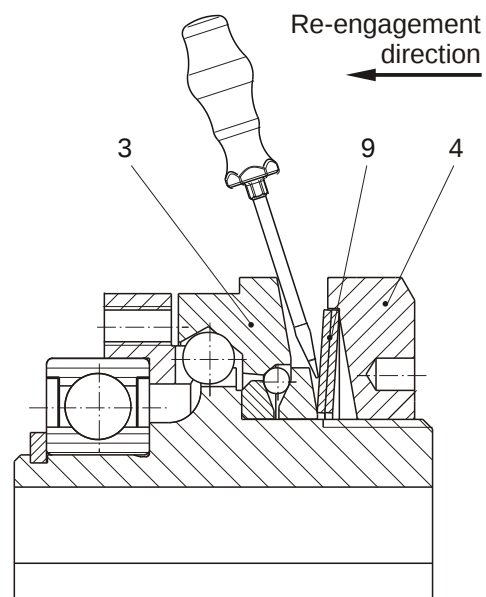


Fig. 2

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49_ _ 4_ Sizes 01 to 3

(B.4.14.1.EN)

Output Elements Installation

The output element is centred on a deep groove ball bearing (6) (tolerance H7/h5) and bolted together with the pressure flange (2).



Please observe the maximum permitted screw-in depth in the pressure flange (2) as well as the connection dimensions "a" and "e" for the output elements, see Figs. 4 or 5 and Table 14.

If the resulting radial force from the output element is anywhere near the centre of the ball bearing (6) and under the max. permitted radial load acc. Table 4, an additional bearing for the output element is not necessary.

No appreciable axial forces (see Table 4) should be transferred from the output element onto the clutch pressure flange (2).

The EAS[®]-Compact[®] with a long protruding hub (Type 490_ _ 4.1 / Fig. 3) is recommended for extremely wide output elements, or for elements with small diameters. On very small diameters, the output element is screwed together with the clutch pressure flange (2) via a customer-side intermediate flange.

Example:

Type 490.614.0

Type 490.614.1

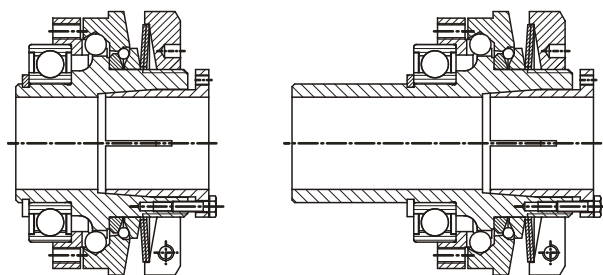


Fig. 3

Ball bearings, needle bearings or bearing bushings are suitable as bearings for the output element, depending on the installation situation and the installation space.

In order to prevent the output element (pressure flange (2)) from moving axially in the direction of the thrust washer (3) during overload, please make sure that the bearing of the output element is designed as a locating bearing (Fig. 5).

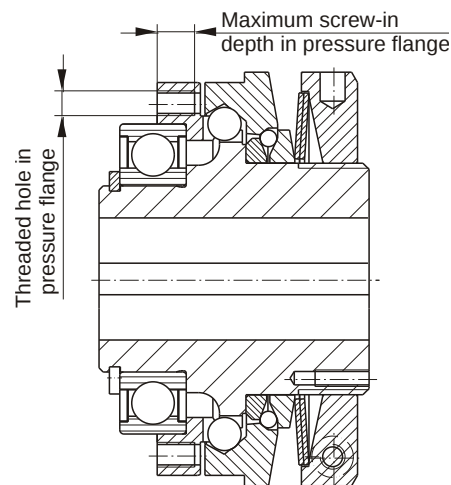


Fig. 4

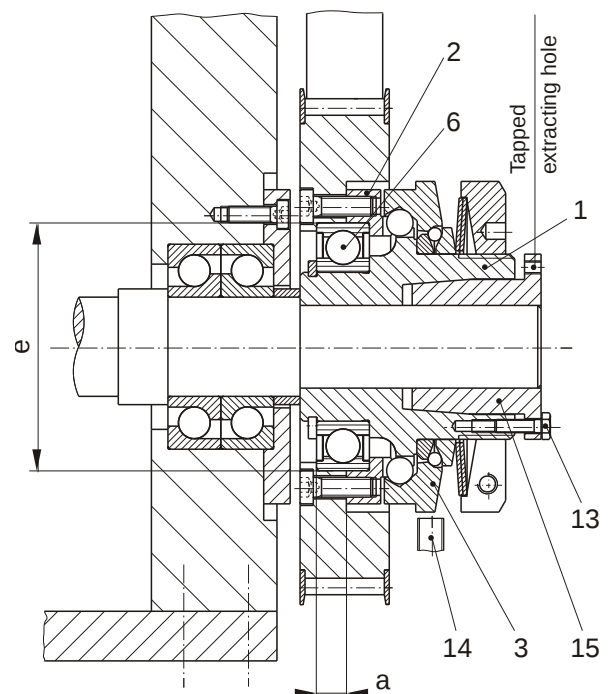


Fig. 5

Table 14

Size	Thread in pressure flange (Fig. 4) with required screw quality for Items 17 and 25	Max. screw-in depth [mm] in the pressure flange (Fig. 4)	Connection dimensions [mm] (Fig. 5)	
			a ^{+0,1}	e ^{H7/h5}
01	8 x M4 / 8.8	6	5	47
0	8 x M5 / 8.8	7	7	62
1	8 x M6 / 8.8	9	9	75
2	8 x M6 / 12.9	10	10	90
3	8 x M8 / 12.9	12	10	100

Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._4_._ Sizes 01 to 3

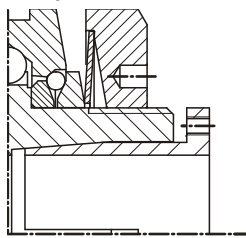
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Cup Spring Layering (Fig. 6)

Correct cup spring layering is a prerequisite for problem-free clutch function and torque adjustment.

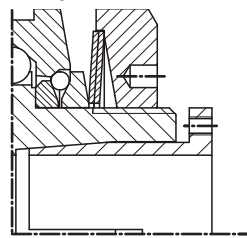
For the lower torque range, **one** cup spring
(Type 49_5_4_._),
for the medium torque range, **two** cup springs
(Type 49_6_4_._),
for the high torque range, **four** cup springs
(Type 49_7_4_._)
and for the maximum torque range
five cup springs (Type 49_8_4_._) are installed.

1x layered



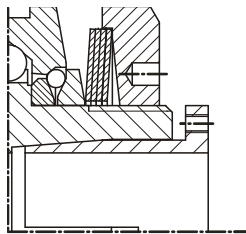
Type 49_5_4_._

2x layered



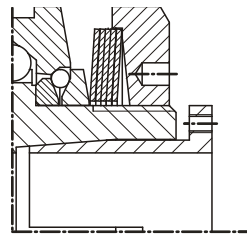
Type 49_6_4_._

4x layered



Type 49_7_4_._

5x layered



Type 49_8_4_._

Fig. 6

Mounting onto the Shaft

EAS®-Compact® clutches include cone bushings, shrink disks, clamping hubs or keyways as part of the standard delivery.

During installation of cone bushings, shrink disks or clamping hubs, please observe the following:

- ☐ Recommended shaft tolerance for cone bushings: h6
- ☐ Recommended shaft tolerance for clamping hubs: h6
- ☐ Recommended shaft tolerance for shrink disk hubs: g6
- ☐ Shaft surface: finely turned or ground
($R_a = 0,8 \mu\text{m}$).
- ☐ Shaft material: Yield point at least 400 N/mm²,
e. g. St 60, St 70, C 45, C 60.
- ☐ Degrease or remove conserving layers on the shafts and bores before installing the clutch.
Greasy or oily bores or shafts do not transmit the torques defined in the catalogue.
- ☐ Mount the clutch or clutch hubs onto both shaft ends using a suitable device and bring it / them into the correct position.
- ☐ Tighten the tensioning screws (13) of the cone bushing (15) in 2 steps cross-wise and then in 3 to max. 6 tightening sequences evenly using a torque wrench to the torque stated in Table 5.
- ☐ Type 494.-:
Tighten the tensioning screws (22) in the shrink disks (20.1) stepwise (in 3 to max. 6 tightening sequences) and cross-wise evenly using a torque wrench to the torque stated in Table 5.
- ☐ Type 496.-:
Tighten the tensioning screws (34.2) in the shrink disks (34.1) using a torque wrench evenly and one after the other in max. 6 sequences to the torque stated in Table 5.
- ☐ The transmittable torques of the shaft-hub connection are dependent on the bore diameter and the quality of the drive shafts used. Please observe the respective transmission tables in the valid and applicable product catalogue.



The clutch or clutch hub carries out an axial movement in the direction of the cone bushing (15) when tightening the cone bushing (15). Because of this effect, please ensure that on the EAS®-Compact® clutch with steel bellows (Type 493_._4.0), first one cone bushing is completely tightened (e.g. Item 15), then the other (steel bellows) side (Item 24, page 3). Please also ensure during installation of Type 493_._4.0 that no axial pressure is placed on the steel bellows (can cause damage).

De-installation of the Cone Bushings and Shrink Disks

In the cone bushings and the shrink disks, there are tapped extracting holes next to the tensioning screws.

- 1) Loosen all tensioning screws by several thread turns.
- 2) Screw out the tensioning screws located next to the tapped extracting holes and screw them into the tapped extracting holes up to their limits.
Then tighten these screws until the tensioning connection loosens.

Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49__ 4__ Sizes 01 to 3

(B.4.14.1.EN)

Shaft Installation via Key Connection

On the EAS®-Compact® with a keyway, the clutch must be axially secured both EAS®-side and lastic-side after mounting onto the shaft, e.g.:

- ❑ for Types 490__ 24__ and 493__ 24.0
with a press cover and a screw, screwed into the shaft threaded centre hole
- ❑ for Types 494__ 24__ and 496__ 24.0
on the EAS®-side with a press cover and a screw, screwed into the shaft threaded centre hole and on the lastic-side with a locking set screw:
 - ➔ Locking set screw (20.4) for hub (20.3), see Fig. 1 on page 3 and table 10 on page 7,
 - ➔ Locking set screw (35.1) for hub (35), see Fig. 1 on page 3 and table 13 on page 8.

Joining Both Clutch Hubs (Items 1 / 27) Type 493__ 4.0 (Fig. 1)



When mounting the hubs (1 and 27), the joining force must not be transferred via the steel bellows
=> danger of bellows deformation.

Joining Both Clutch Components (1/20) Type 494__ 4__ (Figs. 1 and 7)

The flexible elastomeric element (19) is pre-tensioned between the metal claws by joining components 20.1/20.2/20.3 with component 18. To do this, an axial installation force is required. The force required can be reduced by lightly greasing the elastomeric element.



Use PU-compatible lubricants (e. g. Vaseline or HP222)!
No unpermitted high axial pressure should be placed on the elastomeric element (19) in completely assembled condition.
Keep to distance dimension "E" acc. Fig. 7 and Table 10!

