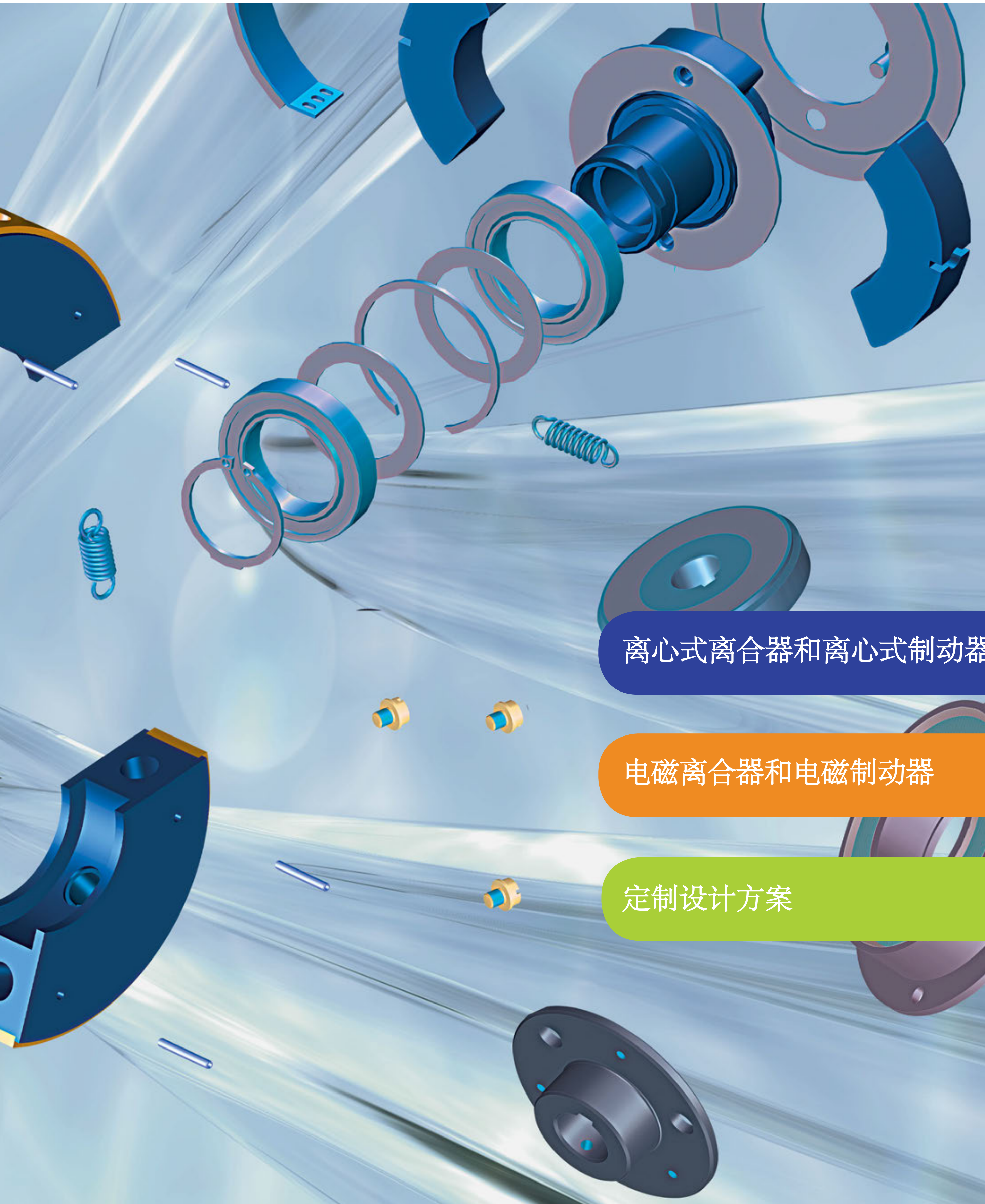
德国 SUCO 传动技术



离心式离合器和离心式制动器

电磁离合器和电磁制动器

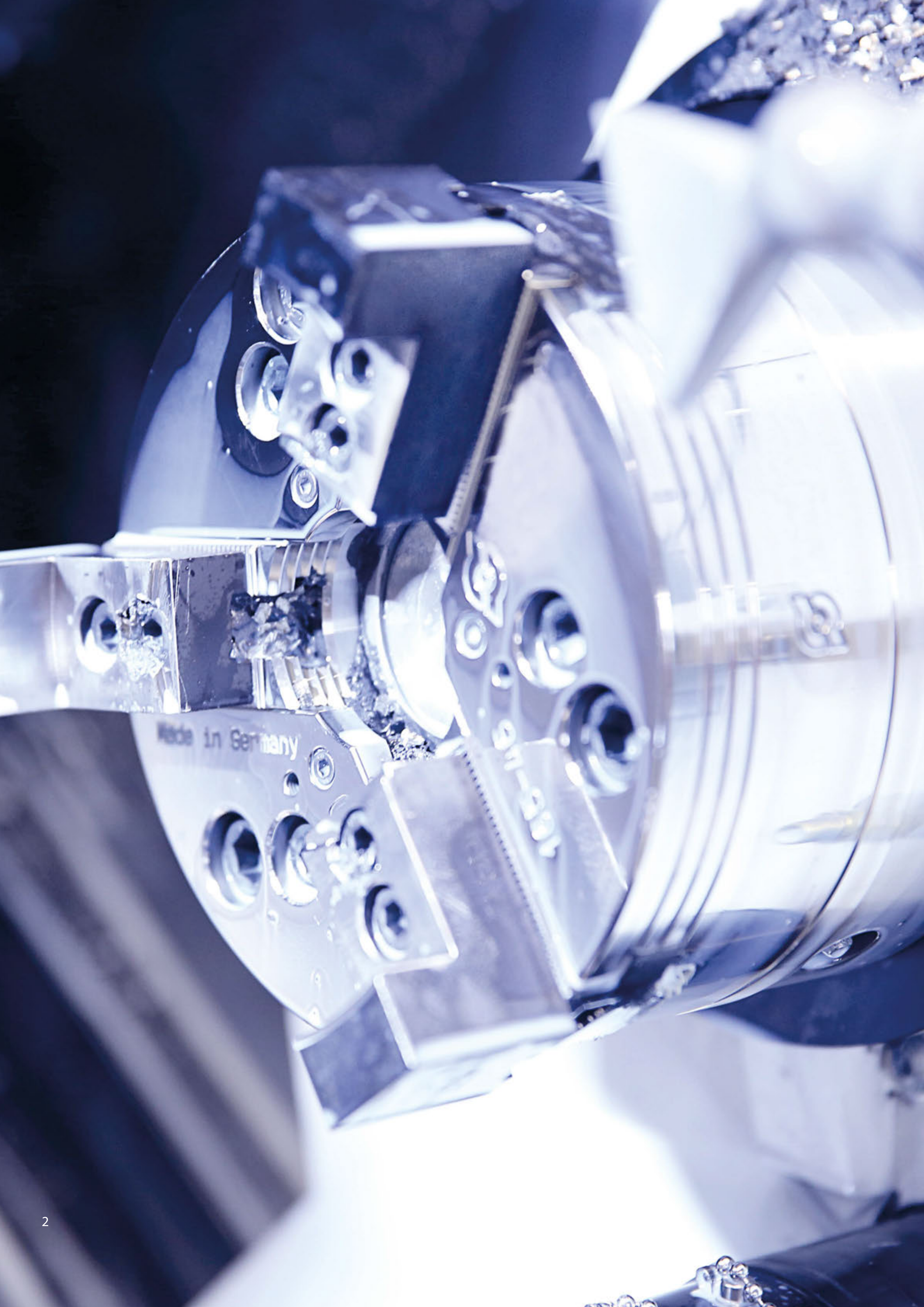
定制设计方案

德国 SUCO 传动技术

目录

Product Catalogue Transmission Technology

3. Edition, March 2019,
Article-number: 1-0-00-999-119


Made in Germany

SUCO Robert Scheuffele GmbH & Co. KG

A transmission technology specialist setting standards on the global stage

SUCO Robert Scheuffele GmbH & Co. KG was founded in 1938 and has established itself across the globe under the trade name SUCO.

