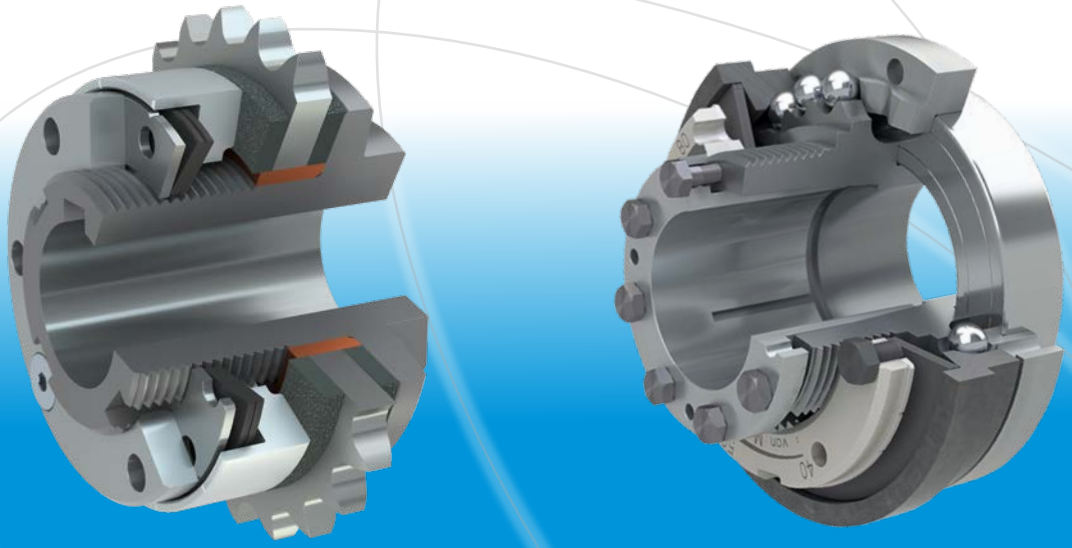
EMPOWER
CORPORATION (SELATAN) SDN BHD
45 & 45A Jalan Bakawali 36, Taman Johor Jaya, 81100 Johor Bahru, Johor, Malaysia
Tel : 607-3511288 Fax : 607-3511292 Email : sales@empowercorp.biz

mayr®

your reliable partner



Torque Limiters

IMG.402.V09.EN

www.mayr®.com

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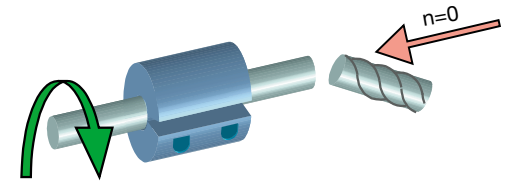
No overload protection means a high risk of damage

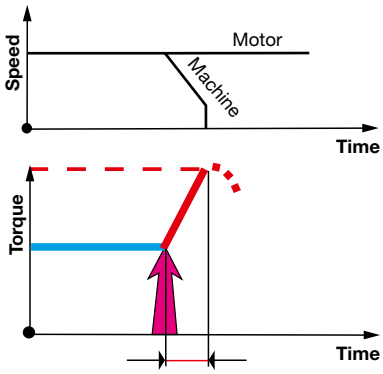
Situation

The input and output sides are connected firmly to each other (material-locking) in the drive line. There are no frictionally-locking or positive-locking connections which could give way without destruction on overload. Current changes in the motor cannot be monitored or processed.



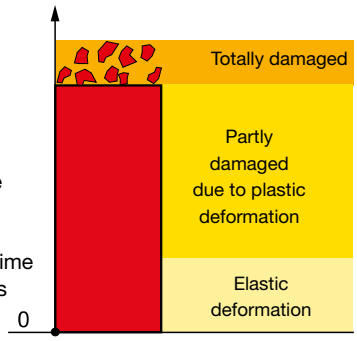
Speed and Torque Paths

After a collision, the torque increases very rapidly to values which can be much higher than the operating torque.
This overload leads to breaks in the drive line. The motor continues to run; the machine speed falls to 0.



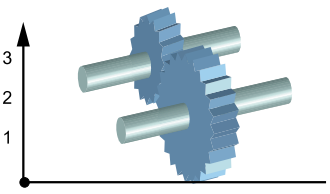
Risk of Damage

Collisions without overload protection usually lead to the machine being completely damaged. The weakest link in the drive line breaks. The machine is no longer operational and downtime will last until the repairs have been carried out.