Joining Both Clutch Components Type 496__ 4.0 (Fig. 1)

Join the misalignment-flexible part and the overload clutch and screw together with cap screws (Item 40) to the tightening torque given in Table 5.

The cap screws (Item 40) must be protected using a screw-securing product, e.g. Loctite 243.



The clutch or clutch hub carries out an axial movement in the direction of the cone bushing (Item 15) when tightening the cone bushing (15).
Because of this effect, please ensure that on the EAS®-Compact® clutch with disk pack (Type 496__ 4.0), first the cone bushing (15) is completely tightened, then the other (disk pack) side.

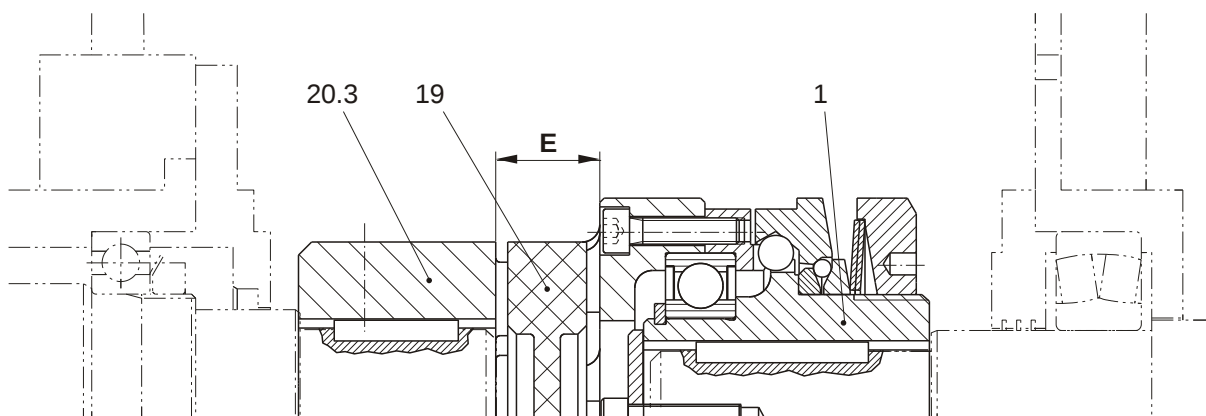


Fig. 7

Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49... 4... Sizes 01 to 3

(B.4.14.1.EN)

Permitted Shaft Misalignments

The EAS®-Compact® clutches Types 494... 4... (lastic backlash-free), 493... 4.0 (with steel bellows) and 496... 4.0 (torsionally rigid backlash-free) compensate for radial, axial and angular shaft misalignments (Fig. 8) without losing their backlash-free function. However, the Type-specific permitted shaft misalignments indicated in Tables 6, 10 and 13 must not simultaneously reach their maximum value.

If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted misalignment values are dependent on one another, see Fig. 9.

The sum total of the actual misalignments in percent of the maximum value must not exceed 100 %.

The permitted misalignment values given in Tables 6, 10 and 13 refer to clutch operation at nominal torque, an ambient temperature of +30 °C and an operating speed of 1500 rpm. If the clutch is operated in other or more extreme operating conditions, please observe the dimensioning guidelines stated in the individual shaft coupling catalogues or contact the manufacturer.

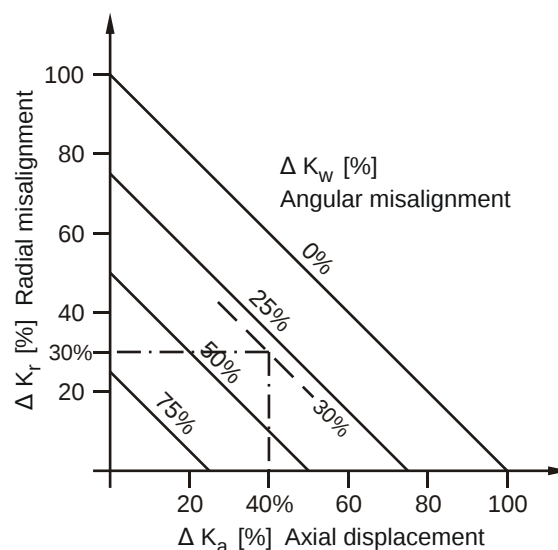
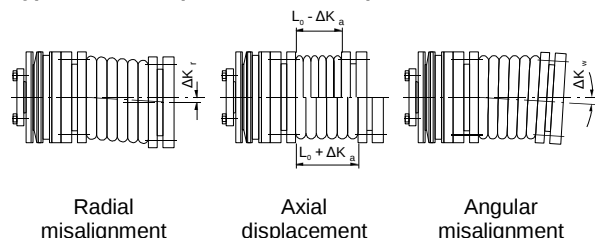
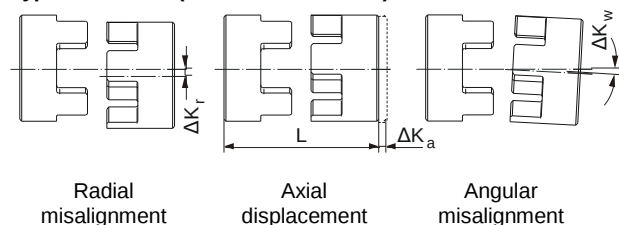


Fig. 9

Type 493... 4.0 (with steel bellows)



Type 494... 4... (lastic backlash-free)



Type 496... 4.0 (torsionally rigid backlash-free)

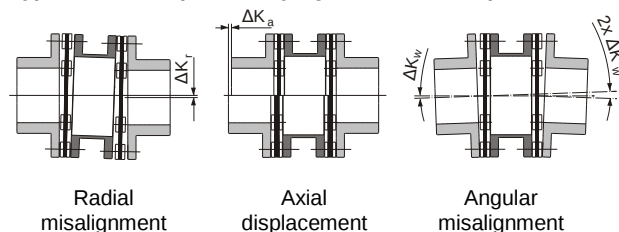


Fig. 8

Example (Size 3 / Type 493... 4.0):

Axial displacement occurrence $\Delta K_a = 0,4$ mm equals 40 % of the permitted maximum value $\Delta K_a = 1,0$ mm.
Radial misalignment occurrence $\Delta K_r = 0,09$ mm equals 30 % of the permitted maximum value $\Delta K_r = 0,3$ mm.
=> permitted angular misalignment $K_w = 30$ % of the maximum value $\Delta K_w = 2,0^\circ$ => $\Delta K_w = 0,6^\circ$

Clutch Alignment

Exact alignment of the clutch improves the running smoothness of the drive line substantially, reduces the load on the shaft bearings and increases the clutch service lifetime.

We recommend alignment of the clutch using a dial gauge or special laser on drives operating at very high speeds.

Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49 _ _ 4_ Sizes 01 to 3

(B.4.14.1.EN)

Torque Adjustment

In order to guarantee low-wear clutch operation, it is essential that the clutch torque is set to a sufficiently high service factor (overload torque to operating torque).

Our experience has shown that an **adjustment factor of 1,5 to 3** gives good results.

On very high load alternations, high accelerations and irregular operation, please set the adjustment factor higher.

Torque adjustment is carried out by turning the adjusting nut (4). The installed cup springs (9) are operated in the negative range of the characteristic curve (see Fig. 12); this means that a stronger pre-tensioning of the cup spring results in a decrease of the spring force.

The torque is set manufacturer-side according to the customer's request.

If no particular torque adjustment is requested customer-side, the clutch will always be **pre-set** and **marked** (calibrated) to approx. 70 % of the maximum torque.

It is possible to check the **"Spring operation in the operating range"** (Fig. 12) using the dimension "a" (distance from the adjusting nut (4) facing side to the hub (1) facing side, as shown in Fig. 10).

Please see Table 3 for the respective values.



Turning the adjusting nut (4) clockwise causes a reduction in torque.
Turning it anti-clockwise causes an increase in torque.
You should be facing the adjusting nut (4) as shown in Fig. 10 and Fig. 11.

Changing the Torque

- a) Please convert the required torque using the formula below into percent of the maximum adjustment value (see Table 3).

Required torque adjustment	x 100 = Adjustment in %
Max. torque adjustment (Table 3)	

- b) Loosen the locking screw (5) in the adjusting nut (4).
c) Turn the adjusting nut (4) using the engraved adjustment scale (Fig. 11) clockwise or anti-clockwise using a hook or a face wrench until the required torque is reached.
d) The required torque results from the marking overlap on the hub (1) and the percent value on the adjusting nut (Item 4 / Figs. 10 and 11).
e) Re-tighten the locking screw (5)



Adjusting the adjusting nut (4) or distorting the cup spring (9) outside of the cup spring characteristic curve (see Fig. 12) stops the clutch functioning.

The inspection dimension "a" (see Table 3) can show deviations due to construction tolerances or to clutch wear. After de-installing the clutch (e.g. due to cup spring replacement or changes to the cup spring layering), the clutch must be re-adjusted and calibrated using dimension "a" (see Table 3 and Fig. 9).

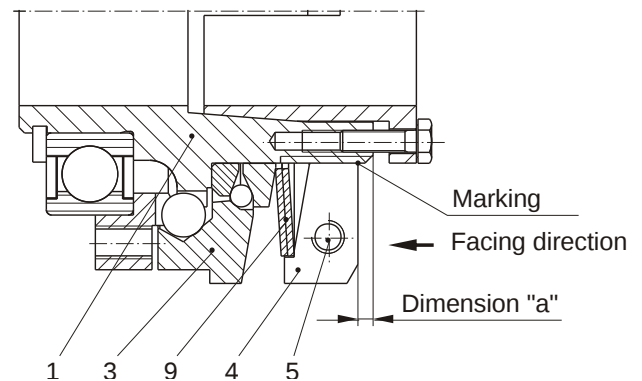


Fig. 10

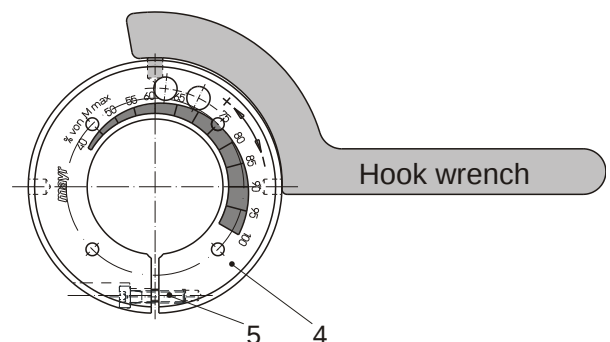


Fig. 11

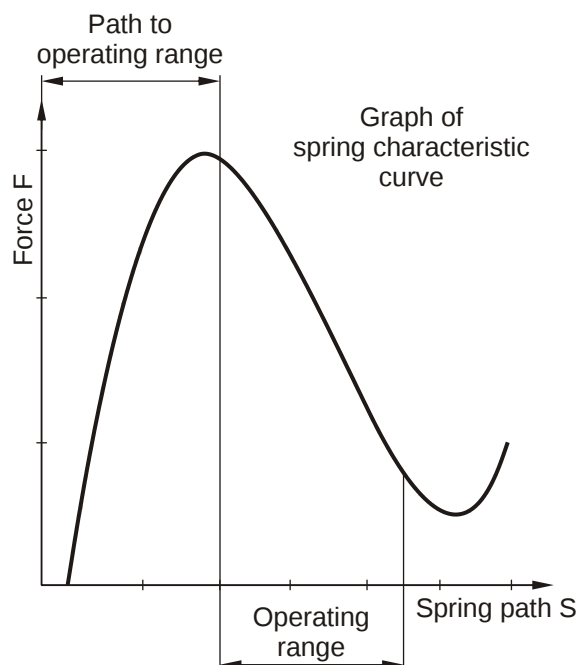


Fig. 12

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49...4... Sizes 01 to 3

(B.4.14.1.EN)

Limit Switch (Item 14; Figs. 1 and 13)

In order to limit run-out times after overload has taken place, a limit switch must be mounted onto the overload clutch.

