The Backlash-free Safety Clutch for

Packaging Machinery
Machine Tools
Paper Machinery
Indexing Drives
Servo Motors

EAS®-NC

Backlash-free Safety Clutch

- *Indicating torque adjustment*
- *Easy assembly*
- *Hardened functional components*
- *Synchronous and Ratchetting design*

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K.405.V06.GB

mayr®
power-
transmission

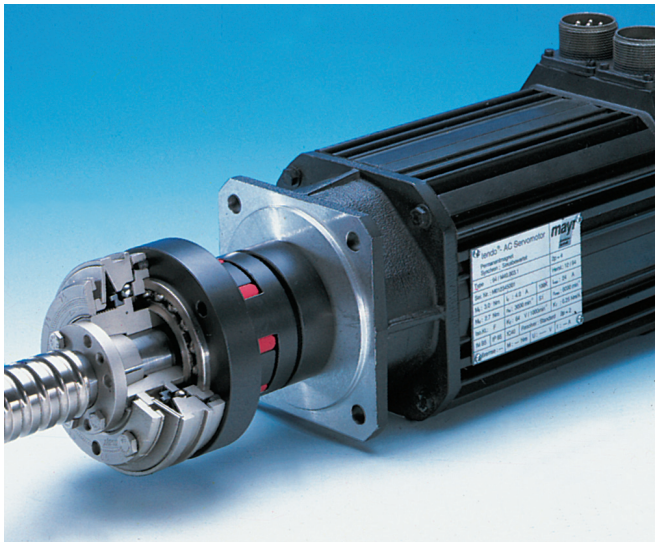
EAS®-NC Clutches
optimum overload protection for your machinery.

EAS®-NC Torque Limiting Clutches guarantee economic protection and reliable operation, in order to maximise utilisation of machinery and equipment.

The continually increasing electric requirements in the power transmission for dynamics, higher speeds and accuracy can be met by using EAS®-NC Clutches.

With its optimum design principles and simple mechanics, EAS®-NC Clutches can withstand the extreme operating conditions. EAS®-NC Clutches provide zero backlash torque transmission characteristics and limit the transmitted torque exactly to a pre-set value.

In case an overload condition occurs in the drive train, due to a blockage or collision for example, the clutch will disengage, disconnecting input and output, thus uncoupling up to 90 % of the damaging energy in the system, which, if not disconnected, would cause costly damage and down-time to the machine.



EAS®-NC Lastic Backlash-free version in a directly driven servo axis. This combination limits the torque precisely to the pre-set value, compensates for shaft misalignments and damps critical vibrations.

Advantages for your application

The EAS®-NC Torque Limiting Clutch is the ideal overload protection for your machine:

- Precise torque limitation prevents costly downtime and repairs in the event of an overload.
- Backlash-free torque transmission guarantees the highest drive accuracy and service life.
- Backlash-free function remains throughout the machine's life.
- High speed and high acceleration obtained through low inertia design.
- Immediate disconnection of input and output drive components prevents costly machine damage.
- The versatility of the design ensures a suitable solution for every application.
- Graduated torque setting eliminates operating errors.
- Low operating expenses through a maintenance-free principle.
- Immediate readiness for use after an overload has occured, minimising machine downtime.

Please Observe:
According to Germany notation, decimal point in this document are represented with a comma.
(e.g. 0,5 instead of 0.5)

Fast mechanical torque limiting even with electronic current monitoring systems.

Although most modern electronic systems are used for control and monitoring, blockages and collisions cannot be completely prevented. False initial start programming errors or operating errors outwit the most sophisticated control concepts. Modern electronic controls are designed with an excess-current release, which should prevent damage due to operating errors.

This type of overload protection has a considerable disadvantage which can be compensated for by a fast mechanical torque limiting safety clutch. Valuable time is lost between collision occuring until the drive motor or equipment is switched off. If a blockage occurs in the drive line the torque increases together with the motor current, and the whole drive system becomes tensioned. This overload situation can cause acute instantaneous damage before the control system registers the current rise and switches off the drive.

This gives the EAS®-NC Torque Limiting Clutch with its mechanical overload protection a decisive advantage. The damaging kinetic energies are uncoupled and released already within a few milliseconds and, as a limit switch can detect the disengaging movement of the clutch, a signal can be used to completely stop the machine or equipment.

Save time on selection and construction

Reduce your costs for product selection and construction to a minimum using our CD-ROM (***mayr***®-ROM) or our internet page (www.mayr.de), with:

- selection programme
- documentation as PDF
- CAD drawings as DXF and
- queries or order possibilities

Please visit our internet page (www.mayr.de) or ask for our CD-ROM (*mayr*®-ROM)!
Telephone 08341/804-0.

Quality, experience, competence

mayr®-drive technology has set the standards for innovative and technically economical solutions for decades. The reasons for this success are, as well as many other factors, the highest product quality and the highly-developed quality consciousness of our employees.

Our certification according to DIN EN ISO 9001:2000 and DIN EN ISO 14001 confirm the high demands which we place upon ourselves. With our polished quality management, our renowned high product quality, our years of experience and the know-how gathered during this time, we are able to offer you comprehensive competence worthy of your trust in the fields of mechanics and electronics.


IQNet
THE INTERNATIONAL CERTIFICATION NETWORK
CERTIFICATE
Chr. Mayr GmbH + Co. KG
Environmental Management System.
ISO 14001 : 1996


ZERTIFIKAT
DQS GmbH
Chr. Mayr GmbH + Co. KG
Qualitätsmanagementsystem
DIN EN ISO 9001 : 2000

Further products in the EAS®-programme:

EAS®-Compact-R
Only corrosion-protected safety clutches are suitable for critical conditions with wet ambient conditions or aggresive mediums. Our product selection ranges from open designs made of stainless steel to sealed, rust-proof clutches or units for integration between the motor and the gearbox.

EAS®-Sp / EAS®-Sm / EAS®-Zr
Pneumatically or electromagnetically controlled torque limiting clutches with a complete disengage, remote-control on-off clutching function. Torque adjustable to suit varied operating conditions.

EAS®-element clutch / EAS®-element
EAS®-element based EAS®-element clutches for high torque applications (0,25–190 kNm). Basic elements can be integrated into existing constructions and offer flexibility of design to suit specific applications.

EAS®-axial
Linear motion overload protection. Tensile and compressive forces monitored via unique compact mechanical element. Eight sizes cover forces between 50 an 300 000 N in 12 variations in type and design.

Indicated torque adjustment

- ❏ The torque can be adjusted sensitively and accurately indicated by the fine pitch threaded graduated adjusting nut.
- ❏ The positive locking of the adjusting nut protects against self-acting unintended adjustment of the pre-set limiting torque. For the NC-sizes 4 to 6 there is an additional mechanical lock and back drive locking.

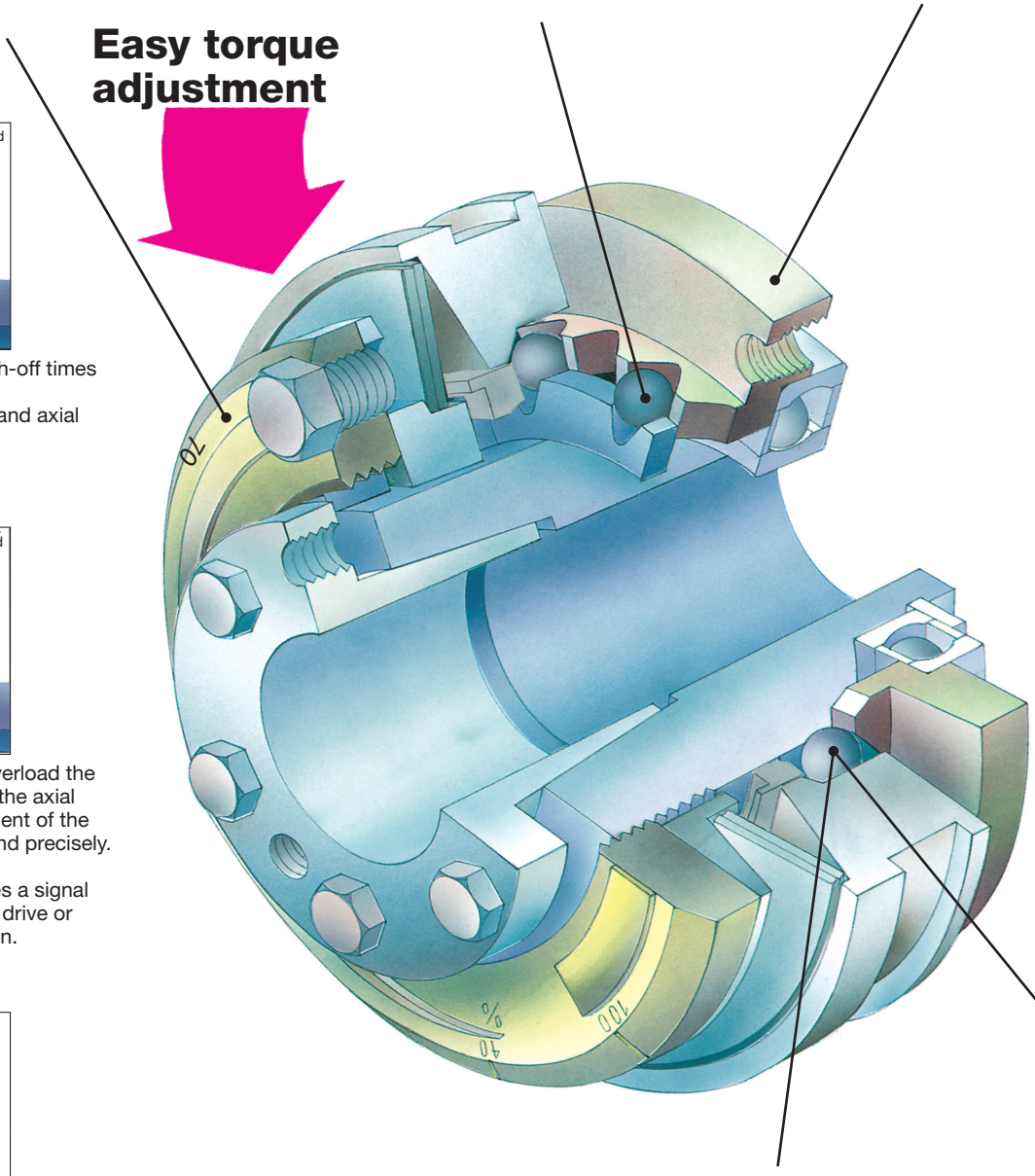
Torque limitation

- ❏ Adjustable torques are transmitted via balls placed in two geometrical defined seats from hub to pressure flange.
- ❏ The balls ratchet out of seats when the pre-set limiting torque is exceeded.

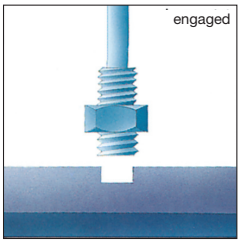
Pressure flange

- ❏ Axially and radially supported by a deep groove ball bearing.
- ❏ Precise connection and axial location of the drive element.

Easy torque adjustment



Limit switch

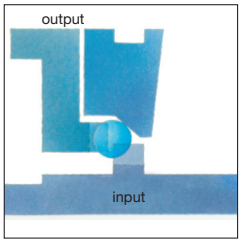


- ❏ Extreme short switch-off times
- ❏ Precise connection and axial point adjustment

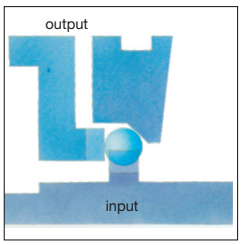
Signal usage

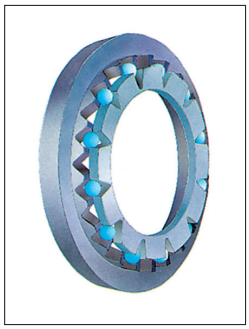
- ❏ In the event of an overload the limit switch detects the axial disengaging movement of the thrust ring quickly and precisely.
- ❏ The limit switch gives a signal for switching off the drive or other control function.

engaged



disengaged

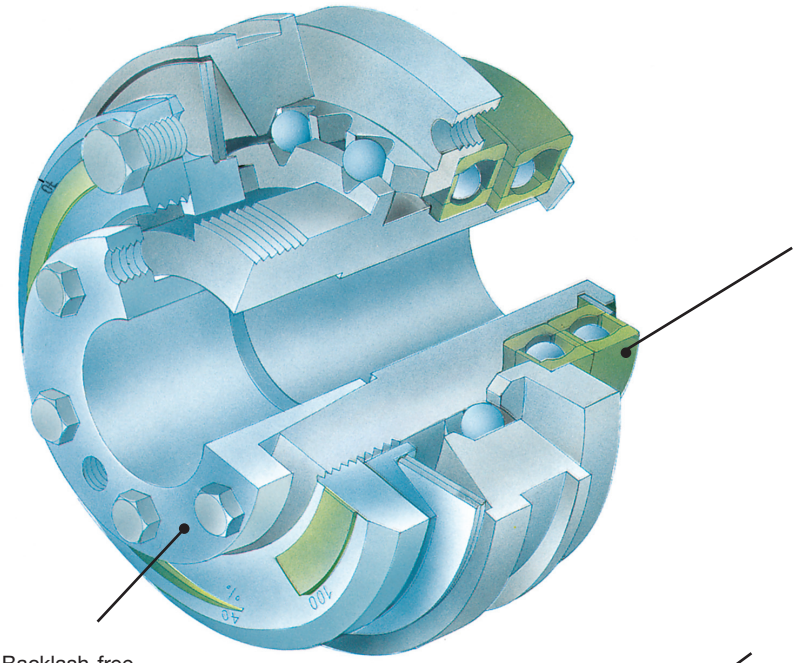




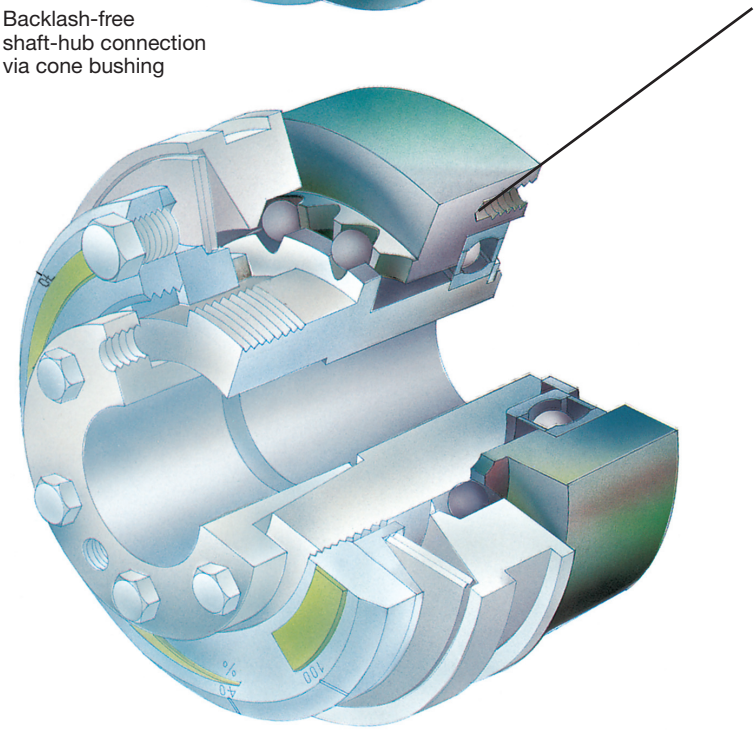
The patented backlash-free principle

The backlash-free torque transmission

- ❏ Balls located in **radially and axially arranged recesses** on the hub and pressure flange.
- ❏ The balls are pressed by the thrust ring **simultaneously into the recesses of the hub and pressure flange** and, therefore, transmit the torque backlash-free in both directions of rotation, even with reversing direction of rotation.
- ❏ Consistent and precise torque decrease in the event of an overload due to *mayr*® cup springs with degressive spring characteristic.



Backlash-free
shaft-hub connection
via cone bushing



EAS®-NC variations

EAS®-NC Type 450
Design .2

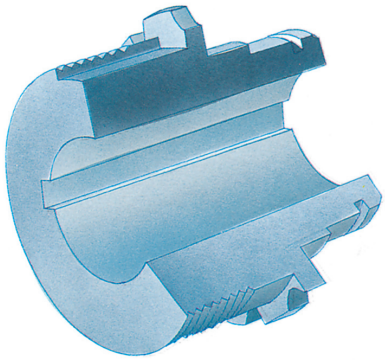
Clutch with special hub variations for fitting of wide drive elements to customer requirements.

- ❏ Stable double bearing
- ❏ Ready for attachment
- ❏ High degree of true running accuracy

EAS®-NC Type 451

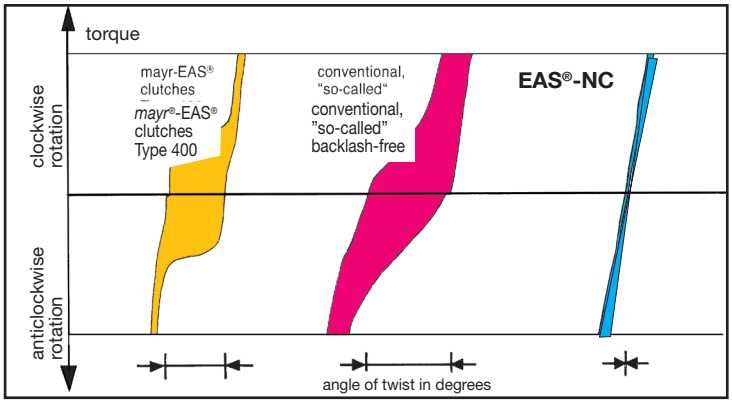
The EAS®-NC principle with the mounting dimensions of our well proven EAS®-Type series 400.