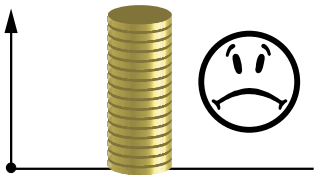
Dimensioning

Heavy, solid and slow-running constructions with high safety factors are necessary in order to keep collision factors as low as possible.



Costs

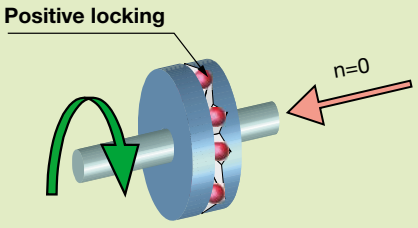
- Expensive replacement parts
- Complicated repairs
- Long downtimes



Perfect overload protection with EAS®-clutches

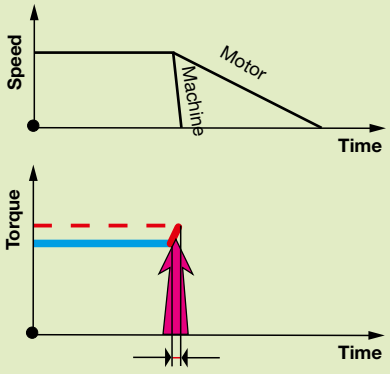
Situation

EAS®-clutches combine input and output-sides using positive locking and limit the torque accurately to the set value. These clutches work with an extremely high setting and repeat accuracy.



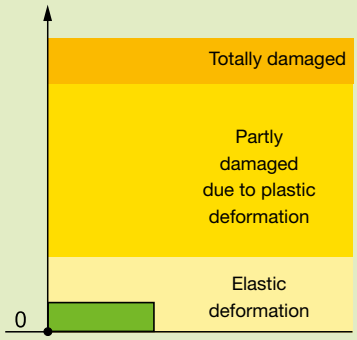
Speed and Torque Paths

On overload, the clutch disengages and separates input and output as quickly as possible. The stored rotatory energy is disconnected and runs free. A limit switch registers clutch disengagement and switches off the drive.



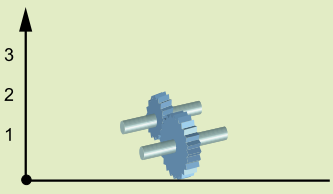
Risk of Damage

The high accuracy and exact torque limitation mean that the drive line is not damaged. All components remain within the elastic deformation range.



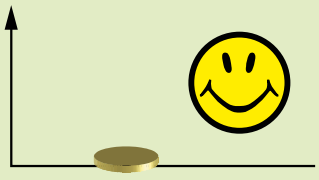
Dimensioning

Small and light constructions are possible due to accurate torque limitation and exact predictions on component load.



Costs

Costs incurred due to damage or wear are no longer to be expected. After a short downtime to remove the overload, the system can be re-started.



Why use EAS®-torque limiters?

Advantages for the Machine Manufacturer

Torque limiters ensure that the load on the components does not exceed the permitted values due to exact torque limitation.
This means that the modern demands on the machine construction can be fulfilled without risk.

- ❒ **Reduction of constructional safety factors**
- ❒ **Optimum machine dimensions**
- ❒ **Low mass moment of inertia**
- ❒ **Smaller drive motors and gearbox**
- ❒ **Material and cost reductions**
- ❒ **High rigidity and vibration-free transmission**

Advantages for Productional Operation

No machine is safe from collisions. They occur due to incorrect operation, control software and hardware malfunctions or ambient influences such as foreign objects.
Torque limiters provide reliable protection and ensure:

- ❒ **Low operational costs**
- ❒ **Minimum repair time expenditure**
- ❒ **High system availability**
- ❒ **High productivity**
- ❒ **Punctual production**
- ❒ **Good delivery image for customers**

Classification of *mayr*®-torque limiters 8 – 25

	Torque limiting	Force limiting	Frictionally-locking	Positive-locking	Magnetic	Ratchetting	Disengaging	Pneum. switchable + controllable	Electr. switchable + controllable	Rustproof	Rustproof and sealed	Catalogue page
Load holding torque limiters												
ROBA®-slip hubs	x		x									8
EAS®-Compact®-torque sensor / EAS®-torque sensor	x			x								9
ROBA®-contitorque / ROBA®-capping head	x				x					x	x	10
Load separating torque limiters												
EAS®-Compact® / EAS®-NC	x			x		x						11
EAS®-Compact® rustproof	x			x		x				x	x	12
EAS®-smartic®	x			x		x						13
EAS®-HTL	x			x		x	x					14
EAS®-HSC	x			x			x					15
EAS®-Compact® overload	x			x			x					16
EAS®-reverse	x			x			x					17
EAS®-elements	x			x			x					18
EAS®-HT	x			x			x					19
EAS®-HSE	x			x			x					21
EAS®-dutytorque	x			x			x					22
EAS®-Sp	x			x			x	x				23
EAS®-Sm / EAS®-Zr	x			x			x		x			24
EAS®-axial		x		x			x					25
Limit Switch												26

