

The perfect Torque Limiting Clutch for

*Machine Tools
Packaging Machinery
Printing and Paper Machinery
Automated Systems
Power Transmission*



compact, backlash-free torque limiting clutch

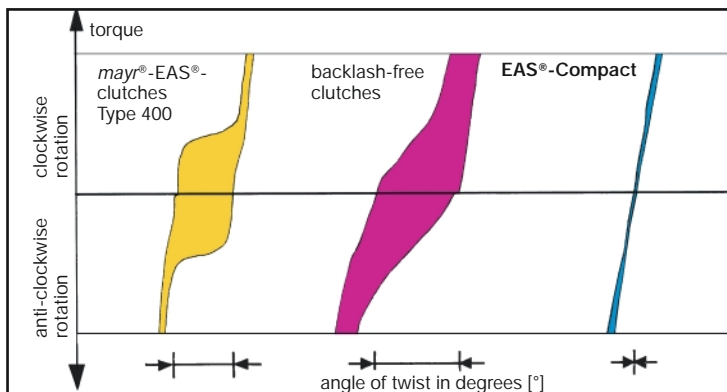
- *Immediate disengagement in case of an overload*
- *Continuous backlash-free torque transmission*
- *High performance/cost ratio*

EAS®-Compact ratchetting clutch/synchronous clutch

Success matrix of the EAS®-Compact

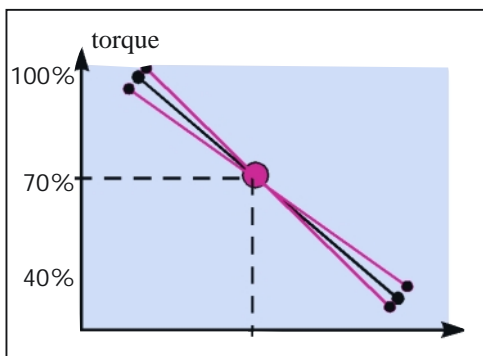
product feature	your advantage	your benefit
safe, readable torque adjustment	easy assembly and operation	time-saving with initial operation
high efficiency	low mass moment of inertia, compact mode of construction	high machine dynamics
backlash-free torque transmission	long service life, less wear	low maintenance expenditure
satisfactory torque path in the drive shaft in case of an overload	optimised dimensions	effective and efficient machine construction

EAS®-Compact - the backlash-free principle



Backlash of the clutch is:

- The angular tolerance between input and output clutch components.
- Also known as circumferential backlash.
- Not to be mistaken with the backlash of the shaft/hub connection.
- With *mayr*® backlash-free means: **backlash** → 0 (see graph).



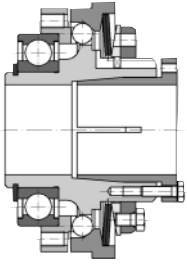
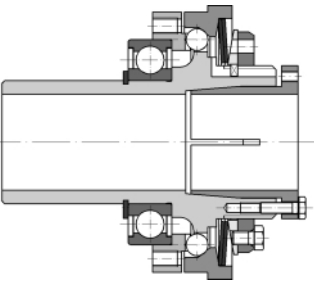
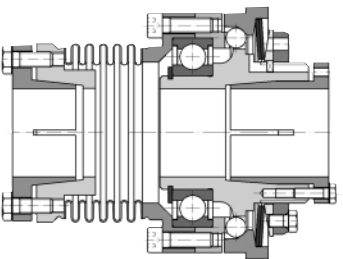
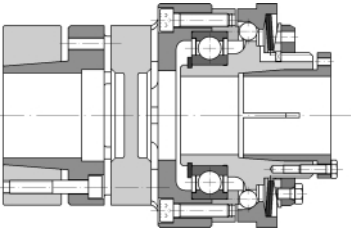
Safe torque adjustment with calibration and percentage scale

EAS®-Compact clutches are calibrated to 70 % of the max. torque at the factory. From this ideal datum it is very easy to accurately set the overload torque to other percentage values of the max. torque via the graduated adjusting nut.

Both adjusting nuts - for axial (standard) and radial (option) adjustments - offer this comfortable, safe and readable torque adjustment.

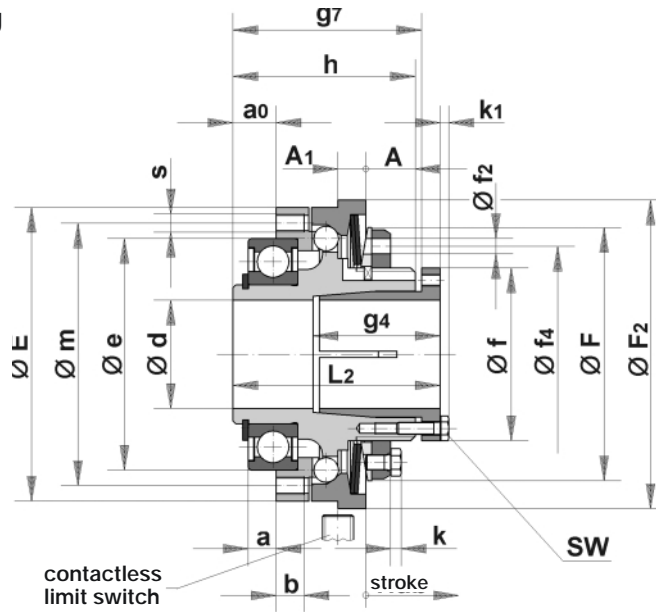
EAS[®]-Compact torque limiting clutch

Summary of types

EAS [®] -Compact clutch	Type Sizes	Torque [Nm]	Application	Page
EAS[®]-Compact standard 	490._ _ _0 Sizes 01÷3	5÷700	Flanged torque limiting clutch for backlash-free torque transmission between shaft and drive element. The torque is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. Low mass moment of inertia. Automatic re-engagement. Long working life.	With cone bushing Type 490._ 1 _0 Page 6 With keyway Type 490._ 2 _0 Page 7
EAS[®]-Compact With long projecting hub 	490._ _ _1 Sizes 01÷3	5÷700	Flanged torque limiting clutch for backlash-free torque transmission between shaft and drive elements. The torque is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. Additional location of wide drive elements on a long hub through roll and slide bearing is possible. Low mass moment of inertia. Automatic re-engagement. Long working life.	With cone bushing Type 490._ 1 _1 Page 8 With keyway Type 490._ 2 _1 Page 9
EAS[®]-Compact With steel bellows coupling 	493._ _ _0 Sizes 01÷3	5÷350	Torque limiting clutch for backlash-free torque transmission between two coaxial shafts. The torque is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. Low mass moment of inertia. Automatic re-engagement. Compensates axial, radial and angular misalignments. Long working life.	With cone bushing Type 493._ 1 _0 Page 10 With keyway Type 493._ 2 _0 Page 11 With cone bushing/clamping hub Type 493._ 3 _0 Page 12
EAS[®]-Compact lastic backlash-free 	494._ _ _ _ Sizes 01÷3	5÷700	Torque limiting clutch for flexible, backlash-free torque transmission between two coaxial shafts. The torque is transmitted backlash-free and reduces immediately when an overload occurs. Low mass moment of inertia. Automatic re-engagement. Compensates axial, radial and angular misalignments. High damping features - long working life.	With cone bushing/clamping hub Type 494._ 0 _ _ Page 13 With cone bushing/shrink disc Type 494._ 1 _ _ Page 14 With keyway Type 494._ 2 _ _ Page 15
EAS[®]-Compact overload	see catalogue K.494.0_GB			
EAS[®]-Compact options				EAS[®]-Compact completely sealed Page 16 EAS[®]-Compact with cover Page 16 EAS[®]-Compact with radial adjustment Page 17 EAS[®]-Compact with clamping ring Page 17
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Electrical accessories			Limit switch	Page 22
Mounting examples				Page 26

Standard with cone bushing

Type 490._1_.0



Sizes 01 ÷ 3
Type 490._1_.0

Technical data

1) Size	Limiting torques for overload $M_G^{1)}$			Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moment of inertias I		Weight kg	Clamping bolts and tightening torques for Ø d	
	Type 490.51_0 Nm	Type 490.61_0 Nm	Type 490.71_0 Nm			Hub side kgm ²	Pressure flange side kgm ²		mm	Nm
01	5 – 12,5	10 – 25	20 – 50	4000	1,2	0,000211	0,000093	0,68	6 x M4	4
0	10 – 25	20 – 50	40 – 100	3000	1,5	0,000531	0,000234	1,14	6 x M4	4
1	20 – 50	40 – 100	80 – 200	2500	1,8	0,001388	0,000643	1,98	8 x M4	4
2	40 – 100	80 – 200	160 – 400	2000	2,0	0,002846	0,001306	2,88	8 x M5	8
3	80 – 175	160 – 350	320 – 700	1200	2,2	0,006858	0,002649	4,59	8 x M6	12

Dimensions

Size	Bore $d^{2) 4)}$ from – to mm	Min. shaft length		A	A ₁	a ⁶⁾	a ₀	b	E	e _{h5} ⁷⁾	F
		g ₄ mm	g ₇ mm								
01	10 – 20	34	42	12	7	5	8	6	65	47	61,5
0	15 – 25	39	51	13,5	8	7	11	7	80	62	67
1	22 – 35	42	62	16	9	9	14	9	95	75	82
2	32 – 45	48	67	17	10	10	16	10	110	90	97
3	35 – 55	53	78	20,5	12	10	18	12	130	100	117

Size	F ₂	f	f ₂	f ₄	h	k	k ₁	L ₂ ³⁾	m	s	SW
01	70	38	5	50	40	2,8	2,8	47	56	8 x M4	7
0	85	44	5	55	48	2,8	2,8	56	71	8 x M5	7
1	100	56	5	70	59	3,5	2,8	67	85	8 x M6	7
2	115	70	6	84	64	4	3,5	73	100	8 x M6 ⁵⁾	8
3	135	84	7	100	75	4	4	86	116	8 x M8 ⁵⁾	10

1) Other sizes for lower and higher torques acc. to EAS[®]-NC-catalogue
 2) Shaft fits: up to Ø 38 h₆, above Ø 38 h₈
 3) Dimensions in an un-tightened condition (in a tightened condition shorter)
 4) Transmittable torques with smaller bores on request
 5) For clutch operation in the max. torque range, bolts of the quality class 12.9 must be used for the attachment of the drive element.
 6) Mounting tolerance +0,1
 7) Fit at customer site H7

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d	With limit switch	Torque adjustment radial
Order number:		490._1_.0		see pages 22 – 25	see page 17

01 ÷ 3 →
 * Medium torque range 5 →
 * High torque range 6 →
 * Max. torque range 7 →
 * See technical data, limiting torque for overload M_G

← According to size
 ← 0 Ratchetting clutch
 ← 5 Synchronous clutch

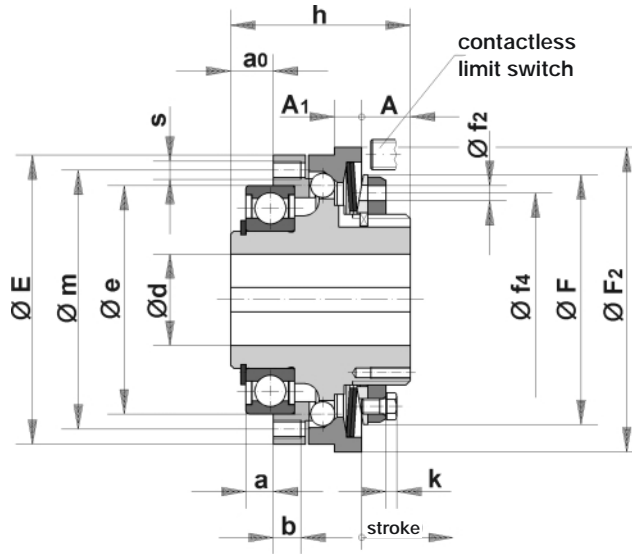
Example: Order number 1 / 490.610.0 / 25 plus limit switch 055.002.5 / radial adjustment

EAS®-Compact ratchetting clutch/synchronous clutch

power transmission

Standard with keyway

Type 490._2_.0



Sizes 01 ÷ 3
Type 490._2_.0

Technical data

1) Size	Limiting torques for overload M_G 1)			Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moment of inertias I		Weight kg
	Type 490.52_0 Nm	Type 490.62_0 Nm	Type 490.72_0 Nm			Hub side kgm ²	Pressure flange side kgm ²	
01	5 – 12,5	10 – 25	20 – 50	4000	1,2	0,000205	0,000093	0,63
0	10 – 25	20 – 50	40 – 100	3000	1,5	0,000505	0,000234	1,02
1	20 – 50	40 – 100	80 – 200	2500	1,8	0,001302	0,000643	1,75
2	40 – 100	80 – 200	160 – 400	2000	2,0	0,002630	0,001306	2,55
3	80 – 175	160 – 350	320 – 700	1200	2,2	0,006329	0,002649	4,07

Dimensions

Size	Bore		A	A ₁	a ⁵⁾	a ₀	b	E	e _{h5} ⁶⁾
	d _{min} ²⁾ mm	d _{max} ³⁾ mm							
01	12	20	12	7	5	8	6	65	47
0	15	25	13,5	8	7	11	7	80	62
1	22	30	16	9	9	14	9	95	75
2	28	40	17	10	10	16	10	110	90
3	32	50	20,5	12	10	18	12	130	100

Size	F	F ₂	f ₂	f ₄	h	k	m	s
01	61,5	70	5	50	40	2,8	56	8 x M4
0	67	85	5	55	48	2,8	71	8 x M5
1	82	100	5	70	59	3,5	85	8 x M6
2	97	115	6	84	64	4	100	8 x M6 ⁴⁾
3	117	135	7	100	75	4	116	8 x M8 ⁴⁾

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue

We reserve the right to make dimensional and design alterations.