The contactless limit switch is to be mounted onto the switching edge of the clutch (Fig. 13) so that no signal changes are caused during normal operation on the limit switch by the usual clutch run-out errors.

In case of overload, the thrust washer (3) carries out a stroke (see Fig. 1 and Table 2) in the direction of the adjusting nut (4), which is used to signal change on the limit switch (14).

The signal change should take place at the latest after an axial thrust washer (3) stroke of 0,5 mm. At the same time, please maintain a radial minimum distance of 0,5 mm in order to prevent rubbing of the contactless limit switch.

Limit Switch Installation

- ☐ Adjust the switch distance for the contactless limit switch acc. Fig. 13. The distance of the thrust washer (3) to the switching point can be adjusted using a hexagon head screw, wrench opening 7.
- ☐ Please ensure that the limit switch is functioning correctly.

Contactless limit switch (mounting example)

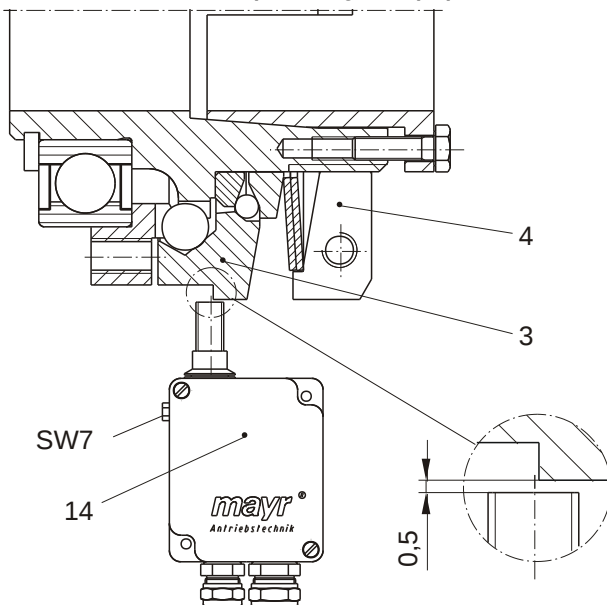


Fig. 13

Maintenance and Maintenance Intervals

Maintenance work, which should be carried out after 2000 operating hours, after 1000 disengagements or at the latest after 1 year, includes:

- Visual inspection
- Functional inspection
- Inspection of the shaft-hub connection
- Inspection of the screw tightening torques
The specified tightening torques (Table 5) must be maintained.
- Inspection of the set torque
- Clutch release inspection
- Bearing or bearing pre-tension inspection
- Re-greasing of the transmission geometries, balls, recesses and sealing elements.

Clutch re-greasing must only be carried out by specially trained personnel.

For greasing, please use NLGI Class 1,5 grease with a basic oil viscosity of 460 mm²/s at 40 °C, e.g. Mobilith SHC460.

When re-installing the clutch, please secure all screws with Loctite 243 (medium hard).

If large amounts of dirt or dust are present or in extreme ambient conditions, it may well be necessary to carry out inspections at shorter intervals.

We recommend that maintenance work is carried out at the site of manufacture.

Disposal

Electronic components (Limit switch):

Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

Steel components:

Steel scrap (Code No. 160117)

All aluminium components:

Non-ferrous metals (Code No. 160118)

Seals, O-rings, V-seals, elastomers:

Plastic (Code No. 160119)

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49__4__ Sizes 01 to 3

(B.4.14.1.EN)

Malfunctions / Breakdowns Type 490__4__

Malfunction	Possible Causes	Solutions
Premature clutch release	Incorrect torque adjustment	1) Set the system out of operation 2) Check the torque adjustment 3) Secure the adjusting nut 4) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
	Adjustment nut has changed position	
	Worn clutch	
Clutch does not release on overload	Incorrect torque adjustment	1) Set the system out of operation 2) Check whether foreign bodies influence the disengagement mechanism function 3) Check the torque adjustment 4) Secure the adjusting nut 5) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
	Adjustment nut has changed position	
	Disengagement mechanism blocked by a foreign body	
	Worn clutch	
Running noises on overload occurrence as clutch slows down	Bearing on output flange is worn or has been previously damaged	1) Set the system out of operation 2) Inspect the clutch at the place of manufacture
	Worn disengagement mechanism	
Running noises in normal operation	Insufficient clutch securement	1) Set the system out of operation 2) Check the clutch securement 3) Check the screw tightening torques 4) Check the torque adjustment and that the adjusting nut sits securely
	Loosened screws	
	Loosened adjusting nut	

Malfunctions / Breakdowns Type 493__4.0

Malfunction	Possible Causes	Solutions
Steel bellows breakage	Incorrect alignment	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment
	Steel bellows have already been damaged in transport or during installation	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment
	Operating parameters are not appropriate for the clutch performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Steel bellows is energised in natural frequency; resonance	1) Set the system out of operation 2) Re-align the line characteristics 3) Replace the entire clutch 4) Check the alignment
Changes in running noise and / or vibration occurrence	Loosened screws, resonances, insufficient coupling securement	1) Set the system out of operation 2) Check the screw tightening torques 3) Check the line characteristics 4) Check the clutch parts and replace if damaged

Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49 _ _ 4_ Sizes 01 to 3

(B.4.14.1.EN)

Malfunctions / Breakdowns Type 494 _ _ 4_

Malfunction	Possible Causes	Solutions
Changes in running noise and / or vibration occurrence	Incorrect alignment	1) Set the system out of operation 2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the clutch installation dimension "E") 3) Check the clutch for wear
	Wear on the elastomeric element, temporary torque transmission due to metal contact	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary.
	Tensioning and clamping screws or locking set screw for axial hub securement or connection screws are loose	1) Set the system out of operation 2) Check the clutch alignment 3) Tighten the tensioning and clamping screws for axial hub securement and the connection screws to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer 4) Check the clutch for wear
Cam breakage	Wear on the elastomeric element, torque transmission due to metal contact	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment
	Cam breakage due to high impact energy / overload / excessively high shaft misalignments	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment 4) Find the cause of overload
	Operating parameters are not appropriate for the coupling performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Operational mistakes due to clutch characteristic data being exceeded	1) Set the system out of operation 2) Check clutch dimensioning 3) Replace the entire clutch 4) Check the alignment 5) Train and advise operating personnel
Premature wear on the elastomeric element	Incorrect alignment	1) Set the system out of operation 2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the clutch installation dimension "E") 3) Check the coupling for wear 4) Insert a new elastomeric element

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49__ 4__ Sizes 01 to 3

(B.4.14.1.EN)

Malfunctions / Breakdowns Type 494__ 4__ (continued)

Malfunction	Possible Causes	Solutions
Premature wear on the elastomeric element	e.g. contact with aggressive liquids / oils, ozone influences, excessively high ambient temperature etc., which lead to physical changes in the elastomeric element	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary. 6) Make sure that further physical changes to the elastomeric element can be ruled out
	The ambient or contact temperatures permitted for the elastomeric element are exceeded	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary. 6) Check the ambient or contact temperature and regulate them (if necessary, use other elastomeric element materials)
Premature wear on the elastomeric element (material liquitation inside the elastomeric element toothing)	Drive vibrations	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary. 6) Find the cause of vibration (if necessary, use an elastomeric element with a lower or higher shore hardness)

Installation and Operational Instructions for EAS[®]-Compact[®] overload clutch Type 49__ 4__ Sizes 01 to 3

(B.4.14.1.EN)

Malfunctions / Breakdowns Type 496__ 4.0

Malfunction	Possible Causes	Solutions
Changes in running noise and / or vibration occurrence	Incorrect alignment, incorrect installation	1) Set the system out of operation 2) Find / resolve the cause of incorrect alignment 3) Check the coupling for wear
	Loose connecting screws, minor fretting corrosion under the screw head and on the disk pack	1) Set the system out of operation 2) Check the clutch parts and replace if damaged 3) Tighten the connecting screws to the specified torque 4) Check the alignment and correct if necessary
	Tensioning screws or locking set screw for axial securement of the hubs are loose	1) Set the system out of operation 2) Check the clutch alignment 3) Tighten the tensioning and clamping screws for axial hub securement to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer 4) Check the clutch for wear
Disk pack breakage	Disk pack breakage due to high load impacts / overload	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the coupling parts and replace if damaged 4) Find the cause of overload and remove it
	Operating parameters are not appropriate for the coupling performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Incorrect operation of the system unit	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the coupling parts and replace if damaged 4) Train and advise operating personnel
Disk packs / connecting screws cracks or breakage	Drive vibrations	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the coupling parts and replace if damaged 4) Check the alignment and correct if necessary 5) Find the cause of vibration and remove it



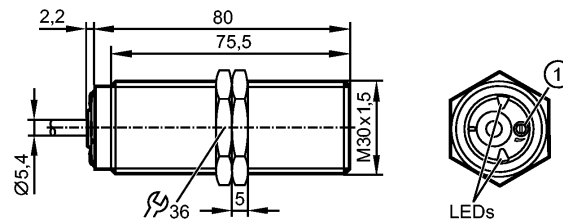
Please Observe!

mayr[®] will take no responsibility or guarantee for replacement parts and accessories which have not been delivered by mayr[®], or for damage resulting from the use of these products.