EAS®-reverse
the disengaging torque limiter with automatic re-engagement

Performance Characteristics

- **Residual torque-free disconnection in case of overload**
- **Automatic re-engagement through reversal of direction of rotation**
- **Easy handling**
- **Completely sealed**
- **Robust double bearing**
- **Steplessly adjustable torque**
- **Extremely low-backlash (< 0.05°)**
- **Hardened functional components**
- **Housing with standard IEC or NEMA dimensions**
- **Temperature range from -30 °C to +80 °C**
- **Optionally available with brake disk**
- **Optionally available with switching disk**

EAS®-reverse flange design

EAS®-reverse double shaft design with a flexible, positive locking coupling

EAS®-reverse in housing with standard-conform dimensions

Designs

- EAS®-reverse with bearing-supported flange for direct mounting of drive elements
- Combinations with flexible, positive locking couplings for the connection of two shafts
- EAS®-reverse in housing with standard-conform dimensions

Applications

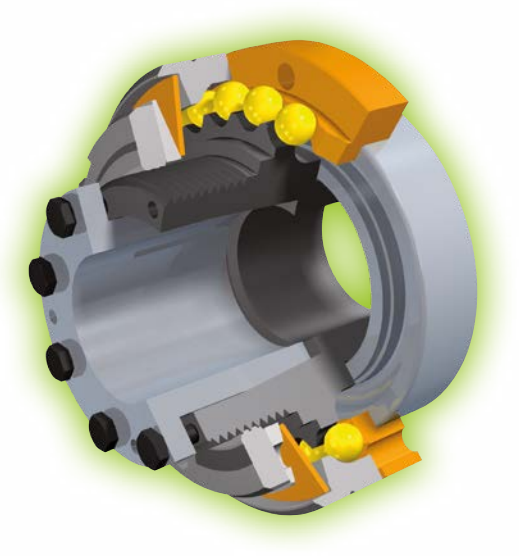
- Heavy machine industry
- Conveyor technology

Technical Data, Dimensions			Size EAS®-reverse flange design			
			3	4	5	6
Limit torques for overload	**M_G**	**[Nm]**	75 – 750	125 – 1250	250 – 2500	500 – 6000
Maximum speed	**n_{max}**	**[rpm]**	3600	2000	2000	2000
Outer diameter		**[mm]**	152	170	222	280
Minimum bore		**[mm]**	17	20	30	40
Maximum bore		**[mm]**	40	50	75	100
Length		**[mm]**	128	148	170	218

For detailed technical data and dimensions, please see catalogue EAS®-reverse: P.4100.V_ _._ _

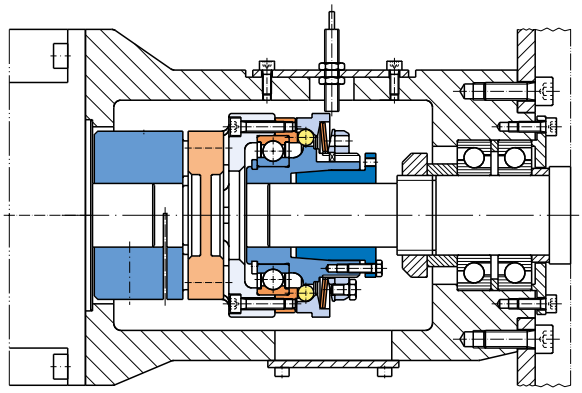
EAS®-Compact® / EAS®-NC
the load separating ratchetting torque limiter

Performance Characteristics



- **Separates immediately, re-engages automatically**
- **Transmits the torque backlash-free in normal operation**
- **Separates input and output in milliseconds on overload**
- **Electrical signal emittance on overload**
- **High switch-off and repeat accuracy**
- **Torque can be adjusted easily and steplessly using adjustment tables**
- **Re-engagement every 15° or synchronously after 360°**
- **High rigidity**