- ❏ Backlash-free
- ❏ Roller bearing in the pressure flange
- ❏ High degree of switching-off accuracy
- ❏ Degressive spring characteristic



EAS®-NC hub with positive shaft-hub connection

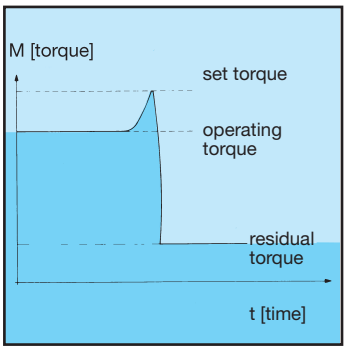
EAS®-NC - the backlash-free principle



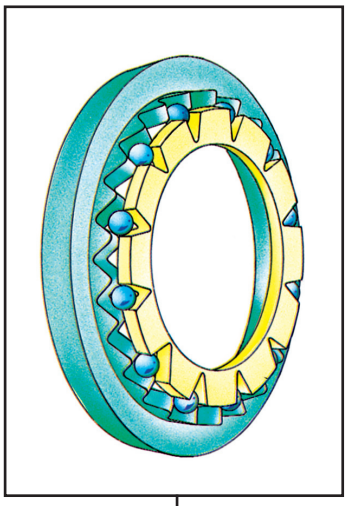
Backlash is:

- ❏ The angular tolerance between input and output clutch components.
- ❏ Also known as circumferential backlash.
- ❏ Not to be mistaken for transmitting backlash from shaft to hub.
- ❏ **With *mayr*® backlash-free means: backlash → 0** (see graph).

EAS®-NC ratchetting clutch



Switching behaviour

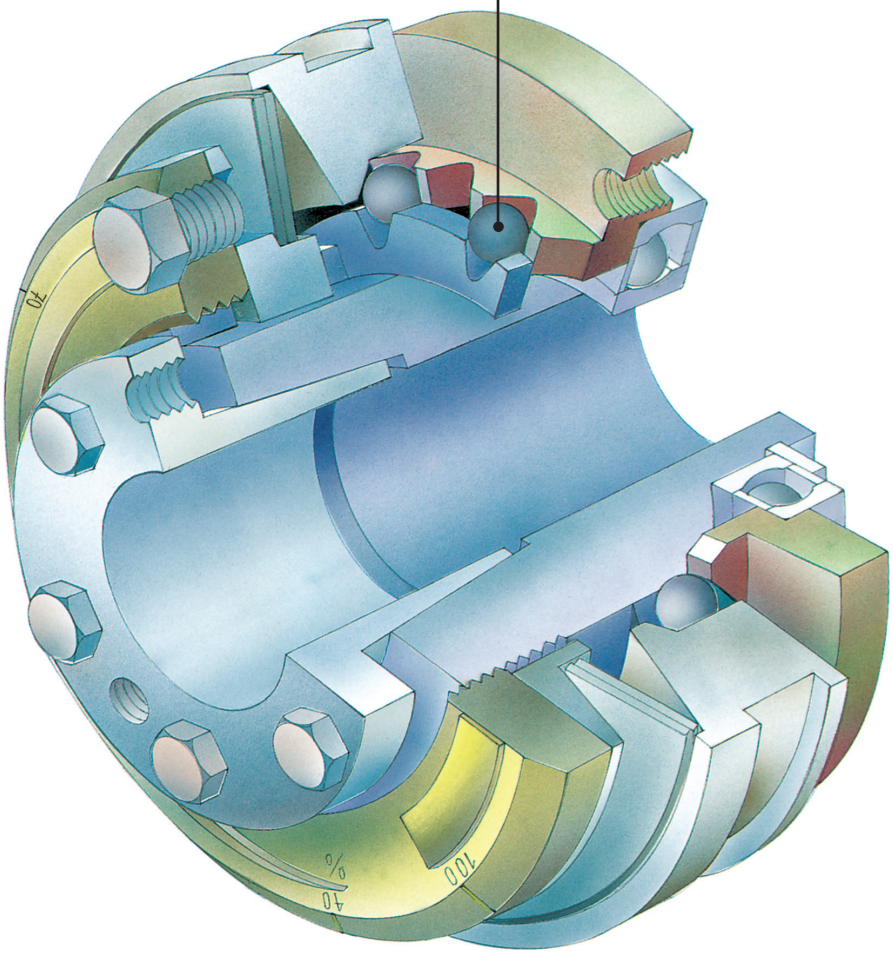


Operating principle of the *mayr*®-EAS®-NC ratchetting clutch

- ❏ When the pre-set limiting torque is achieved, the torque drops immediately.
- ❏ The EAS®-NC ratchetting clutch ratchets and re-engages automatically at the next convenient ball detent after removal of the overload.
- ❏ The *mayr*® limit switch switches off the drive immediately
- ❏ or makes another control function.

The backlash-free torque transmitting safety clutch

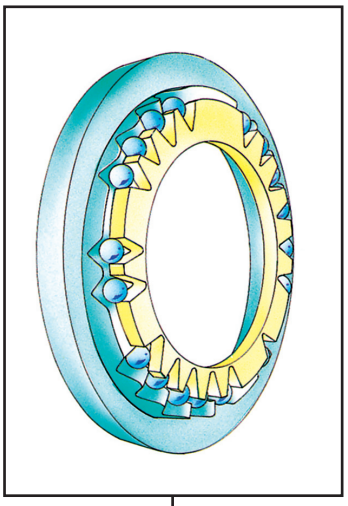
- ❏ Uniform and constant torque transmission due to precision manufacture of the ball detents.
- ❏ Clean and precise torque adjustment due to graduated, readable adjusting nut.
- ❏ In the event of an overload:
  * rapid torque decrease
  * signal for equipment control
- ❏ The EAS®-NC ratchetting clutch guarantees an immediate readiness for operation of the machine and equipment after removal of the overload.
- ❏ Reliable collision protection e.g. in feed drives of machine tools.

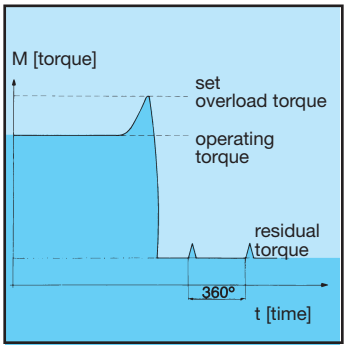


EAS®-NC synchronous clutch

Operating principle of the *mayr*®-EAS®-NC synchronous clutch

- ❏ The EAS®-NC synchronous clutch disengages when the pre-set limiting torque is achieved.
- ❏ After removal of the overload the clutch re-engages automatically synchronously at 360°. Other cycles, for example 180°, are also available.





switching behaviour

- ❏ Re-engagement is only guaranteed at a certain position due to the special *mayr*® synchronous geometry of the *mayr*®-precision balls and ball detents.
- ❏ Uniform and constant torque transmission.
- ❏ Versatile tuning controls for cycles are possible, for example
  - * transfer points
  - * feed systems
  - * handling systems.
- ❏ Clean and precise torque adjustment due to graduated, readable adjusting nut.

- ❏ In the event of an overload:
  - * immediate torque reduction
  - * control signal
  - * synchronous re-engagement
  - * reliable collision and overload protection

mayr®-EAS®-NC safety clutch in machines and equipment

- **reduces downtimes**
- **increases availability**
- **increases productivity**

a safety advantage for

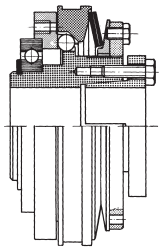
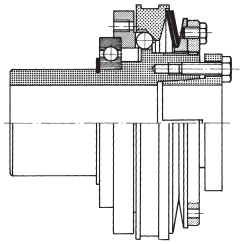
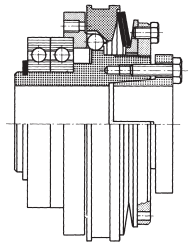
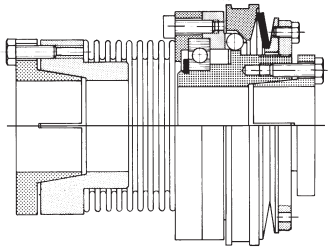
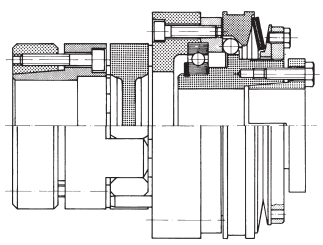
... persons

... machines

... controls

EAS®-NC ratchetting clutch/synchronous clutch

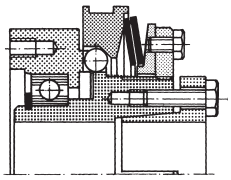
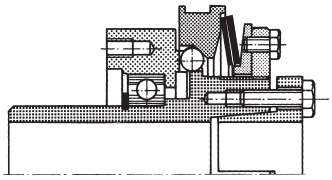
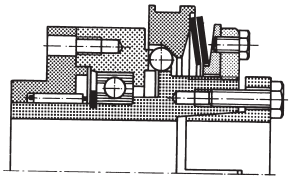
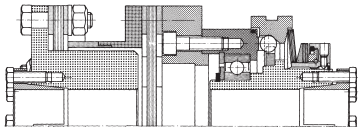
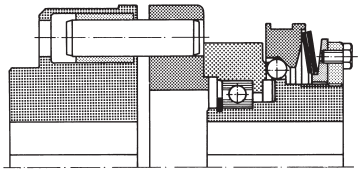
Summary of types

EAS®-NC clutch	Type Size	Torque [Nm]	Application
EAS®-NC short hub 	450._ _ _.0 Sizes 03 – 3	0,65 – 450	Flanged torque limiting clutch 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. Page 10 with cone bushing Type 450._1_.0 Page 11 with keyway Type 450._2_.0
EAS®-NC long projecting hub 	450._ _ _.1 Sizes 03 – 3	0,65 – 450	Flanged torque 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. 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. Page 12 with cone bushing Type 450._1_.1 Page 13 with keyway Type 450._2_.1
EAS®-NC two-bearings design 	450._ _ _.2 Sizes 03 – 3	0,65 – 450	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. EAS®-NC two-bearings version for direct stable location of the drive elements on the clutch, Low mass moment of inertia. Automatic re-engagement. Long working life. Page 14 with cone bushing Type 450._1_.2 Page 15 with keyway Type 450._2_.2
EAS®-NC with steel bellows coupling 	453._ _ _.0 Sizes 03 – 3	0,65 – 450	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. Page 16 with cone bushing Type 453._1_.0 Page 17 with keyway Type 453._2_.0 Page 18 with cone bushing/ clamping hub Type 453._3_.0
EAS®-NC lastic backlash-free 	454._ _ _._ Sizes 01 – 3	4 – 450,	Torque limiting clutch for flexible, backlash-free torque transmission between two coaxial shafts. The torque is transmitted backlash-free until disengagement and reduces immediately when an overload occurs. Automatic re-engagement. Compensates axial, radial and angular misalignments. High degree of damping characteristic - Long service life. Page 19 with cone bushing/ clamping hub Type 454._0_._ Page 20 with cone bushing/ shrink disc Type 454._1_._ Page 21 with keyway Type 454._2_._

EAS®-NC ratchetting clutch/synchronous clutch

mayr® power transmission

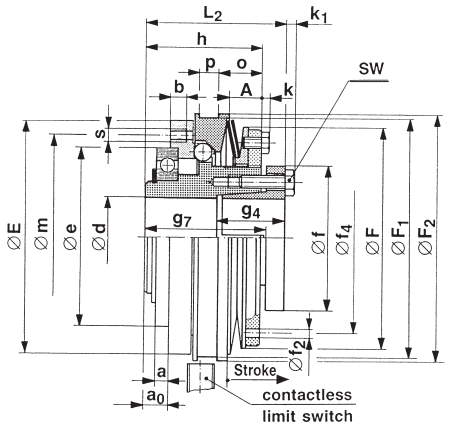
Summary of types

EAS®-NC clutch	Type Size	Torque [Nm]	Application
EAS®-NC short hub with fitting dimensions of the type series 400 	451.___.0 Sizes 01 – 6	4 – 2400	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.
			Page 22 with cone bushing Type 451._1_.0
			Page 23 with keyway Type 451._2_.0
EAS®-NC with long projecting hub and fitting dimensions of the type series 400 	451.___.1 Sizes 01 – 6	4 – 2400	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.
			Page 24 with cone bushing Type 451._1_.1
			Page 25 with keyway Type 451._2_.1
EAS®-NC with short supported hub and fitting dimensions of the type series 400 	451.___.5 Sizes 01 – 3	4 – 450	Simple symmetrical and narrow drive elements can be fitted without additional support bearing due to the integrated bearing. Low mass moment of inertia. Automatic re-engagement. Long working life.
			Page 26 with cone bushing Type 451._1_.5
			Page 27 with keyway Type 451._2_.5
EAS®-NC torsionally rigid 	456.___.8 Sizes 4 – 6	75 – 2400	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. High torsional stiffness. Long working life.
			Page 28 with cone bushing Type 456._1_.8
			Page 29 with keyway Type 456._2_.8
EAS®-NC lastic 	457._2_.0 Sizes 01 – 3	4 – 450	Backlash-free torque limiting clutch combined with a torsionally flexible shaft coupling for connection two shafts. The flexible coupling section is designed as a simple slip-on coupling which allows an easy assembly and dismantling of the clutch. Long working life.
			Page 30 with keyway Type 457._2_.0
Mounting examples and Technical explanations			Page 31 – 35
Electrical accessories			Limit switch
			Page 36 – 38

EAS®-NC ratchetting clutch/synchronous clutch

Short hub with cone bushing

Type 450._1_.0



Sizes 03 – 3 Type 450._1_.0

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 450.51_.0 Nm	Type 450.61_.0 Nm	Type 450.71_.0 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000027	0,000008	0,18	4xM3	1
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000054	0,000018	0,28	4xM3	1
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,00019	0,00006	0,55	4xM4	3
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,00047	0,00018	0,94	6xM4	3
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00120	0,00039	1,63	6xM5	5,5
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00273	0,00077	3,03	6xM6	9,5
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00620	0,00173	3,95	8xM6	9,5

Dimensions

Size	Bore d 2) from – to mm	Min. shaft length g_4 mm	g_7 mm	A 6)	a 7)	a_0	b	E	e_{h5} 8)	F
03	6 – 12	11,5	25,5	7,2	2	4,5	5	40	30	37
02	8 – 15	15,5	30,5	9,5	2	5	5	47	37	42
01	9 – 16	18	36	9,5	3	6	6	60	47	57
0	12 – 20	23	43	10,2	4	8	7	77	62	63
1	15 – 25	27	49	10,9	5	10	7,5	90	68	82
2	22 – 35	29	54	12,6	5	10	8,5	106	80	103
3	32 – 45	32	61	14,7	5	10	9,5	125	100	118,5

Size	F_1	F_2	f	f_2	f_4	h 6)	k	k_1	L_2 3)	m	o 6)	p	s	SW
03	– 4)	45	26	–	–	24	– 5)	2	28,5	35	– 4)	– 4)	6 x M3	5,5
02	– 4)	50	30	3	37	29	– 5)	2	34,5	42	– 4)	– 4)	6 x M3	5,5
01	– 4)	65	35	5	46	33	1,0 5)	2,8	41	53	– 4)	– 4)	6 x M4	7
0	75	80	39	5	50	41	1,3 5)	2,8	49	69	14,9	7,5	6 x M5	7
1	90	95	48	6	67	47	3,0	3,5	56	80	17,4	7,5	6 x M6	8
2	105	110	61	6	84	52	5,5	4	62	90	19,7	8	6 x M6	10
3	125	130	74	7	104	59	5,5	4	70	112	23,5	9	6 x M8	10

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 $_{h6}$, above Ø 38 $_{h8}$
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) thrust washer without keyway, limit switch is located at the control element-front face
5) countersunk screw with hexagon socket DIN 7991
6) the dimensions A; h; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		450._1_.0		see pages 36–38

03 – 3 →
* medium torque range. . . . . 5 →
* high torque range. . . . . 6 →
* max. torque range . . . . . 7 →

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

* see technical data, limiting torque for overload M_G

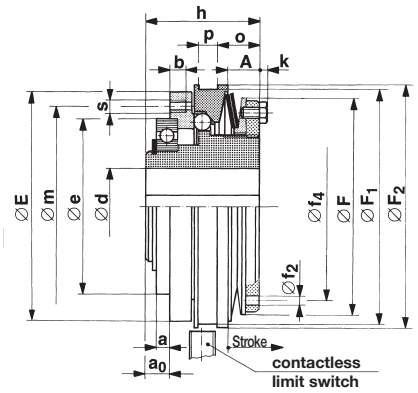
Example: Order number 1 / 450.610.0 / 25 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

mayr® power transmission

Short hub with keyway

Type 450._2_.0



Sizes 03 – 3 Type 450._2_.0

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 450.52_.0 Nm	Type 450.62_.0 Nm	Type 450.72_.0 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm²	Pressure flange side kgm²	Weight kg
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000025	0,000008	0,17
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000051	0,000018	0,26
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,00018	0,00006	0,51
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,00046	0,00018	0,89
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00117	0,00039	1,62
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00265	0,00077	2,86
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00602	0,00173	3,72

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 6)	a 7)	a_0	b	E	e_{h5} 8)	F
03	6	11	7,2	2	4,5	5	40	30	37
02	8	16 4)	9,5	2	5	5	47	37	42
01	9	20	9,5	3	6	6	60	47	57
0	12	20	10,2	4	8	7	77	62	63
1	15	25	10,9	5	10	7,5	90	68	82
2	22	35 5)	12,6	5	10	8,5	106	80	103
3	32	45	14,7	5	10	9,5	125	100	118,5

Size	F_1	F_2	f_2	f_4	h 6)	k	m	o 6)	p	s
03	– 2)	45	–	–	24	– 3)	35	– 2)	– 2)	6 x M3
02	– 2)	50	3	37	29	– 3)	42	– 2)	– 2)	6 x M3
01	– 2)	65	5	46	33	1 3)	53	– 2)	– 2)	6 x M4
0	75	80	5	50	41	1,3 3)	69	14,9	7,5	6 x M5
1	90	95	6	67	47	3,0	80	17,4	7,5	6 x M6
2	105	110	6	84	52	5,5	90	19,7	8	6 x M6
3	125	130	7	104	59	5,5	112	23,5	9	6 x M8

1) other sizes for lower and higher torques on request
2) thrust washer without keyway, limit switch is located at the control element-front facer
3) countersunk screw with hexagon socket DIN 7991
4) up to Ø 14 Nut keyway to DIN 6885/1, above Ø 14 keyway to DIN 6885/3
5) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
6) the dimensions A; h; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

9) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	With limit switch
Order number:		450._2_.0	9)	see pages 36–38

03 – 3 → size
* medium torque range . . . . . 5 → 0 ratchetting clutch
* high torque range. . . . . 6 → 5 synchronous clutch
* max. torque range . . . . . 7 → according to size