DI0101

DIA2010-ZROA/5-3600 I/MIN

Evaluation systems, power supplies



1: potentiometer



Product characteristics

Compact speed monitor M30

DIA

M30 x 1.5

Cable

Inductive sensor

Sensing range 10 mm [f]

flush mountable

Application

Application	simple evaluation of rotating and linear movement with regard to underspeed; blocking
Switching function	output is switched during the start-up delay and if (f actual) is greater than (f preset)
Electrical design	AC/DC
Switching output	normally open

Electrical data

Nominal voltage [V]	20...250 AC/DC (45...65 Hz, AC)
Reverse polarity protection	yes
Protection class	II

Outputs

Transistor	
Current rating (continuous) [mA]	350 AC, 50 °C / 250 AC, 80 °C / 100 DC, 80 °C
Current rating (peak) [mA]	2200 (20 ms / 0.5 Hz)
Minimum load current [mA]	> 6
Leakage current [mA]	< 1.5
Voltage drop [V]	< 7.5
Short-circuit proof	no
Overload protection	no

Range

Sensing range (Sn) [mm]	10
Real sensing range (Sr) [mm]	10 ± 10 %
Operating distance [mm]	0...8.1
Correction factors	mild steel = 1 / stainless steel approx. 0.8 / brass approx. 0.5 / Al approx. 0.5 / Cu approx. 0.4

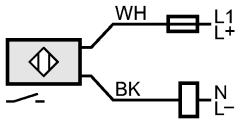
Measuring / setting range

Setting range [pulses/min.]	5...3600
Adjustment of the switch point	multiturn potentiometer
Hysteresis [% of Sp]	10
Start-up delay [s]	12

DI0101

DIA2010-ZROA/5-3600 I/MIN

Evaluation systems, power supplies

Reaction times	
Damping frequency (max.) [pulses/min]	4800 *)
Environment	
Ambient temperature [°C]	-25...80
Protection	IP 65 / IP 67
Tests / approvals	
EMC	EN 60947-5-2
Mechanical data	
Mounting	flush mountable
Housing materials	Brass special coating; PA (polyamide); TPE-U
Weight [kg]	0.296
Displays / operating elements	
Output status indication LED	2 x yellow
Electrical connection	
Connection	PUR cable / 2 m; 2 x 0.5 mm²
Wiring Core colours BK black WH white	
	
Note: miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting)	
Accessories	
Accessories (included)	2 lock nuts
Remarks	
Remarks	Recommendation: check the unit for reliable function after a short circuit. *) bei Sn/2
Pack quantity [piece]	1

General Instructions for Mounting, Maintenance and Service of Hydraulic Cylinders

1. Mounting of Hydraulic Cylinders

1. Get sure that all mechanical constructions structures and parts in the working area are stable and do not cause any risk for injury during the mounting.
2. Check that the cylinders are delivered according to the order and get sure that they have not been damaged during the transportation and that the type of cylinder is aimed for the application.
3. Mount the cylinder to the lugs or other mounting devices. Do not use unsuitable tools like heavy hammer etc.
4. If it is necessary to pull out the piston rod for the mounting, remove the plugs in the oil connections and protect the surface of the piston rod to avoid scratches. Protect the oil connections against dirt.
5. Check that the oil tubes /pipes do not touch any structures and that there is not any other risk for damage in any position of the cylinder during its working cycle.
6. Check that the couplings and nipples for the oil connections have the right thread to ensure a good and removable connection.
7. After fitting the cylinder, remove all protection plugs and tapes (on crease nipples, adjustment screws etc.) check the tightness of the air-bleed screws (do not tighten too hard) crease the bearings and get familiar with the adjustments of the cylinder (e.g. pressure valves, end dampings)

Note! Hydraulic cylinders always are delivered unadjusted. The adjustment is done according to the final demand during the start-up procedure.

Note! If compressed air is used to assist the mounting (for pushing out the piston rod), be careful about the flexibility of the pressured air and the friction of the cylinder seals. In some cases the difficulty to control the movement can cause risk for injury and damage.

2. Start up procedure

1. After starting the hydraulic system the air must be bled off from the cylinders. Open slowly the air bleed screws until no more air comes out. If the cylinder is not equipped with air bleed screws the air can also be bled out by opening slowly the couplings in the oil connections.

If the pipe line is short and there are only a small number of valves and other control devices in the systems, the air can bleed out by itself through the valves into the reservoir.

Dampings and other possible adjustments are done after air-bleeding.

Note! During the actions mentioned above the cylinder should not be loaded and the system pressure and the oil flow shall be as low as possible.

Ensure yourself that the cylinder is fully under control and operates logically. After this rise the system pressure gradually to the desired level.

Finally clean the cylinder from oil and dirt, check the tightness of the oil connections and get sure that the cylinders are free to move.

Note! Hydraulic cylinders are not designed to withstand cranking forces.

Note! Once more check out that all fitting screws of the devices are properly tightened.

3. Service

In the normal conditions hydraulic cylinders are reliable and do not need any special service. The cylinders should be kept clean and bearings well creased. The more difficult the conditions of the cylinder are working the more attention should be paid for preventive service.

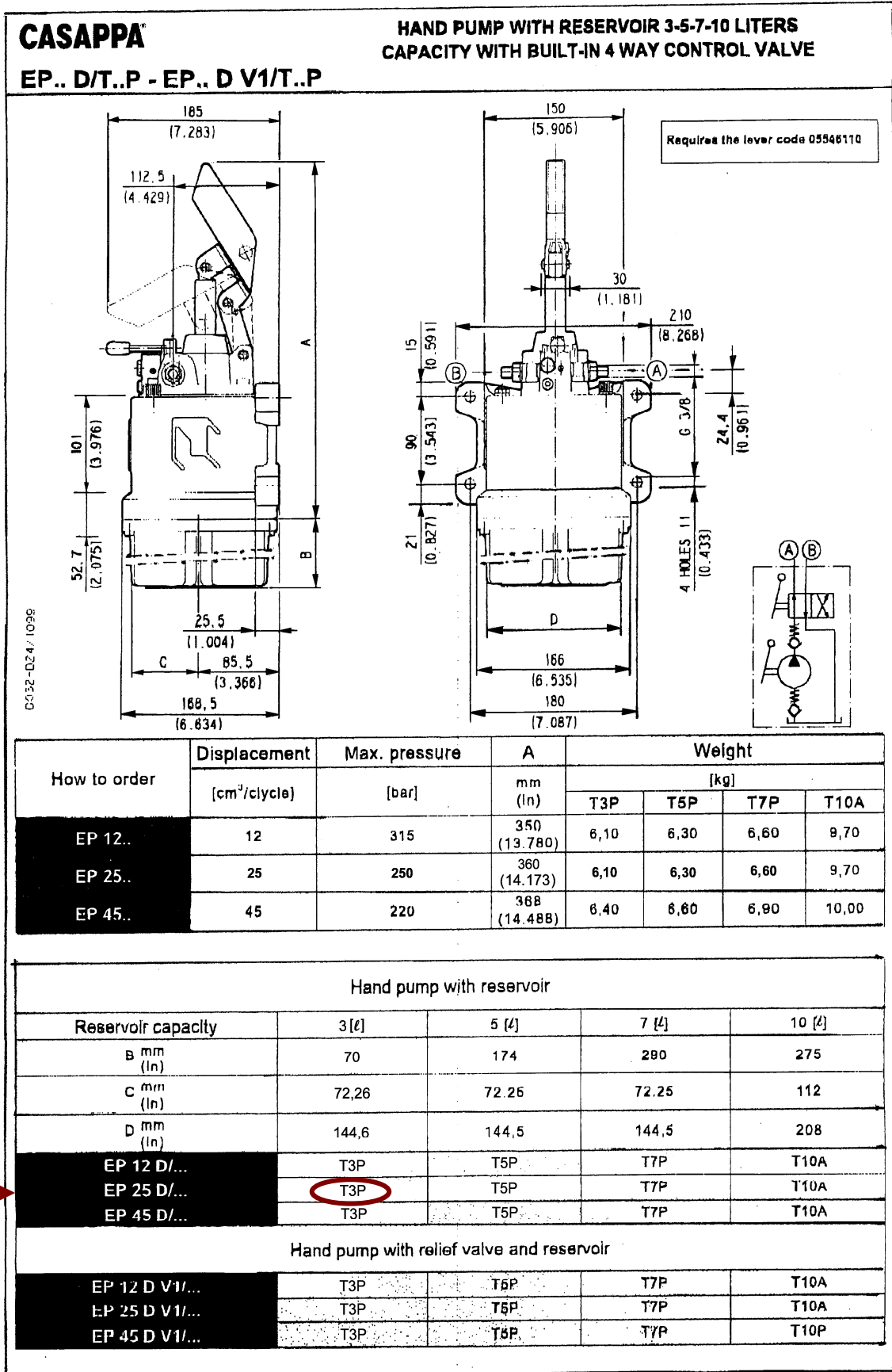
Normally, seals are the only wear-out parts that must be replaced. The life time of the seals depends among other things on the working cycle, duty, temperature, environment and so on. When changing the seals follow the instructions given above for the mounting of the cylinder.

Mineral oils are normally used in the hydraulic cylinders. In case of special oils, please, contact the manufacturer.

Typical features of hydraulic cylinders:

- speed < 1.0 m/s
- temperature max 100° C,
recommended < 60° C min -30° C
- painting E8012 Epoxy
- bearings: steel/steel, to be creased

HAND PUMP WITH RESERVOIR / HYDRAULIKÄSIPUMPPU EP 25 D/T3P



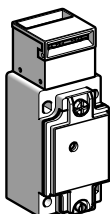
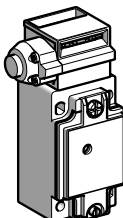
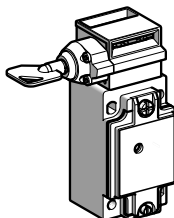
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Safety detection solutions

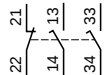
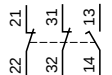
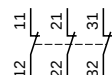
Safety switches

Metal, turret head ⁽¹⁾, types XCS A, B, C and E

Cable entries tapped for Pg 13.5 (n° 13) cable gland

Type of switch	Without locking of key			With locking of key, manual unlocking ⁽²⁾		
						
						
LED indication on opening of N/C contacts	Without	1 orange LED ≈ 24/48 V	1 orange LED ≈ 110/240 V	Without	1 orange LED ≈ 24/48 V	1 orange LED ≈ 110/240 V

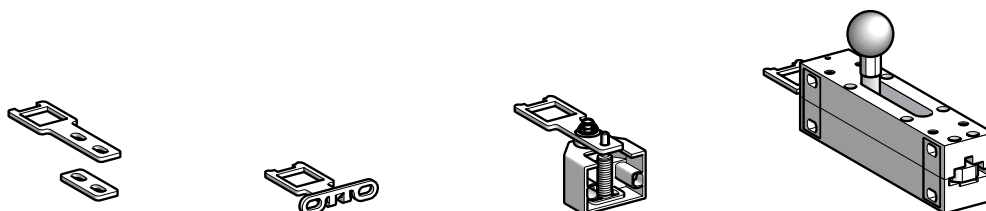
References of switches without operating key (⊖ N/C contact with positive opening operation)

3-pole N/C + N/O + N/O (2 N/O staggered) slow break (3)		XCS A501 ⊖	XCS A511 ⊖	XCS A521 ⊖	XCS B501 ⊖	XCS B511 ⊖	XCS B521 ⊖	XCS C501 ⊖	XCS C511 ⊖	XCS C521 ⊖
3-pole N/C + N/C + N/O (N/O staggered) slow break (3)		XCS A701 ⊖	XCS A711 ⊖	XCS A721 ⊖	XCS B701 ⊖	XCS B711 ⊖	XCS B721 ⊖	XCS C701 ⊖	XCS C711 ⊖	XCS C721 ⊖
3-pole N/C + N/C + N/C slow break (3)		XCS A801 ⊖	-	-	XCS B801 ⊖	-	-	XCS C801 ⊖	-	-
Weight (kg)		0.440	0.440	0.440	0.475	0.475	0.475	0.480	0.480	0.480

Complementary characteristics not shown under general characteristics (page 32921/3)

Actuation speed	Maximum: 0.5 m/s, minimum: 0.01 m/s
Resistance to forcible key withdrawal	XCS B and XCS C: 1500 N; XCS E: 2000 N
Mechanical durability	XCS A and XCS E: > 1 million operating cycles XCS B and XCS C: 0.6 million operating cycles
Maximum operating rate	For maximum durability: 600 operating cycles per hour
Minimum force for extraction of key	≥ 20 N
Cable entry	XCS A, XCS B, XCS C: 1 cable entry. XCS E: 2 cable entries. Entries tapped for n° 13 cable gland conforming to NF C 68-300 (DIN Pg 13.5). Clamping capacity 9 to 12 mm.
Materials	Body : zamak. Head : zamak. Safety screws : 5-lobe torque. Protective plate : steel.