Installation Example



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

Designs

- ❒ Flange clutches with single or double bearings for direct mounting onto drive elements such as pulleys, toothed wheels and chain sprockets
- ❒ Design with a long hub for mounting very wide drive elements. An additional bearing on the hub using a roller bearing or a plain bearing is possible
- ❒ Combinations with torsionally rigid or flexible couplings for the connection of two shafts; compensation of shaft misalignment

Applications

- ❒ General drive technology
- ❒ Automation technology
- ❒ Machine tools
- ❒ Packing machines
- ❒ Printing and paper machines
- ❒ Foodstuffs technology
- ❒ Conveyor technology
- ❒ Drinks industry

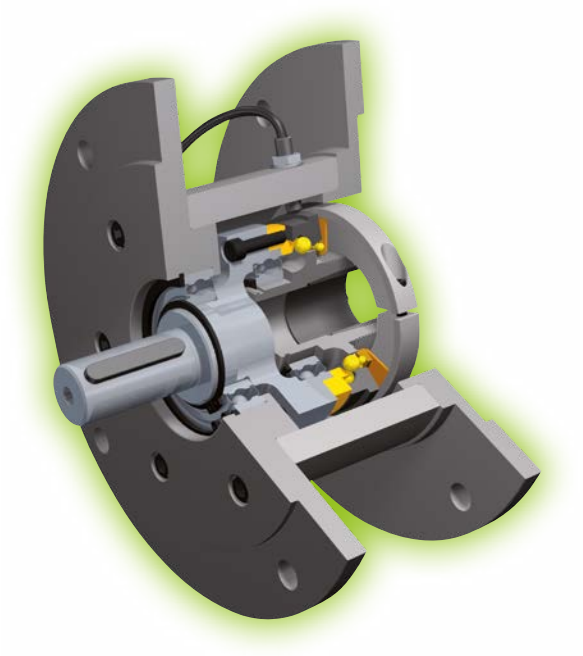
Technical Data, Dimensions			Size 03	02	01	0	1	2	3	4
Limit torques for overload	M_G	[Nm]	0.65 – 3.8	2 – 15	5 – 62.5	10 – 125	20 – 250	40 – 500	70 – 875	120 – 1500
Maximum speed	n_{max}	[rpm]	4000	4000	4000	3000	2500	2000	1200	800
Outer diameter		[mm]	45	50	70	85	100	115	135	166
Minimum bore		[mm]	6	8	10	15	22	28	32	40
Maximum bore		[mm]	12	16	20	25	35	45	55	65
Length Flange design		[mm]	28.5	34.5	47	56	67	73	86	130

For detailed technical data and dimensions, please see catalogue EAS®-Compact®: K.490.V_ _._ _

EAS®-HTL
the load separating, ratchetting or disengaging torque limiter

Performance Characteristics

- **Separates immediately on overload**
- **Re-engages automatically (ratchetting and synchronous clutch design)**
- **Slows down freely (overload clutch design)**
- **EAS®-Compact® in a housing with IEC or NEMA flanges (housing protection IP53)**
- **Integrated limit switch for switch-off in case of overload**
- **Cost-effective, closed unit**
- **Easy installation due to standardised connection dimensions and short design**
- **Fail-safe and reliable due to protection against mechanical damage, corrosion, penetration of dirt and washing out of grease**
- **Solid housing**
  Hanging loads can be attached to it
- **Backlash-free torque transmission**
- **Torque adjustment possible**



Designs

- ❒ Enclosed in an IEC or NEMA flanged housing
- ❒ Synchronous, ratchetting or overload clutch designs