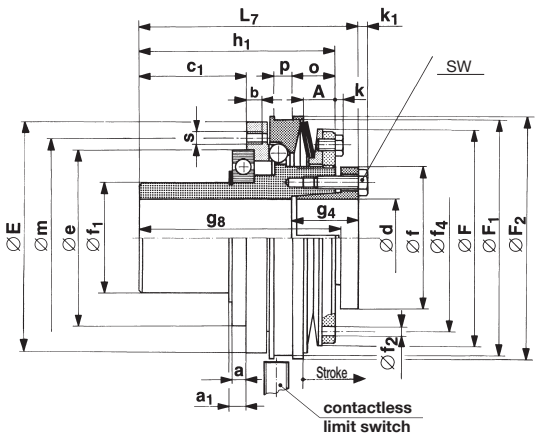
* see technical data, limiting torque for overload M_G

Exemple: Order number 1 / 450.620.0 / 25 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Long projecting hub with cone bushing

Type 450._1_.1



Sizes 03 – 3 Type 450._1_.1

Technical data

Size [1]	Limiting torques for overload M_G [1] Type 450.51_.1 Nm	Type 450.61_.1 Nm	Type 450.71_.1 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000028	0,000008	0,20	4xM3	1
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000058	0,000018	0,32	4xM3	1
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,00019	0,00006	0,63	4xM4	3
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,00050	0,00018	1,11	6xM4	3
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00126	0,00039	1,78	6xM5	5,5
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00287	0,00077	3,45	6xM6	9,5
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00676	0,00173	5,03	8xM6	9,5

Dimensions

Size	Bore d [2] from – to mm	Min. shaft length g_4 mm	g_8 mm	A [6]	a [7]	a_1	b	c_1	E	e_{h5} [8]	F
03	6 – 12	11,5	41,5	7,2	2	3,0	5	20,5	40	30	37
02	8 – 15	15,5	50,5	9,5	2	3,2	5	25	47	37	42
01	9 – 16	18	61	9,5	3	4,2	6	31	60	47	57
0	12 – 20	23	70	10,2	4	5,5	7	35	77	62	63
1	15 – 25	27	79	10,9	5	6,75	7,5	40	90	68	82
2	22 – 35	29	92	12,6	5	7,0	8,5	48	106	80	103
3	32 – 45	32	111	14,7	5	7,5	9,5	60	125	100	118,5

Size	F_1	F_2	f	f_{1h6}	f_2	f_4	h_1 [6]	k	k_1	L_7 [3]	m	o [6]	p	s	SW
03	– [4]	45	26	17	–	–	40	– [5]	2	44,5	35	– [4]	– [4]	6 x M3	5,5
02	– [4]	50	30	25	3	37	49	– [5]	2	54,5	42	– [4]	– [4]	6 x M3	5,5
01	– [4]	65	35	30	5	46	58	1 [5]	2,8	66	53	– [4]	– [4]	6 x M4	7
0	75	80	39	35	5	50	68	1,3 [5]	2,8	76	69	14,9	7,5	6 x M5	7
1	90	95	48	40	6	67	77	3,0	3,5	86	80	17,4	7,5	6 x M6	8
2	105	110	61	50	6	84	90	5,5	4	100	90	19,7	8	6 x M6	10

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) thrust washer without keyway, limit switch is located at the control element-front face
5) countersunk screw with hexagon socket DIN 7991
6) the dimensions A; h_1; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		450._1_.1		see pages 36–38

03 – 3 → Size
* medium torque range . . . . . 5 → Type
* high torque range . . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

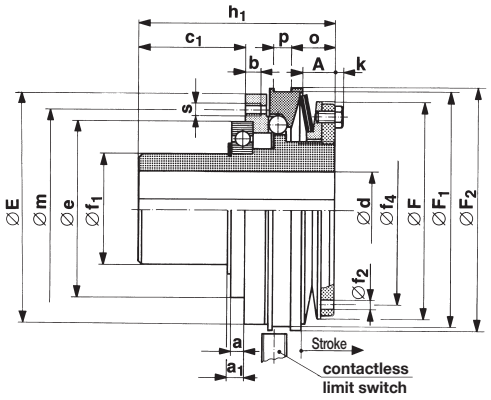
* see technical data, limiting torque for overload M_G

Example: Order number 2 / 450.510.1 / 30 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Long projecting hub keyway

Type 450._2_.1 with keyway



Sizes 03 – 3 Type 450._2_.1

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 450.52_.1 Nm	Type 450.62_.1 Nm	Type 450.72_.1 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm²	Pressure flange side kgm²	Weight kg
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000026	0,000008	0,19
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000055	0,000018	0,30
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,00019	0,00006	0,59
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,00049	0,00018	1,06
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00123	0,00039	1,77
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00279	0,00077	3,28
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00658	0,00173	4,80

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 6)	a 7)	a_1	b	c_1	E	e_{h5} 8)	F
03	6	11	7,2	2	3,0	5	20,5	40	30	37
02	8	16 4)	9,5	2	3,2	5	25	47	37	42
01	9	20	9,5	3	4,2	6	31	60	47	57
0	12	20	10,2	4	5,5	7	35	77	62	63
1	15	25	10,9	5	6,75	7,5	40	90	68	82
2	22	35 5)	12,6	5	7,0	8,5	48	106	80	103
3	32	45	14,7	5	7,5	9,5	60	125	100	118,5

Size	F_1	F_2	$f_{1\ h6}$	f_2	f_4	h_1 6)	k	m	o 6)	p	s
03	– 2)	45	17	–	–	40	– 3)	35	– 2)	– 2)	6 x M3
02	– 2)	50	25	3	37	49	– 3)	42	– 2)	– 2)	6 x M3
01	– 2)	65	30	5	46	58	1 3)	53	– 2)	– 2)	6 x M4
0	75	80	35	5	50	68	1,3 3)	69	14,9	7,5	6 x M5
1	90	95	40	6	67	77	3,0	80	17,4	7,5	6 x M6
2	105	110	50	6	84	90	5,5	90	19,7	8	6 x M6
3	125	130	65	7	104	109	5,5	112	23,5	9	6 x M8

1) other sizes for lower and higher torques on request
2) thrust washer without keyway, limit switch is located at the control element-front face
3) countersunk screw with hexagon socket DIN 7991
4) up to Ø 14 keyway to DIN 6885/1, above Ø 14 keyway to DIN 6885/3
5) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
6) the dimensions A; h_1; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

9) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	With limit switch
Order number:		450._2_.1	9)	see pages 36–38

03 – 3 → Size
* medium torque range . . . . . 5 → Type
* high torque range . . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

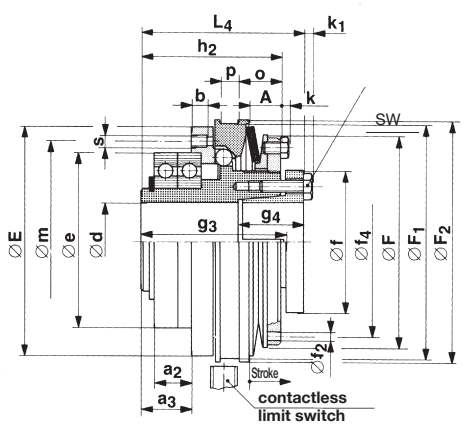
* see technical data, limiting torque for overload M_G

Example: Order number 2 / 450.520.1 / 30 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Two-bearings design with cone bushing

Type 450._1_.2



Sizes 03 – 3 Type 450._1_.2

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 450.51_.2 Nm	Type 450.61_.2 Nm	Type 450.71_.2 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000028	0,000008	0,13	4xM3	1
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000058	0,000018	0,31	4xM3	1
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,000197	0,00006	0,60	4xM4	3
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,000496	0,00018	1,03	6xM4	3
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00124	0,00039	1,74	6xM5	5,5
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00282	0,00077	3,20	6xM6	9,5
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00697	0,00173	4,24	8xM6	9,5

Dimensions

Size	Bore d 2) from – to mm	Min. shaft length g_3 mm	g_4 mm	A 6)	a_2 7)	a_3	b	E	e_{h5} 8)	F
03	6 – 12	32,5	11,5	7,2	9	11,5	5	40	30	37
02	8 – 15	37,5	15,5	9,5	9	12	5	47	37	42
01	9 – 16	45	18	9,5	12	15	6	60	47	57
0	12 – 20	52	23	10,2	13	17	7	77	62	63
1	15 – 25	58	27	10,9	14	19	7,5	90	68	82
2	22 – 35	64	29	12,6	15	20	8,5	106	80	103
3	32 – 45	72	32	14,7	16	21	9,5	125	100	118,5

Size	F_1	F_2	f	f_2	f_4	h_2 6)	k	k_1	L_4 3)	m	o 6)	p	s	SW
03	– 4)	45	26	–	–	31	– 5)	2	35,5	35	– 4)	– 4)	6 x M3	5,5
02	– 4)	50	30	3	37	36	– 5)	2	41,5	42	– 4)	– 4)	6 x M3	5,5
01	– 4)	65	35	5	46	42	1,0 5)	2,8	50	53	– 4)	– 4)	6 x M4	7
0	75	80	39	5	50	50	1,3 5)	2,8	58	69	14,9	7,5	6 x M5	7
1	90	95	48	6	67	56	3,0	3,5	65	80	17,4	7,5	6 x M6	8
2	105	110	61	6	84	62	5,5	4	72	90	19,7	8	6 x M6	10
3	125	130	74	7	104	70	5,5	4	81	112	23,5	9	6 x M8	10

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) thrust washer without keyway, limit switch is located at the control element-front face
5) countersunk screw with hexagon socket DIN 7991
6) the dimensions A; h_2; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		450._1_.2		see pages 36–38

03 – 3 →
* medium torque range . . . . . 5 →
* high torque range . . . . . 6 →
* max. torque range . . . . . 7 →

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

* see technical data, limiting torque for overload M_G

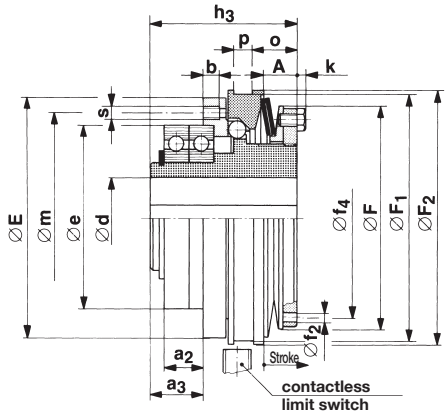
Example: Order number 1 / 450.610.2 / 25 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

mayr® power transmission

Two-bearings design with keyway

Type 450._2_.2



Sizes 03 – 3 Type 450._2_.2

Technical data

1) Size	Limiting torques for overload M_G 1) Type 450.52_.2 Nm	Type 450.62_.2 Nm	Type 450.72_.2 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	4000	0,8	0,000026	0,000008	0,18
02	2 – 5	5 – 10	6 – 15	4000	1,0	0,000055	0,000018	0,29
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,000197	0,00006	0,56
0	8 – 20	15 – 40	23 – 60	4000	1,5	0,000496	0,00018	0,98
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,00124	0,00039	1,73
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00282	0,00077	3,03
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00697	0,00173	4,01

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 6)	a_2 7)	a_3	b	E	e_{h5} 8)	F
03	6	11	7,2	9	11,5	5	40	30	37
02	8	16 4)	9,5	9	12	5	47	37	42
01	9	20	9,5	12	15	6	60	47	57
0	12	20	10,2	13	17	7	77	62	63
1	15	25	10,9	14	19	7,5	90	68	82
2	22	35 5)	12,6	15	20	8,5	106	80	103
3	32	45	14,7	16	21	9,5	125	100	118,5

Size	F_1	F_2	f_2	f_4	h_3 6)	k	m	o 6)	p	s
03	– 2)	45	–	–	31	– 3)	35	– 2)	– 2)	6 x M3
02	– 2)	50	3	37	36	– 3)	42	– 2)	– 2)	6 x M3
01	– 2)	65	5	46	42	1 3)	53	– 2)	– 2)	6 x M4
0	75	80	5	50	50	1,3 3)	69	14,9	7,5	6 x M5
1	90	95	6	67	56	3,0	80	17,4	7,5	6 x M6
2	105	110	6	84	62	5,5	90	19,7	8	6 x M6
3	125	130	7	104	70	5,5	112	23,5	9	6 x M8

1) other sizes for lower and higher torques on request
2) thrust washer without keyway, limit switch is located at the control element-front face
3) countersunk screw with hexagon socket DIN 7991
4) up to Ø 14 keyway to DIN 6885/1, above Ø 14 keyway to DIN 6885/3
5) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
6) the dimensions A; h^3; o refer to the hub edge
7) mounting tolerance +0,1
8) fit by the user H7

We reserve the right to make dimensional and design alterations.

9) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	With limit switch
Order number:		450._2_.2	9)	see pages 36–38

03 – 3 →
* medium torque range . . . . . 5 →
* high torque range . . . . . 6 →
* max. torque range . . . . . 7 →

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

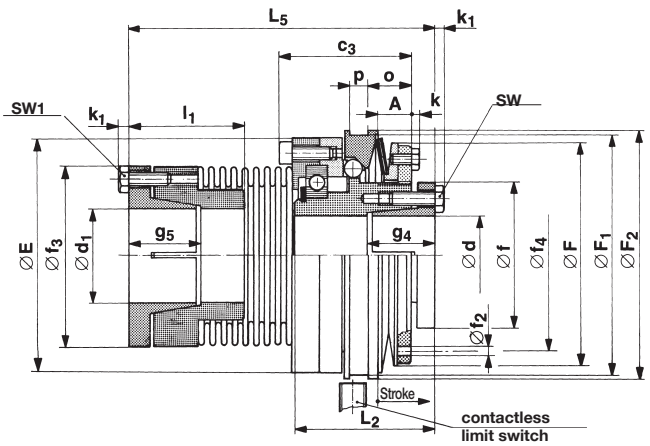
* see technical data, limiting torque for overload M_G

Example: Order number 1 / 450.620.2 / 25 / 6885–1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Steel bellows with cone bushing

Type 453._1_.0



Sizes 03 – 3 Type 453._1_.0

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 453.51_.0 Nm	Type 453.61_.0 Nm	Type 453.71_.0 Nm	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 axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	12	4000	0,8	0,2	2	0,1
02	2 – 5	5 – 10	6 – 15	25	4000	1,0	0,3	2	0,1
01	4 – 10	8 – 20	12 – 30	50	4000	1,2	0,4	2	0,15
0	8 – 20	15 – 40	23 – 60	100	4000	1,5	0,5	2	0,15
1	15 – 36	30 – 72	45 – 108	200	3000	1,8	0,8	2	0,2
2	30 – 75	60 – 150	90 – 225	350	2500	2,0	1,0	2	0,25
3	60 – 150	120 – 300	180 – 450	600	2000	2,2	1,2	2	0,3

Size	Mass moments of inertia I Hub side kgm^2	Flexible side kgm^2	Weight kg	Clamping bolts and tightening torques at Ø d mm	Nm	at Ø d_1 mm	Nm	Bore 2) d from–to mm	d_1 from–to mm	Min. shaft length g_4 mm	g_5 mm
03	0,000027	0,000026	0,29	4 x M3	1,3	4 x M3	1,3	6 – 12	6 – 12	11,5	12,5
02	0,000054	0,000059	0,47	4 x M3	1,3	4 x M3	1,3	8 – 15	8 – 15	15,5	16
01	0,00019	0,00020	0,97	4 x M4	3	4 x M4	3	9 – 16	9 – 20	18	23,5
0	0,00047	0,00061	1,68	6 x M4	3	6 x M5	5,5	12 – 20	12 – 25	23	27
1	0,00120	0,00133	2,73	6 x M5	5,5	6 x M6	9,5	15 – 25	15 – 35	27	29
2	0,00273	0,00274	4,75	6 x M6	9,5	6 x M8	17	22 – 35	22 – 42	29	32
3	0,00620	0,00616	6,55	8 x M6	9,5	8 x M8	15	32 – 45	32 – 50	32	35

Dimensions

Size	A 6)	c_3 6)	E	F	F_1	F_2	f	f_2	f_3	f_4	k	k_1	L_2 3)	L_5 3)	l_1 3)	o 6)	p	SW	SW_1
03	7,2	28	40	37	– 5)	45	26	–	30	–	– 5)	2	28,5	58,5	14	– 4)	– 4)	5,5	5,5
02	9,5	33,5	47	42	– 5)	50	30	3	36	37	– 5)	2	34,5	70,5	21	– 4)	– 4)	5,5	5,5
01	9,5	36,5	60	57	– 5)	65	35	5	47	46	1,0 5)	2,8	41	85	27	– 4)	– 4)	7	7
0	10,2	48	77	63	75	80	39	5	58	50	1,3 5)	2,8	49	98	36	14,9	7,5	7	8
1	10,9	54	90	82	90	95	48	6	70	67	3,0	3,5	56	115	39	17,4	7,5	8	10
2	12,6	60	106	103	105	110	61	6	80	84	5,5	4	62	134	47	19,7	8	10	13
3	14,7	69	125	118,5	125	130	74	7	97	104	5,5	4	70	152	56	23,5	9	10	13

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) thrust washer without keyway, limit switch is located at the control element-front face
5) countersunk screw with hexagon socket DIN 7991
6) the dimensions A; h; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	Bore Ø d_1 H7	With limit switch
Order number:		4 5 3 . _ 1 _ . 0			see pages 36–38

03 – 3 → Size
* medium torque range . . . . . 5 → Type
* high torque range . . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size (Bore Ø d H7)
→ according to size (Bore Ø d_1 H7)
→ 0 ratchetting clutch
→ 5 synchronous clutch