References of operating keys



Description	Straight key	Wide key	Pivoting key	Latch for sliding doors
For limit switches XCS A, B, C, E	XCS Z01	XCS Z02	XCS Z03	XCS Z05
Weight (kg)	0.020	0.020	0.095	0.600

(1) Adjustable throughout 360° in 90° steps. Blanking plug for operating head slot included with switch.

(2) Unlocking by pushbutton for XCS B●●● and by key operated lock for XCS C●●●.

(3) Schematic diagrams shown represent the contact states whilst the operating key is inserted in the head of the switch.

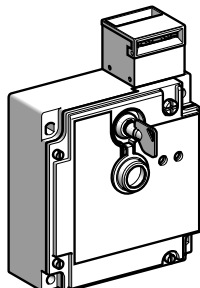
Dimensions:
pages 32923/3 and

32923/4

Connections:

page 32923/5

Type of switch	With interlocking, locking by electromagnet
----------------	---



Type of interlocking	Locking on de-energisation and unlocking on energisation of electromagnet (2). To order a limit switch with locking on energisation and unlocking on de-energisation of the electromagnet, replace the 2 nd number by 5 in the references shown below. Example: XCS E5311 becomes XCS E5511 .			
LED indication	Orange LED: "guard open" signalling. Green LED: "guard closed and locked" signalling.			
Supply voltage of electromagnet	~ or = 24 V (50/60 Hz on ~)	~ or = 48 V (50/60 Hz on ~)	~ or = 110/120 V (3) (50/60 Hz on ~)	~ or = 220/240 V (3) (50/60 Hz on ~)
Type of contact on electromagnet	N/C + N/O 2 N/C	N/C + N/O 2 N/C	N/C + N/O 2 N/C	N/C + N/O 2 N/C

References of switches without operating key (⊕ N/C contact with positive opening operation)

3-pole N/C + N/O + N/O (2 N/O staggered) slow break (4)		XCS E5311 ⊕	—	XCS E5321 ⊕	—	XCS E5331 ⊕	—	XCS E5341 ⊕	—
3-pole N/C + N/C + N/O (N/O staggered) slow break (4)		XCS E7311 ⊕	XCS E73117 ⊕	XCS E7321 ⊕	XCS E73217 ⊕	XCS E7331 ⊕	XCS E73317 ⊕	XCS E7341 ⊕	XCS E73417 ⊕
3-pole N/C + N/C + N/C slow break (4)		XCS E8311 ⊕ (5)	XCS E83117 ⊕ (5)	XCS E8321 ⊕ (5)	—	XCS E8331 ⊕ (5)	—	XCS E8341 ⊕ (5)	—
Weight (kg)	1.140	1.140	1.140	1.140	1.140	1.140	1.140	1.140	1.140

Electromagnet characteristics

Load factor	100 %			
Rated operational voltage	~ or = 24 V	~ or = 48 V	~ or = 110/120 V	~ or = 220/240 V
Voltage limits	- 20 % + 10 % of the rated operational voltage (including ripple on ~) conforming to IEC/EN 60947-1			
Service life	20,000 hours			
Consumption	Inrush: 10 VA. Sealed: 10 VA			

LED indicator characteristics

Rated insulation voltage	50 V conforming to IEC/EN 60947-1	250 V conforming to IEC/EN 60947-1
Current consumption	7 mA	7 mA
Rated operational voltage	~ or = 24/48 V	~ 110/240 V
Voltage limits	~ or = 20...52 V (including ripple on ~)	~ 95...264 V (including ripple on ~)
Service life	100,000 hours	100,000 hours
Protection against overvoltages	Yes	Yes

(1) Adjustable throughout 360° in 90° steps. Blanking plug for operating head slot included with switch.

(2) A key operated lock enables the forced opening of the interlocking device, allowing key withdrawal and subsequent opening of the N/C safety contacts.

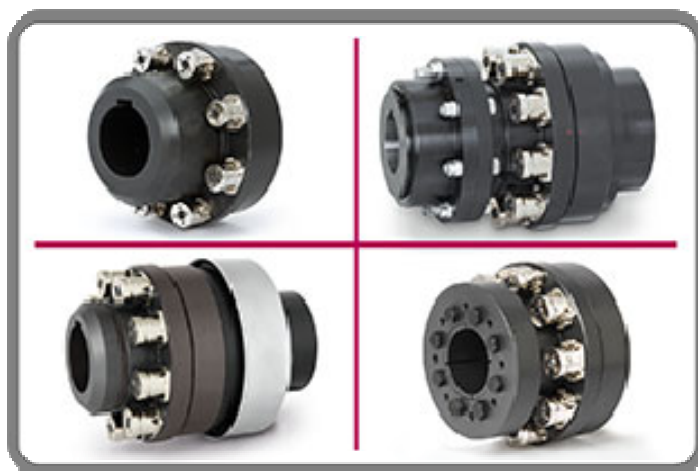
(3) For use on ~ 110/120 V or ~ 220/240 V, remove the LED indicator module.

(4) Schematic diagrams shown represent the contact states whilst the operating key is inserted in the head of the switch.

(5) Units supplied with a single green LED.

INSTRUCTION MANUAL

ST- SAFETY COUPLINGS



Document ID: RW Manual – ST / Rev. 17.12

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We are certified !

according to ISO 9001:2008

D-ZM-16029-01-01 Registration No. 40503432/3

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INSTRUCTION MANUAL

ST SAFETY COUPLINGS



ST / Rev. 17.12

ST1 STN STF ST2 STE ST3 ST4 STB ST-R

I. DESIGN & COMPOSITION ex factory R+W

R+W Safety Couplings from the Standard Series integrates robust Bearings, built in with the preload perfectly matched to each coupling at final assembly .

The ST Series are sealed in order to avoid intrusion of dust or other substances as well as preventing the leakage of grease.

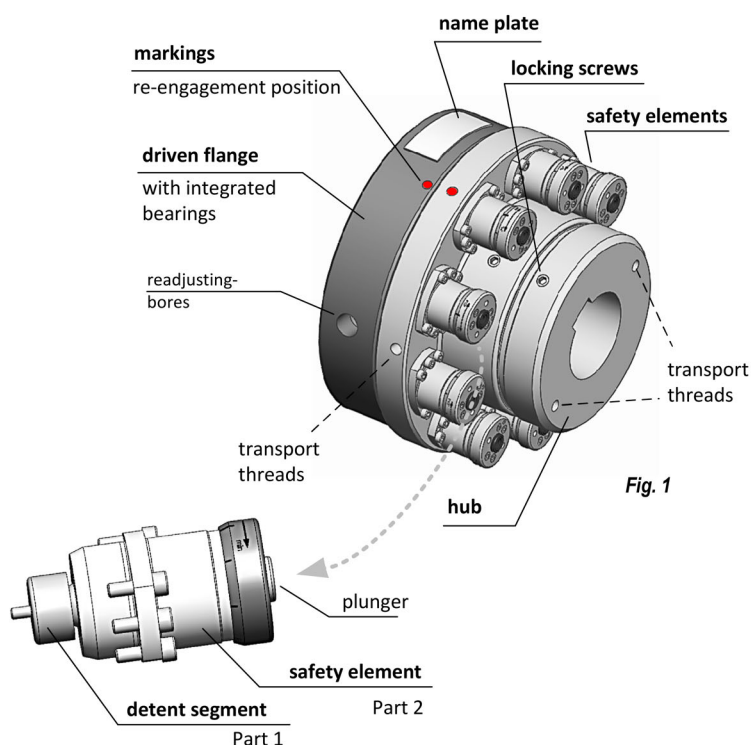
R+W Safety Elements, Type ST consist of two main parts:

Part 1: detent segment,

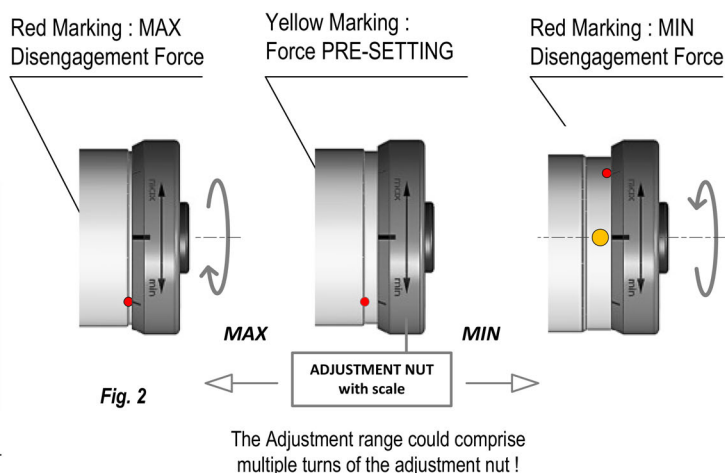
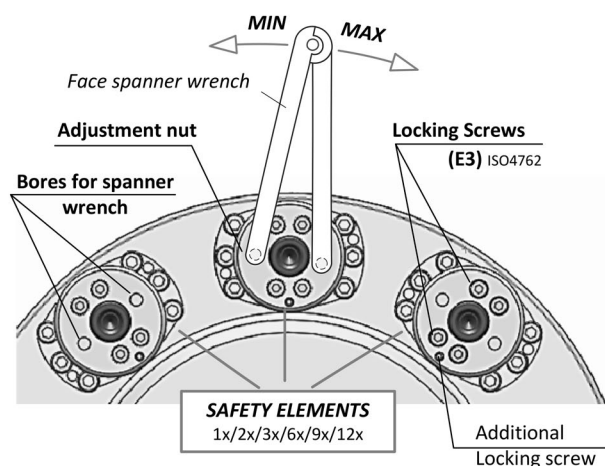
Part 2: self-contained, spring loaded plunger module.

The safety elements are equipped with a robust housing which contains the spring loaded plunger assembly.