Applications

- ❒ Foodstuffs technology
- ❒ Process engineering
- ❒ Chemical industry

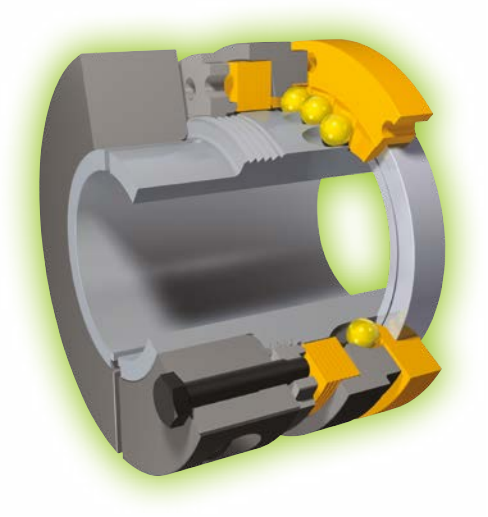
Technical Data, Dimensions			Size			
			Synchronous, ratchetting clutch		Overload clutch	
			IEC 63 – 180	NEMA 56C – 256TC	IEC 80 – 315	NEMA 56C – 256TC
Limit torques for overload	M_G	[Nm]	2 – 700	5 – 400	5 – 3000	5 – 400
Maximum speed	n_{max}	[rpm]	4000	4000	8000	8000
Outer diameter		[mm]	140 – 350	180 – 250	200 – 550	180 – 250
Minimum bore			11 mm	0.625 inch	19 mm	0.625 inch
Maximum bore			48 mm	1.625 inch	75 mm	1.625 inch
Length			53 – 126 mm	3.070 – 5.280 inch	78 – 252 mm	3.070 – 5.280 inch

For detailed technical data and dimensions, please see catalogue EAS®-HTL: P.HTL.V_ _._ _

EAS®-smartic®
the load separating ratchetting torque limiter

Performance Characteristics

- **Separates immediately, re-engages automatically**
- **Very easy and quick installation via the clamping ring hub by tightening one single screw**
- **Permanent backlash-free torque transmission**
- **Good dynamic characteristics**
- **Economical and reliable**
- **Simple and safe torque adjustment via a graduation scale with a directly readable torque indication**
- **Highest possible transmission security due to keyway and clamping ring hub**
- **High torque range from 6 – 100 % of the maximum torque**
- **Adjustment of the different torques possible by re-layering the cup springs already installed without reducing/adding the number of springs**



EAS®-smartic® combined with
the backlash-free, torsionally rigid disk pack coupling ROBA®-DS

Designs

- ❒ Flange clutches for direct mounting onto drive elements such as pulleys, toothed wheels and chain sprockets
- ❒ Combinations with a backlash-free flexible coupling for the connection of two shafts; compensation of shaft misalignment and damping of critical vibrations
- ❒ Combinations with a backlash-free torsionally rigid coupling for the connection of two shafts; compensation of shaft misalignment and high torsional spring rigidity

Applications

- ❒ General drive technology
- ❒ Automation technology
- ❒ Machine tools
- ❒ Packing machines
- ❒ Printing and paper machines
- ❒ Foodstuffs technology
- ❒ Conveyor technology
- ❒ Drinks industry

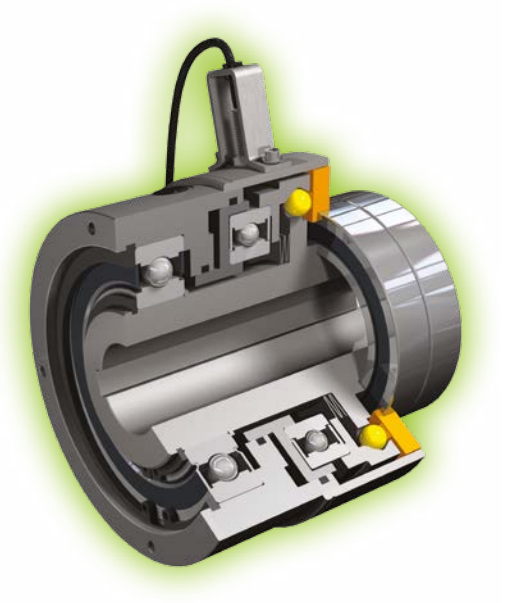
Technical Data, Dimensions				Size 01	0	1	2
Limit torques for overload		M_G	[Nm]	2.7 – 60	5 – 120	10 – 240	20 – 500
Maximum speed	Flange design, clamping ring hub	n_{max}	[rpm]	3000	3000	2500	2000
Outer diameter			[mm]	59	72	88	104
Minimum bore			[mm]	10	14	19	20
Maximum bore			[mm]	22	32	42	50
Length			[mm]	51	56	65	75

For detailed technical data and dimensions, please see catalogue EAS®-smartic®: K.481.V_ _._ _

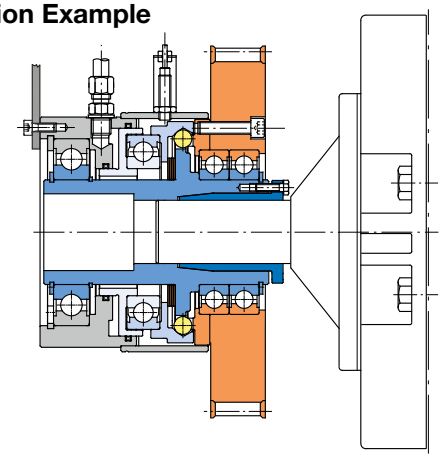
EAS®-Sp
the load separating switchable and controllable torque limiter