* see technical data, limiting torque for overload M_G

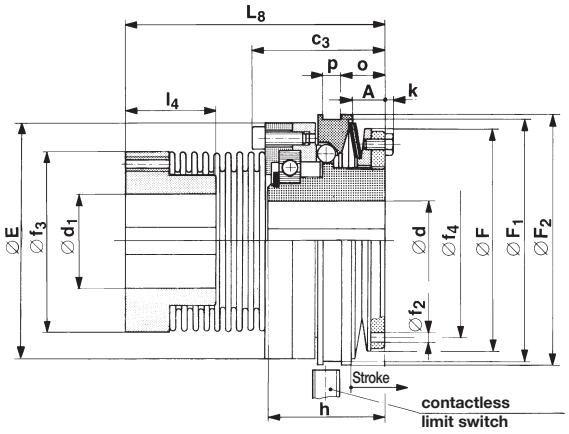
Example: Order number 2 / 453.615.0 /22/ 25 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

mayr® power transmission

Steel bellows with keyway

Type 453._2_.0



Sizes 03 – 3 Type 453._2_.0

Technical data

Size [1]	Limiting torques for overload M_G [1] Type 453.52_.0 Nm	Type 453.62_.0 Nm	Type 453.72_.0 Nm	Nominal torque of flexible, torsionally rigid steel coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
03	0,65 – 1,3	1,3 – 2,6	2 – 3,8	12	4000	0,8	0,2	2	0,1
02	2 – 5	5 – 10	6 – 15	25	4000	1,0	0,3	2	0,1
01	4 – 10	8 – 20	12 – 30	50	4000	1,2	0,4	2	0,15
0	8 – 20	15 – 40	23 – 60	100	4000	1,5	0,5	2	0,15
1	15 – 36	30 – 72	45 – 108	200	3000	1,8	0,8	2	0,2
2	30 – 75	60 – 150	90 – 225	350	2500	2,0	1,0	2	0,25
3	60 – 150	120 – 300	180 – 450	600	2000	2,2	1,2	2	0,3

Size	Mass moments of inertia I Hub side kgm^2	Flexible side kgm^2	Weight kg	Bore d_{min} mm	d_{max} mm	$d_{1\,min}$ mm	$d_{1\,max}$ mm
03	0,000025	0,000026	0,29	6	11	6	11
02	0,000051	0,000059	0,47	8	16 [4]	8	16 [4]
01	0,00018	0,00020	0,97	9	20	9	20 [6]
0	0,00046	0,00061	1,68	12	20	12	25 [7]
1	0,00117	0,00133	2,73	15	25	15	35 [5]
2	0,00265	0,00274	4,75	22	35 [5]	22	42 [8]
3	0,00602	0,00616	6,55	32	45	32	50

Dimensions

Size	A [9]	c_3 [9]	E	F	F_1	F_2	f_2	f_3	f_4	h	k	L_8 [9]	l_4	o [9]	p
03	7,2	28	40	37	– [2]	45	–	30	–	24	– [3]	49,3	9,5	– [2]	– [2]
02	9,5	33,5	47	42	– [2]	50	3	36	37	29	– [3]	59	15	– [2]	– [2]
01	9,5	36,5	60	57	– [2]	65	5	47	46	33	1,0 [3]	69	25	– [2]	– [2]
0	10,2	48	77	63	75	80	5	58	50	41	1,3 [3]	81	27	14,9	7,5
1	10,9	54	90	82	90	95	6	70	67	47	3,0	96	29	17,4	7,5
2	12,6	60	106	103	105	110	6	80	84	52	5,5	113	36	19,7	8
3	14,7	69	125	118,5	125	130	7	97	104	59	5,5	129	44	23,5	9

1) other sizes for lower and higher torques on request
2) thrust washer without keyway, limit switch is located at the control element-front face
3) countersunk screw with hexagon socket DIN 7991
4) up to Ø 14 keyway to DIN 6885/1, above Ø 14 keyway to DIN 6885/3
5) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
6) up to Ø 18 keyway to DIN 6885/1, above Ø 18 keyway to DIN 6885/3
7) up to Ø 22 keyway to DIN 6885/1, above Ø 22 keyway to DIN 6885/3
8) up to Ø 38 keyway to DIN 6885/1, above Ø 38 keyway to DIN 6885/3
9) the dimensions A; c_3; L_8; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	Bore Ø d_1 H7	With limit switch
Order number:		453._2_.0			see pages 36–38

03 – 3 →
* medium torque range . . . . . 5 →
* high torque range . . . . . 6 →
* max. torque range . . . . . 7 →

→ according to size
→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

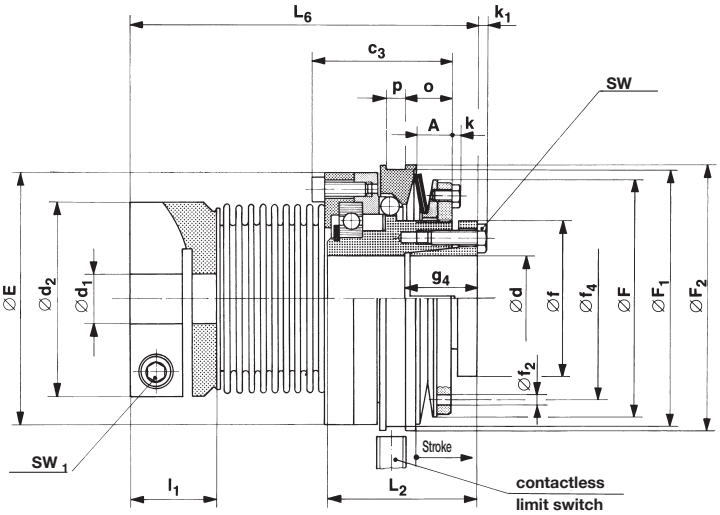
* see technical data, limiting torque for overload M_G

Example: Order number 3 / 453.525.0 / 30 / 6885-1 / 40 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

EAS®-NC with steel bellows
NC-side cone bushing
bellows side clamping hub

Type 453._3_.0



Sizes 0 – 3 Type 453._3_.0

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 453.53_.0 Nm	Type 453.63_.0 Nm	Type 453.73_.0 Nm	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 axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
0	8 – 20	15 – 40	23 – 60	100	4000	1,5	0,5	2	0,15
1	15 – 36	30 – 72	45 – 108	200	3000	1,8	0,8	2	0,2
2	30 – 75	60 – 150	90 – 225	350	2500	2,0	1,0	2	0,25
3	60 – 150	120 – 300	180 – 450	600	2000	2,2	1,2	2	0,3

Size	Mass moments of inertia I Hub side kgm^2	Flexible side kgm^2	Weight kg	Clamping bolts and tightening torques SW mm	SW Nm	SW_1 mm	SW_1 Nm	Bore d 2) from–to mm	Bore d_1 from–to mm	Min. shaft length g_4 mm	Min. shaft length l_1 mm
0	0,00047	0,00061	1,68	6 x M4	3	M6	18	12 – 20	15 – 32	23	28
1	0,00120	0,00133	2,73	6 x M5	5,5	M6	18	15 – 25	25 – 42	27	28
2	0,00273	0,00274	4,75	6 x M6	9,5	M8	43	22 – 35	30 – 45	29	36
3	0,00620	0,00616	6,55	8 x M6	9,5	M10	87	32 – 45	35 – 55	32	40

Dimensions

Size	A 6)	c_3 6)	d_2	E	F	F_1	F_2	f	f_2	f_4	k	k_1	L_2 3)	L_6 3)	l_1	o 6)	p	SW	SW_1
0	10,2	48	60	77	63	75	80	39	5	50	1,3 5)	2,8	49	108	28	14,9	7,5	7	5
1	10,9	54	71	90	82	90	95	48	6	67	3,0	3,5	56	122,5	28	17,4	7,5	8	5
2	12,6	60	82	106	103	105	110	61	6	84	5,5	4	62	146	36	19,7	8	10	6
3	14,7	69	98	125	118,5	125	130	74	7	104	5,5	4	70	165,5	40	23,5	9	10	8

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
5) countersunk screw with hexagon socket DIN 7991
6) the dimensions A; c3; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	Bore Ø d_1 H7	With limit switch
Order number:		4 5 3 . _ 3 _ . 0			see pages 36–38

0 – 3
* medium torque range 5
* high torque range 6
* max. torque range 7

according to size
according to size
0 ratchetting clutch
5 synchronous clutch

* see technical data, limiting torque for overload M_G

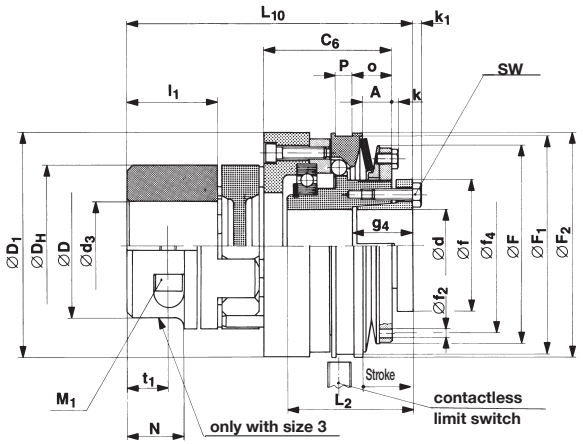
Example: Order number 2 / 453.635.0 /22/ 30 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

EAS®-NC with flexible backlash-free shaft coupling

Type 454._0_._

NC-side cone bushing
bellows side clamping hub



Sizes 01 – 3 Type 454._0_._

Technical data

Size	Limiting torque for overload M_G		Nominal torque flexible, backlash-free shaft coupling T_{KN} [1]						Max. speed n_{max}	Stroke of thrust washer in the event of an overload	Tightening torques clamping bolts T_A at the diameter:		Weight
	Type 454.50._._	Type 454.60._._	92 Shore A		98 Shore A		64 Shore D				Ø d	Ø d_3	
			T_{KN}	$T_{KN\,max}$	T_{KN}	$T_{KN\,max}$	T_{KN}	$T_{KN\,max}$					
	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	rpm	mm	Nm	Nm	kg
01	4 – 10	8 – 20	10	20	17	34	21	42	4000	1,2	3	10,5	0,95
0	8 – 20	15 – 40	35	70	60	120	75	150	4000	1,5	3	10,5	1,60
1	15 – 36	30 – 72	95	190	160	320	200	400	3000	1,8	5,5	25,0	2,70
2	30 – 75	60 – 150	190	380	325	650	405	810	2500	2,0	9,5	25,0	4,90
3	60 – 150	120 – 300	265	530	450	900	560	1120	2000	2,2	9,5	25,0	7,10

Size	Shaft misalignements flexible coupling							Mass moments of inertia I		Bores		Min. shaft length g_4
	axial	radial			angular misalignements			Hub side	Flexible side	Flexible side	EAS®-NC-side	
	92/98 Shore A 64 Shore D	92 Shore A	98 Shore A	64 Shore D	92 Shore A	98 Shore A	64 Shore D			Ød$_3$ [1]	Ød [2]	
	ΔK_a	ΔK_r	ΔK_r	ΔK_r	α	α	α					
	mm	mm	mm	mm	°	°	°	kgm²	kgm²	mm	mm	mm
01	1,2	0,10	0,06	0,04	1,0	0,9	0,8	0,00018	0,0001	10 – 20	9 – 16	18
0	1,4	0,14	0,10	0,07	1,0	0,9	0,8	0,00046	0,0004	15 – 28	12 – 20	23
1	1,5	0,15	0,11	0,08	1,0	0,9	0,8	0,00117	0,0010	19 – 35	15 – 25	27
2	1,8	0,17	0,12	0,09	1,0	0,9	0,8	0,00265	0,0020	20 – 45	22 – 35	29
3	2,0	0,19	0,14	0,1	1,0	0,9	0,8	0,00602	0,0050	28 – 45	32 – 45	32

1) The transmittable torques of the flexible coupling "T_{KN}" depend on factors, as for example with temperatures, torsional stiffness etc. Please also see clutch design ROBA®-ES cat. K.940. or contact our company. Furthermore, the transmittable torques of the flexible coupling depend on the bore diameter d_3, please also see Table 1 on page 32
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8

Dimensions

Size	A [4]	C_6	D	D_1	D_H	F	F_1	F_2	f	f_2	f_4	k	k_1	l_1	L_2 [6]	L_{10} [6]	M_1	N	o [4]	p	t_1	SW
01	9,5	38	–	65	40	57	–	65	35	5	46	1,0 [5]	2,8	25	41	89	M6	–	– [7]	– [7]	12	7
0	10,2	47	–	80	55	63	75	80	39	5	50	1,3	2,8	30	49	103	M6	–	14,9	7,5	14	7
1	10,9	55	–	95	65	82	90	95	48	6	67	3,0	3,5	35	56	119	M8	–	17,4	7,5	13,5	8
2	12,6	61	–	106	80	103	105	110	61	6	84	5,5	4	45	62	140	M8	–	19,7	8	20	10
3	14,7	69	75	130	95	118,5	125	130	74	7	104	5,5	4	50	70	156	M8	28	23,5	9	20	10

4) the dimensions A; C_6; o refer to the hub edge
5) countersunk screw with hexagon socket DIN 7991
6) dimensions in an un-tightened condition (in tightened condition shorter)
7) thrust washer without keyway, limit switch is located at the control element-front face

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	Bore Ø d_3 F7	With limit switch
Order number:		454._0_._			see pages 36–38

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
→ 3 flexible coupling 92 Shore A
→ 4 flexible coupling 98 Shore A
→ 6 flexible coupling 64 Shore D
→ 0 ratchetting clutch
→ 5 synchronous clutch

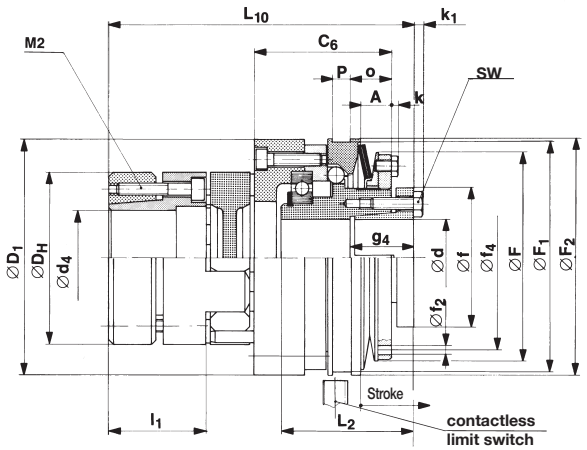
Example: Order number 2 / 454.605.3 /22/ 25 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

EAS®-NC with flexible backlash-free shaft coupling

NC-side cone bushing
lastic-side shrink disc

Type 454._1_._



Sizes 01 – 3 Type 454._1_._

Technical data

Size	Limiting torque for overload M_G Type 454.51._._ Nm	Type 454.61._._ Nm	Type 454.71._._ Nm	Nominal torque flexible backlash-free shaft coupling T_{KN} [1] 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	64 Shore D T_{KN} Nm	64 Shore D $T_{KN\,max}$ Nm	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: Ø d Nm	Ø d_4 Nm	Weight kg
01	4 – 10	8 – 20	–	10	20	17	34	21	42	4000	1,2	3	3,0	0,95
0	8 – 20	15 – 40	23 – 60	35	70	60	120	75	150	4000	1,5	3	6,0	1,60
1	15 – 36	30 – 72	45 – 108	95	190	160	320	200	400	3000	1,8	5,5	6,0	2,70
2	30 – 75	60 – 150	90 – 225	190	380	325	650	405	810	2500	2,0	9,5	10,5	4,90
3	60 – 150	120 – 300	180 – 450	265	530	450	900	560	1120	2000	2,2	9,5	35,0	7,10

Size	Shaft misalignements flexible coupling axial 92/98 Shore A 64 Shore D ΔK_a mm	radial 92 Shore A ΔK_r mm	radial 98 Shore A ΔK_r mm	radial 64 Shore D ΔK_r mm	angular misalignements 92 Shore A α °	angular misalignements 98 Shore A α °	angular misalignements 64 Shore D α °	Mass moments of inertia I Hub side kgm²	Mass moments of inertia I Flexible side kgm²	Bores Flexible side Ød4 mm	Bores EAS®-NC side Ød [2] mm	Min. shaft length g_4 mm
01	1,2	0,10	0,06	0,04	1,0	0,9	0,8	0,00018	0,0001	10 – 20	9 – 16	18
0	1,4	0,14	0,10	0,07	1,0	0,9	0,8	0,00046	0,0004	15 – 25	12 – 20	23
1	1,5	0,15	0,11	0,08	1,0	0,9	0,8	0,00117	0,0010	19 – 35	15 – 25	27
2	1,8	0,17	0,12	0,09	1,0	0,9	0,8	0,00265	0,0020	20 – 40	22 – 35	29
3	2,0	0,19	0,14	0,1	1,0	0,9	0,8	0,00602	0,0050	28 – 42	32 – 45	32

1) The transmittable torques of the flexible coupling "T_{KN}" depend on factors, as for example with temperatures, torsional stiffness etc. Please also see clutch design ROBA®-ES cat. K.940. or contact our company.
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8

Dimensions

Size	A [4]	C_6	D_1	D_H	F	F_1	F_2	f	f_2	f_4	k	k_1	l_1	L_2 [6]	L_{10} [6]	M_2	o [4]	p	SW
01	9,5	38	65	40	57	–	65	35	5	46	1,0 [5]	2,8	25	41	89	6xM4	– [7]	– [7]	7
0	10,2	47	80	55	63	75	80	39	5	50	1,3	2,8	30	49	103	4xM5	14,9	7,5	7
1	10,9	55	95	65	82	90	95	48	6	67	3,0	3,5	35	56	119	8xM5	17,4	7,5	8
2	12,6	61	106	80	103	105	110	61	6	84	5,5	4	45	62	140	8xM6	19,7	8	10
3	14,7	69	130	95	118,5	125	130	74	7	104	5,5	4	50	70	156	4xM8	23,5	9	10

4) the dimensions A; C_6; o refer to the hub edge
5) countersunk screw with hexagon socket DIN 7991
6) dimensions in an un-tightened condition (in tightened condition shorter)
7) thrust washer without keyway, limit switch is located at the control element-front face

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	Bore Ø d_4 H7	With limit switch
Order number:		454._1_._			see pages 36–38

01 – 3 →
* medium torque range. . . . . 5 →
* high torque range. . . . . 6 →
* max. torque range . . . . . 7 →