The two main product groups, pressure monitoring (mechanical pressure switches, vacuum switches, electronic pressure switches and pressure transmitters) and transmission technology (centrifugal clutches and brakes, electromagnetic clutches and brakes), are developed, designed and manufactured at the Bietigheim-Bissingen site, approximately 20 km north of Stuttgart in Germany.

Peter Stabel, Director

Marcell Kempf, Director

Highest quality in all areas

The development and continual expansion of the company premises are indications of a thriving company.

Work on global presence has been rigorous, and today SUCO is actively represented by distribution companies in France (SUCO VSE France – a 50/50 joint venture with VSE Volumentechnik GmbH) and in the USA (SUCO Technologies Inc.), by associate company ESI Technology Ltd in Wrexham, North Wales, and by more than 60 mostly exclusive sales partners in over 50 countries.

Certified to DIN EN ISO 9001:2015, SUCO has retained its consistently high quality standards for many years, something substantiated by numerous audits by reputable companies from a broad diversity of industry sectors.

This worldwide acknowledged product quality is guaranteed with CNC-controlled machining centres, automated assembly machines, sophisticated test systems and the latest in measuring equipment. Outstanding products, high level of customer service and excellent price/performance ratio guarantee SUCO's good market positioning within the product sectors mentioned.

A sophisticated level of personnel qualification, a high identifaction of the employees with the company, process-oriented structures and efficient organisation are guarantees for continued company growth into the future.

Observance of ethical principles and comprehensive environmental awareness is standard at SUCO, and guarantees high class business relationships on the highest level for our customers all over the world.

This catalogue does not only give a clear and structured overview of our capabilities all around our comprehensive range of transmission technology products but also offers detailed technical explanations supporting you in many challenges occurring in your specific applications.

Please trust in a company with 80 years of experience.

SUCO – A success story

From a mechanical workshop to an industrial company operating on the global stage

1938
Robert Scheuffele starts up a mechanic's workshop

1945
Start of the partnership between Robert Scheuffele and Georg Fuhrmann

* 16.10.1909 † 20.02.1966

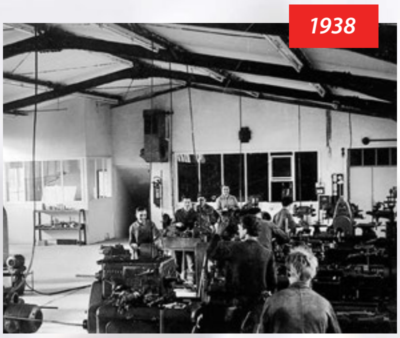
* 15.01.1912 † 04.02.1982

1946
Production start of centrifugal clutches and brakes

1953
Move into the new premises in Bietigheim-Bissingen, Keplerstrasse (still headquarter today)

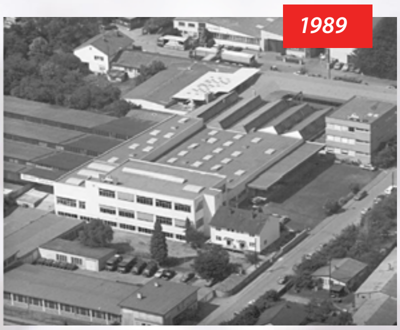
1956
Registration of trade name SUCO with worldwide trademark protection

1960
Production start of mechanical pressure switches for the automotive industry



A view into production

Administration building, Bietigheim-Bissingen



Aerial shot of premises, Bietigheim-Bissingen

1997
First DIN ISO 9001 company certification

1998
Start of market penetration in Asia by setting up a company pool

Broadening of product expertise to electronic pressure monitoring

Start of the „fully automatic pressure switch adjusting" development project with the Fraunhofer Institute