After adjustment and burn-in procedure of each safety element they are assembled to the safety couplings without any back lash.



II. TORQUE ADJUSTMENT :



After loosening (approx. 1 rotation) the locking screws (E3), the adjustment nut can be turned to adjust the disengagement setting. Incremental values are marked on the adjustment scale.

After adjustment, the torque setting is secured by tightening the locking screws (E3).

CAUTION

All safety elements must be set To the same value.



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ST1

STN

STF

ST2

STE

ST3

ST4

STB

ST-R

III. RE-ENGAGEMENT : COUPLING / SAFETY ELEMENTS

After the overload has been cleared, the drive or driven side must be rotated until the re-engagement position markings are lined up. The elements can only be re-engaged in this position. The element is re-engaged through Applying an axial force to the plunger.

Re-engagement is audible. Once this is completed, the torque limiter is ready for operation.

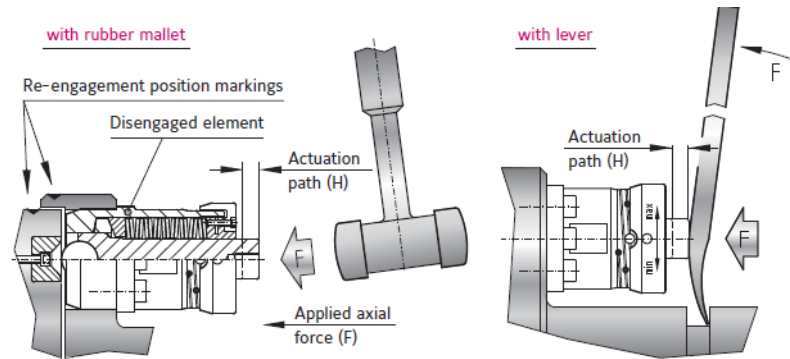


Fig. 3

safety elements SERIES	10/11	15/16	30/31	70/71
Actuation max. H (mm)	3,5	4,5	7,5	10,5
restoring force max. F (kN)	0,4	2	4	6

Tab. 1

IV. DIS-ENGAGEMENT : COUPLING / SAFETY ELEMENTS

Before starting operation, if necessary, the coupling may be disengaged in situ. (see figure 4)

For that R+W offers special tools for all sizes of safety elements.

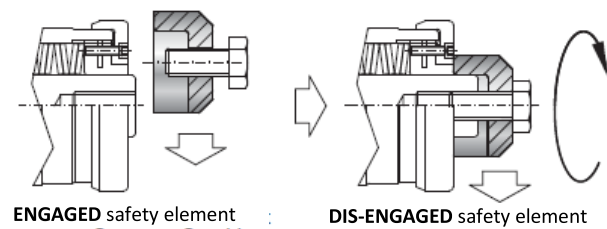


Fig. 4

V. MARKING / NAME PLATE : SAFETY ELEMENTS

Each safety element has a marking engraved on the housing with the following information:

Series of safety element,
Packaging range of springs, serial number
Pre-adjusted re-engagement force in kN.

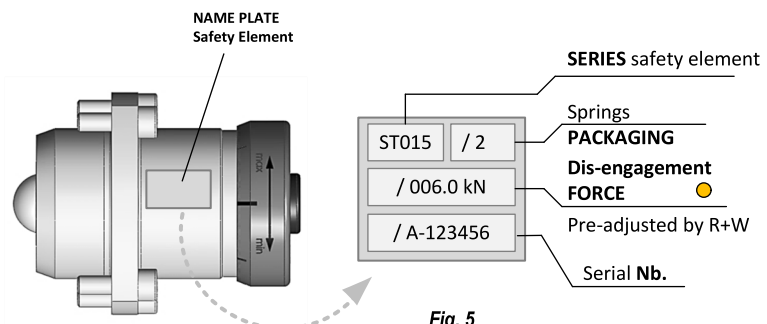


Fig. 5



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- ST1
- STN
- STF
- ST2
- STE
- ST3
- ST4
- STB
- ST-R

V/. MOUNTING & DIS-MOUNTING : SAFETY ELEMENTS

After loosening the screws (E1) the safety elements the safety elements can be removed from the main body (see Fig.6). To ease removal you find two threaded push-off bores at flange of the safety element’s housing .

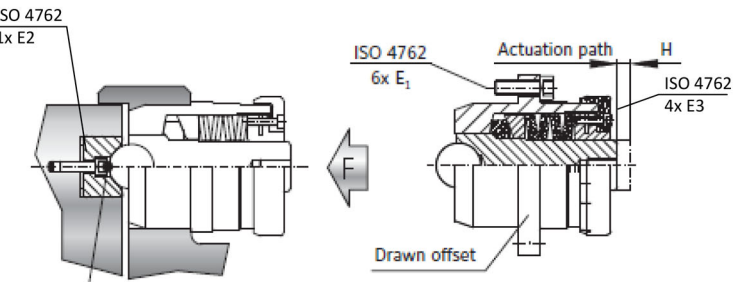


Fig. 6

Note: Prior to mounting the safety element, the ball seat must be lubricated (e.g. Klüber Isoflex Topas NB 52).

SERIES		10/11	15/16	30/31	70/71
Screws (12.9)	E1	6xM4x12	6xM5x16	6xM8x25	6xM12x35
Tightening torque	(Nm)	4.5	10	40	40
Screws (12.9)	E2	1xM3x12	1xM4x12	1xM6x20	1xM8x25
Tightening torque	(Nm)	2	4.5	15.5	38
Screws (12.9)	E3	4xM3x12	4xM4x14	4xM4x16	4xM5x20
Tightening torque	(Nm)	2	4.5	4.5	10
Thread	E4	M4	M5	M8	M10
Actuation path	H (mm)	3.5	4.5	8	10.5
Fit length	L1 (± 0,1 mm)	30/36	36/45	60/69	79/94
Depth measurement	L2 (± 0,1 mm)	7.5/13.5	10/19	20.5/29.5	29/44
Gauge ball	Ø G (mm)	12	16	25	30

Tab. 2

VII. MOUNTING & DIS-MOUNTING : DETENT SEGMENTS

After removing the mounting screws (E2) extract the detent segment using a puller tool. (see Fig.7)

(Fig.8) shows the steps for mounting the detent segment
Before re-mounting the safety elements make sure that the Detents are sufficiently greased.

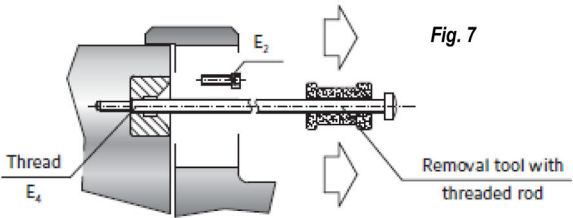


Fig. 7

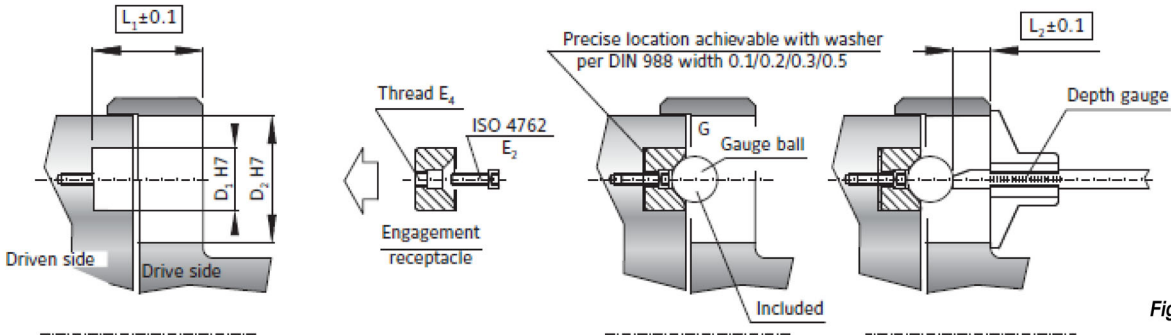


Fig. 8

CAUTION

Dimensions L1 oder L2 (see Tab.2) must be checked before installing the detent segments.



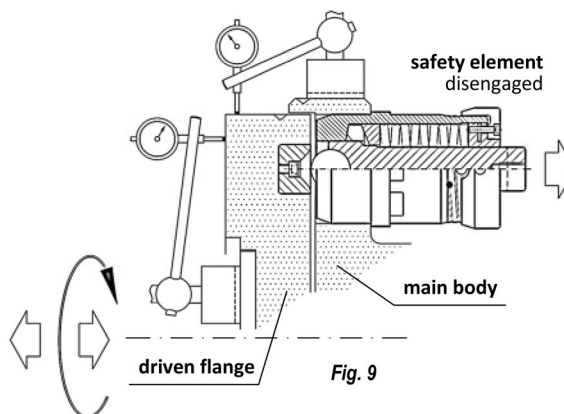
ST / Rev. 17.12

ST1 STN STF ST2 STE ST3 ST4 STB ST-R

VIII. INSPECTIONS & MAINTENANCE :

! ► After 20 disengagements the coupling should be checked for axial and radial play.

To perform this check, the safety elements need to be disengaged, so that the driven flange can be rotated relative to the main body. (see Fig.9)
Using dial gauges with a resolution of 0.01mm, the axial and radial play can be determined. Depending on the coupling size, normal measurements shall be in the range of 0.03-0.1mm.



! ► Check the detent segments for excessive wear.

Verify dimension L2 using the method shown in Fig.10!
It directly effects the clearance between main body and driven flange ! If signs of wear on the detent segments are detected, they must be replaced.

! ► Bearing lubrication

Under normal conditions it is not necessary to add grease to the bearings, as they have been designed And assembled for lifetime lubrication.

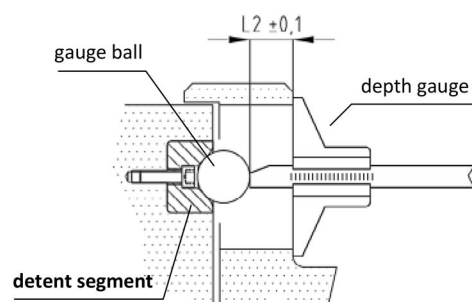


Fig. 10

! CAUTION

In applications which will expose the coupling to heavy vibration, solid waste or dust and dirt, or abrasive liquids, the above mentioned values can change.

Please contact R+W in these cases !

! ► NOTE

At the first start up of the safety coupling (particularly sizes 2, 4, 5) it can happen that some grease (from the assembly process) will be blown out. This is normal and will stop after a short running-in time of the coupling. Excessive grease can be removed using a usual Cleaning agent (e.g. Loctite SF 7063).