* see technical data, limiting torque for overload M_G

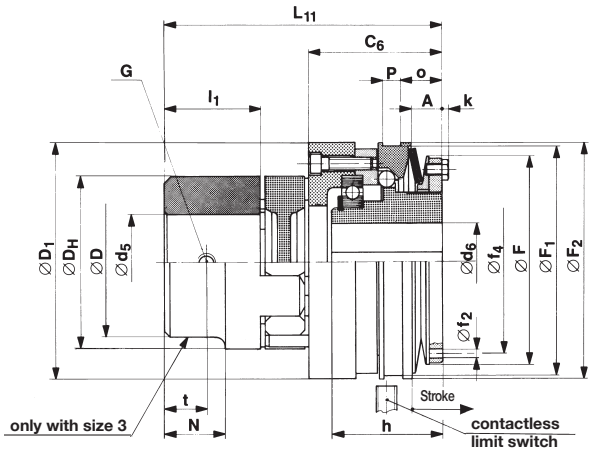
→ according to size
→ according to size
→ 3 flexible coupling 92 Shore A
→ 4 flexible coupling 98 Shore A
→ 6 flexible coupling 64 Shore D
→ 0 ratchetting clutch
→ 5 synchronous clutch

Example: Order number 2 / 454.615.3 /22/ 25 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

EAS®-NC with flexible backlash-free shaft coupling
NC-side keyway
lastic-side keyway

Type 454._2_._



Sizes 01 – 3 Type 454._2_._

Technical data

Size	Limiting torque for overload M_G			Nominal torque flexible backlash-free shaft coupling T_{KN} 1)						Max. speed n_{max}	Stroke of the thrust washer in the event of an overload	Weight
	Type 454.52._._	Type 454.62._._	Type 454.72._._	92 Shore A		98 Shore A		64 Shore D				
				T_{KN}	$T_{KN\ max}$	T_{KN}	$T_{KN\ max}$	T_{KN}	$T_{KN\ max}$			
	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	rpm	mm	kg
01	4 – 10	8 – 20	–	10	20	17	34	21	42	4000	1,2	0,95
0	8 – 20	15 – 40	23 – 60	35	70	60	120	75	150	4000	1,5	1,60
1	15 – 36	30 – 72	45 – 108	95	190	160	320	200	400	3000	1,8	2,70
2	30 – 75	60 – 150	90 – 225	190	380	325	650	405	810	2500	2,0	4,90
3	60 – 150	120 – 300	180 – 450	265	530	450	900	560	1120	2000	2,2	7,10

Size	Shaft misalignements flexible coupling							Mass moments of inertia I		Bores	
	axial	radial			angular misalignements			Hub side	Flexible side	Flexible side	EAS®-NC side
	92/98 Shore A 64 Shore D	92 Shore A	98 Shore A	64 Shore D	92 Shore A	98 Shore A	64 Shore D				
	ΔK_a	ΔK_r	ΔK_r	ΔK_r	α	α	α			$Ød_5$	Ød
	mm	mm	mm	mm	°	°	°	kgm^2	kgm^2	mm	mm
01	1,2	0,10	0,06	0,04	1,0	0,9	0,8	0,00018	0,0001	6 – 24	9 – 20
0	1,4	0,14	0,10	0,07	1,0	0,9	0,8	0,00046	0,0004	8 – 28	12 – 20
1	1,5	0,15	0,11	0,08	1,0	0,9	0,8	0,00117	0,0010	10 – 38	15 – 25
2	1,8	0,17	0,12	0,09	1,0	0,9	0,8	0,00265	0,0020	12 – 45	22 – 35 3)
3	2,0	0,19	0,14	0,1	1,0	0,9	0,8	0,00602	0,0050	14 – 55	32 – 45

1) The transmittable torques of the flexible coupling "T_{KN}" depend on factors, as for example with temperatures, torsional stiffness etc. Please also see clutch design ROBA®-ES cat. K.940. or contact our company.
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3

Dimensions

Size	A 4)	C_6	D	D_1	D_H	F	F_1	F_2	f_2	f_4	G	h	k	l_1	L_{11}	N	o 4)	p	t
01	9,5	38	–	65	40	57	–	65	5	46	M5	33	1,0 5)	25	80	–	– 7)	– 7)	10
0	10,2	47	–	80	55	63	75	80	5	50	M5	41	1,3	30	95	–	14,9	7,5	10
1	10,9	55	–	95	65	82	90	95	6	67	M6	47	3,0	35	110	–	17,4	7,5	15
2	12,6	61	–	106	80	103	105	110	6	84	M8	52	5,5	45	130	–	19,7	8	15
3	14,7	69	75	130	95	118,5	125	130	7	104	M8	59	5,5	50	145	28	23,5	9	20

4) the dimensions A; C_6; o refer to the hub edge
5) countersunk screw with hexagon socket DIN 7991
7) thrust washer without keyway, limit switch is located at the control element-front face

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d_6 H7	Bore Ø d_5 H7	With limit switch
Order number:		454._2_._			see pages 36–38

01 – 3 →
* medium torque range . . . . . 5 →
* high torque range . . . . . 6 →
* max. torque range . . . . . 7 →

* see technical data, limiting torque for overload M_G

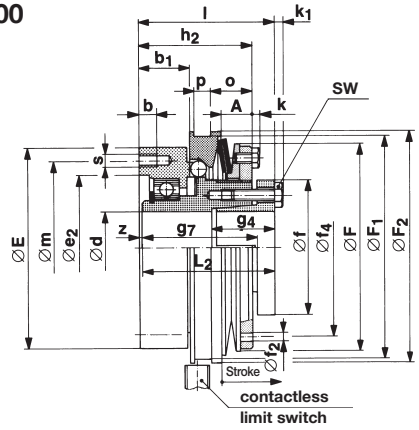
→ according to size
→ according to size
→ 3 flexible coupling 92 Shore A
→ 4 flexible coupling 98 Shore A
→ 6 flexible coupling 64 Shore D
→ 0 ratchetting clutch
→ 5 synchronous clutch

Example: Order number 2 / 454.625.3 /22/ 25 with limit switch 055.002.5

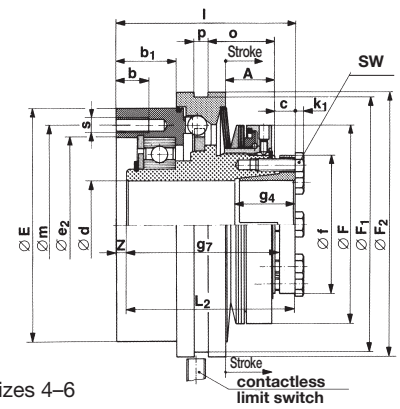
EAS®-NC ratchetting clutch/synchronous clutch

Short hub with fitting dimensions of the type series 400 and cone bushing

Type 451._1_.0



Sizes 01 – 3



Sizes 4–6

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 451.41_.0 Nm	Type 451.51_.0 Nm	Type 451.61_.0 Nm	Type 451.71_.0 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
01	–	4 – 10	8 – 20	12 – 30	4000	1,2	0,000191	0,000091	0,62	4 x M4	3,5
1	–	15 – 36	30 – 72	45 – 108	3000	1,8	0,001194	0,000572	1,78	6 x M5	5,5
2	–	30 – 75	60 – 150	90 – 225	2500	2,0	0,00270	0,00121	3,27	6 x M6	9,5
3	–	60 – 150	120 – 300	180 – 450	2000	2,2	0,00614	0,00280	4,34	8 x M6	9,5
4	75 – 150	150 – 300	300 – 600	–	400	2,5	0,03211	0,01548	10,3	8 x M8	20
5	150 – 300	300 – 600	600 – 1200	–	400	2,8	0,05325	0,03732	17,0	8 x M10	40
6	300 – 600	600 – 1200	1200 – 2400	–	300	3,4	0,07178	0,03783	21,0	8 x M12	60

Dimensions

Size	Bore d 2) from – to mm	Min. shaft length g_4 mm	Min. shaft length g_7 mm	A 7)	b	b_1	c	E	e_2^{H7} 6)	F	F_1	F_2
01	9 – 16	18	36	9,5	8	18,5	–	55	42 M7	57	– 5)	65
1	15 – 25	27	49	10,9	10	23,1	–	82	62 M7	82	90	95
2	22 – 35	29	54	12,6	10	21,8	–	100	78	103	105	110
3	32 – 45	32	61	14,7	12	24,5	–	120	90,5	118,5	125	130
4	35 – 55	38	96	31	20	37,5	13	146	110	125	160	166
5	42 – 65	51	111	36,5	25	42	16	176	130	145	185	196
6	50 – 75	60	117	38	26	44	20	186	145	165	214	220

Size	f	f_2	f_4	h_2 7)	k	k_1	L_2 3)	l 3)	m	o 7)	p	s	SW	z
01	35	5	46	37	0,3 4)	2,8	41	45	48	– 5)	– 5)	6 x M5	7	4
1	48	6	67	51	3,0	3,5	56	60	70	17,4	7,5	6 x M5	8	4
2	61	6	84	54	5,3	4	62	64	89	19,7	8	6 x M6	10	2
3	74	7	104	61,5	5,3	4	70	72,5	105	23,5	9	6 x M8	10	2,5
4	87	–	–	–	–	5,5	106	112,5	125	42	9	6 x M10	13	6,5
5	110	–	–	–	–	7	123	129,5	155	48,5	9	6 x M12	17	6,5
6	124	–	–	–	–	8	132	139	160	46	9	6 x M12	19	7

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in a tightend condition shorter)
4) countersuck screw with hexagon socket DIN 7991
5) thrust washer without keyway, limit switch is located at the control element-front face
6) H7 beside of sizes 01 and 1
7) for sizes 01–3 the dimensions A; h_2; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		4 5 1 . _ 1 _ . 0		see pages 36–38

01 – 6 → Size
* low torque range . . . . . 4 → Type
* medium torque range. . . . . 5 → Type
* high torque range. . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

* see technical data, limiting torque for overload M_G

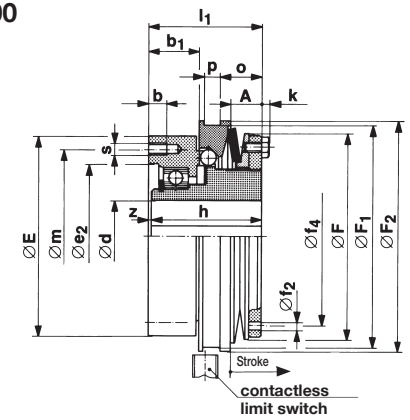
Example: Order number 6 / 451.610.0 / 60 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

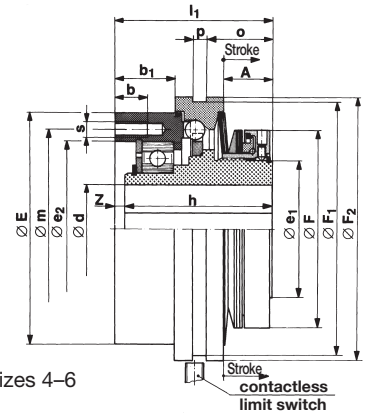
mayr® power transmission

Short hub with fitting dimensions of the type series 400 and keyway

Type 451._2_.0



Sizes 01 – 3



Sizes 4–6

Technical data

1) Size	Limiting torques for overload M_G 1) Type 451.42_.0 Nm	Type 451.52_.0 Nm	Type 451.62_.0 Nm	Type 451.72_.0 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg
01	–	4 – 10	8 – 20	12 – 30	4000	1,2	0,000190	0,000091	0,57
1	–	15 – 36	30 – 72	45 – 108	3000	1,8	0,001191	0,000572	1,77
2	–	30 – 75	60 – 150	90 – 225	2500	2,0	0,00265	0,00121	3,10
3	–	60 – 150	120 – 300	180 – 450	2000	2,2	0,00596	0,00280	4,11
4	75 – 150	150 – 300	300 – 600	–	400	2,5	0,03173	0,01548	10,4
5	150 – 300	300 – 600	600 – 1200	–	400	2,8	0,04960	0,03732	16,9
6	300 – 600	600 – 1200	1200 – 2400	–	300	3,4	0,06921	0,03783	20,5

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 6)	b	b_1	E	e_1	e_2^{H7} 5)	F	F_1
01	9	20	9,5	8	18,5	55	–	42 M7	57	– 3)
1	15	25	10,9	10	23,1	82	–	62 M7	82	90
2	22	35 4)	12,6	10	21,8	100	–	78	103	105
3	32	45	14,7	12	24,5	120	–	90,5	118,5	125
4	22	55	31	20	37,5	146	87	110	125	160
5	28	65	36,5	25	42	176	102,5	130	145	185
6	45	75	38	26	44	186	125	145	165	214

Size	F_2	f_2	f_4	h	k	l_1 6)	m	o 6)	p	s	z
01	65	5	46	33	1,0 2)	37	48	– 3)	– 3)	6 x M5	4
1	95	6	67	47	3,0	51	70	17,4	7,5	6 x M5	4
2	110	6	84	52	5,3	54	89	19,7	8	6 x M6	2
3	130	7	104	59	5,3	61,5	105	23,5	9	6 x M8	2,5
4	166	–	–	93	–	99,5	125	42	9	6 x M10	6,5
5	196	–	–	107	–	113,5	155	48,5	9	6 x M12	6,5
6	220	–	–	112	–	119	160	46	9	6 x M12	7

1) other sizes for lower and higher torques on request
2) countersuck screw with hexagon socket DIN 7991
3) thrust washer without keyway, limit switch is located at the control element-front face
4) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
5) H7 beside of sizes 01 and 1
6) for sizes 01–3 the dimensions A; l_1; o refer to the hub edge
7) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		4 5 1 . _ 2 _ . 0	7)	see pages 36–38

01 – 6 → Size
* low torque range . . . . . 4 → Type
* medium torque range. . . . . 5 → Type
* high torque range. . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

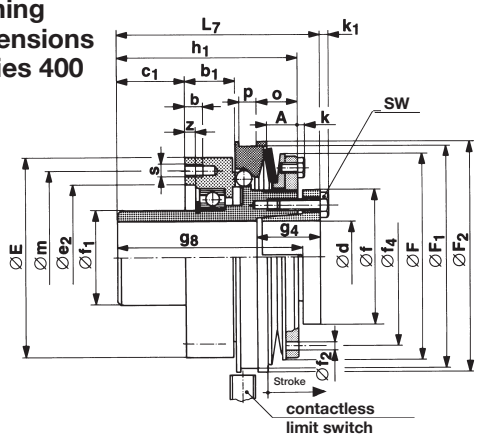
* see technical data, limiting torque for overload M_G

Example: Order number 6 / 451.620.0 / 60 / 6885-1 with limit switch 055.002.5

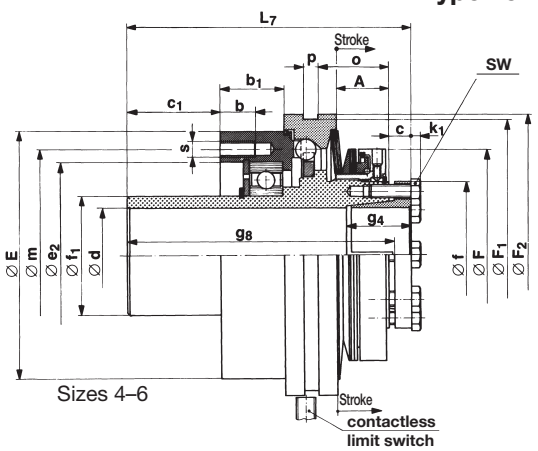
EAS®-NC ratchetting clutch/synchronous clutch

Long projecting hub with cone bushing and fitting dimensions of the type series 400

Type 451._1_.1



Sizes 01 – 3



Sizes 4–6

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 451.41_.1 Nm	Type 451.51_.1 Nm	Type 451.61_.1 Nm	Type 451.71_.1 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side mm	Pressure flange side kgm²	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
01	–	4 – 10	8 – 20	12 – 30	4000	1,2	0,00025	0,000091	0,70	4 x M4	3,5
1	–	15 – 36	30 – 72	45 – 108	3000	1,8	0,00125	0,000572	1,93	6 x M5	5,5
2	–	30 – 75	60 – 150	90 – 225	2500	2,0	0,00284	0,00121	3,69	6 x M6	9,5
3	–	60 – 150	120 – 300	180 – 450	2000	2,2	0,00670	0,00280	5,42	8 x M6	9,5
4	75 – 150	150 – 300	300 – 600	–	400	2,5	0,03313	0,01548	11,7	8 x M8	20
5	150 – 300	300 – 600	600 – 1200	–	400	2,8	0,05325	0,03732	19,1	8 x M10	40
6	300 – 600	600 – 1200	1200 – 2400	–	300	3,4	0,07590	0,03783	24,0	8 x M12	60

Dimensions

Size	Bore d 2) from – to mm	Min. shaft length g_4 mm	g_8 mm	A 7)	b	b_1	c	c_1	E	e_2^{H7} 6)	F	F_1	F_2
01	9 – 16	18	61	9,5	8	18,5	–	21	55	42 M7	57	– 5)	65
1	15 – 25	27	79	10,9	10	23,1	–	26	82	62 M7	82	90	95
2	22 – 35	29	92	12,6	10	21,8	–	36	100	78	103	105	110
3	32 – 45	32	111	14,7	12	24,5	–	47,5	120	90,5	118,5	125	130
4	35 – 55	38	155	31	20	37,5	13	52,5	146	110	125	160	166
5	42 – 65	51	175	36,5	25	42	16	57,5	176	130	145	185	196
6	50 – 75	60	188	38	26	44	20	64	186	145	165	214	220

Size	f	$f_{1\ h6}$	f_2	f_4	h_1 7)	k	k_1	L_7 3)	m	o 7)	p	s	SW	z
01	35	30	5	46	58	1,0 4)	2,8	66	48	– 5)	– 5)	6 x M5	7	5,5
1	48	40	6	67	77	3,0	3,5	86	70	17,4	7,5	6 x M5	8	7,25
2	61	50	6	84	90	5,3	4	100	89	19,7	8	6 x M6	10	5
3	74	65	7	104	109	5,3	4	120	105	23,5	9	6 x M8	10	5
4	87	70	–	–	–	–	5,5	165	125	42	9	6 x M10	13	–
5	110	85	–	–	–	–	7	187	155	48,5	9	6 x M12	17	–
6	124	95	–	–	–	–	8	203	160	46	9	6 x M12	19	–

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) countersunk screw with hexagon socket DIN 7991
5) thrust washer without keyway, limit switch is located at the control element-front face
6) H7 beside of sizes 01 and 1
7) for sizes 01–3 the dimensions A; h_1; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		4 5 1 . _ 1 _ . 1		see pages 36–38

01 – 6 →
* low torque range . . . . . 4 →
* medium torque range. . . . . 5 →
* high torque range. . . . . 6 →
* max. torque range . . . . . 7 →