1999
Founding of subsidiary SUCO VSE France

2001
Certification to DIN ISO 9001:2000

2002
Penetration of the markets in South America and Eastern Europe

2004
Development start of fully automatic assembly systems for pressure switch modules

2005
New company name: SUCO Robert Scheuffele GmbH & Co. KG

Development of the SUCO zero clutch

1969

Production start of electromagnetic clutches and brakes

Set-up of a pan-European sales network

1979

Further development of SUCO pressure switches especially for hydraulic and pneumatic applications

Strategic alignment to the industry

1980

Development of the hex 24 pressure switch series for broad industrial applications

1984

Development of the hex 27 pressure switch series for broad industrial applications

1987

Broadening of the product range to include custom pre-wired pressure switches

1988

Start of sales in the US

1993

Development of pressure dampers for ABS brake systems in the automotive industry

SUCO VSE France,
Le Mans, France

SUCO Technologies
Boca Raton, USA

ESI Technology,
Wrexham, UK

Aerial shot of premises,
Bietigheim-Bissingen

2006

Development and production start of descenders with centrifugal technology

Enhancement of the laboratory test facility for simulating several million test cycles under different test conditions

Development of the world's smallest pressure switch with adjustable switching point to 400 bar (patented)

2007

Founding of subsidiary SUCO Technologies Inc., USA

2009

Acquisition of ESI Technology Ltd. (UK)

2010

Across-the-board use of enhanced automatic pressure switch adjusters; Development of a transmitter series based on SoS technology

2011

Development of the SUCO thermal brake

2013

75-year company anniversary celebrations

2014

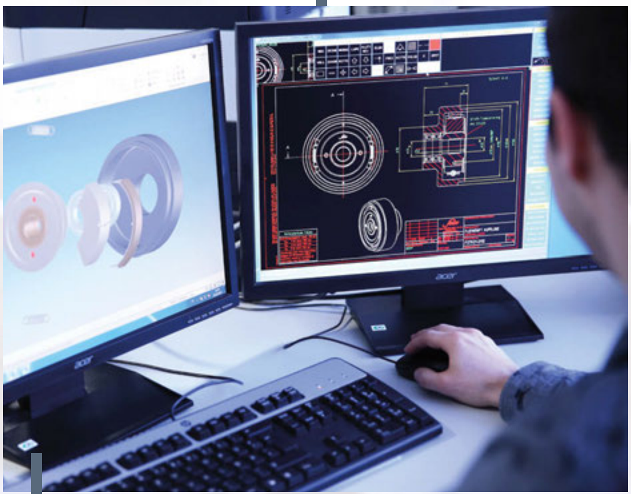
Development of additional intelligent functions integrated in mechanical pressure switches

2017

Certification to DIN ISO 9001:2015

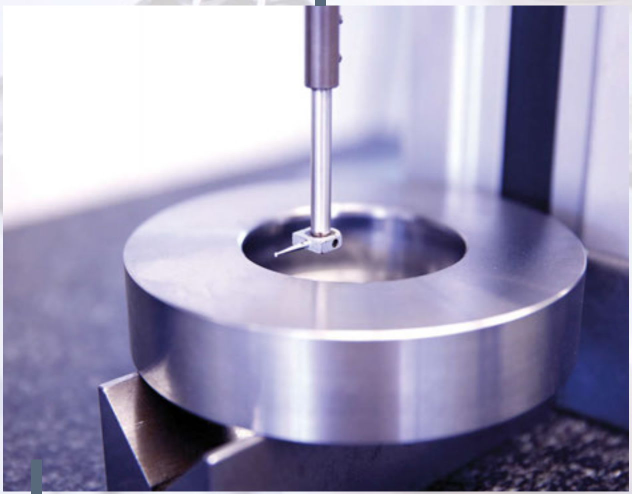
Tradition and Innovation

The preservation of proven traditions and continuous efforts in innovation enable visions to become successful reality



Design and development of new products using the latest CAD tools.

The best quality products are possible due to the best quality raw materials.



Products are subjected to comprehensive testing and measurements to simulate realistic ambient conditions and loads.