Performance Characteristics

- **Separates immediately on overload at the controlled switch-off torque**
- **Pneumatically switchable and controllable**
- **Synchronous coupling after each full turn**
- **High switch-off and repeat accuracy**
- **Torque can be steplessly adjusted via compressed air**
- **Optimum torque adaptation possible in every production process phase**
- **Application-tailored switching and control devices for optimum use of function and performance range**



Installation Example



EAS®-Sp clutch mounted onto the shaft end:
The clutch is axially secured via a cone bushing and allows a backlash-free torque connection from shaft to hub.

Designs

- ❒ Pneumatic clutch with steplessly adjustable torque using the amount of air pressure
- ❒ Flange clutches with two integrated ball bearings for direct mounting onto drive elements such as pulleys, toothed wheels and chain sprockets
- ❒ Combinations with a torsionally rigid flexible coupling for the connection of two shafts; compensation of shaft misalignment
- ❒ Designed for automated machines with changing operating conditions or changing cycle sequences and speeds

Applications

- ❒ Filling machines
- ❒ Printing machines
- ❒ Packing machines
- ❒ Conveyor technology

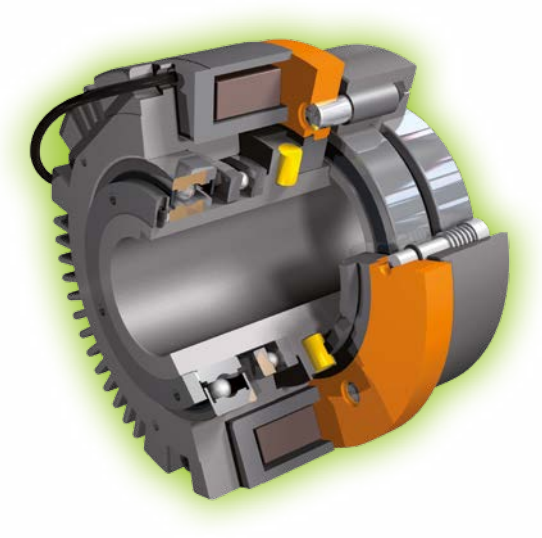
Technical Data, Dimensions				Size						
				01	0	1	2	3	4	5
Limit torques for overload		M_G	[Nm]	4 – 40	15 – 75	25 – 150	50 – 200	100 – 500	200 – 1000	500 – 2500
Maximum speed		n_{max}	[rpm]	5000	4000	2500	2000	2000	1500	500
Outer diameter			[mm]	76	90	115	130	160	200	285
Minimum bore	Flange design, keyway		[mm]	10	12	15	20	20	25	38
Maximum bore			[mm]	20	22	35	42	50	65	95
Length			[mm]	87	105	126	135	153	185	260

For detailed technical data and dimensions, please see catalogue EAS®-Sp/EAS®-Sm/Zr: K.406.V_ _._ _

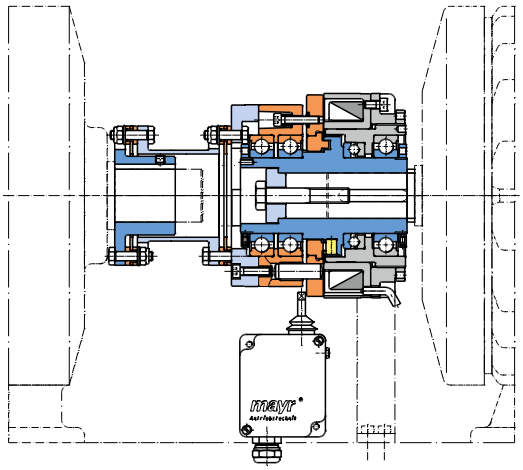
EAS®-Sm / EAS®-Zr
the load separating switchable and controllable torque limiter

Performance Characteristics

- **Separates immediately on overload at the controlled switch-off torque**
- **Electrically switchable and controllable**
- **Synchronous coupling after each full turn on EAS®-Sm**
- **Coupling in 15°-steps on EAS®-Zr**
- **High switch-off and repeat accuracy**
- **Torque can be steplessly adjusted via current**
- **Optimum torque adaptation possible in every production process phase**
- **Application-tailored switching and control devices for optimum use of function and performance range**



Installation Example



EAS®-Sm with torsionally rigid flexible all-steel coupling positioned between the motor and the gearbox. When the clutch disengages, the armature disk moves axially and operates the limit switch.