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

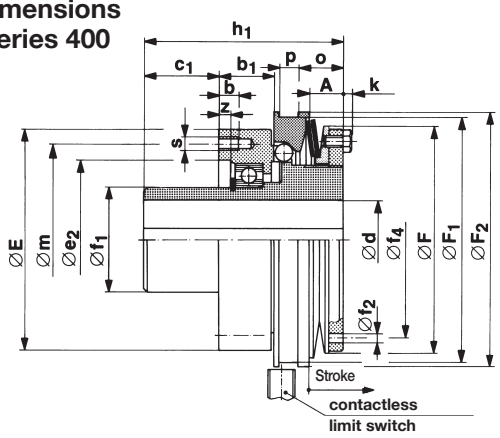
* see technical data, limiting torque for overload M_G

Example: Order number 4 / 451.610.1 / 40 with limit switch 055.002.5

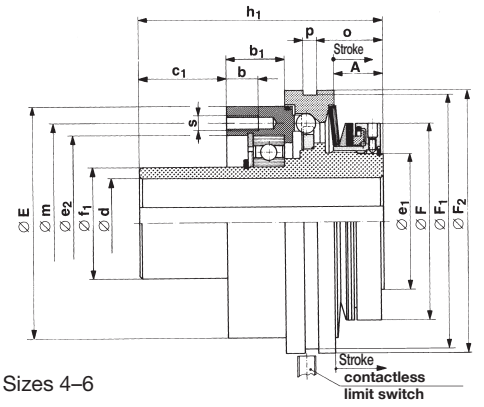
EAS®-NC ratchetting clutch/synchronous clutch

Long projecting hub with keyway and fitting dimensions of the type series 400

Type 451._2_.1



Sizes 01 – 3



Sizes 4–6

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 451.42_.1 Nm	Type 451.52_.1 Nm	Type 451.62_.1 Nm	Type 451.72_.1 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg
01	–	4 – 10	8 – 20	12 – 30	4000	1,2	0,00025	0,000091	0,65
1	–	15 – 36	30 – 72	45 – 108	3000	1,8	0,00125	0,000572	1,92
2	–	30 – 75	60 – 150	90 – 225	2500	2,0	0,00279	0,00121	3,52
3	–	60 – 150	120 – 300	180 – 450	2000	2,2	0,00652	0,00280	5,19
4	75 – 150	150 – 300	300 – 600	–	400	2,5	0,03224	0,01548	12,0
5	150 – 300	300 – 600	600 – 1200	–	400	2,8	0,05215	0,03732	19,5
6	300 – 600	600 – 1200	1200 – 2400	–	300	3,4	0,07353	0,03783	23,8

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 6)	b	b_1	c_1	E	e_1	e_2 H7 5)	F
01	9	20	9,5	8	18,5	21	55	–	42 M7	57
1	15	25	10,9	10	23,1	26	82	–	62 M7	82
2	22	35 4)	12,6	10	21,8	36	100	–	78	103
3	32	45	14,7	12	24,5	47,5	120	–	90,5	118,5
4	22	55	31	20	37,5	52,5	146	87	110	125
5	28	65	36,5	25	42	57,5	176	102,5	130	145
6	45	75	38	26	44	64	186	125	145	165

Size	F_1	F_2	$f_{1\ h6}$	f_2	f_4	h_1 6)	k	m	o 6)	p	s	z
01	– 3)	65	30	5	46	58	1,0 2)	48	– 3)	– 3)	6 x M5	5,5
1	90	95	40	6	67	77	3,0	70	17,4	7,5	6 x M5	7,25
2	105	110	50	6	84	90	5,3	89	19,7	8	6 x M6	5
3	125	130	65	7	104	109	5,3	105	23,5	9	6 x M8	5
4	160	166	70	–	–	152	–	125	42	9	6 x M10	–
5	185	196	85	–	–	171	–	155	48,5	9	6 x M12	–
6	214	220	95	–	–	183	–	160	46	9	6 x M12	–

1) other sizes for lower and higher torques on request
2) countersuck screw with hexagon socket DIN 7991
3) thrust washer without keyway, limit switch is located at the control element-front face
4) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
5) H7 beside of sizes 01 and 1
6) for sizes 01–3 the dimensions A; h_1; o refer to the hub edge
7) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		451._2_.1	7)	see pages 36–38

01 – 6 → Size
* low torque range . . . . . 4 → Type
* medium torque range. . . . . 5 → Type
* high torque range. . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

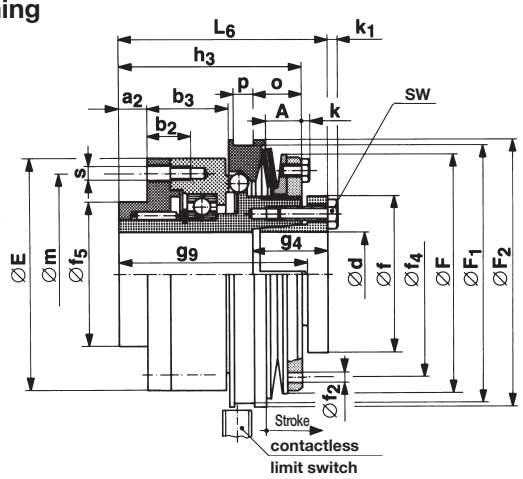
* see technical data, limiting torque for overload M_G

Example: Order number 6 / 451.520.1 / 60 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Short supported hub with cone bushing and fitting dimensions of the type series 400

Type 451._1_.5



Sizes 01 – 3 Type 451._1_.5

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 451.51_.5 Nm	Type 451.61_.5 Nm	Type 451.71_.5 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm^2	Pressure flange side kgm^2	Weight kg	Clamping bolts and tightening torques for Ø d mm	Nm
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,000201	0,000121	0,82	4 x M4	3,5
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,001224	0,000862	2,28	6 x M5	5,5
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00285	0,00154	3,57	6 x M6	9,5
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00638	0,00384	5,64	8 x M6	9,5

Dimensions

Size	Bore d 2) from–to mm	Min. shaft length g_4 mm	g_9 mm	A 6)	a_2	b_2	b_3	E	F	F_1	F_2
01	9 – 16	18	52,5	9,5	8	12,5	23	55	57	– 5)	65
1	15 – 25	27	71	10,9	10	18	31,1	82	82	90	95
2	22 – 35	29	73	12,6	12	15	26,8	100	103	105	110
3	32 – 45	32	81,5	14,7	12	18	30,5	120	118,5	125	130

Size	f	f_2	f_4	$f_{5\ h6}$	h_3 6)	k	k_1	L_6 3)	m	o 6)	p	s	SW
01	35	5	46	38	49,5	1,0 4)	2,8	57,5	48	– 5)	– 5)	6 x M5	7
1	48	6	67	50	69	3,0	3,5	78	70	17,4	7,5	6 x M5	8
2	61	6	84	60	71	5,3	4	81	89	19,7	8	6 x M6	10
3	74	7	104	80	79,5	5,3	4	90,5	105	23,5	9	6 x M8	10

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 h_6, above Ø 38 h_8
3) dimensions in an un-tightened condition (in tightened condition shorter)
4) countersunk screw with hexagon socket DIN 7991
5) thrust washer without keyway, limit switch is located at the control element-front face
6) the dimensions A; h_3; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d H7	With limit switch
Order number:		4 5 1 . _ 1 _ . 5		see pages 36–38

01 – 3 → Size
* medium torque range . . . . . 5 → Type
* high torque range . . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ Bore: according to size
→ With limit switch: 0 ratchetting clutch
→ With limit switch: 5 synchronous clutch

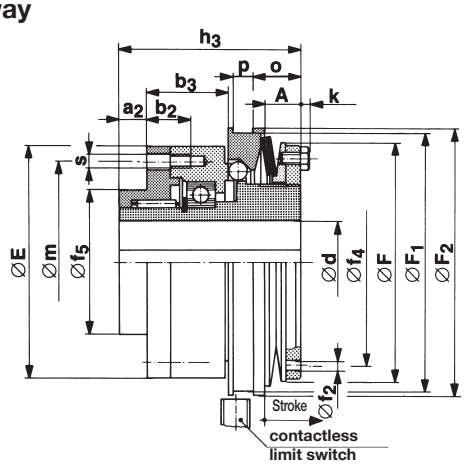
* see technical data, limiting torque for overload M_G

Example: Order number 2 / 451.510.5 / 30 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Short supported hub with keyway and fitting dimensions of the type series 400

Type 451._2_.5



Sizes 01 – 3 Type 451._2_.5

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 451.52_.5 Nm	Type 451.62_.5 Nm	Type 451.72_.5 Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Mass moments of inertia I Hub side kgm²	Pressure flange side kgm²	Weight kg
01	4 – 10	8 – 20	12 – 30	4000	1,2	0,000200	0,000121	0,77
1	15 – 36	30 – 72	45 – 108	3000	1,8	0,001221	0,000862	2,77
2	30 – 75	60 – 150	90 – 225	2500	2,0	0,00280	0,00154	3,40
3	60 – 150	120 – 300	180 – 450	2000	2,2	0,00620	0,00384	5,41

Dimensions

Size	Bore d_{min} mm	Bore d_{max} mm	A 5)	a_2	b_2	b_3	E	F	F_1	F_2
01	9	20	9,5	8	12,5	23	55	57	-- 4)	65
1	15	25	10,9	10	18	31,1	82	82	90	95
2	22	35 3)	12,6	12	15	26,8	100	103	105	110
3	32	45	14,7	12	18	30,5	120	118,5	125	130

Size	f_2	f_4	$f_{5\ h6}$	h_3 5)	k	m	o 5)	p	s
01	5	46	38	49,5	1,0 2)	48	– 4)	– 4)	6 x M5
1	6	67	50	69	3,0	70	17,4	7,5	6 x M6
2	6	84	60	71	5,3	89	19,7	8	6 x M6
3	7	104	80	79,5	5,3	105	23,5	9	6 x M8

1) other sizes for lower and higher torques on request
2) countersunk screw with hexagon socket DIN 7991
3) up to Ø 33 keyway to DIN 6885/1, above Ø 33 keyway to DIN 6885/3
4) thrust washer without keyway, limit switch is located at the control element-front face
5) the dimensions A; h_3; o refer to the hub edge
6) Position of the keyway to the mounting bore "s" in the pressure flange not defined. A defined position is possible on request.

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	With limit switch
Order number:		451._2_.5	6)	see pages 36–38

01 – 3 → Size
* medium torque range . . . . . 5 → Type
* high torque range . . . . . 6 → Type
* max. torque range . . . . . 7 → Type

→ according to size (Bore)
→ 0 ratchetting clutch (Type)
→ 5 synchronous clutch (Type)

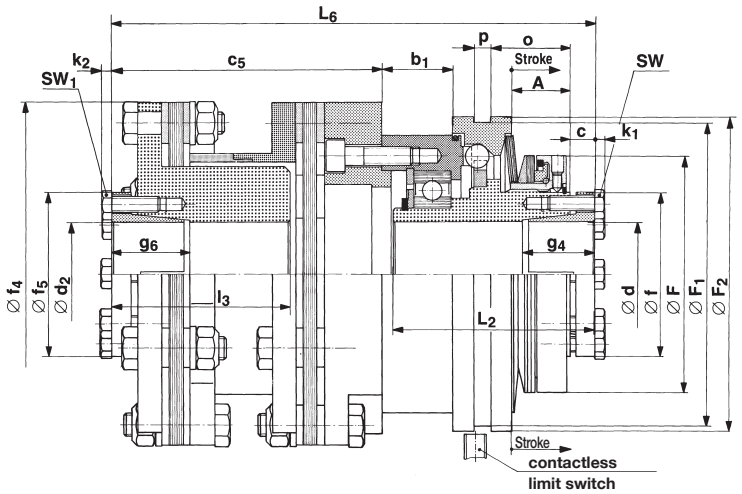
* see technical data, limiting torque for overload M_G

Example: Order number 2 / 451.520.5 / 30 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Torsionally rigid with cone bushing

Type 456._1_.8



Sizes 4 – 6 Type 456._1_.8

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 456.41_.8 Nm	Type 456.51_.8 Nm	Type 456.61_.8 Nm	Nominal torque of flexible torsionally rigid coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
4	75 – 150	150 – 300	300 – 600	1000	400	2,5	1,6	2	2,2
5	150 – 300	300 – 600	600 – 1200	1600	400	2,8	1,8	2	2,2
6	300 – 600	600 – 1200	1200 – 2400	2500	300	3,4	1,8	2	2,5

Size	Mass moments of inertia I Hub side kgm²	Flexible side kgm²	Weight kg	Clamping bolts and tightening torques at Ø d mm	Nm	at Ø d_2 mm	Nm	Bore 2) d from – to mm	d_2 from – to mm	Min. shaft length g_4 mm	g_6 mm
4	0,03211	0,07278	25,8	8 x M8	20	8 x M10	30	35 – 55	42 – 65	38	51
5	0,05083	0,16973	39,6	8 x M10	40	8 x M12	40	42 – 65	50 – 75	51	60
6	0,07179	0,17255	46,5	8 x M12	60	8 x M12	60	50 – 75	55 – 85	60	60

Dimensions

Size	A	b_1	c	c_5 3)	F	F_1	F_2	f	f_4	f_5
4	31	37,5	13	198	125	160	166	87	180	110
5	36,5	42	16	208	145	185	196	110	200	124
6	38	44	20	228	165	214	220	124	215	135

Size	k_1	k_2	L_2 3)	L_6 3)	l_3 3)	o	p	SW	SW_1
4	5,5	7	106	310,5	96	42	9	13	17
5	7	8	123	337,5	100	48,5	9	17	19
6	8	9	132	367	110	46	9	19	19

1) other sizes for lower and higher torques on request
2) shaft fit: up to Ø 38 $_{h6}$, above Ø 38 $_{h8}$
3) 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 Ø d H7	Bore Ø d_2 H7	With limit switch
Order number:		4 5 6 . _ 1 _ . 8			see pages 36 – 38

4 – 6 →
* low torque range . . . . . 4 →
* medium torque range. . . . . 5 →
* high torque range . . . . . 6 →

→ according to size
→ according to size
→ 0 ratchetting clutch
→ 5 synchronous clutch

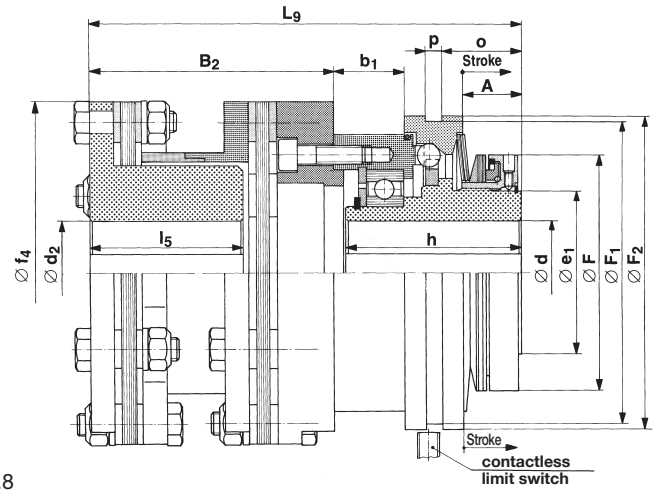
* see technical data, limiting torque for overload M_G

Example: Order number 6 / 456.510.8 / 50 / 60 plus limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

mayr® power transmission

Torsionally rigid with keyway **Type 456._2_.8**



Sizes 4 – 6 Type 456._2_.8

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 456.42_.8 Nm	Type 456.52_.8 Nm	Type 456.62_.8 Nm	Nominal torque of flexible torsionally rigid coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility axial ΔK_a mm	angular ΔK_w °	radial ΔK_r Sleeve 1 mm
4	75 – 150	150 – 300	300 – 600	1000	400	2,5	1,6	2	2,2
5	150 – 300	300 – 600	600 – 1200	1600	400	2,8	1,8	2	2,2
6	300 – 600	600 – 1200	1200 – 2400	2500	300	3,4	1,8	2	2,5

Size	Mass moments of inertia I Hub side kgm^2	Flexible side kgm^2	Weight kg	Bore d_{min} mm	d_{max} mm	$d_{2\,min}$ mm	$d_{2\,max}$ mm
4	0,03173	0,07151	25,8	22	55	28	80
5	0,04960	0,11552	35,2	28	65	30	85
6	0,06921	0,14818	45,4	45	75	38	90

Dimensions

Size	A	B_2	b_1	e_1	F	F_1
4	31	182	37,5	87	125	160
5	36,5	188	42	102,5	145	185
6	38	208	44	125	165	214

Size	F_2	f_4	h	L_9	l_5	o	p
4	166	180	93	281,5	80	42	9
5	196	200	107	301,5	80	48,5	9
6	220	215	112	327	90	46	9

1) other sizes for lower and higher torques on request

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	Bore Ø d_2^{H7}	With limit switch
Order number:		4 5 6 . _ 2 _ . 8			see pages 36 – 38

4 – 6 → Size
* low torque range . . . . . 4 → Type
* medium torque range. . . . . 5 → Type
* high torque range . . . . . 6 → Type

→ Bore Ø d^{H7}: according to size
→ Bore Ø d_2^{H7}: according to size
→ With limit switch: 0 ratchetting clutch
→ With limit switch: 5 synchronous clutch

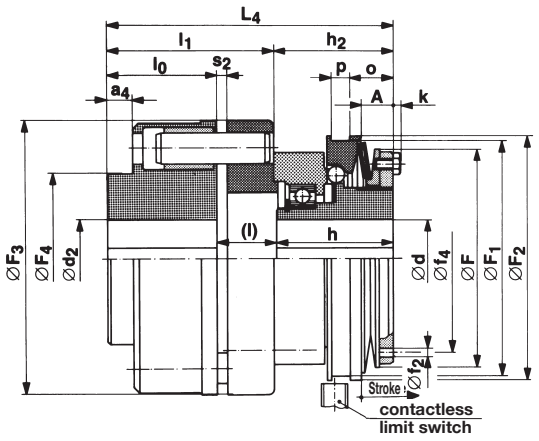
* see technical data, limiting torque for overload M_G

Example: Order number 4 / 456.520.8 / 50 / 6885-1 / 60 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Lastic with Keyway EAS®-side keyway lastic-side

Type 457._2_.0



Sizes 01 – 3 Type 457._2_.0

Technical data

Size 1)	Limiting torques for overload M_G 1) Type 457.52_.0 Nm	Limiting torques for overload M_G 1) Type 457.62_.0 Nm	Nominal torque of flexible torsionally rigid coupling T_{KN} Nm	Max. speed n_{max} rpm	Stroke of the thrust washer in the event of an overload mm	Permissible flexibility axial ΔK_a mm	angular ΔK_w °	radial ΔK_r mm
01	4 – 10	8 – 20	75	4000	1,2	±1	0,5	0,5
1	15 – 36	30 – 72	150	3000	1,8	±1	0,5	0,5
2	30 – 75	60 – 150	150	2500	2,0	±1	0,5	0,5
3	60 – 150	120 – 300	300	2000	2,2	±1	0,5	0,5

Size	Mass moments of inertia I Hub side kgm^2	Mass moments of inertia I Flexible Side kgm^2	Weight kg	Bore d from – to mm	Bore $d_{2\,min}$ mm	Bore $d_{2\,max}$ mm
01	0,000190	0,000811	1,57	9 – 20	11	30
1	0,001191	0,00365	4,1	15 – 25	11	42
2	0,00265	0,00413	5,2	22 – 35 3)	11	42
3	0,00596	0,01133	8,6	32 – 45	13	60

Dimensions

Size	A 5)	a_4	F	F_1	F_2	F_3	F_4	f_2	f_4
01	9,5	7	57	– 4)	65	80	50	5	46
1	10,9	10	82	90	95	105	65	6	67
2	12,6	10	103	105	110	105	65	6	84
3	14,7	19	118,5	125	130	135	85	7	104

Size	h	h_2 5)	k	L_4 5)	l	l_0	l_1	o 5)	p	s_2
01	33	37	1,0 2)	86	23	30	49	– 4)	– 4)	4
1	47	51	3,0	113	24	42	62	17,4	7,5	4
2	52	54	5,3	118	24	42	64	19,7	8	4
3	59	61,5	5,3	142,5	28,5	55	81	23,5	9	4

1) other sizes for lower and higher torques on request
2) countersunk screw with hexagon socket DIN 7991
3) up to Ø 33 keyway acc. DIN 6885/1, over Ø 33 keyway acc. DIN 6885/3.
4) thrust washer without keyway, limit switch is located at the control element-front face
5) the dimensions A; h; o refer to the hub edge

We reserve the right to make dimensional and design alterations.