Computer-aided test bench for engagement speed.

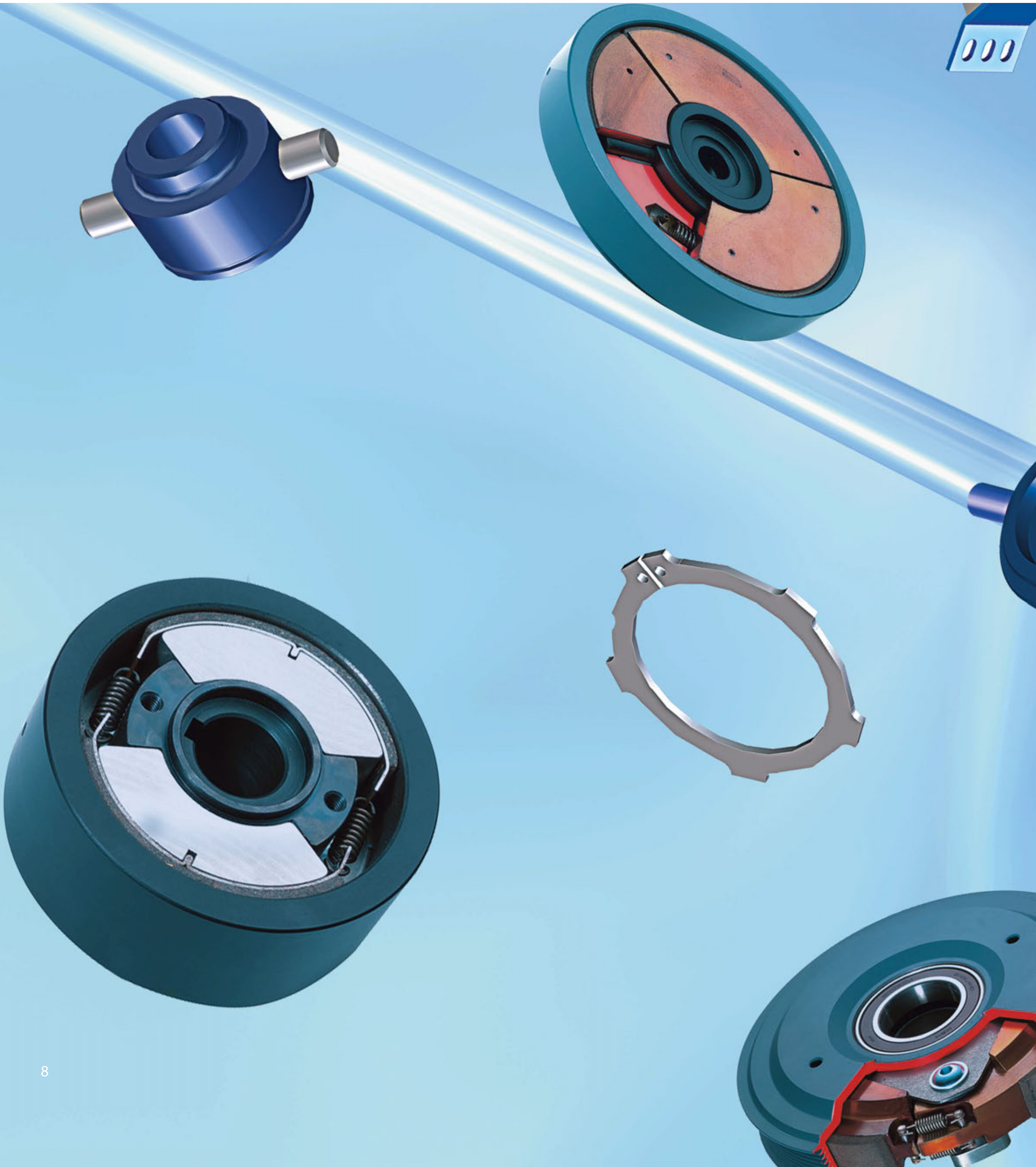
Experienced employees with long staff membership and professional competence guarantee high quality.