2) Smaller bores for low torques on request

3) Bigger bores on request

4) For clutch operation in the max. torque range, bolts of the quality class 12.9 must be used for the attachment of the drive element.

5) Mounting tolerance +0,1

6) Fit at customer site H7

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d	With limit switch	Torque adjustment radial
Order number:		490._2_.0		see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range

* High torque range

* Max. torque range

* See technical data, limiting torque for overload M_G

← According to size

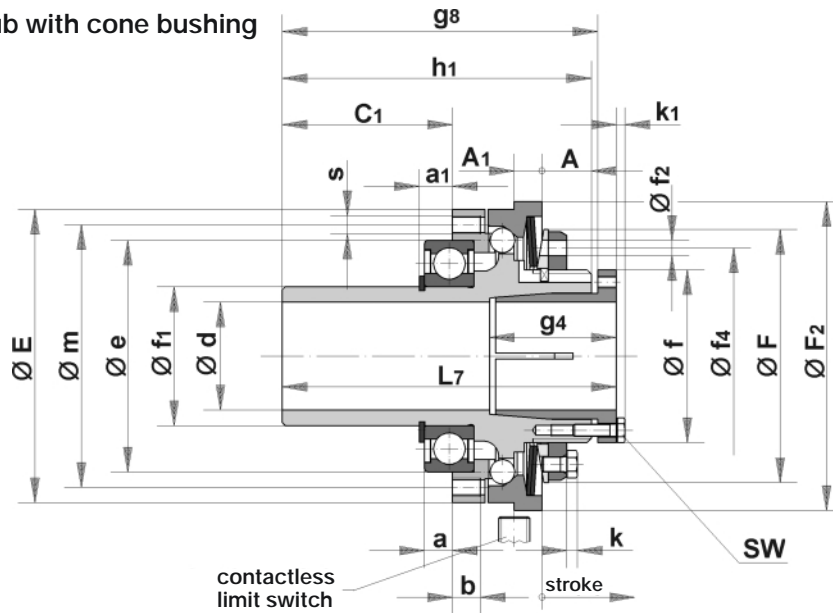
← 0 Ratchetting clutch

← 5 Synchronous clutch

Example: Order number 1 / 490.620.0 / 25 plus limit switch 055.002.5

Long projecting hub with cone bushing

Type 490._1_.1



Sizes 01÷3
Type 490._1_.1

Technical data

1) Size	Limiting torques for overload $M_G^{1)}$			Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moment of inertias I		Weight kg	Clamping bolts and tightening torques for $\varnothing d$	
	Type 490.51_1 Nm	Type 490.61_1 Nm	Type 490.71_1 Nm			Hub side kgm ²	Pressure flange side kgm ²		mm	Nm
01	5 – 12,5	10 – 25	20 – 50	4000	1,2	0,000225	0,000093	0,78	6 x M4	4
0	10 – 25	20 – 50	40 – 100	3000	1,5	0,000588	0,000234	1,36	6 x M4	4
1	20 – 50	40 – 100	80 – 200	2500	1,8	0,001491	0,000643	2,26	8 x M4	4
2	40 – 100	80 – 200	160 – 400	2000	2,0	0,003105	0,001306	3,34	8 x M5	8
3	80 – 175	160 – 350	320 – 700	1200	2,2	0,007350	0,002649	5,18	8 x M6	12

Dimensions

Size	Bore $d^{2) 4)}$ from – to mm	Min. shaft length		A	A ₁	a ⁶⁾	a ₁	b	C ₁	E	e _{h5} ⁷⁾	F
		g ₄ mm	g ₈ mm									
01	10 – 20	34	67	12	7	5	6,5	6	33	65	47	61,5
0	15 – 25	39	83	13,5	8	7	8,75	7	43	80	62	67
1	22 – 35	42	103	16	9	9	11,5	9	55	95	75	82
2	32 – 45	48	118	17	10	10	13	10	67	110	90	97
3	35 – 55	53	133	20,5	12	10	14	12	73	130	100	117

Size	F ₂	f	f _{1 h6}	f ₂	f ₄	h ₁	k	k ₁	L ₇ ³⁾	m	s	SW
01	70	38	30	5	50	65	2,8	2,8	72	56	8 x M4	7
0	85	44	40	5	55	80	2,8	2,8	88	71	8 x M5	7
1	100	56	45	5	70	100	3,5	2,8	108	85	8 x M6	7
2	115	70	55	6	84	115	4	3,5	124	100	8 x M6 ⁵⁾	8
3	135	84	65	7	100	130	4	4	141	116	8 x M8 ⁵⁾	10

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue

We reserve the right to make dimensional and design alterations.

2) Shaft fits: up to $\varnothing 38_{h6}$, above $\varnothing 38_{h8}$

3) Dimensions in an un-tightened condition (in a tightened condition shorter)

4) Transmittable torques with smaller bores on request

6) Mounting tolerance + 0,1

5) For clutch operation in the max. torque range, bolts of the quality class 12.9 must be used for the attachment of the drive element.

7) Fit at customer site H7

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d$	With limit switch	Torque adjustment radial
Order number:		490._1_.1		see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range 5 →

* High torque range 6 →

* Max. torque range 7 →

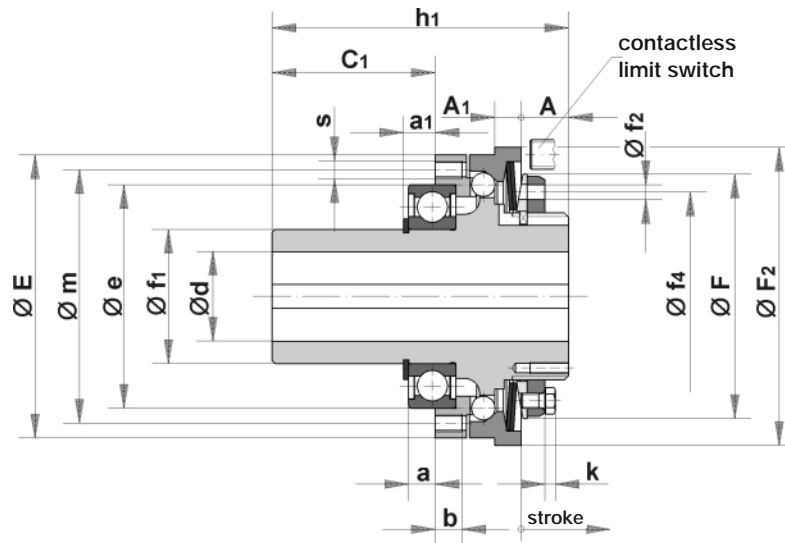
* See technical data, limiting torque for overload M_G

← According to size

← 0 Ratchetting clutch

← 5 Synchronous clutch

Example: Order number 1 / 490.610.1 / 25 plus limit switch 055.002.5 / radial adjustment



Sizes 01 ÷ 3
Type 490._2_.1

Technical data

1) Size	Limiting torques for overload $M_G^{1)}$			Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moment of inertias I		Weight kg
	Type 490.52_1 Nm	Type 490.62_1 Nm	Type 490.72_1 Nm			Hub side kgm^2	Pressure flange side kgm^2	
01	5 – 12,5	10 – 25	20 – 50	4000	1,2	0,000219	0,000093	0,73
0	10 – 25	20 – 50	40 – 100	3000	1,5	0,000562	0,000234	1,24
1	20 – 50	40 – 100	80 – 200	2500	1,8	0,001405	0,000643	2,04
2	40 – 100	80 – 200	160 – 400	2000	2,0	0,002889	0,001306	3,00
3	80 – 175	160 – 350	320 – 700	1200	2,2	0,006851	0,002649	4,66

Dimensions

Size	Bore		A	A ₁	a ⁵⁾	a ₁	b	C ₁	E	e _{h5} ⁶⁾
	d _{min} ²⁾ mm	d _{max} ³⁾ mm								
01	12	20	12	7	5	6,5	6	33	65	47
0	15	25	13,5	8	7	8,75	7	43	80	62
1	22	30	16	9	9	11,5	9	55	95	75
2	28	40	17	10	10	13	10	67	110	90
3	32	50	20,5	12	10	14	12	73	130	100

Size	F	F ₂	f _{1 h6}	f ₂	f ₄	h ₁	k	m	s
01	61,5	70	30	5	50	65	2,8	56	8 x M4
0	67	85	40	5	55	80	2,8	71	8 x M5
1	82	100	45	5	70	100	3,5	85	8 x M6
2	97	115	55	6	84	115	4	100	8 x M6 ²⁾
3	117	135	65	7	100	130	4	116	8 x M8 ²⁾

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue

We reserve the right to make dimensional and design alterations.

2) Smaller bores for low torques on request

3) Bigger bores on request

4) For clutch operation in the max. torque range, bolts of the quality class 12.9 must be used for the attachment of the drive element.

5) Mounting tolerance + 0,1

6) Fit at customer site H7

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d	With limit switch	Torque adjustment radial
Order number:		490._2_.1		see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range 5 →

* High torque range 6 →

* Max. torque range 7 →

* See technical data, limiting torque for overload MG

← According to size

← 0 Ratchetting clutch

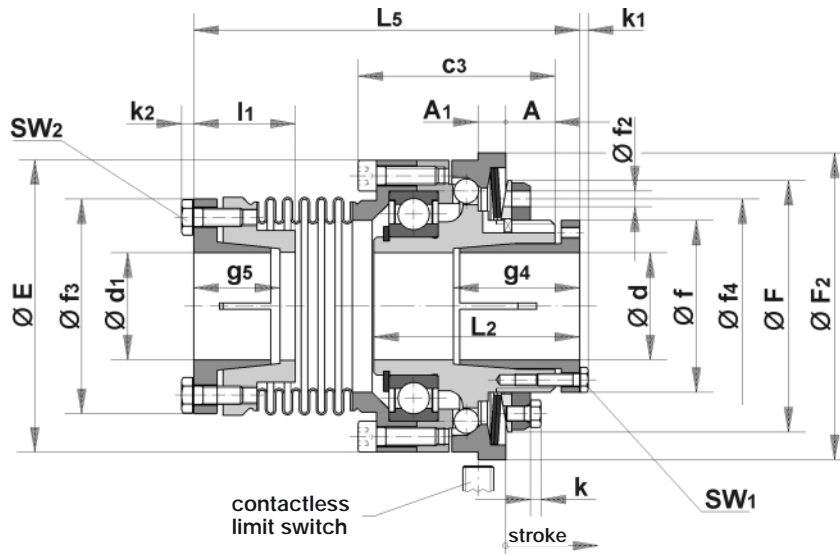
← 5 Synchronous clutch

Example: Order number 1 / 490.620.1 / 25 plus limit switch 055.002.5

EAS® -Compact ratchetting clutch/synchronous clutch

Steel bellows with cone bushing

Type 493._1_.0



Sizes 01 ÷ 3
Type 493._1_.0

Technical data

Size	Limiting torques for overload $M_G^{1)}$		Nominal torque of flexible, torsionally rigid steel bellows coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility		
	Type 493.51-.0 Nm	Type 493.61_.0 Nm				axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
01	5 – 12,5	10 – 25	50	4000	1,2	0,4	2	0,15
0	10 – 25	20 – 50	100	3000	1,5	0,6	2	0,15
1	20 – 50	40 – 100	200	2500	1,8	0,8	2	0,20
2	40 – 100	80 – 200	350	2000	2,0	1,0	2	0,25
3	80 – 175	160 – 350	600	1200	2,2	1,0	2	0,30