Designs

- ❒ Electromagnetic clutch with steplessly adjustable torque using the current
- ❒ Flange clutches with two integrated ball bearings for direct mounting onto drive elements such as pulleys, toothed wheels and chain sprockets
- ❒ Design with cover for dusty and dirty operation areas
- ❒ Combinations with a torsionally rigid flexible coupling for the connection of two shafts; compensation of shaft misalignment
- ❒ Designed for automated machines with changing operating conditions or changing cycle sequences and speeds

Applications

- ❒ Filling machines
- ❒ Printing machines
- ❒ Packing machines
- ❒ Conveyor technology

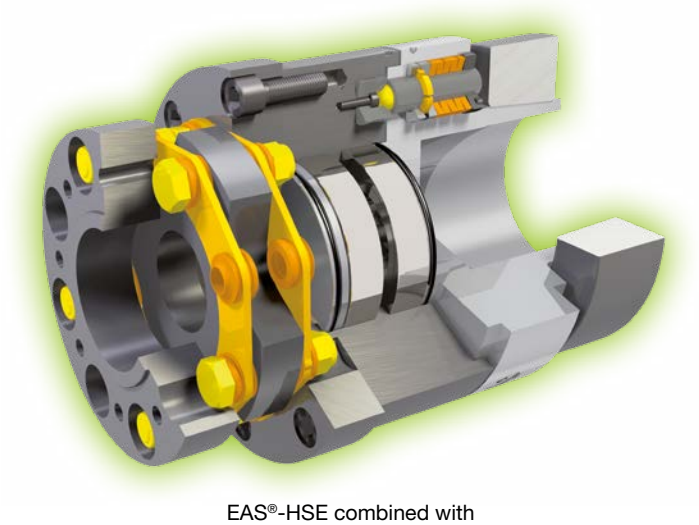
Technical Data, Dimensions				Size 0	1	2	3	4
Limit torques for overload		M_G	[Nm]	6 – 25	12 – 50	25 – 100	50 – 200	100 – 375
Maximum speed		n_{max}	[rpm]	4000	3000	2500	2000	2000
Outer diameter			[mm]	115	135	155	180	210
Minimum bore	Flange design, keyway		[mm]	9	14	19	22	24
Maximum bore			[mm]	22	35	42	50	60
Length			[mm]	100	110	125	140	155

For detailed technical data and dimensions, please see catalogue EAS®-Sp/EAS®-Sm/Zr: K.406.V_ _._ _

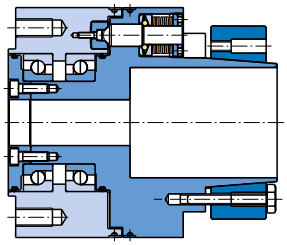
EAS®-HSE
the load separating disengaging torque limiter

Performance Characteristics

- **Separates immediately on overload**
- **Slows down freely**
- **Positive locking overload clutch**
- **Complete separation**
- **Synchronous re-engagement**
- **Balanced when completely installed**
- **Diverse mounting variations**
- **High torsional rigidity**
- **High performance density**
- **Low mass moment of inertia**
- **High speeds of up to 12000 rpm**
  (up to 20000 rpm possible as special design)



EAS®-HSE combined with
the torsionally rigid disk pack coupling ROBA®-DS



Flange design

Designs

- ❒ Combinations with a torsionally rigid misalignment-flexible all-steel coupling (ROBA®-DS coupling) for the connection of two shafts; compensation of shaft misalignment
- ❒ Flange design

Applications

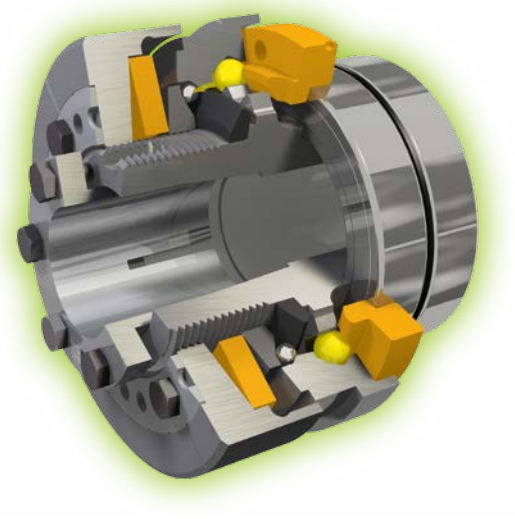
- ❒ High-torque test stands
- ❒ For high-speed applications