Ultra-modern production plant with integrated, fully-automated component handling enables to manufacture first-class clutches and brakes.

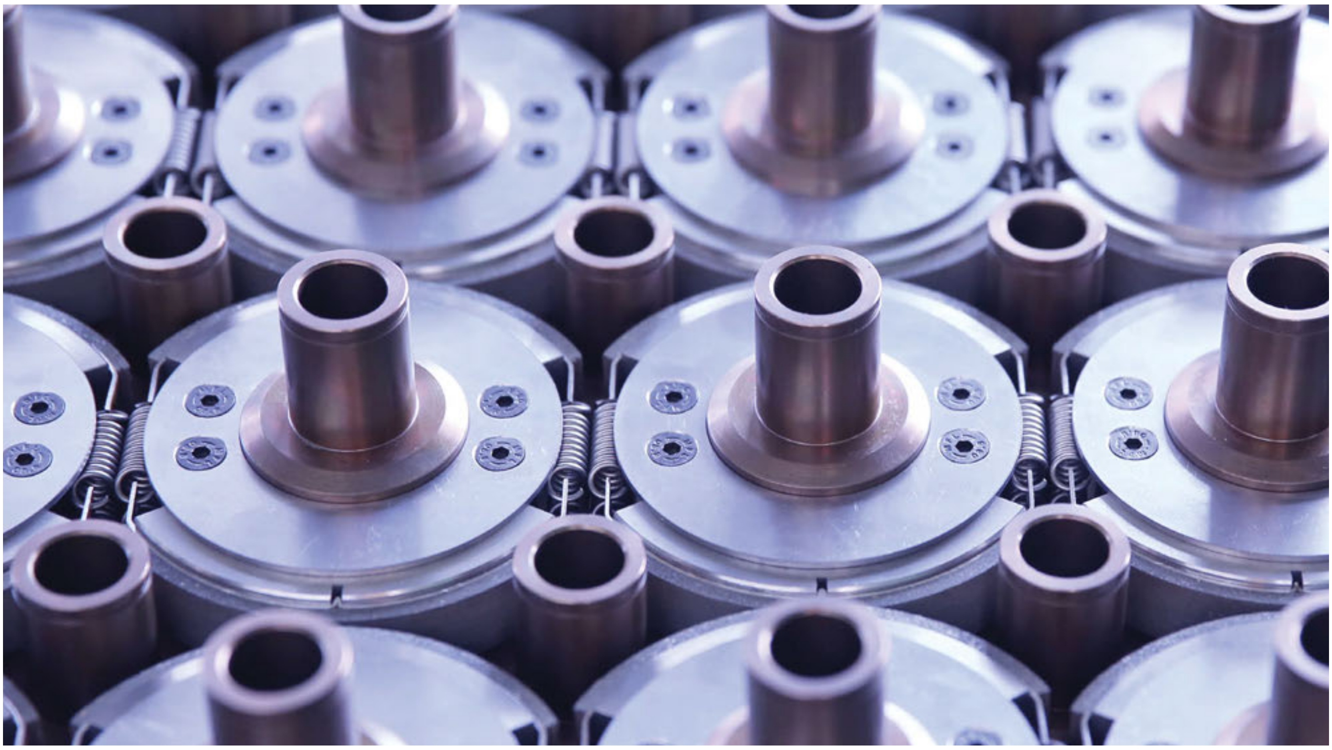
Ready-made clutches are waiting for their delivery to the customers.

From here our products are dispatched to customers all over the world.

Centrifugal clutches and brakes



General technical information on centrifugal clutches and brakes



How do centrifugal clutches or brakes work?

Centrifugal clutches and brakes use centrifugal forces to transmit power (clutch) or to limit speed (brake).

As the brakes are based on a physical principle, centrifugal clutches or brakes **do not require any additional external power supply,** which makes them a perfect solution for safety applications.

Centrifugal clutches and brakes consist of a **driving shaft** ①. Around the driving shaft, there are **flyweights** ② mounted, which are kept on the shaft by **springs** ③. On the outer side of the flyweights there are **friction pads** ④.