Size	Mass moment of inertia I		Weight kg	Clamping bolts and tightening torques				Bore ^{2) 4)}		Min. shaft length	
	Hub side kgm^2	Flexible side kgm^2		at $\varnothing d$		at $\varnothing d_1$		d from - to mm	d_1 from - to mm	g_4 mm	g_5 mm
01	0,000211	0,000233	1,09	6 x M4	4	4 x M4	3	10 – 20	9 – 20	34	24
0	0,000531	0,000664	1,88	6 x M4	4	6 x M5	5	15 – 25	12 – 25	39	27
1	0,001388	0,001583	3,08	8 x M4	4	6 x M6	9,5	22 – 35	15 – 35	42	29
2	0,002846	0,003276	4,60	8 x M5	8	6 x M8	17	32 – 45	22 – 42	48	32
3	0,006858	0,007079	7,19	8 x M6	12	8 x M8	17	35 – 55	32 – 50	53	35

Dimensions

Size	A	A ₁	c ₃	E	F	F ₂	f	f ₂	f ₃	f ₄	k	k ₁	k ₂	L ₂ ³⁾	L ₅ ³⁾	I ₁ ³⁾	SW ₁	SW ₂
01	12	7	45	65	61,5	70	38	5	47	50	2,8	2,8	2,8	47	93	27,5	7	7
0	13,5	8	53	80	67	85	44	5	60	55	2,8	2,8	3,5	56	109	29	7	8
1	16	9	64	95	82	100	56	5	70	70	3,5	2,8	4,0	67	125,5	33	7	10
2	17	10	70	110	97	115	70	6	81	84	4,0	3,5	5,3	73	138	37	8	13
3	20,5	12	81	130	117	135	84	7	98	100	4,0	4,0	5,3	86	151	45	10	13

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue

2) Shaft fits: up to $\varnothing 38_{H6}$, above $\varnothing 38_{H8}$

3) Dimensions in an un-tightened condition (in a tightened condition shorter)

4) Transmittable torques with smaller bores on request

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d$	Bore $\varnothing d_1$	With limit switch	Torque adjustment radial
Order number:		493._1_.0			see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range 5 →

* High torque range 6 →

* See technical data, limiting torque for overload M_G

← According to size

← According to size

← 0 Ratchetting clutch

← 5 Synchronous clutch

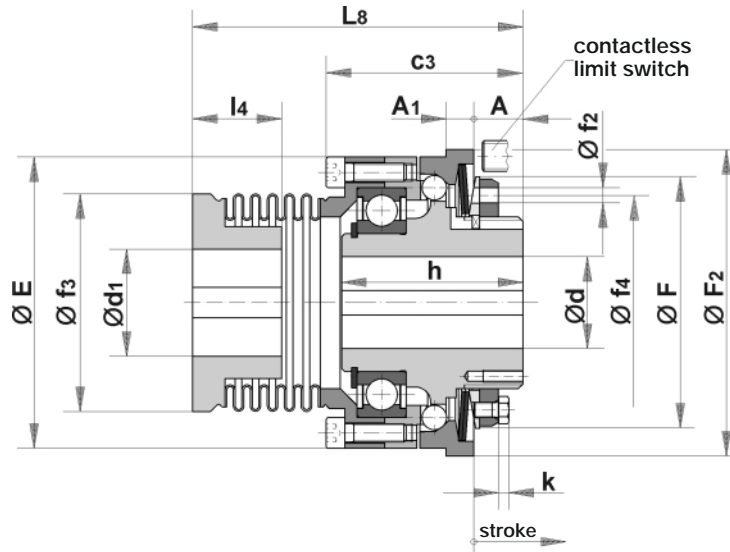
Example: Order number 1 / 493.615.0 / 22 / 25 plus limit switch 055.002.5 / radial adjustment

EAS®-Compact ratchetting clutch/synchronous clutch

power transmission

Steel bellows with keyway

Type 493._2_.0



Sizes 01 ÷ 3
Type 493._2_.0

Technical data

Size	Limiting torques for overload M_G ¹⁾		Nominal torque of flexible, torsionally rigid steel bellows coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility		
	Type 493.52-.0 Nm	Type 493.62_.0 Nm				axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
01	5 – 12,5	10 – 25	50	4000	1,2	0,4	2	0,15
0	10 – 25	20 – 50	100	3000	1,5	0,6	2	0,15
1	20 – 50	40 – 100	200	2500	1,8	0,8	2	0,20
2	40 – 100	80 – 200	350	2000	2,0	1,0	2	0,25
3	80 – 175	160 – 350	600	1200	2,2	1,0	2	0,30

Size	Mass moment of inertia I		Weight kg	Bore			
	Hub side kgm^2	Flexible side kgm^2		d_{min} mm	d_{max} mm	$d_{1 min}$ mm	$d_{1 max}$ mm
01	0,000205	0,000233	1,04	9	20	9	20 ²⁾
0	0,000505	0,000664	1,76	15	25	12	25 ³⁾
1	0,001302	0,001583	2,85	15	30	15	35 ⁴⁾
2	0,002630	0,003276	4,27	22	40	22	42 ⁵⁾
3	0,006359	0,007079	6,90	32	50	32	50

Dimensions

Size	A	A ₁	c ₃	E	F	F ₂	f ₂	f ₃	f ₄	h	k	L ₈	l ₄
01	12	7	45	65	61,5	70	5	47	50	40	2,8	77,5	25
0	13,5	8	53	80	67	85	5	60	55	48	2,8	92	27
1	16	9	64	95	82	100	5	71	70	59	3,5	107,5	29
2	17	10	70	110	97	115	6	81	84	64	4,0	119	36
3	20,5	12	81	130	117	135	7	98	100	75	4,0	140,5	44

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue
 2) Up to Ø 18 keyway to DIN 6885/1, above Ø 18 keyway to DIN 6885/3
 3) Up to Ø 22 keyway to DIN 6885/1, above Ø 22 keyway to DIN 6885/3
 4) Up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
 5) Up to Ø 38 keyway to DIN 6885/1, above Ø 38 keyway to DIN 6885/3

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d	Bore Ø d ₁	With limit switch	Torque adjustment radial
Order number:		493._2_.0			see pages 22 – 25	see page 17

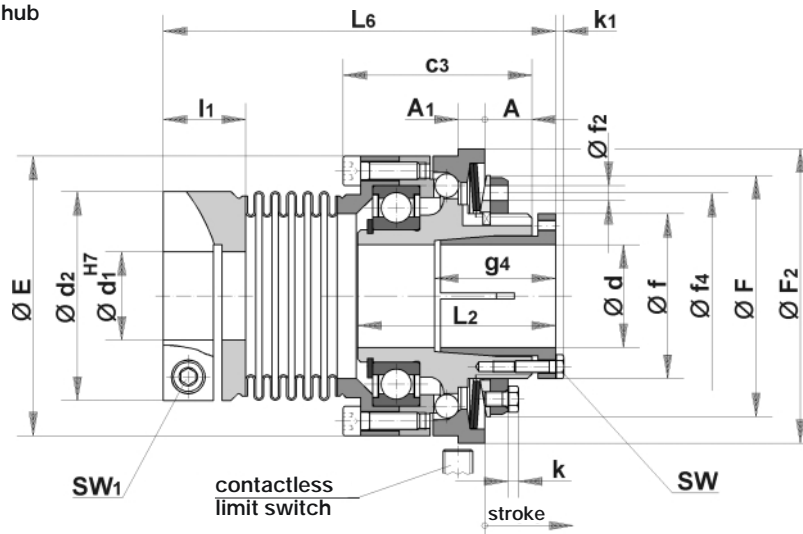
01 ÷ 3 →
 * Medium torque range 5 →
 * High torque range 6 →
 * See technical data, limiting torque for overload M_G

← According to size
 ← According to size
 ← 0 Ratchetting clutch
 ← 5 Synchronous clutch

Example: Order number 2 / 493.625.0 / 22 / 25 plus limit switch 055.002.5

EAS®-Compact with steel bellows coupling
EAS®-side cone bushing
Coupling-side clamping hub

Type 493._3_.0



Sizes 01 ÷ 3
Type 493._3_.0

Technical data

Size	Limiting torques for overload M_G ¹⁾		Nominal torque of flexible, torsionally rigid steel bellows coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility		
	Type 493.53-.0 Nm	Type 493.63_.0 Nm				axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
01	5 – 12,5	10 – 25	50	4000	1,2	0,4	2	0,15
0	10 – 25	20 – 50	100	3000	1,5	0,6	2	0,15
1	20 – 50	40 – 100	200	2500	1,8	0,8	2	0,20
2	40 – 100	80 – 200	350	2000	2,0	1,0	2	0,25
3	80 – 175	160 – 350	600	1200	2,2	1,0	2	0,30

Size	Mass moment of inertia I		Weight kg	Clamping bolts and tightening torques				Bore ^{2) 4)}		Min. shaft length	
	Hub side kgm ²	Flexible side kgm ²		at $\varnothing d$ mm Nm		at $\varnothing d_1$ mm Nm		d from - to mm	d ₁ from - to mm	g ₄ mm	l ₁ mm
01	0,000211	0,000233	1,22	6 x M4	4	M5	10	10 – 20	12 – 25	34	24
0	0,000531	0,000664	1,91	6 x M4	4	M6	18	15 – 25	15 – 32	39	28
1	0,001388	0,001583	3,10	8 x M4	4	M6	18	22 – 35	25 – 42	42	28
2	0,002846	0,003276	4,65	8 x M5	8	M8	43	32 – 45	30 – 45	48	36
3	0,006858	0,007079	7,12	8 x M6	12	M10	87	35 – 55	35 – 55	53	40

Dimensions

Size	A	A ₁	c ₃	d ₂	E	F	F ₂	f	f ₂	f ₄	k	k ₁	L ₂	L ₆ ³⁾	SW	SW ₁
01	12	7	45	50	65	61,5	70	38	5	50	2,8	2,8	47	102	7	4
0	13,5	8	53	60	80	67	85	44	5	55	2,8	2,8	56	119	7	5
1	16	9	64	71	95	82	100	56	5	70	3,5	2,8	67	133	7	5
2	17	10	70	82	110	97	115	70	6	84	4,0	3,5	73	150	8	6
3	20,5	12	81	98	130	117	135	84	7	100	4,0	4,0	86	177	10	8

1) Other sizes for lower and higher torques acc. to EAS®-NC-catalogue

We reserve the right to make dimensional and design alterations.

2) Shaft fits: up to $\varnothing 38_{H6}$, above $\varnothing 38_{H8}$

3) Dimensions in an un-tightened condition (in a tightened condition shorter)

4) Transmittable torques with smaller bores on request

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d$	Bore $\varnothing d_1^{H7}$	With limit switch	Torque adjustment radial
Order number:		493._3_.0			see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range 5 →

* High torque range 6 →

* See technical data, limiting torque for overload M_G

← According to size

← According to size

← 0 Ratchetting clutch

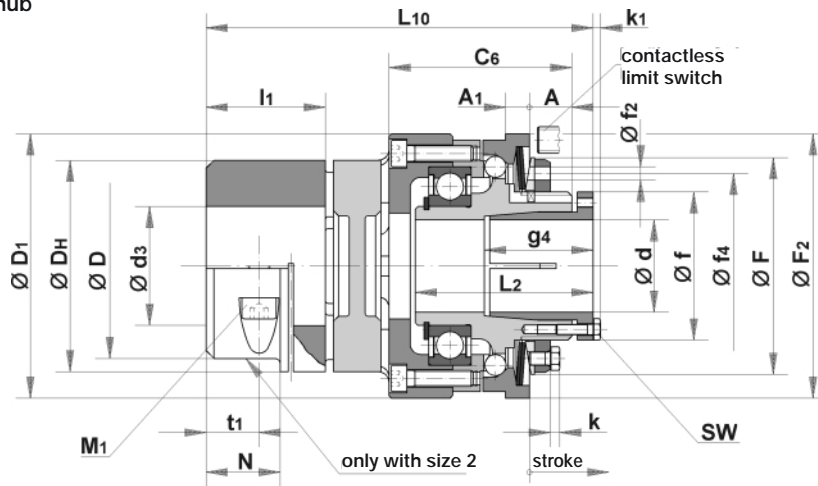
← 5 Synchronous clutch

Example: Order number 0 / 493.635.0 / 22 / 25 plus limit switch 055.002.5 / radial adjustment

EAS®-Compact with flexible, backlash-free shaft coupling

Type 494._0._.

EAS®-side cone bushing
Coupling-side clamping hub



Sizes 01 ÷ 3
Type 494._0._.