Order example:

To be included when ordering, please state:	Size	Type	Bore Ø d^{H7}	Bore Ø d_2 H7	With limit switch
Order number:		457._2_.0			see pages 36–38

01 – 3 → according to size
* medium torque range . . . . . 5 → according to size
* high torque range . . . . . 6 → 0 ratchetting clutch
5 synchronous clutch

* see technical data, limiting torque for overload M_G

Example: Order number 3 / 457.525.0 / 30 / 6885-1 / 40 / 6885-1 with limit switch 055.002.5

EAS®-NC ratchetting clutch/synchronous clutch

Mounting example

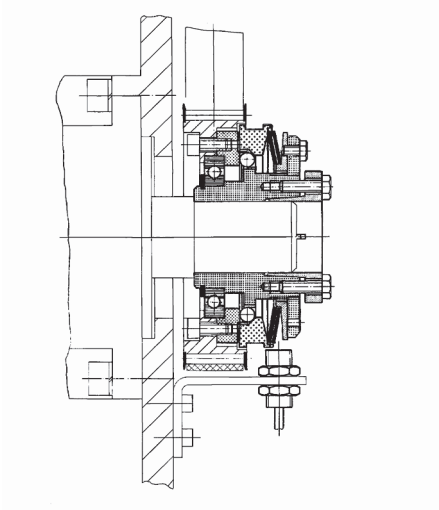


Fig. 1

EAS®-NC Short hub

For the EAS®-NC short hub the drive elements are located over the deep groove ball bearing and attached to the pressure flange. If the resulting radial force of the drive element is nearly in the middle of the ball bearing, an additional support for the drive element is not necessary.

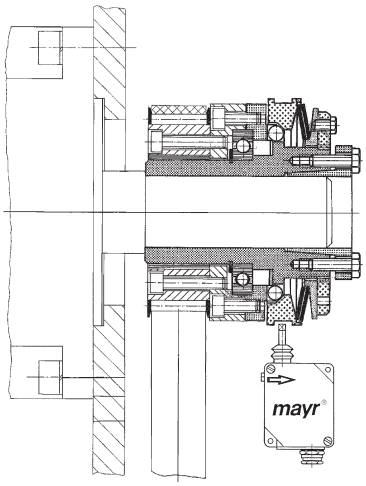


Fig. 2

EAS®-NC with long projecting hub

For very wide drive elements or for elements with very small diameters our EAS®-NC with long projecting hub is recommended. In case of small diameters the drive element is attached to the pressure flange of the clutch via an intermediate flange supplied by the customer. The support for the drive element via a ball bearing, needle bearing or slide bearing depending on the mounting situation and available space can be used.

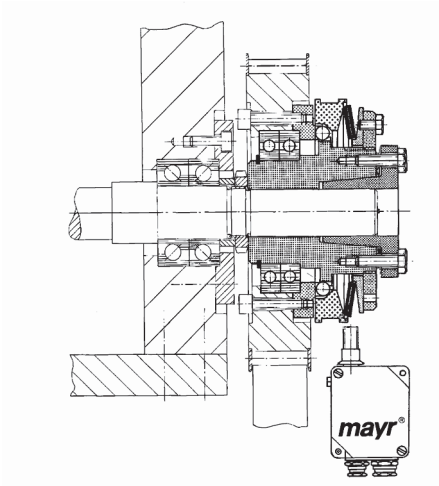


Fig. 3

EAS®-NC Type 450._1_.2

Two bearings-design for wide drive elemtens, whose application of force of the resulting radial force is in the middle of both bearings.
In this case the drive element can be attached directly to the pressure flange without additional support.

Please Observe (for Figs. 1-3)
The screw quality and the tightening torque for the fixing screws on the drive element are to be selected so that the set limit torque can be transmitted with sufficient certainty via frictional locking.

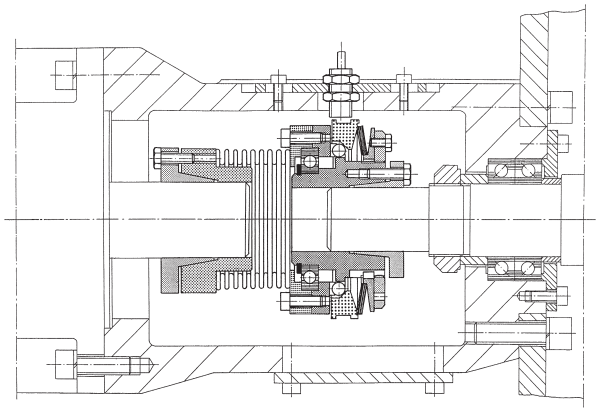


Fig. 4

EAS®-NC with steel bellows coupling

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

In the mounting example shown on the right side, the EAS®-NC with steel bellows coupling is mounted between motor and ball screw spindle. The torque is transmitted backlash-free until disengagement and drops immediately after the event of an overload. The contactless limit switch (initiator) gives signal to switch off the drive.

Table: Coordination bore diameter d_3 / d_4 or the flexible coupling to transmittable torque „T_{KN}“ with EAS®-NC Type 454._0_.0 / 454._1_._

Size	Preferred bores Ø d_3 / Ø d_4 and appropriate transmittable torques T_{KN} [Nm] of the friction tight of the clamping hubs / shrink discs with Type 454._0_.0																													
	Ø 10		Ø 11		Ø 15		Ø 16		Ø 19		Ø 20		Ø 22		Ø 24		Ø 25		Ø 28		Ø 30		Ø 32		Ø 35		Ø 38		Ø 40		Ø 42		Ø 45	
	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	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4	d_3	d_4
01	23	33	25	38	34	61	36	67	43	84	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	–	–	–	–	34	56	36	62	43	81	45	87	50	100	54	120	57	125	63	–	–	–	–	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	79	147	83	153	91	177	100	203	104	216	116	256	124	282	133	308	145	343	–	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–	–	–	–	83	197	91	228	100	261	104	279	116	332	124	368	133	405	145	460	158	513	166	547	174	–	187	–
3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	116	300	124	350	133	400	145	500	158	600	166	680	174	730	187	–

Table 1 The transmittable torque with clamping connection consider the max. play of fit with shaft fit k6/F7 resp. H7. The torque decreases with larger play to fit.

Technical explanations

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

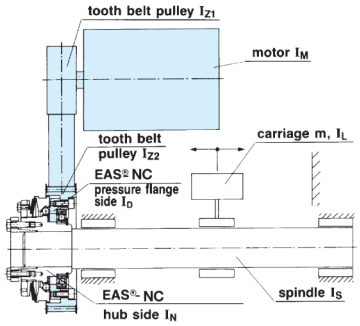


Fig. 1

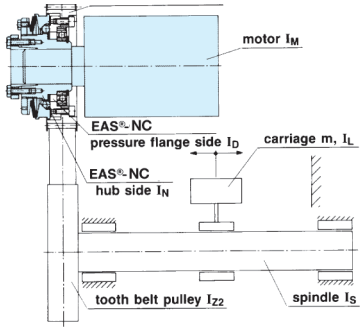


Fig. 2

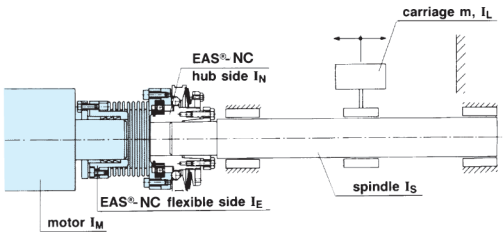


Fig. 3

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

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

$$I_2 = I_N + I_S + I_L$$

I_L from equation (7)

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

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

$$I_1 = I_M + I_N$$

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

I_L from equation (7)

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

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

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

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

I_L from equation (7)

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

EAS®-NC ratchetting clutch/synchronous clutch

Torque at spindle

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

Rate of feed of carriage

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

Angular velocity of motor shaft ω_1 and spindle ω_2

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

Mass of carriage reduced to the spindle

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

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

Energy with collision **without** EAS®-NC clutch

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

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

Energy with collision **with** EAS®-NC clutch

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

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

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

Remaining residual energy

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

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

Uncoupled energy

$$\Delta W = W_g - W_2 \quad [J] \qquad (11)$$

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

W_g from equation (8), W_2 from equation (9),
W_R from equation (10)

Designations:

I_g	[kgm²]	total mass moment of inertia without EAS®-NC clutch related to the motor shaft
I_1	[kgm²]	mass moment of inertia at the input side related to the shaft with the EAS®-NC clutch
I_2	[kgm²]	mass moment of inertia at the output side (spindle side) related to the shaft with the EAS®-NC clutch
I_M	[kgm²]	mass moment of inertia of the motor
I_{Z1}	[kgm²]	mass moment of inertia of the tooth belt pulley at the motor side
I_{Z2}	[kgm²]	mass moment of inertia of the second tooth belt pulley
I_S	[kgm²]	mass moment of inertia of the spindle
I_L	[kgm²]	mass of the carriage reduced to the spindle
I_N	[kgm²]	mass moment of inertia of the EAS®-NC, hub side
I_D	[kgm²]	mass moment of inertia of the EAS®-NC, pressure flange side
I_E	[kgm²]	mass moment of inertia of the EAS®-NC, flexible coupling
I_{Ku}	[kgm²]	mass moment of inertia of the two-shaft-connection before installing the EAS®-NC clutch
M_1	[Nm]	nominal torque of the motor
M_2	[Nm]	torque on the spindle
M_B	[Nm]	max. torque of the motor
M_A	[Nm]	required disengaging torque in the acceleration phase

Required disengaging torque in the acceleration phase (axis horizontal)

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

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)

application acc. $M_A = \left(M_B \cdot \frac{n_1}{n_2} - M_L\right) \cdot \frac{I_2}{I_2 + I_1} + M_L$ [Nm]
to fig. 1

application acc. $M_A = \left(M_B - M_L \cdot \frac{n_2}{n_1}\right) \cdot \frac{I_2}{I_2 + I_1} + M_L \cdot \frac{n_2}{n_1}$ [Nm]
to fig. 2 (14)

application acc. $M_A = \left(M_B - M_L\right) \cdot \frac{I_2}{I_2 + I_1} + M_L$ [Nm]
to fig. 3

M_L from equation (15)

Load torque from carriage mass with any alignment

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

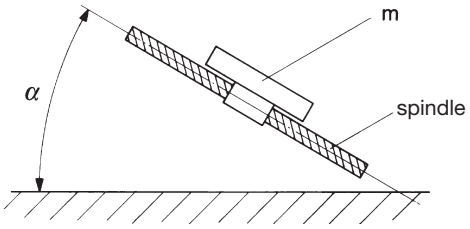


Fig. 4

Setting of the limiting torque

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

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

M_2 from equation (4)

Condition: The disengaging torque M_A, from equation (13) or (14) must be smaller than the torque M_G adjusted at the clutch (multiplied with the factor 1,2).

M_G	[Nm]	limiting torque for an overload
M_L	[Nm]	load torque from carriage mass with any alignment
g	$[\frac{m}{s^2}]$	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]	ascent of the spindle
V	$[\frac{m}{s}]$	rate of the feed of carriage
W_g	[J]	total energy in the case of a collision without EAS®-NC clutch
W_2	[J]	energy in the case of a collision with EAS®-NC 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

Calculation example

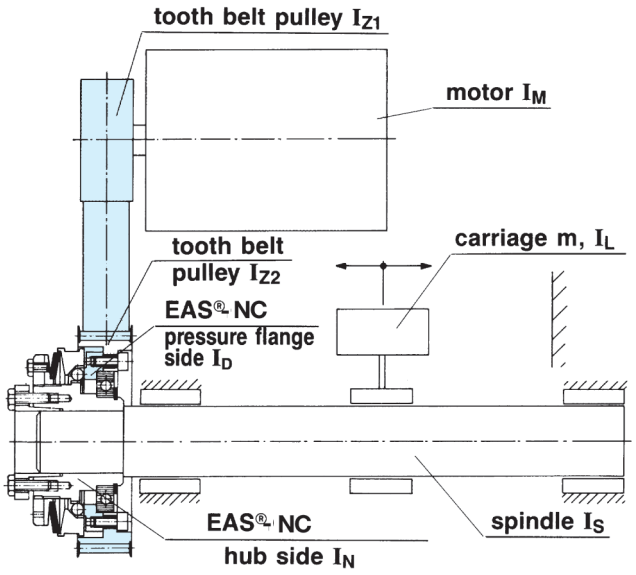


Fig. 1

Arrangement as shown in figure 1.

Indications:

mass of the carriage	m	= 560 kg
mass moment of inertia of the motor	I_M	= 0,0037 kgm²
mass moment of inertia of the	I_{Z1}	= 0,0006 kgm²
tooth belt pulleys	I_{Z2}	= 0,01132 kgm²
mass moment of inertia of the spindle	I_S	= 0,00067 kgm²
drive speed of the motor	n_1	= 2000 rpm
speed of the spindle	n_2	= 1000 rpm
ascent of the spindle	p	= 10 mm
nominal torque of the motor	M_1	= 14 Nm
max. torque of the motor	M_B	= 40 Nm

Preselection of the clutch

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

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

Selected: EAS®-NC size 1, Type 450.610.0
torque range M_G = 30 ÷ 72 Nm
(see technical data, page 10)

Mass moment of inertia of the EAS®-NC

hub side	I_N = 0,00120 kgm² (see techn. data, page 10)
pressure flange side	I_D = 0,00039 kgm² (see techn. data, page 10)

Rate of feed of carriage

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

Angular velocity of the motor shaft ω_1 and spindle ω_2

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

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

Mass of carriage reduced to the spindle

$I_L = m \cdot \frac{v^2}{\omega_2^2} = 560 \cdot \frac{0{,}1667^2}{104{,}7^2}\ kgm^2 =$ **0,00142 kgm²**

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

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

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

= **0,00765 kgm²**

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

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

$I_2 = I_N + I_S + I_L = 0{,}00120 + 0{,}00067 + 0{,}00142\ kgm^2 =$

= **0,00329 kgm²**

$W_2 = 1/2 \cdot I_2 \cdot \omega_2^2 = 1/2 \cdot 0{,}00329 \cdot 104{,}7^2\ J =$ **18 J**

Remaining residual energy

$W_R = \frac{W_2}{W_g} \cdot 100 = \frac{18}{167} \cdot 100 =$ **10,8 %**

Uncoupled energy

$\Delta W = W_g - W_2 = 167\ J - 18\ J =$ **149 J**

$\Delta W = 100 - W_R = 100 - 10{,}8 =$ **89,2 %**

Required disengaging torque in the acceleration phase

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

$= 0{,}00039 + 0{,}01132 + (0{,}0006 + 0{,}0037) \cdot (\frac{2000}{1000})^2 =$

= **0,0289 kgm²**

$M_A = M_B \cdot \frac{I_2}{I_2 + I_1} \cdot \frac{n_1}{n_2} = 40 \cdot \frac{0{,}00329}{0{,}00329 + 0{,}0289} \cdot \frac{2000}{1000} =$ **8,2 Nm**

Setting of the limiting torque

$M_G = 1{,}5 \cdot M_2 = 1{,}5 \cdot 28\ Nm =$ **42 Nm**

The disengaging torque $1{,}2 \cdot M_A = 1{,}2 \cdot 8{,}2\ Nm = 9{,}84\ Nm$ is less than the set limiting torque M_G= 42 Nm.

Indicated torque adjustment

The EAS®-NC torque limiting clutch offers the comfort of the indicated torque adjustment at the adjusting nut (not for sizes 02/03). 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 self-acting unintended adjustment of the pre-set limiting torque. For EAS®-NC sizes 4–6 additional mechanical locking against blokking and backtwisting.