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ST2



A1.0 ELASTOMER SEGMENTS – ST2 Series :

Type	Relative damping (ψ)	Temperature range constant peak	Material	Shore hardness	Features
A (Standard)	1.0	-40°C to +80°C +90°C	Natural and synthetic rubber	75-80 Shore A	Very high wear resistance
B	1.0	-40°C to +100°C +120°C	Synthetic rubber	73-78 Shore A	Resistant to many oils and fuels
C	1.0	-70°C to +120°C +140°C	Silicone rubber	70-75 Shore A	High temperature range

Tab. A1

The compensating elements of the ST2 safety couplings are the elastomer segments. They transmit torque while damping vibration and compensating for lateral, axial and Angular misalignment. Three different versions are available with version A being supplied with the ST2 safety coupling unless otherwise specified.

Elastomer segments can be easily changed after installation. Every coupling utilizes 6x elastomer segments. The elastomer segments do not need to be installed prior to coupling mounting.

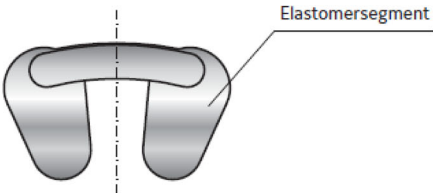
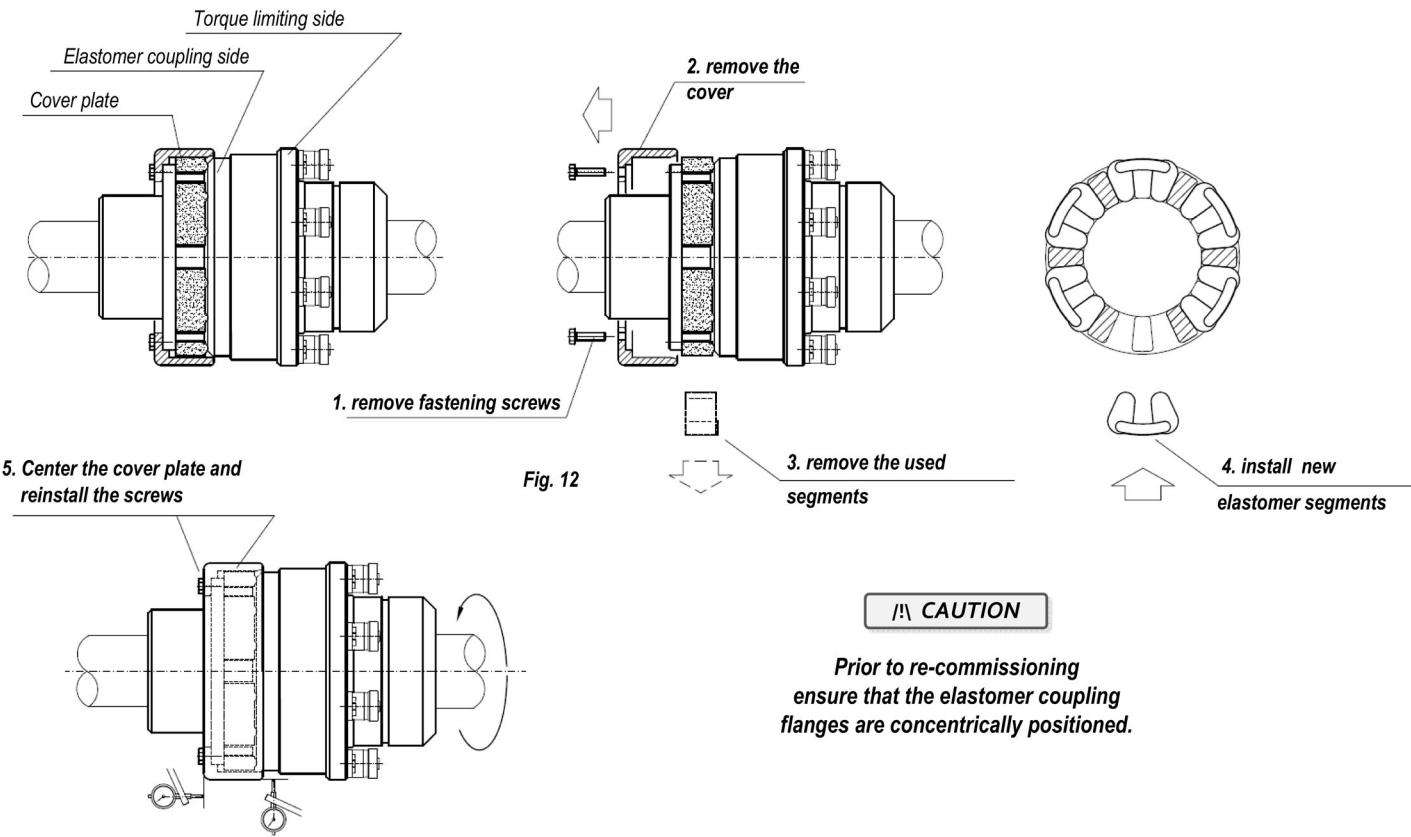


Fig. 11

A1.1 CHANGING THE ELASTOMER SEGMENTS – ST2 Series :





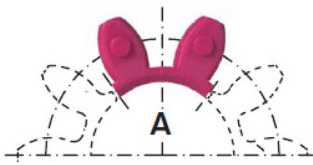
ST / Rev. 17.12

STE

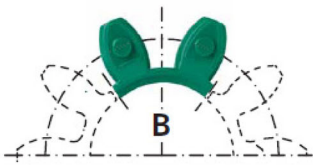


A2.0 ELASTOMER SEGMENTS – STE Series :

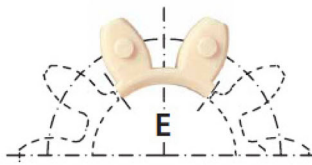
The equalizing element of the STE safety coupling is the elastomer insert. It transmits torque without backlash or vibration. There are 5x Elastomer segments built in the safety coupling. The elastomer insert defines the characteristics of the entire drive system. Backlash is eliminated by the press fit of the elastomer into the hubs. Through variation of the Shore hardness of the elastomer insert, the coupling system can be optimized for the ideal torsional characteristics.



Shore hardness 98 Sh A



Shore hardness 64 Sh D



Shore hardness 64 Sh D

Fig. 13

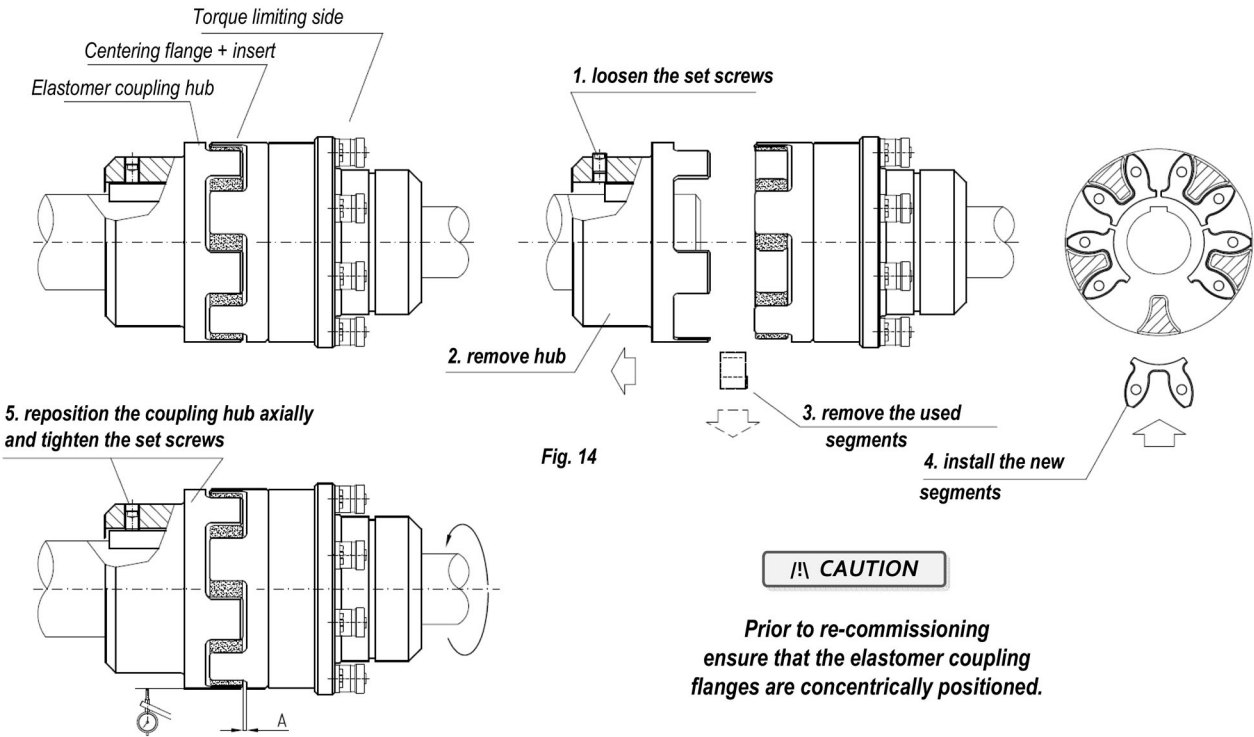
DESCRIPTION OF THE ELASTOMER TYPES

Type	Shore hardness	Color	Material	Relative damping (μ)	Temperature range	Features
A	98 Sh A	red	TPU	0.4 - 0.5	-30°C to +100°C	high damping
B	64 Sh D	green	TPU	0.3 - 0.45	-30°C to +120°C	high torsional stiffness
E	64 Sh D	beige	Hytrel	0.3 - 0.45	-50°C to +150°C	temperature resistant

The values of relative damping were determined at 10 Hz and +20° C.

Tab. A2

A2.1 CHANGING THE ELASTOMER SEGMENTS – STE Series :





A3.0 INSTALLATION :

1. Ensure that the shaft is clean and free of nicks, burrs, rust, etc. Also ensure that all clamping bolts are present and loose prior to sliding the torque limiter onto the shaft.

Caution: If bolts are not loose during initial installation, permanent damage may occur.

2. Use a thin coating of machine oil to lightly lubricate the bore and shaft for ease of assembly.

Caution: Do not use lubricants containing Molybdenum Disulfide (MoS_2).

3. Before tightening clamping bolts, ensure that the conical clamping ring is parallel to the face of the torque limiter. Using a torque wrench, tighten bolts uniformly in circular sequence (not in a star pattern) to $1/3 (T_A)$ of installation torque value. Next, tighten each bolt to $2/3 (T_A)$ installation torque value in same manner. Finally, tighten bolts to full installation torque value (T_A).