Technical data

Size	Limiting torques for overload M_G			Nominal torque flexible, backlash-free shaft coupling $T_{KN}^{1)}$				Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Tightening torques clamping bolts T_A at the diameter:		Weight kg
	Type ¹⁾ 494.50_._ Nm	Type ¹⁾ 494.60_._ Nm	Type ¹⁾ 494.70_._ Nm	92 Shore A T_{KN} Nm	92 Shore A $T_{KN max}$ Nm	98 Shore A T_{KN} Nm	98 Shore A $T_{KN max}$ Nm			$\varnothing d$ Nm	$\varnothing d_3$ Nm	
01	5 – 12,5	10 – 25	20 – 50	35	70	60	120	4000	1,2	4	10	1,34
0	10 – 25	20 – 50	40 – 100	95	190	160	320	3000	1,5	4	25	2,21
1	20 – 50	40 – 100	80 – 200	190	380	325	650	2500	1,8	4	25	3,85
2	40 – 100	80 – 200	–	265	530	450	900	2000	2,0	8	25	6,04
3	80 – 175	160 – 350	–	310	620	525	1050	1200	2,2	12	90	9,98

Size	Shaft misalignments flexible coupling					Mass moments of inertia I		Bores		Min. shaft length g_4 mm	
	Axial		Radial		Angular misalignments		Hub side kgm^2	Flex.-side kgm^2	Flex.-side $\varnothing d_3^{1)}$ mm		EAS®-Com-side $\varnothing d^{2) 3)}$ mm
	92/98 Shore A ΔK_a mm	92 Shore A ΔK_r mm	98 Shore A ΔK_r mm	92 Shore A α°	98 Shore A α°						
01	1,4	0,14	0,10	1,0	0,9	0,000211	0,0004	15 – 28	10 – 20	34	
0	1,5	0,15	0,11	1,0	0,9	0,000531	0,0010	19 – 35	15 – 25	39	
1	1,8	0,17	0,12	1,0	0,9	0,001388	0,0020	20 – 45	22 – 35	42	
2	2,0	0,19	0,14	1,0	0,9	0,002846	0,0050	28 – 45	32 – 45	48	
3	2,1	0,21	0,16	1,0	0,9	0,006858	0,0114	35 – 55	35 – 55	53	

1) The transmittable torques of the flex. coupling, T_{KN} are dependent on factors as for example temperature factor, torsional rigidity factor etc., see also clutch design ROBA®-ES catalogue K.940 or please contact our sales office. Furthermore the transmittable torques of the flexible coupling depend on the bore diameter d_3 , see also table 1 on page 18.

2) Shaft fits: up to $\varnothing 38_{h6}$, above $\varnothing 38_{h8}$

3) Transmittable torques with smaller bores on request

Dimensions

Size	A	A ₁	C ₆	D	D ₁	D _h	F	F ₂	f	f ₂	f ₄	k	k ₁	L ₂ ⁶⁾	L ₁₀ ⁶⁾	I ₁	M ₁	N	t ₁	SW
01	12	7	47	–	70	55	61,5	70	38	5	50	2,8	2,8	47	102	30	M6	–	12	7
0	13,5	8	56,5	–	85	65	67	85	44	5	55	2,8	2,8	56	119,5	35	M8	–	13,5	7
1	16	9	69	–	100	80	82	100	56	5	70	3,5	2,8	67	146	45	M8	–	20	7
2	17	10	74	75	115	95	97	115	70	6	84	4,0	3,5	73	159	50	M8	28	20	8
3	20,5	12	87	–	135	105	117	135	84	7	100	4,0	4,0	86	182	56	M12	–	21	8

6) Dimensions in an un-tightened condition (in a tightened condition shorter)

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d$	Bore $\varnothing d_3$	With limit switch	Torque adjustment radial
Order number:		494._0._.			see pages 22 – 25	see page 17

01 ÷ 3

* Medium torque range

* High torque range

* Max. torque range

* See technical data, limiting torque for overload M_G

According to size

According to size

3 Flex. coupling 92 shore A

4 Flex. coupling 98 shore A

0 Ratchetting clutch

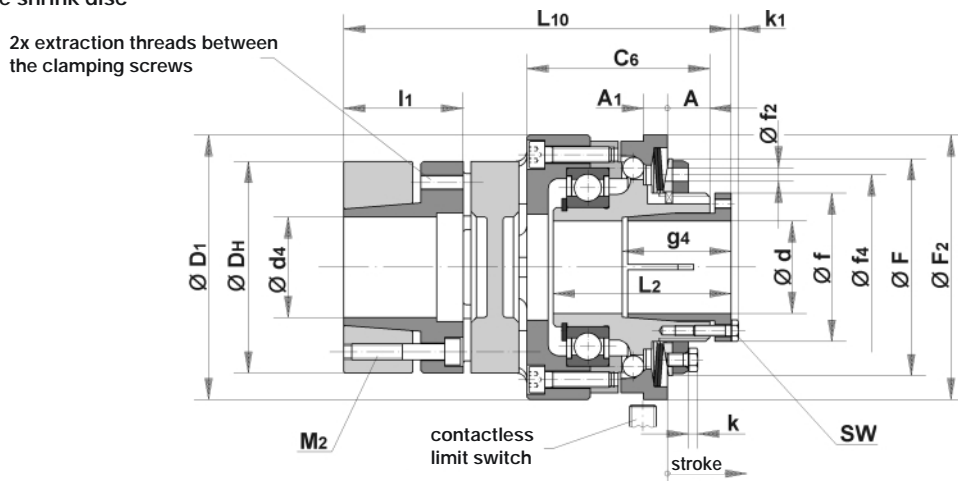
5 Synchronous clutch

Example: Order number 1 / 494.605.3 / 22 / 25 plus limit switch 055.002.5

EAS® -Compact with flexible, backlash-free shaft coupling

Type 494._1._.

EAS®-side cone bushing
Coupling-side shrink disc



Sizes 01÷3
Type 494._1._.

Technical data

Size	Limiting torques for overload M_G			Nominal torque flexible, backlash-free shaft coupling $T_{KN}^{1)}$				Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Tightening torques clamping bolts T_A at the diameter:		Weight kg
	Type ¹⁾ 494.51._. Nm	Type ¹⁾ 494.61._. Nm	Type ¹⁾ 494.71._. Nm	92 Shore A T_{KN} Nm / $T_{KN max}$ Nm		98 Shore A T_{KN} Nm / $T_{KN max}$ Nm				$\varnothing d$ Nm	$\varnothing d_4$ Nm	
01	5 – 12,5	10 – 25	20 – 50	35	70	60	120	4000	1,2	4	6,0	1,34
0	10 – 25	20 – 50	40 – 100	95	190	160	320	3000	1,5	4	6,0	2,21
1	20 – 50	40 – 100	80 – 200	190	380	325	650	2500	1,8	4	10,5	3,85
2	40 – 100	80 – 200	160 – 400	265	530	450	900	2000	2,0	8	25	6,04
3	80 – 175	160 – 350	-	310	620	525	1050	1200	2,2	12	30	9,98

Size	Shaft misalignments flexible coupling					Mass moments of inertia I		Bores		Min. shaft length g_4 mm
	Axial	Radial		Angular misalignments		Hub side kgm^2	Flex.-side kgm^2	Flex.-side $\varnothing d_4^{1)}$ mm	EAS®-Com-side $\varnothing d^{2) 3)}$ mm	
	92/98 Shore A ΔK_a mm	92 Shore A ΔK_r mm	98 Shore A ΔK_r mm	92 Shore A α°	98 Shore A α°					
01	1,4	0,14	0,10	1,0	0,9	0,000211	0,0004	15 – 28	10 – 20	34
0	1,5	0,15	0,11	1,0	0,9	0,000531	0,0010	19 – 38	15 – 25	39
1	1,8	0,17	0,12	1,0	0,9	0,001388	0,0020	20 – 45	22 – 35	42
2	2,0	0,19	0,14	1,0	0,9	0,002846	0,0050	28 – 50	32 – 45	48
3	2,1	0,21	0,16	1,0	0,9	0,006858	0,0114	35 ⁴⁾ – 60	35 ⁴⁾ – 60	53

1) The transmittable torques of the flex. coupling „TKN“ are dependent on factors as for example temperature factor, torsional rigidity factor etc., see also clutch design ROBA®-ES catalogue K.940 or please contact our sales office. Furthermore the transmittable torques of the flexible coupling depend on the bore diameter d_3 , see also table 1 on page 18.

2) Shaft fits: up to $\varnothing 38_{H6/g6}$, above $\varnothing 38_{H8/g8}$

4) Shaft fits : up to $\varnothing 40_{j6}$

3) Transmittable torques with smaller bores on request

Dimensions

Size	A	A ₁	C ₆	D ₁	D _h	F	F ₂	f	f ₂	f ₄	k	k ₁	L ₂ ⁶⁾	L ₁₀ ⁶⁾	I ₁	M ₂	SW
01	12	7	47	70	55	61,5	70	38	5	50	2,8	2,8	47	102	30	4 x M5	7
0	13,5	8	56,5	85	65	67	85	44	5	55	2,8	2,8	56	119,5	35	8 x M5	7
1	16	9	69	100	80	82	100	56	5	70	3,5	2,8	67	146	45	8 x M6	7
2	17	10	74	115	95	97	115	70	6	84	4,0	3,5	73	159	50	4 x M8	8
3	20,5	12	87	135	105	117	135	84	7	100	4,0	4,0	86	182	56	4 x M8	8

6) Dimensions in an un-tightened condition (in a tightened condition shorter)

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d$	Bore $\varnothing d_4$	With limit switch	Torque adjustment radial
Order number:		494._1._.			see pages 22 – 25	see page 17

- 01 ÷ 3 →
- * Medium torque range 5 →
- * High torque range 6 →
- * Max. torque range 7 →
- * See technical data, limiting torque for overload M_G
- ← According to size
- ← According to size
- ← 3 Flex. coupling 92 shore A
- ← 4 Flex. coupling 98 shore A
- ← 0 Ratchetting clutch
- ← 5 Synchronous clutch

Example: Order number 1 / 494.615.3 / 22 / 25 plus limit switch 055.002.5 radial adjustment

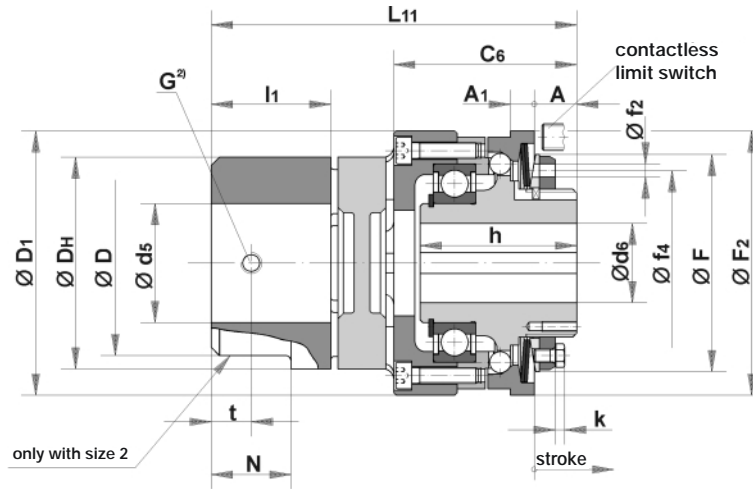
EAS®-Compact ratchetting clutch/synchronous clutch

power transmission

EAS®-Compact with flexible, backlash-free shaft coupling

Type 494._2._.

EAS®-side keyway
Coupling-side keyway



Sizes 01÷3
Type 494._2._.

Technical data

Size	Limiting torques for overload M_G			Nominal torque flexible, backlash-free shaft coupling $T_{KN}^{1)}$				Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Weight kg
	Type ¹⁾ 494.52._. Nm	Type ¹⁾ 494.62._. Nm	Type ¹⁾ 494.72._. Nm	92 Shore A		98 Shore A				
				T_{KN} Nm	$T_{KN max}$ Nm	T_{KN} Nm	$T_{KN max}$ Nm			
01	5 – 12,5	10 – 25	20 – 50	35	70	60	120	4000	1,2	1,26
0	10 – 25	20 – 50	40 – 100	95	190	160	320	3000	1,5	2,09
1	20 – 50	40 – 100	80 – 200	190	380	325	650	2500	1,8	3,62
2	40 – 100	80 – 200	160 – 400	265	530	450	900	2000	2,0	5,70
3	80 – 175	160 – 350	320 – 700	310	620	525	1050	1200	2,2	9,56

Size	Shaft misalignments flexible coupling					Mass moments of inertia I		Bores	
	Axial 92/98 Shore A ΔK_a mm	Radial 92 Shore A ΔK_r 98 Shore A ΔK_r mm		Angular misalignments 92 Shore A α 98 Shore A α °		Hub side kgm ²	Flex.-side kgm ²	Flex.-side $\varnothing d_5^{1)}$ mm	EAS®-Com-side $\varnothing d_6^{5) 6)}$ mm
01	1,4	0,14	0,10	1,0	0,9	0,000205	0,0004	8 – 28	12 – 20
0	1,5	0,15	0,11	1,0	0,9	0,000505	0,0010	10 – 38	15 – 25
1	1,8	0,17	0,12	1,0	0,9	0,001302	0,0020	12 – 45	22 – 30
2	2,0	0,19	0,14	1,0	0,9	0,002630	0,0050	14 – 55	28 – 40
3	2,1	0,21	0,16	1,0	0,9	0,006359	0,0114	20 – 60	32 – 50

1) The transmittable torques of the flex. coupling „TKN“ are dependent on factors as for example temperature factor, torsional rigidity factor etc., see also clutch design ROBA®-ES catalogue K.940 or please contact our sales office.