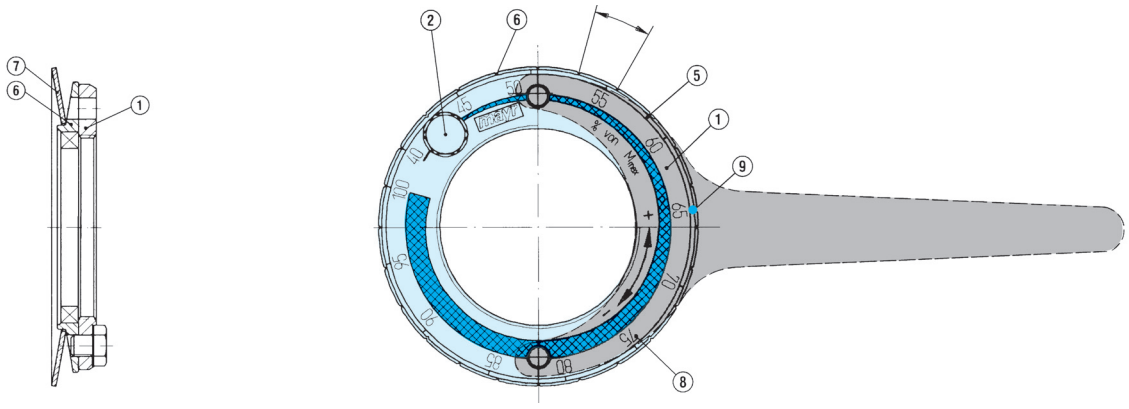


Fig. 1

Important Note!

Depending on the kind of drive and drive constellation torque peaks (e. g. due to impact of the starting torque in case of asynchronous motors, load impacts, static friction or similar) can occur in the drive shaft which are clearly over the operating torque of the equipment (motor).
The costumer has to consider the 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®-NC sizes 01–6 are adjusted **generally** at approx. 70%–75% of the corresponding max. torque and marked (calibrated) at the factory, if no other torque adjustment is required.

EAS®-NC sizes 03+02 must be adjusted as per the included adjusting diagrams, if there is no adjustment or calibration made at the factory.

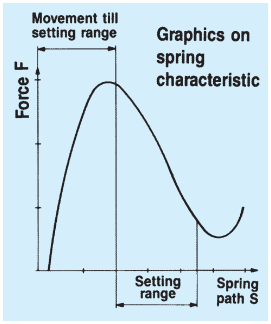


Fig. 2

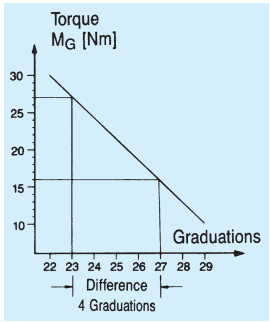


Fig. 3

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) (for sizes 4–6, 4 setscrews) from the adjusting nut.

Turn adjusting nut clockwise or anti-clockwise with the use of a face wrench according to the engraved graduation (for sizes 03 and 02 setting diagram) 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 (for sizes 03 and 02 from the graduations on the adjusting diagram) 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.

Limit switch Type 055.000.5 (Mechanical Operation)

Application

This device is used to monitor mechanical movements and end positions. It is a controlling sensor for electronic and mechanical sequences. It also registers axial disengaging movements, e.g. on EAS®-clutches.

Function

The pre-tensioned contact is discharged by actuating the switching lever: Contacts 11-14 (21-24) open, contacts 11-12 (21-22) close.

Design

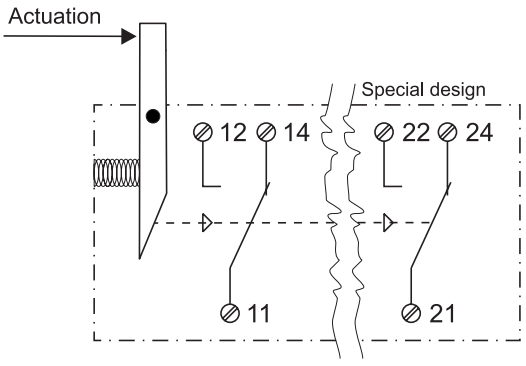
The microswitch is fitted into a light metal housing and is actuated by a switching lever. Operation is only possible in one direction.

The limit switch is fixed using M4 cap screws via two screw-on mounting links attached diagonally.

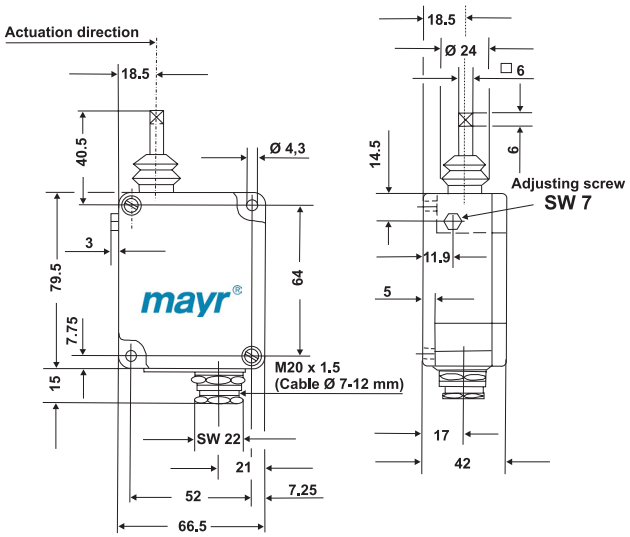
Technical Data

Contact	1 changeover contact (special design: 2 changeover contacts)
Switching capacity	250 VAC / 15 A (with 2 contacts: 10A) 24 VDC / 6 A 60 VDC / 1,5 A 250 VDC / 0,2 A min. 12 VDC/10 mA
Contact material	AgCdO 90/10
Switching frequency	Max. 200 switching operations/min
Ambient temperature	-10 °C up to +85 °C
Protection	IP 54
Weight	275 g
Switching path setting	Using the adjusting screw (SW 7), the zero point can be moved right or left by max. 5 mm
Switching path	Advance travel: min. 0,15 to 0,5 mm Overtravel: max. 10 mm, depending on the zero point setting
Special Types	Different control lever lengths as well as a design with 2 changeover contacts are possible on request

Electrical Connection



Dimensions (mm)



Order Example

To be stated on order:	Type
Order number	0 5 5 . 0 0 0 . 5

Limit switch Type 055.00_.5 (Contactless)

Application

This device is used for measuring and monitoring axial and radial disengaging movements, e.g. on EAS®-clutches.
It acts as a control sensor for electronic and mechanical sequences.

Function

When the sensor surface of the NAMUR sensor scans a metal control flag (damped), the signal relay is triggered, is de-energised and drops. Contacts 1 - 2 are opened. Damping is possible from all sides.

Electrical Connection (Terminal)

1 – 2 – 3	Potential-free two-way contact
5 – 6	Connection input voltage

Design

The electronic amplifier is installed in a light metal housing. The limit switch is fixed using two screw-on mounting links attached diagonally with M4 cap screws.

Technical Data

Input voltage (dependent on design)	230 VAC, ±10 %, 50-60 Hz 115 VAC, ±10 %, 50-60 Hz 24 VDC, PELV, ±5 %, protected against reverse polarity, for overvoltage category II connection
Power consumption	max. 1,5 VA
Ambient temperature	-10 °C up to +60 °C limit switch -25 °C up to +60 °C NAMUR sensor
Protection	IP 54
Conductor cross section	max. 2,5 mm² / AWG 14
Weight	400 g / 14 oz
Protection fuse	0,1 A / fast acting at 24 VDC (in system)
Signalling relay	Potential-free two-way contacts Contact load max. 250 VAC/12 A Contact material AgNi 90/10 Max. frequency of operating cycles 20 Hz at min. load, 0,1 Hz at max. load
NAMUR sensor internal	Installed in a light metal housing, operating distance SN 2 mm, flush fitting, max. frequency of operating cycles 2 kHz, the zero point can be set per 1 mm by means of the lateral adjusting screw (SW 7).
NAMUR sensor external	metal housing M12 x 1, operating distance SN 2 mm, flush fitting, max. frequency of operating cycles 2 kHz, standard cable length 2 m, max. 100m with special design, Protection IP 67

Order example:

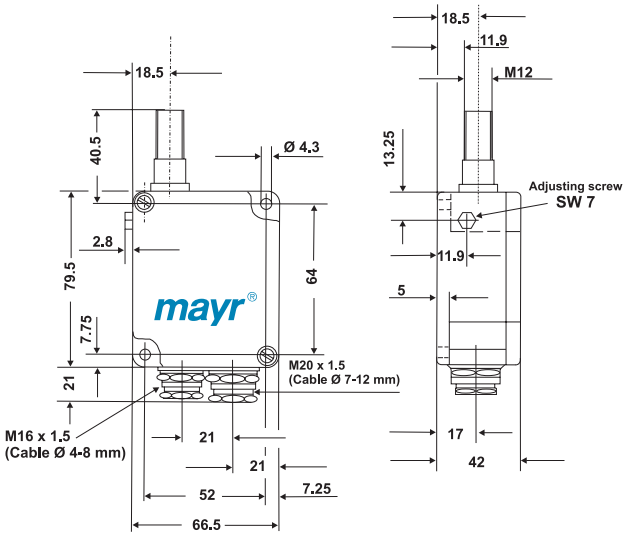
To be stated on order:	Type	Connected voltage
Order number:	055.00_.5	___

Contactless sensing
Sensor external 1
Sensor internal 2

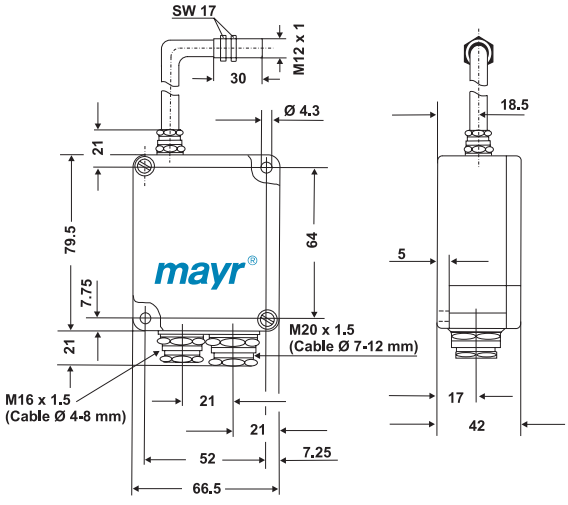
230 VAC
115 VAC
24 VDC

E189728 (N)

Dimensions (internal NAMUR sensor)



Dimensions (external NAMUR sensor)



Limit switch Type 055.010.6 (Mechanical Operation, Multi-directional)

Application

The limit switch is used to monitor and measure axial or radial mechanical movements and adjustments e.g. on EAS®-clutches. The device is suitable for clutches with a minimum stroke of 1,1 mm with radial actuation and 0,9 mm with axial actuation.

Function

By actuating the metal tappet, contacts 11 – 12 are opened.

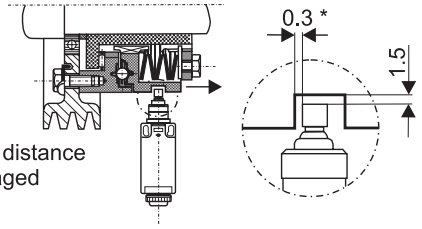
Electrical Connection (Terminals)

11 – 12	NC contact

Technical Data

Contact	1 x NC contact, forced disconnection contacts ⊖
Contact (special design)	additional 1 x NO contact, terminals 23 – 24, galvanically separated (Zb)
Contact-opening	see switching travel diagram
Contact-closing	see switching travel diagram
Contact load	NC contact 250 VAC/2,5 A 24 VDC/1 A min. 12 VDC/10 mA
Contact distance 250 VAC	>1,25 mm
Contact distance 24 VDC	<1,25 mm, min. 0,5 mm
Contact material	Ag90Ni10
Max. input current	acc. to DIN EN 60947-5-1 AC15/DC13
Metal tappet travel	max. 4 mm axial or radial
Switching frequency	max. 100/Min.
Mechanical lifetime	1 x 10^6 switching cycles, unloaded
Conductor cross section	1,5 mm^2 / AWG 16
Ambient temperature	-30 °C up to +80 °C
Protection	IP 65
Protection insulation	acc. to protection class II ⧈
Housing	thermoplastic, self extinguishing acc. to UL94-V0
Weight	120 g / 4.2 oz

Installation



*Switch distance on engaged clutch

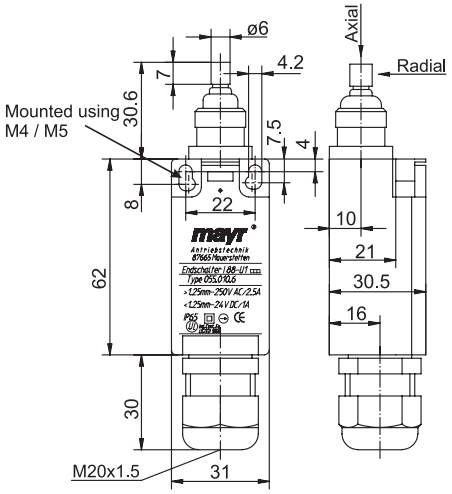
Order Example

To be stated on order:	Type
Order number	055.010.6

CE

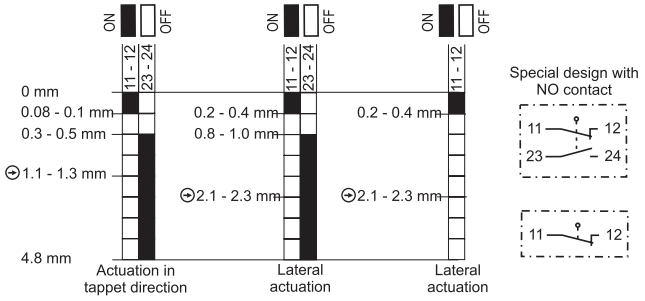
Ind.Cont.Eq. LISTED 1B68

Dimensions (mm)



Fixed positioning for safety application with fixing screws 2 x M5 (DIN 921).

Switching Travel Diagram



Warning! Do not install switch so that it drags and observe max. actuation travel (travel of metal tappet)

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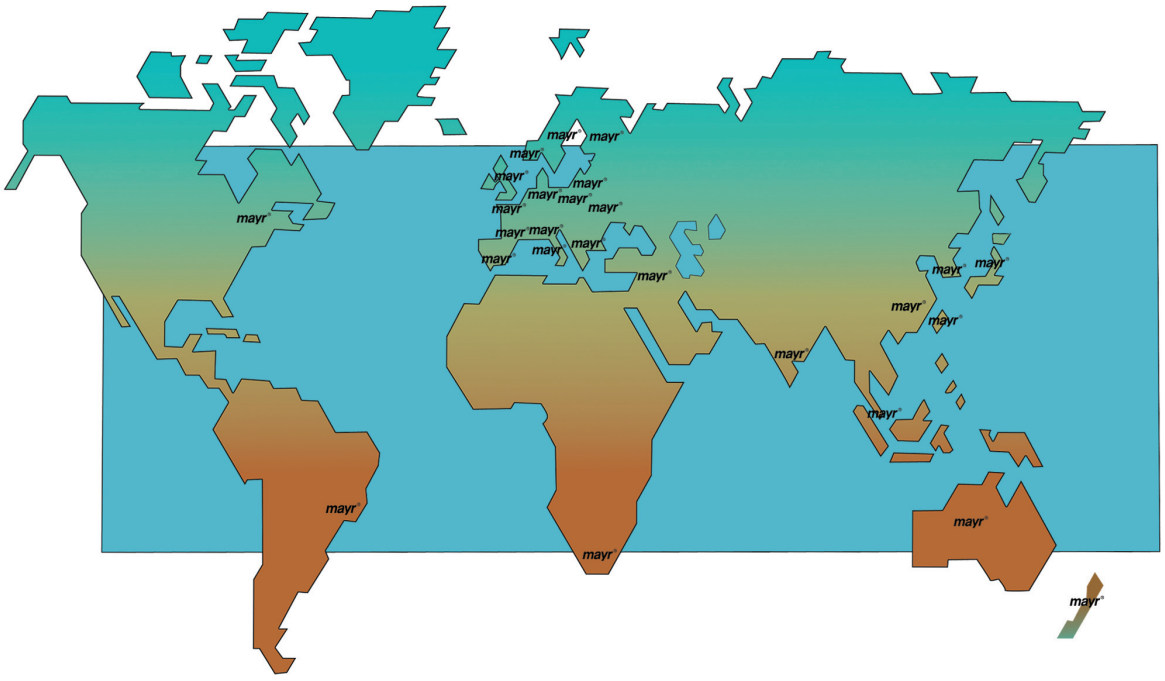

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Note:
If a country is not shown, please refer to headquarters or our web site to be advised of the nearest responsible agent.

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your reliable partner

Product Summary

Safety Clutches/ Overload Clutches

- **EAS®-Compact®/EAS®-NC**
  Positive locking and completely backlash-free torque limiting clutches
- **EAS®-smartic®**
  Cost-effective torque limiting clutches, quick installation
- **EAS®-element clutch/EAS®-elements**
  Load-disconnecting protection against high torques
- **EAS®-axial**
  Exact limitation of tensile and compressive forces
- **EAS®-Sp/EAS®-Sm/EAS®-Zr**
  Load-disconnecting torque limiting clutches with switching function
- **ROBA®-slip hub**
  Load holding, frictionally locked torque limiting clutches
- **ROBA®-contitorque**
  Magnetic continuous slip clutches

Shaft Couplings

- **smartflex®**
  Perfect precision couplings for servo and stepping motors
- **ROBA®-ES**
  Backlash-free and damping for vibration-sensitive drives
- **ROBA®-DS/ROBA®-D**
  Backlash-free, torsionally rigid all-steel couplings
- **EAS®-control-DS**
  Cost-effective torque-measuring couplings-

Electromagnetic Brakes/Clutches

- **ROBA-stop® standard**
  Multifunctional all-round safety brakes
- **ROBA-stop®-M motor brakes**
  Robust, cost-effective motor brakes
- **ROBA-stop®-S**
  Water-proof, robust monoblock brakes
- **ROBA-stop®-Z/ROBA-stop®-silenzio®**
  Doubly safe elevator brakes
- **ROBA®-diskstop®**
  Compact, very quiet disk brakes
- **ROBA®-topstop®**
  Brake systems for gravity loaded axes
- **ROBA®-linearstop**
  Backlash-free brake systems for linear motor axes
- **ROBATIC®/ROBA®-quick/ROBA®-takt**
  Electromagnetic clutches and brakes, clutch brake units

DC Drives

- ***tendo*®-PM**
  Permanent magnet-excited DC motors
- ***tendo*®-SC**
  1 quadrant and 4 quadrant transistor controllers

16/04/2007 IM

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