4. Verify final installation torque value (T_A) of each clamping bolt with torque wrench. Installation is now complete.

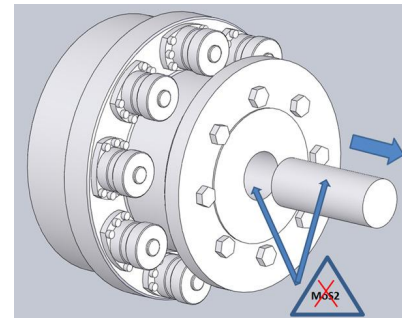


Fig. 15

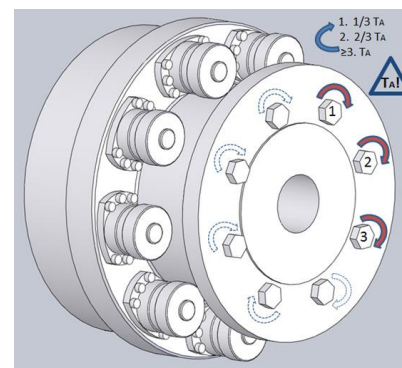


Fig. 16

A3.1 REMOVAL :

5. Loosen the clamping bolts evenly and in reverse circular sequence as shown in step 3. Failure to do so could result in jamming the conical clamping ring inside the torque limiter. Caution: Do not completely remove the clamping bolts from the threaded holes, as this can create a potential hazard.

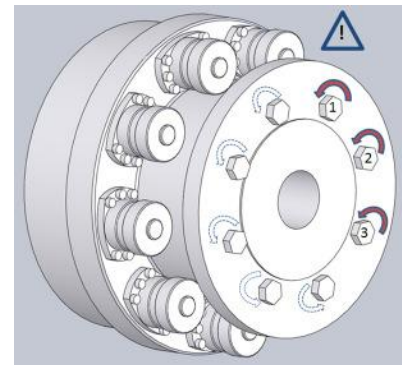


Fig. 17

6. After properly loosening all clamping bolts, ensure shaft is clean and free of nicks, burrs, rust, etc. and slide the torque limiter off the shaft.

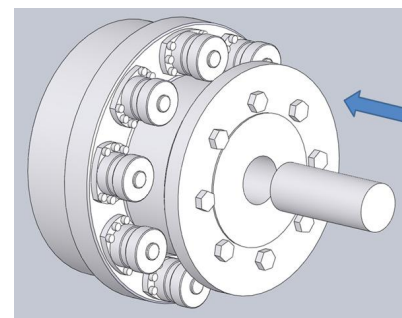


Fig. 18

SKF 729124



Instructions for use

Bedienungsanleitung | Instrucciones de uso | Mode d'emploi | Manuale d'istruzioni | Instruções de uso
Инструкция по эксплуатации | 使用说明书 | Ръководство за употреба | Návod k použití | Betjeningsvejledning
Οδηγίες χρήσης | Kasutusjuhend | Käyttöohjeet | Upute za korisnike | Használati útmutató | Naudojimo instrukcija
Lietošanas instrukcija | Gebruiksaanwijzing | Instruksjoner for bruk | Instrukcja obsługi | Instrucțiuni de utilizare
Návod na používanie | Navodila za uporabo | Bruksanvisning | Kullanma talimatları

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READ THIS FIRST Safety precautions

Read this instruction for use fully. Follow all safety precautions to avoid personal injury or property damage during equipment operation. SKF cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect equipment operation. In case of any uncertainties as regards the use of the equipment contact SKF.

Failure to comply with the following could cause equipment damage and personal injury.

- Do ensure that the equipment is only operated by trained personnel.
 - Do wear proper personal protective gear, such as eye protection and protective gloves, when operating the equipment.
 - Do inspect the equipment and all accessories carefully before use.
 - Do not use damaged components or modify the equipment.
 - Do use clean recommended hydraulic oils (SKF LHM 300, LHDF 900 or similar).
 - Do not use glycerin or water based fluids as a pressure medium. Premature equipment wear or damage can result.
 - Do not use the equipment above the stated maximum hydraulic pressure.
 - Do not adjust safety valves to work at pressures above the maximum working pressure.
 - Do not extend the handle in order to reduce the required force to reach maximum pressure. Use hand pressure only.
 - Do not use the pumps with accessories, which are rated below the maximum working pressure of the pump.
 - Do use a pressure gauge to monitor the oil outlet pressure.
 - Do ensure that all the air has been removed from the hydraulic system before pressurising the hydraulic system.
 - Do prevent the workpiece (e.g. bearing, gearwheel or similar item) from being forcibly ejected upon sudden release of pressure (e.g. by use of retaining nut).
- Do not use damaged hoses. Avoid sharp bends and kinks when connecting hoses. Sharp bends and kinks will internally damage the hose leading to premature failure. Applying pressure to a damaged hose may cause it to rupture.
 - Do not lift the equipment by the hoses or couplings.
 - Do follow local safety regulations.
 - Do service the equipment by a qualified hydraulic technician or SKF Repair Centre.
 - Do replace worn or damaged parts with genuine SKF parts.

EC Declaration of conformity

We, SKF Maintenance Products, Kelvinbaan 16, 3439 MT Nieuwegein, The Netherlands herewith declare that the products described in these instructions for use, are in accordance with the conditions of the following directive: Machinery Directive 2006/42/EC and are in conformity with the following standards: EN-ISO 12100:2010, EN-ISO 4413

Nieuwegein, The Netherlands, June 2013

Sébastien David
Manager Product Development and Quality

1. Description

The 729124 has a maximum pressure of 100 MPa (14 500 psi) and delivers a volume per stroke of 0,5 cm³ (0.03 in³).

The pump is suitable for SKF hydraulic nuts ($\leq$ HMV 54), and for mounting or dismounting bearings or components with an interference fit applying the SKF Oil Injection Method, where a maximum pressure of 100 MPa is required.

The pump is supplied with a 1,5 m (5 ft) long,

high pressure hose with quick connection coupling. Mating quick connection nipple for attachment to the workpiece is included. The pump is filled with SKF mounting fluid LHM 300 and comes with an additional 1 litre can with the same fluid.

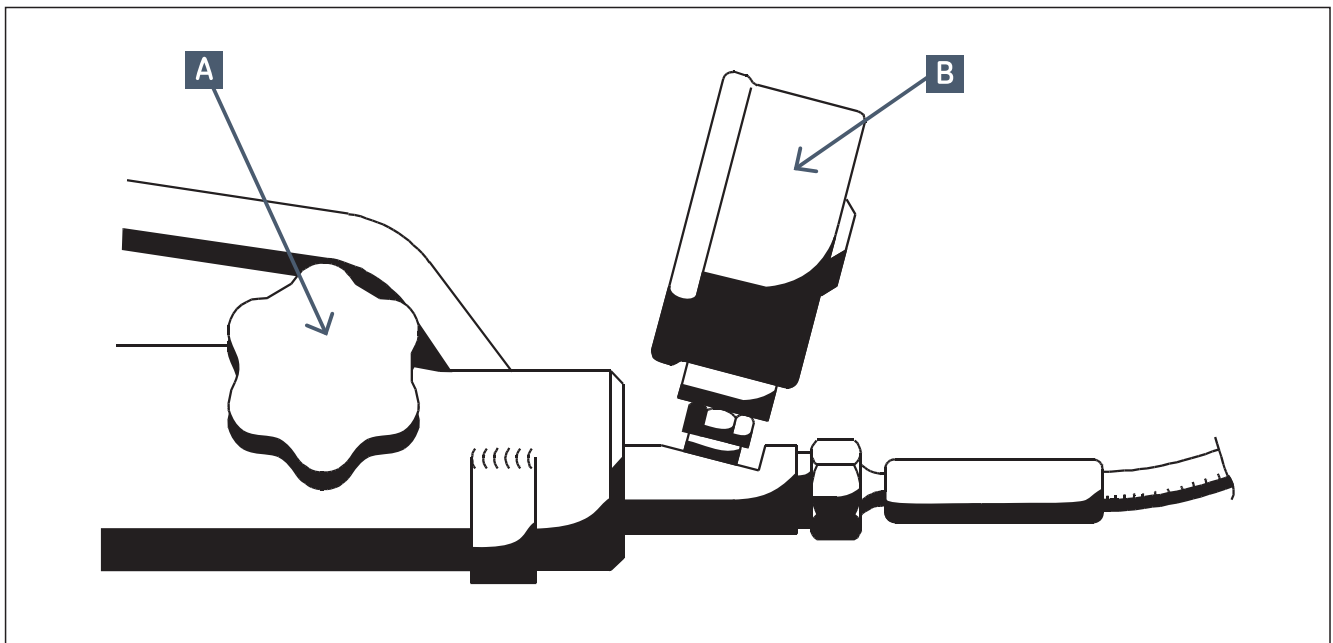
Everything is packed in a sturdy plastic case. The pump has an overpressure valve and a pressure gauge. The release valve is an integrated part of the pump head.

2. Technical data

Designation	729124
Maximum pressure	100 MPa (14 500 psi)
Volume per stroke	0,5 cm ³ (0.03 in ³)
Oil container capacity	250 cm ³ (15 in ³)
Handle force at 100 MPa	300 N (66 lbf)
Pressure hose	1,5 m (5 ft) long with quick connection coupling
Connection nipple	G 1/4 external or internal thread
Oil viscosity of mounting fluid	300 mm ² /s (1 400 SUS) at 20 °C (68 °F)
Weight (filled with oil)	3,5 kg (8 lb)

3. Operating instructions

- a) Check oil level by unthreading the container plug on the rear end of the container. Make sure there is enough of oil for your complete operation.
For mounting bearings with the SKF oil injection method, or by means of an hydraulic nut, it is recommended to use an oil with a viscosity of approximately 300 mm²/s (1 400 SUS) at the operating temperature. For dismounting bearings, we recommend to use an oil with a viscosity of approx 900 mm²/s (4 100 SUS) at operating temperature.
- b) Hold the pump horizontally or slightly tilted forwards in order to secure oil supply.
- c) Close the release valve on the right hand side of the pump without using force.
- d) Screw the quick connection nipple (G 1/4) into the application.
- e) Connect the hose to the nipple by gently withdrawing the snap-ring on the quick connector. The hose is disconnected in the same manner.
- f) Continue pumping until necessary pressure is reached for your application. Maximum pressure is 100 MPa (14 500 psi) at which pressure the safety valve will open.
- g) Open the release valve, allowing superfluous oil to return to the oil container.



- A. Oil release valve
- B. Pressure gauge

4. Maintenance

4.1 Replacing the oil

When replacing the oil or after maintenance, make sure no air is trapped in the system. This should be checked before attaching the hose to the application by making sure only air-free oil comes out of the hose when pumping. Only use clean, recommended hydraulic oils.

4.2 Cleanliness

Keep the pump clean from dirt and metal particles in order to avoid excessive wear.

4.3 Replacement parts

Designation	Description
729108	Gauge nipple
729124-1	Hand-pump (sub-assembly)
729124-3	Repair kit
729124-4	Release knob and spindle
729124-5	Oil container tube
729831 A	Quick connection coupling, G 1/4
729832 A	Quick connection nipple, G 1/4
729126	High pressure hose
1077587/2	Pressure gauge (100 MPa, 63 mm)
THGD 100	Digital oil pressure gauge*
729124-CC	Toolcase with inlay for 729124

Items marked* are ONLY for 729124 DU.

4.4 Accessories

Designation	Description
LHMF 300/5	Mounting fluid (5 litre, 300 mm ² /s at 20 °C)
LHDF 900/5	Dismounting fluid (5 litre, 900 mm ² /s at 20 °C)

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