2) Keyway displaced to „G“ by 180°

Dimensions

Size	A	A ₁	C ₆	D	D ₁	D _h	F	F ₂	f ₂	f ₄	G ²⁾	h	k	L ₁₁	I ₁	N	t
01	12	7	47	-	70	55	61,5	70	5	50	M5	40	2,8	95	30	-	10
0	13,5	8	56,5	-	85	65	67	85	5	55	M6	48	2,8	111,5	35	-	15
1	16	9	69	-	100	80	82	100	5	70	M8	59	3,5	138	45	-	15
2	17	10	74	75	115	95	97	115	6	84	M8	64	4	150	50	28	20
3	20,5	12	87	-	135	105	117	135	7	100	M8	75	4	171	56	-	25

5) Smaller bores for lower torques on request

6) Larger bores on request

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore $\varnothing d_6$	Bore $\varnothing d_5$	With limit switch	Torque adjustment radial
Order number:		494._2._.			see pages 22 – 25	see page 17

01 ÷ 3 →

* Medium torque range

* High torque range

* Max. torque range

* See technical data, limiting torque for overload M_G

← According to size

← According to size

← 3 Flex. coupling 92 shore A

← 4 Flex. coupling 98 shore A

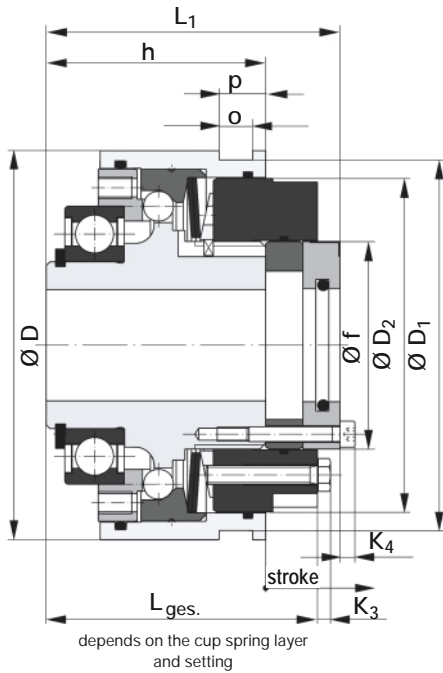
← 0 Ratchetting clutch

← 5 Synchronous clutch

Example: Order number 1 / 494.625.3 / 22 / 25 plus limit switch 055.002.5 radial adjustment

EAS®-Compact options

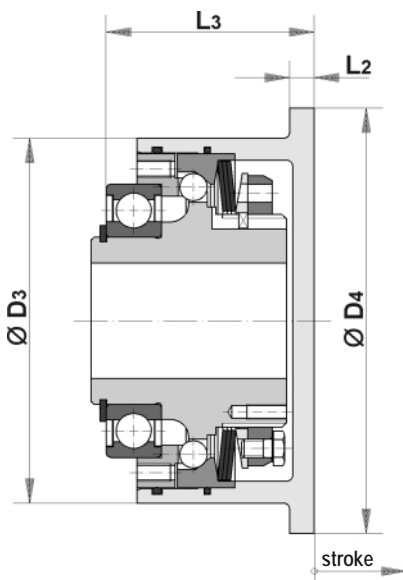
EAS®-Compact completely sealed



type 490.____ version „C“

Filling equipment in the food industry are daily cleaned with partially aggressive media. For such or similar applications EAS®-Compact totally enclosed torque limiters can be designed. The steel sealing prevents the penetration of dirt and humidity into the clutch on the one hand and ensures that no grease can get out of the clutch.

EAS®-Compact with removable sealing cover



type 490.____ version „A“

The plastic-cover does not require any additional fixings. It is pushed onto the clutch and engages. This cover is suitable for speeds up to approx. 500 rpm. In case of higher speeds the steel cover should be selected.

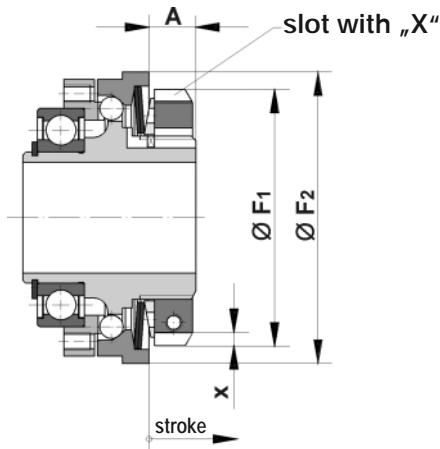
Dimensions

Size	D	D ₁	D ₂	D ₃	D ₄	f	h	K ₃	L ₁	L ₂	L ₃	o	p
01	75	70	60	75	90	34	40	2,8	47	7	47	7,5	10
0	90	85	75	90	105	44	48	2,8	56	8	56	9	10,5
1	105	100	90	105	120	56	59	3,5	67	8	67	9	12,5
2	120	115	105	120	140	70	64	4	73	9	73	9	13
3	140	135	125	140	165	84	75	4	86	11	86	9	14

EAS®-Compact torque limiter

EAS®-Compact options

EAS®-Compact with adjusting nut for radial torque adjustment

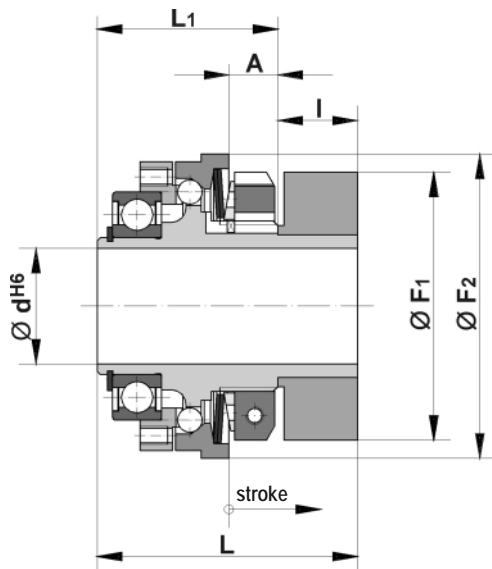


The EAS®-Compact can be fitted with an adjusting nut for radial torque adjustment if the clutch is not axially accessible in case of narrow mounting conditions. As with the standard unit there is a graduated percentage scale fitted at the adjusting nut which indicates the percentage of the max. torque the clutch is adjusted to.

Dimensions

Size	A	F ₁	F ₂	X	x
01	12	59	70	6	3
0	13,5	73	85	7	4
1	16	88	100	7	4
2	17	104	115	8	4,5
3	20,5	125	135	10	4

EAS®-Compact with clamping ring



EAS®-Compact torque limiters with clamping ring hubs can be fitted quickly and tightened easily onto the shaft. The slit clamping ring is stressed only with one screw. Due to the design with the adjusting nut for radial torque adjustment the limiting torque for overload can also be modified in an assembled condition.

Dimensions

Size	A	Bore		F ₁	F ₂	L	L ₁	I
		d _{min}	d _{max}					
01	14,5	10	25 ¹⁾	60	70	65	43,5	18
0	19	15	32 ²⁾	72	85	77	53,5	22
1	20,5	22	40 ³⁾	84	100	90	63,5	26
2	23,5	32	45 ⁴⁾	97	115	103	70,5	32
3	26	35	55 ⁵⁾	115	135	117	80,5	36

1) With bore Ø 10 – 14 limiting torque for overload M_G = 70 %
 2) With bore Ø 15 – 19 limiting torque for overload M_G = 70 %
 3) With bore Ø 22 – 29 limiting torque for overload M_G = 70 %
 4) With bore Ø 32 – 40 limiting torque for overload M_G = 70 %
 5) With bore Ø 35 – 45 limiting torque for overload M_G = 70 %

Table: Relationship of the flexible coupling bore diameter d_3/d_4 to the transmittable torque „ T_{KN} “ of the EAS®-Compact Type 494._0._. / 494._1._.

Size	Preferred bores $\varnothing d_3$ (clamping hub) / $\varnothing d_4$ (clamping ring) and appropriate transmittable torques T_{KN} (Nm) of the friction tight of the clamping hubs (with type 494._0._.) clamping rings (with type 494._1._.)																			
	$\varnothing 15$		$\varnothing 16$		$\varnothing 19$		$\varnothing 20$		$\varnothing 22$		$\varnothing 24$		$\varnothing 25$		$\varnothing 28$		$\varnothing 30$		$\varnothing 32$	
	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	66	36	71	43	86	45	92	50	102	54	113	57	118	63	120	-	-	-	-
0	-	-	-	-	79	174	83	184	91	205	100	225	104	235	116	266	124	286	133	307
1	-	-	-	-	-	-	83	255	91	283	100	311	104	326	116	368	124	397	133	426
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	116	420	124	460	133	500
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	on request

Size	$\varnothing 35$		$\varnothing 38$		$\varnothing 40$		$\varnothing 42$		$\varnothing 45$		$\varnothing 48$		$\varnothing 50$		$\varnothing 52$		$\varnothing 55$			
	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	145	320	-	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1	145	470	158	515	166	544	174	580	187	650	-	-	-	-	-	-	-	-		
2	145	563	158	627	166	670	174	714	187	770	-	820	-	900	-	-	-	-		
3	on request																			

Table 1 The transmittable torque with clamping connection takes into account the max. fit with shaft tolerance k6 and bore tolerances F7 or H7. With larger tolerances and fits the torque will decrease.

Selection of size, calculation of energy, torque adjustment for horizontal axes.

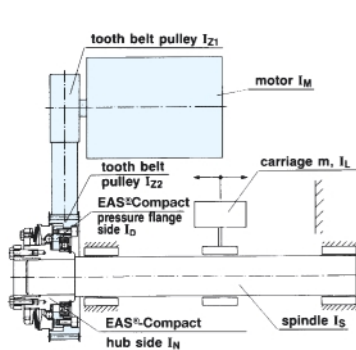


Fig. 1

$$I_g = I_M + I_{Z1} + (I_{Z2} + I_S + I_L) \cdot \left(\frac{n_1}{n_2}\right)^2$$

$$I_1 = I_D + I_{Z2} + (I_{Z1} + I_M) \cdot \left(\frac{n_1}{n_2}\right)^2$$

$$I_2 = I_N + I_S + I_L$$

I_L from equation (7)

Preselection of the clutch
 $M_{req.} = 1,5 \cdot M_2$ [Nm] (M_2 from eq. (4))

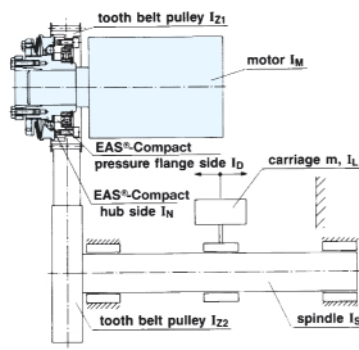


Fig. 2

$$I_g = I_M + I_{Z1} + (I_{Z2} + I_S + I_L) \cdot \left(\frac{n_2}{n_1}\right)^2$$

$$I_1 = I_M + I_N$$

$$I_2 = I_D + I_{Z1} + (I_{Z2} + I_S + I_L) \cdot \left(\frac{n_2}{n_1}\right)^2$$

I_L from equation (7)

Preselection of the clutch
 $M_{req.} = 1,5 \cdot M_1$ [Nm]

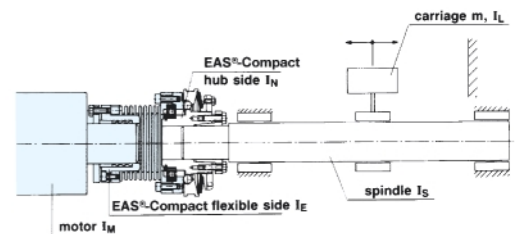


Fig. 3

$$I_g = I_M + I_{Ku} + I_S + I_L \quad [\text{kgm}^2] \quad (1)$$

$$I_1 = I_M + I_E \quad [\text{kgm}^2] \quad (2)$$

$$I_2 = I_N + I_S + I_L \quad [\text{kgm}^2] \quad (3)$$

I_L from equation (7)