Technical Data, Dimensions				Size 02	01	0
Limit torques for overload		M_G	[Nm]	100 – 1000	325 – 2500	1400 – 8400
Maximum speed		n_{max}	[rpm]	12000	10000	7000
Outer diameter			[mm]	125	170	250
Minimum bore			[mm]	48	47	70
Maximum bore			[mm]	60	75	120
Length	Flange design		[mm]	142.2	182.4	250

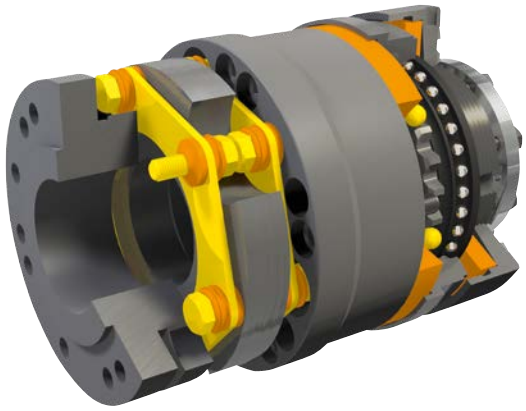
For detailed technical data and dimensions, please see catalogue EAS®-HSC/EAS®-HSE: P.4090.V_ _._ _

EAS®-HSC
the load separating disengaging torque limiter

Performance Characteristics



- **Separates immediately on overload**
- **Slows down freely**
- **Positive locking overload clutch**
- **Complete separation**
- **Synchronous re-engagement**
- **Balanced when completely installed**
- **Diverse mounting variations**
- **High torsional rigidity**
- **High performance density**
- **Low mass moment of inertia**
- **High speeds of up to 12000 rpm**



EAS®-HSC combined with
the torsionally rigid disk pack coupling ROBA®-DS

Designs

- ❒ Flange Design
- ❒ Combinations with a torsionally rigid misalignment-flexible all-steel coupling (ROBA®-DS coupling) for the connection of two shafts; compensation of shaft misalignment

Applications

- ❒ Test stands
- ❒ For high-speed applications

Technical Data, Dimensions			Size 01	0	1	2	3
Limit torques for overload	M_G	[Nm]	5 – 62.5	10 – 125	20 – 250	40 – 500	80 – 1000
Maximum speed	n_{max}	[rpm]	12000	10000	9000	7000	6000
Outer diameter		[mm]	70	85	100	115	135
Minimum bore		[mm]	10	15	22	32	35
Maximum bore		[mm]	20	25	35	45	55
Length Flange design		[mm]	62	76	90	100	112

For detailed technical data and dimensions, please see catalogue EAS®-HSC/EAS®-HSE: P.4090.V_ _._ _

EAS®-HT, flange design
the load separating disengaging torque limiter

EAS®-HT backlash-free
(EAS®-HT flange design combined with a disk pack coupling)

EAS®-HT lastic bolt
(EAS®-HT flange design combined with a flexible, positive-locking coupling)

EAS®-HT toothed coupling
(EAS®-HT flange design combined with a toothed coupling with crowned teeth cutting)

EAS®-HT
flange design

Designs

- The compact, ready for installation flange design can easily be integrated into the drive line
- Combinations with flexible couplings for the connection of two shafts; damping of impact loads
- Combinations with a toothed coupling for the connection of two shafts; high misalignment compensation capability, temperature-resistant
- Combination with a backlash-free torsionally rigid coupling for the connection of two shafts; compensation of shaft misalignment and high torsional spring rigidity

Applications

Heavy duty applications; used for example in

- shovel excavators
- dredgers
- turbine construction
- water lock drives
- rolling mills
- steel plants

Technical Data, Dimensions			Size EAS®-HT flange design						
			0	1	2	3	4	5	6
Limit torques for overload	M_G	[kNm]	7.5 – 15	12.5 – 25	20 – 40	37.5 – 75	70 – 140	125 – 250	220 – 440
Maximum speed	n_{max}	[rpm]	2000	1750	1500	1250	1000	900	750
Outer diameter		[mm]	275	320	380	455	545	620	720
Bore Toothed coupling		[mm]	95	130	150	185	210	285	340
Length		[mm]	226	243	298	312	328	476	485

For detailed technical data and dimensions, please see catalogue EAS®-HT: K.440.V_ _._ _