Preselection of the clutch
 $M_{req.} = 1,5 \cdot M_1$ [Nm]

Torque at spindle for arrangement Fig.1

$$M_2 = M_1 \cdot \frac{n_1}{n_2} \quad [\text{Nm}] \quad (4)$$

Rate of feed of carriage

$$v = \frac{p \cdot n_2}{6 \cdot 10^4} \quad \left[\frac{\text{m}}{\text{s}} \right] \quad (5)$$

Angular velocity of motor shaft ω_1 and spindle ω_2

$$\omega_1 = \frac{n_1 \cdot \pi}{30} \quad [\text{s}^{-1}]; \quad \omega_2 = \frac{n_2 \cdot \pi}{30} \quad [\text{s}^{-1}] \quad (6)$$

Mass of carriage reduced to the spindle

$$I_L = m \cdot \frac{v^2}{\omega_2^2} \quad [\text{kgm}^2] \quad (7)$$

v from equation (5), ω_2 from equation (6)

Energy with collision without EAS®-Compact clutch

$$W_g = \frac{1}{2} \cdot I_g \cdot \omega_1^2 \quad [\text{J}] \quad (8)$$

I_g from equation (1), ω_1 from equation (6)

Energy with collision with EAS®-Compact clutch

$$W_2 = \frac{1}{2} \cdot I_2 \cdot \omega_2^2 \quad [\text{J}] \text{ for arrangement as shown in Fig. 1} \quad (9)$$

$$W_2 = \frac{1}{2} \cdot I_2 \cdot \omega_1^2 \quad [\text{J}] \text{ for arrangement as shown in Figs. 2+3} \quad (9)$$

I_2 from equation (3), ω_1 and ω_2 from equation (6)

Remaining residual energy

$$W_R = \frac{W_2}{W_g} \cdot 100 \quad [\%] \quad (10)$$

W_g from equation (8), W_2 from equation (9),

Uncoupled energy

$$\Delta W = W_g - W_2 \quad [\text{J}] \quad (11)$$

$$\Delta W = 100 - W_R \quad [\%] \quad (12)$$

W_g from equation (8), W_2 from equation (9),

W_R from equation (10)

Required disengaging torque in the acceleration phase (axis horizontal)

$$M_A = M_B \cdot \frac{I_2}{I_2 + I_1} \cdot \frac{n_1}{n_2} \cdot * \quad [\text{Nm}] \quad (13)$$

I_1 from equation (2), I_2 from equation (3)

* speed ratio $\frac{n_1}{n_2}$ is not valid for Figures 2 and 3.

Required disengaging torque in acceleration phase (axis aligned by choice).

$$\text{Usage after } M_A = \left(M_B \cdot \frac{n_1}{n_2} - M_L \right) \cdot \frac{I_2}{I_2 + I_1} + M_L \cdot 1,2 \quad [\text{Nm}] \quad \text{Fig. 1}$$

$$\text{Usage after } M_A = \left(M_B - M_L \cdot \frac{n_2}{n_1} \right) \cdot \frac{I_2}{I_2 + I_1} + M_L \cdot 1,2 \quad [\text{Nm}] \quad (14) \quad \text{Fig. 2}$$

$$\text{Usage after } M_A = \left(M_B - M_L \right) \cdot \frac{I_2}{I_2 + I_1} + M_L \cdot 1,2 \quad [\text{Nm}] \quad \text{Fig. 3}$$

M_L from equation (15)

If M_A is higher than M_{max} of the clutch you have chosen, select bigger size.

Load torque from carriage mass with alignment by choice

$$M_L = \frac{m \cdot g \cdot \sin \alpha \cdot p}{2 \cdot \pi \cdot 1000} \quad [\text{Nm}] \quad (15)$$

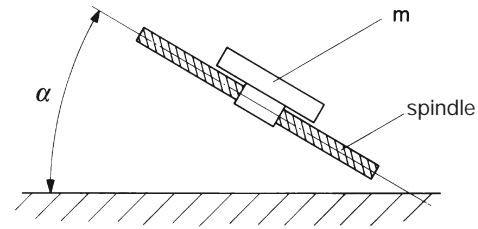


Fig. 4

Required disengaging torque for nominal torque

$$M_G = 1,5 \cdot M_1 \quad [\text{Nm}] \text{ (arrangement as shown in Figure 2)} \quad (16)$$

$$M_G = 1,5 \cdot M_2 \quad [\text{Nm}] \text{ (arrangement as shown in Figs. 1 + 3)}$$

M_2 from equation (4)

Setting of the clutch: The clutch must be set to M_G or M_A depending which value is higher

Designations:

I_g [kgm ²]	total mass moment of inertia without EAS®-Compact clutch related to the motor shaft
I_1 [kgm ²]	mass moment of inertia at the input side related to the shaft with the EAS®-Compact clutch
I_2 [kgm ²]	mass moment of inertia at the output side (spindle side) related to the shaft with the EAS®-Compact clutch
I_M [kgm ²]	mass moment of inertia of the motor
I_{Z1} [kgm ²]	mass moment of inertia of the tooth belt pulley at the motor side
I_{Z2} [kgm ²]	mass moment of inertia of the second tooth belt pulley
I_S [kgm ²]	mass moment of inertia of the spindle
I_L [kgm ²]	mass of the carriage reduced to the spindle
I_N [kgm ²]	mass moment of inertia of the EAS®-Compact, hub side
I_D [kgm ²]	mass moment of inertia of the EAS®-Compact, pressure flange side
I_E [kgm ²]	mass moment of inertia of the EAS®-Compact, flexible coupling
I_{Ku} [kgm ²]	mass moment of inertia of the two-shaft-connection before installing the EAS®-Compact clutch
M_1 [Nm]	nominal torque of the motor
M_2 [Nm]	torque at spindle
M_B [Nm]	max. torque of the motor
M_A [Nm]	required disengaging torque in the acceleration phase
M_G [Nm]	limiting torque for an overload
M_L [Nm]	load torque from carriage mass with any alignment
g [$\frac{\text{m}}{\text{s}^2}$]	acceleration of fall
m [kg]	mass of the carriage
n_1 [rpm]	drive speed of the motor (fast motion)
n_2 [rpm]	speed of the spindle (fast motion)
p [mm]	ascend of the spindle
v [$\frac{\text{m}}{\text{s}}$]	rate of the feed of carriage
W_g [J]	total energy in the case of a collision without EAS®-Compact clutch
W_2 [J]	energy in the case of a collision with EAS®-Compact clutch
W_R [%]	remaining residual energy
ΔW [J]	uncoupled energy
ΔW [%]	uncoupled energy
ω_1 [s ⁻¹]	angular velocity of the motor shaft
ω_2 [s ⁻¹]	angular velocity of the spindle
α [°]	angular of the spindle Fig. 4
M_{req}	min. disengaging torque for preselection of the clutch

Calculation example

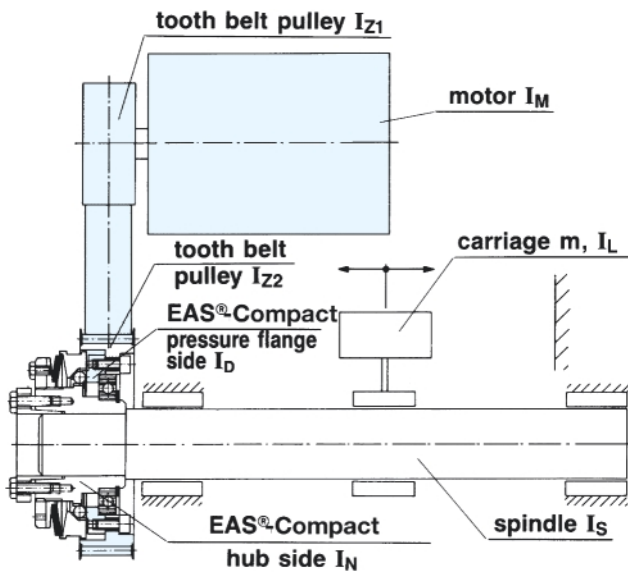


Fig. 1

Arrangement as shown in figure 1.

Indications:

mass of the carriage	$m = 560 \text{ kg}$
mass moment of inertia of the motor	$I_M = 0,0037 \text{ kgm}^2$
mass moment of inertia of the tooth belt pulleys	$I_{Z1} = 0,0006 \text{ kgm}^2$
mass moment of inertia of the spindle	$I_S = 0,00067 \text{ kgm}^2$
drive speed of the motor	$n_1 = 2000 \text{ rpm}$
speed of the spindle	$n_2 = 1000 \text{ rpm}$
ascent of the spindle	$p = 10 \text{ mm}$
nominal torque of the motor	$M_1 = 14 \text{ Nm}$
max. torque of the motor	$M_B = 40 \text{ Nm}$

Preselection of the clutch

$$M_{\text{req.}} = 1,5 \cdot M_2; \quad M_2 = M_1 \cdot \frac{n_1}{n_2} = 14 \text{ Nm} \cdot \frac{2000 \text{ rpm}}{1000 \text{ rpm}} = 28 \text{ Nm}$$

$$M_{\text{req.}} = 1,5 \cdot 28 \text{ Nm} = 42 \text{ Nm}$$

Selected: EAS®-Compact size 0, Type 490.610.0
torque range $M_G = 20 \div 50 \text{ Nm}$
(see technical data, page 6)

Mass moment of inertia of the EAS®-Compact

hub side $I_N = 0,000531 \text{ kgm}^2$ (see techn. data, page 6)
pressure flange side $I_D = 0,000234 \text{ kgm}^2$ (see techn. data, page 6)

Rate of feed of carriage

$$v = \frac{p \cdot n_2}{6 \cdot 10^4} = \frac{10 \cdot 1000}{6 \cdot 10^4} \text{ m/s} = 0,1667 \text{ m/s}$$

Angular velocity of the motor shaft ω_1 and spindle ω_2

$$\omega_1 = \frac{n_1 \cdot \pi}{30} = \frac{2000 \cdot \pi}{30} \text{ s}^{-1} = 209 \text{ s}^{-1}$$

$$\omega_2 = \frac{n_2 \cdot \pi}{30} = \frac{1000 \cdot \pi}{30} \text{ s}^{-1} = 104,7 \text{ s}^{-1}$$

Mass of carriage reduced to the spindle

$$I_L = m \cdot \frac{v^2}{\omega_2^2} = 560 \cdot \frac{0,1667^2}{104,7^2} \text{ kgm}^2 = 0,00142 \text{ kgm}^2$$

Energy in the case of a collision without EAS®-Compact clutch

$$I_g = I_M + I_{Z1} + (I_{Z2} + I_S + I_L) \cdot \left(\frac{n_2}{n_1}\right)^2 =$$

$$= 0,0037 + 0,0006 + (0,01132 + 0,00067 + 0,00142) \cdot \left(\frac{1000}{2000}\right)^2 =$$

$$= 0,00765 \text{ kgm}^2$$

$$W_g = 1/2 \cdot I_g \cdot \omega_1^2 = 1/2 \cdot 0,00765 \cdot 209^2 \text{ J} = 167 \text{ J}$$

Energy in the case of a collision with EAS®-Compact clutch

$$I_2 = I_N + I_S + I_L = 0,00531 + 0,00067 + 0,00142 \text{ kgm}^2 =$$

$$= 0,0074 \text{ kgm}^2$$

$$W_2 = 1/2 \cdot I_2 \cdot \omega_2^2 = 1/2 \cdot 0,0074 \cdot 104,7^2 \text{ J} = 14 \text{ J}$$

Remaining residual energy

$$W_R = \frac{W_2}{W_g} \cdot 100 = \frac{14}{167} \cdot 100 = 8,4 \%$$

Uncoupled energy

$$\Delta W = W_g - W_2 = 167 \text{ J} - 14 \text{ J} = 153 \text{ J}$$

$$\Delta W = 100 - W_R = 100 - 8,4 = 91,6 \%$$

Required disengaging torque in the acceleration phase

$$I_1 = I_D + I_{Z2} + (I_{Z1} + I_M) \cdot \left(\frac{n_1}{n_2}\right)^2 =$$

$$= 0,000234 + 0,01132 + (0,0006 + 0,0037) \cdot \left(\frac{2000}{1000}\right)^2 =$$

$$= 0,0287 \text{ kgm}^2$$

$$M_A = \left(M_B \cdot \frac{I_2}{I_2 + I_1} \cdot \frac{n_1}{n_2} \right) \cdot 1,2$$

$$= \left(40 \cdot \frac{0,0074}{0,0074 + 0,0287} \cdot \frac{2000}{1000} \right) \cdot 1,2 = 8,2 \text{ Nm}$$

Required disengaging torque for nominal torque

$$M_g = 1,5 \cdot M_2 = 1,5 \cdot 28 \text{ Nm} = 42 \text{ Nm}$$

Setting of the clutch

The clutch must be set to $M_G = 42 \text{ Nm}$

Technical Explanations

Indicated torque adjustment

The EAS[®]-Compact torque limiting clutch offers the comfort of the indicated torque adjustment at the adjusting nut. The possibility for indication offers a substantially simplified torque adjustment and a simple monitoring of the set releasing value with an installed clutch.

- The limiting torque can be adjusted sensitively and indicated exactly by the fine pitch threaded graduated adjusting nut.
- The positive locking of the adjusting nut protects against selfacting unintended adjustment of the pre-set limiting torque. The integral blocking protection prevents the clutch from becoming spring bound.

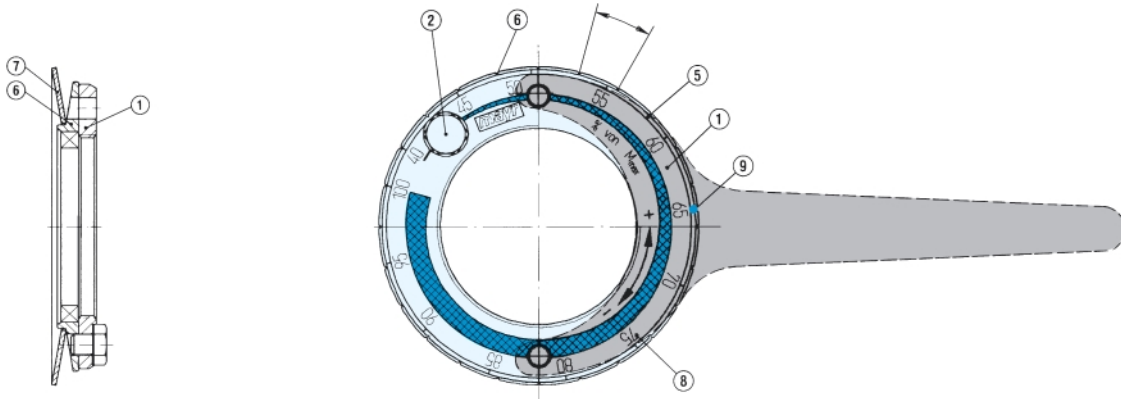


Fig. 1

Important Note!

Torque peaks (e.g. starting torque impact with asynchronous motors) can occur according to a kind of drive and drive constellation which are clearly over the operating torque of the equipment (of the motor). The customer must consider this behaviour for the design or adjustment of the clutch.

Torque adjustment

The adjustment is made by turning the adjusting nut. The cup springs operate in the negative area of their characteristics (see figure 2). A stronger pre-tension of the cup springs effects a decrease of the spring pressure. Turning the adjusting nut in a clockwise direction reduces the torque, and in anti-clockwise direction increases the torque (viewed in the direction of the nut - figure 1).

EAS[®]-Compact are adjusted **generally** at 70 % - 75 % of the corresponding max. torque and marked (calibrated) at the factory, if no other torque adjustment is required. The corresponding torque adjustment or the adjustable range is indicated on the Type tag.

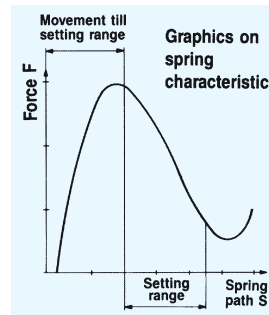


Fig. 2

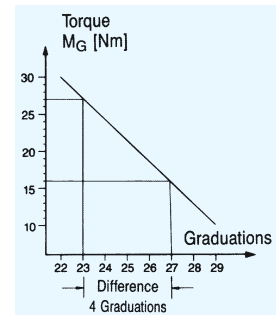


Fig. 3

Torque adjustment by the aid of the adjusting diagram

- Grease thread and contact faces of the adjusting nut, retaining ring and hub.
- Manually screw on adjusting nut (1) until contact is made with the cup springs (7).
- Continue turning until the 4 graduations (5) at the circumference of the adjusting nut (1) and the notches in the retaining ring (6) are in line with each other.
- Using a face wrench, turn the adjusting nut (1) through the number of graduations corresponding to the required torque (Fig. 3) (number of graduations as per setting diagram).
- The graduations at the circumference of the adjusting nut (5) and retaining ring (6) must remain in the same position.
- Put Loctite 242 onto the retaining screw (2) and screw it into the adjusting nut (1).

Attention!!

After dismantling the clutch (e.g. by changing the cup springs or cup spring layers) the clutch must be re-adjusted.

Adjusting the torque

Remove the retaining screw (2) from the adjusting nut.

Turn adjusting nut clockwise or anti-clockwise with the use of a face wrench according to the engraved graduation until the required torque is set. The required torque is achieved when the graduation in the retaining ring and the indication on the percentage in the adjusting nut are overlapped. Afterwards the retaining screw or setscrew, respectively (locking by Loctite 242) are screwed into the adjusting nut again, whereby the 4 graduations in the adjusting nut and retaining ring must remain in the same position.

Example:

Existing adjustment 65 % of the max. torque.
The customer requires 90 % of the max. torque.

Turn adjusting nut anti-clockwise, as described above, until 90 % of the graduation are in line with the notches in the retaining ring. If necessary, the alignment of the notches at the circumference of the adjusting nut must be overlapped with the graduations of the retaining ring.

Manufacturing declaration

The limit switch is a component for installation into a machine according to the machine guide line 98/37/EG.

An operation is prohibited until it has been noticed that the machine in which this unit is fitted, corresponds to the EG-regulations. The limit switch corresponds to the low voltage regulation 73/23/EWG.

There is no interference caused by the limit switch according to the EMV-regulation 89/336/EWG.

Safety regulations!



Hazardous conditions when contacting live leads and components. Only qualified and well-trained specialists should work at the units to avoid any personal and material damages.



The installation and operating instruction has to be read carefully and the safety regulations have to be observed before installation and initial operation.

Limit switch Type 055.000.5 mechanical actuating

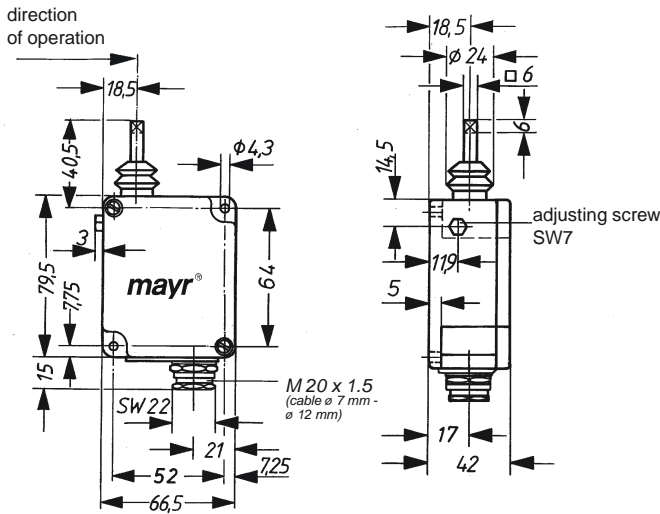
Application

- Monitoring of mechanical movements and final positions.
- Control switch for electrical and mechanical sequences.
- In connection with EAS®-products axial disengaging movements are monitored.

Design

The micro switch fitted into a light metal housing is actuated by a control lever. Operation is only possible in one direction. By actuating the control lever the pretensioned micro switch is unloaded: Opens contacts 11 – 14, closes 11 – 12. The limit switch is fastened via two screw-on brackets with 4 cap screws attached diagonally.

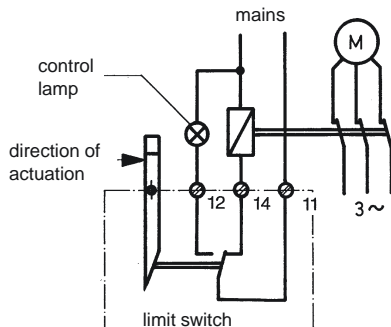
Dimensions



Technical data

- **Micro switch:** 1 x change-over contacts 11-12-14
- **(snap-acting)**
- **Contact load:** 250 VAC/15 Amp.
24 VDC/6 Amp.
60 VDC/1,5 Amp.
250 VDC/0,2 Amp.
- **Contact capacity min.:** 12 VDC, 10 mA
- **Contact material:** Ag CdO 90/10
- **Switching frequency:** max. 200 switchings/min.
- **Ambient temperature:** -10 °C up to +85 °C
- **Protection:** IP 54
- **Weight:** 275 g
- **Switch travel:** By adjusting screw arranged laterally the zero shift is possible to right and left by max. 5 mm, wrench width SW 7.
- **Pretravel:** min. 0,5 mm
- **Overtravel:** max. 10 mm, depending on the zero shift. adjustment the overtravel can be 5 mm to 10 mm.

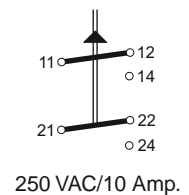
Wiring diagram



(on request)

Special types

- Different switch lever lengths
- Micro switch with 2 change over-contacts



To be included when ordering, please state:	Type
Order number:	055.000.5

Limit switch

Manufacturing declaration

The limit switch is a component for installation into a machine according to the machine guide line 98/37/EG.

An operation is prohibited until it has been noticed that the machine in which this unit is fitted, corresponds to the EG-regulations. The limit switch corresponds to the low voltage regulation 73/23/EWG.

There is no interference caused by the limit switch according to the EMVC-regulation 89/336/EWG.

Safety regulations!



Hazardous conditions when contacting live leads and components. Only qualified and well-trained specialists should work at the units to avoid any personal and material damages.

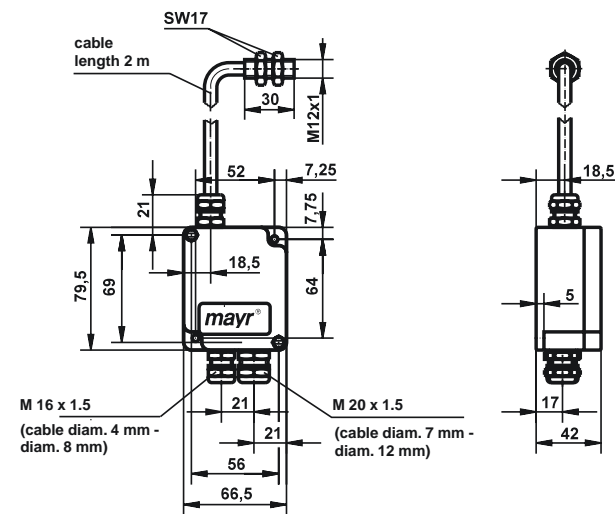


The installation and operating instruction has to be read carefully and the safety regulations have to be observed before installation and initial operation.

Limit switch - proximity sensing

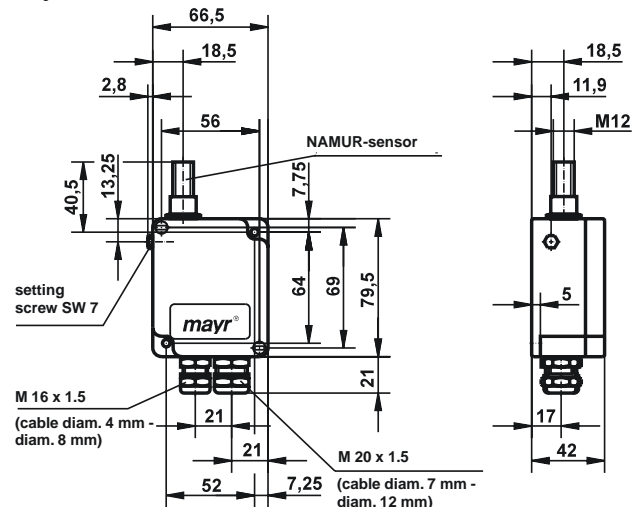
Type 055.001.5 (external sensor)

External NAMUR-sensor with a 2 m long cable (standard). Special lengths on request, possible max. 100m.



Type 055.002.5 (internal sensor)

Internal NAMUR-sensor fitted in the light metal housing. Lateral adjusting screw SW 7 for the adjustment of the zero point by 1mm each.



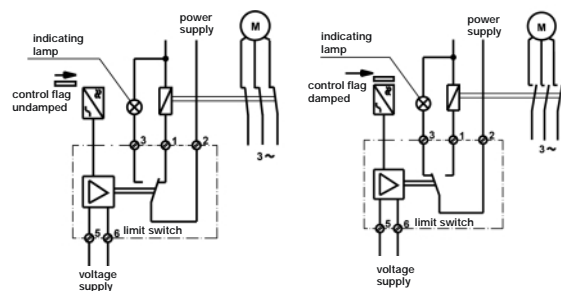
Design

The electronic amplifier is fitted into a light metal housing which can be attached via two diagonal fastening brackets with M4 cap screws. The relay is triggered during passing - **damped** - the sensor area of the NAMUR-sensor with a metallic control flag, it gets currentless and is released. Contacts 2-3 are closed. Damping of the NAMUR-sensor is possible from all sides.

When transmitting relay „currentless“ and contacts 2-3 closed:

- damping of the transmitter or
- no supply voltage or
- cable breakage of the NAMUR-transmitter

Wiring diagram



Contacts 1-2 closed, when:

- supply voltage is switched-on and
- relay is energised and
- NAMUR-sensor is undamped

Contacts 3-2 closed, when:

- supply voltage is switched-off or
- relay is de-energised or
- NAMUR-sensor is damped or
- cable breakage transmitter cable

Technical data

- Supply voltage: 230 VAC, +/-10 %, 50-60 Hz
115 VAC, +/-10 %, 50-60 Hz
24 VDC, +/-5 %, independent polarity
1,5 VA
- Input:
- Ambient temperature: amplifier -10 °C up to +60 °C
NAMUR-sensor -25 °C up to +60 °C
- Protection: amplifier IP 54
NAMUR-sensor IP67
- Max. connection cross section: 2,5 mm²
- Relay: 1 x change over contact, potential free
Contact load: max. 230 VAC/5 Amp.
NAMUR-sensor: to EN 50227
metal housing M 12 x 1 mm
flush fitting
switching distance SN 2 mm
max. switching frequency 2 kHz

To be included when ordering, please state	Type	Supply voltage
Order number:	055.00_.5	---

Proximity sensing		230 VAC
sensor external1	→	115 VAC
sensor internal2	→	24 VDC

Example: Proximity limit switch with an external sensor and a supply voltage of 230 VAC.

Order number: 055.001.5, 230 VAC

Manufacturing declaration

The limit switch is a component for installation into a machine according to the machine guide line 98/37/EG.
 An operation is prohibited until it has been noticed that the machine in which this unit is fitted, corresponds to the EG-regulations. The limit switch corresponds to the low voltage regulation 73/23/EWG.
 There is no interference caused by the limit switch according to the EMV-regulation 89/336/EWG.

Safety regulations

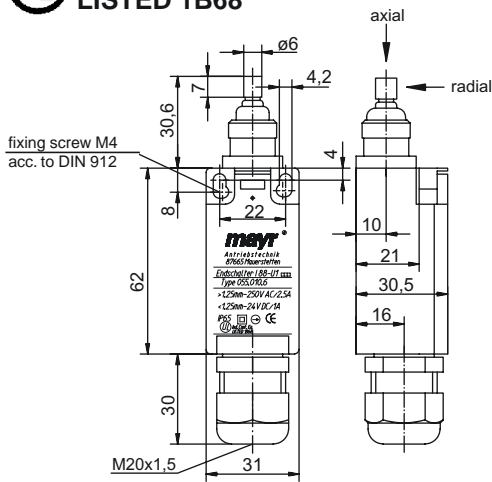


Hazardous conditions when contacting live leads and components.
 Only qualified and well-trained specialists should work at the units to avoid any personal and material damages.

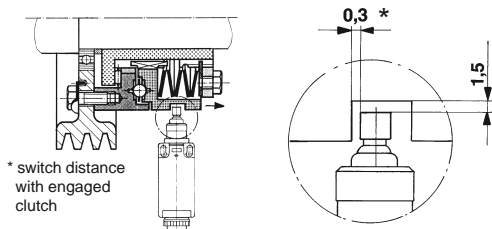


The installation and operating instruction has be read carefully and the safety regulations have to be observed before installation and initial operation.

Dimensions



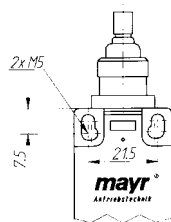
Assembly



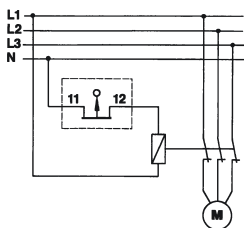
Attention! Do not fit switch in a dragging way and observe max. actuation travel (4 mm)

Fixed positioning

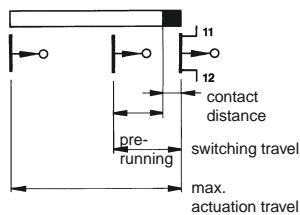
for safety application with fixing screw 2 x M 5, DIN 912



Wiring diagram



Switching travel diagram



Application and Function

Monitoring of universal, mechanical movements and adjustments.
 Suitable for clutches with a minimum stroke of
 - 1,1 mm with radial actuation
 - 0,9 mm with axial actuation
 By actuating the metal rod the contacts 11 – 12 are opened.
 Zb: contacts separated by force, electrically disconnected.

Technical data

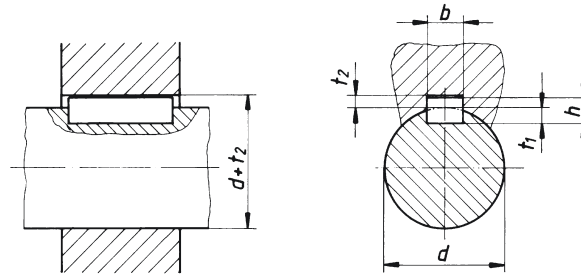
- Contact 1 x opener (Zb) -> automatic separation of the opener contact acc. to DIN EN 60947-5-1
- Contact opening - after 0,2 – 0,4 mm with radial actuation
 - after 0,1 mm with axial actuation
- Load opener-contact contact-distance >1,25 mm = 250 VAC/2,5 Amp.
 contact-distance <1,25 mm = 24 VDC/ 1 Amp.
 (min. contact distance 0,5 mm with 24 VDC)
- Max. current at make acc. to EN 60947-5-1
 AC 15 - control electromagnetic force
 DC 13 - control of electromagnets
- Max. actuating travel of the metal tappet 4 mm, axial or radial
- Switching frequency max. 100/min.
- Mech. service life 1 x 10⁶ hysteresis, unloaded
- Cable gland M20 x 1,5
- Max. connection cross section 1,5 mm²
- Ambient temperature -30 °C up to +80 °C
- Protection IP 65
- Protection insulation acc. to protection class II
- Housing thermoplastic, self extinguishing to UL94-V0
- Weight approx. 120 g

Approbations/Standards

- UL
- CE
- EN 60529 protection
- EN 60204 protection of machines
 -electrical equipment of machines-
- EN 60947-1 low voltage switch gears
 -general definitions-
- EN 60947-5-1 low voltage switch gears
 -control units and control elements-

Order example:

To be included when ordering, please state:	Type
Order number:	055.010.6



Diameter d	according to DIN 6885/1				according to DIN 6885/3			
	Width b 1)	Depth h	Shaft keyway depth t ₁	Hub keyway depth d + t ₂	Width b 2)	Depth h	Shaft keyway depth t ₁	Hub keyway depth d + t ₂
above to	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
6	8	2	2	1,2	d + 1	2		
8	10	3	3	1,8	d + 1,4	3		
10	12	4	4	2,5	d + 1,8	4		
12	17	5	5	3	d + 2,3	5	3	d + 1,2
17	22	6	6	3,5	d + 2,8	6	4	d + 1,6
22	30	8	7	4	d + 3,3	8	5	d + 2,0
30	38	10	8	5	d + 3,3	10	6	d + 2,4
38	44	12	8	5	d + 3,3	12	6	d + 2,2
44	50	14	9	5,5	d + 3,8	14	6	d + 2,1
50	58	16	10	6	d + 4,3	16	7	d + 2,4
58	65	18	11	7	d + 4,4	18	7	d + 2,3
65	75	20	12	7,5	d + 4,9	20	8	d + 2,7
75	85	22	14	9	d + 5,4	22	9	d + 3,1
85	95	25	14	9	d + 5,4	25	9	d + 2,9
95	110	28	16	10	d + 6,4	28	10	d + 3,2
110	130	32	18	11	d + 7,4	32	11	d + 3,5
130	150	36	20	12	d + 8,4	36	12	d + 3,8
150	170	40	22	13	d + 9,4			
170	200	45	25	15	d + 10,4			
200	230	50	28	17	d + 11,4			
230	260	56	32	20	d + 12,4			
260	290	63	32	20	d + 12,4			
290	330	70	36	22	d + 14,4			
330	380	80	40	25	d + 15,4			
380	440	90	45	28	d + 17,4			
440	550	100	50	31	d + 19,5			

1) Tolerance range of the hub keyway width b is JS 9
 2) Tolerance range of the hub keyway width b is J 9

Bore diameter		Dimensions	
above	to		
[mm]		[µm]	
6	10	+ 15	0
10	18	+ 18	0
18	30	+ 21	0
30	50	+ 25	0
50	80	+ 30	0
80	120	+ 35	0
120	180	+ 40	0

Mounting examples

Fig. 1

EAS®-Compact standard

For the EAS®-Compact standard the drive elements are located on the deep groove ball bearing and screwed up with the pressure flange. If the resulting radial force of the drive element is roughly in the centre of the ball bearing an additional bearing of the drive element can be omitted.

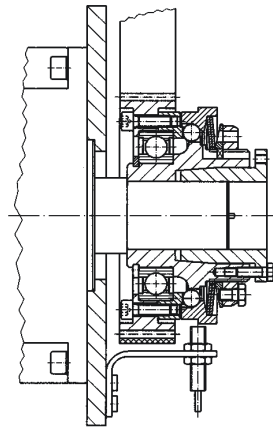


Fig. 2

EAS®-Compact long projecting hub

The EAS®-Compact with long projecting hub is recommended for very wide drive elements or elements with very small diameters. In case of a small diameter the drive element is screwed up with the pressure flange of the clutch by means of an intermediate flange provided by the customer. Ball bearings, needle bearings or slide bearings are suitable as bearing for the drive element depending on the mounting situation and space.

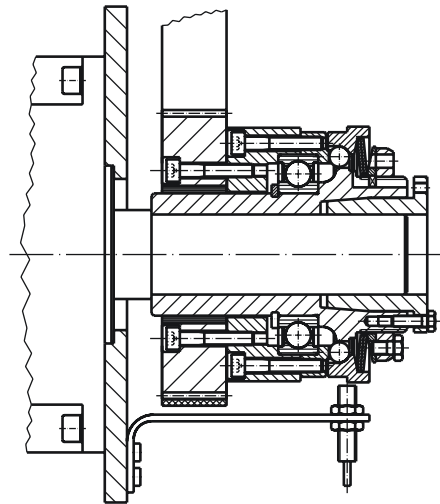


Fig. 3

EAS®-Compact with flexible shaft coupling

EAS®-Compact with backlash-free, torsionally flexible and vibrational damping shaft coupling for connection of two shafts. the coupling compensates axial, radial and angular shaft misalignments.

In the comparison to the EAS®-Compact with the steel bellows coupling it is torsionally flexible in circumferential direction.

The EAS®-Compact with steel bellows coupling is fitted between motor and ball screw spindle in the mounting example shown on the right side. The torque is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. the contactless limit switch (initiator) provides a signal to switch off the drive.

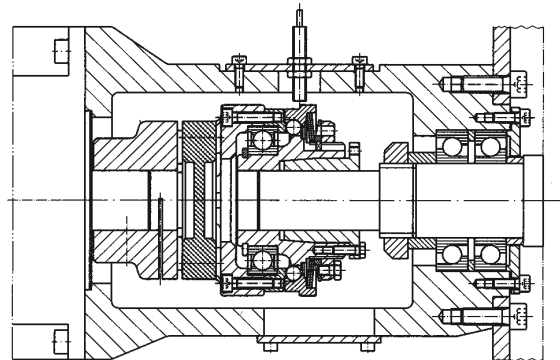


Fig. 4

EAS®-Compact with steel bellows coupling

EAS®-Compact with torsionally rigid flexible steel bellows coupling for connecting two shafts. The coupling compensates axial, radial and angular shaft misalignments. It is torsionally rigid in circumferential direction. The EAS®-Compact with steel bellows coupling has a low mass of inertia in comparison to the EAS®-Compact with ROBA®-D coupling.

The EAS®-Compact with steel bellows coupling is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. The contactless limit switch (initiator) provides a signal to switch off the drive.