1. When the driving shaft starts turning, the flyweights and the friction pads are kept together by the retaining forces of the springs.

2. At a predefined speed (engagement speed), the centrifugal forces overcome the retaining forces of the springs and the friction pads do contact **the outer drum** ⑤.

3. The friction pads begin to transmit power to the drum, but will show a slipping effect until the speed is further increased to the operating speed, which means a non-slip torque transmission.

Based on long experience and know-how, SUCO designs the clutches with a safety factor, which guarantees that the transmissible torque at the operating speed is higher than necessary. This ensures a slip free application and thus, reduces wear and service requirements.

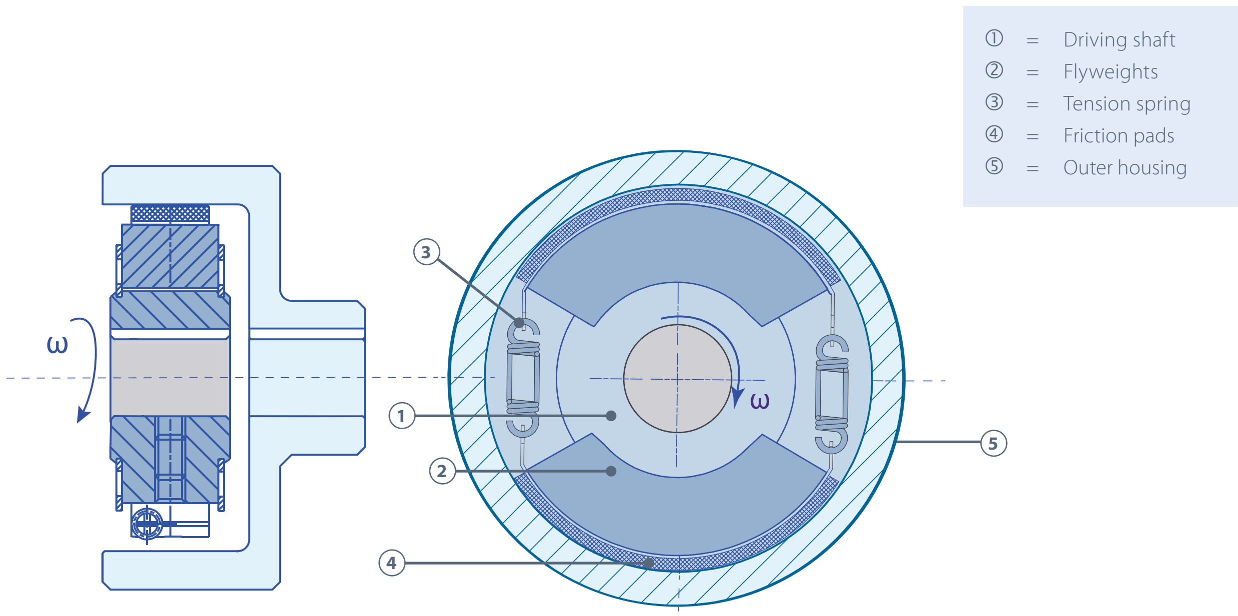
Differences between a centrifugal clutch and a centrifugal brake:

The main difference between a centrifugal clutch and a centrifugal brake is in the drum:

At a centrifugal clutch the drum is not fixed and will begin to turn when the engagement speed / operating speed is reached.

At a centrifugal brake the outer drum is fix and cannot turn. This causes a braking force when the friction pads touch the drum.

When designing and operating centrifugal brakes, there must be a special focus on braking time and maximum heat. Please refer to page 13 for further information.



Construction of a centrifugal clutch /brake

Typical applications for centrifugal clutches:

Centrifugal clutches are mainly used as a start up clutch. A centrifugal clutch allows the usage of a smaller motor, because the motor can start loadfree until it has reached its optimum operating speed, at which the load is smoothly added by the centrifugal clutch.

Typical applications for centrifugal brakes:

The main application for centrifugal brakes is limiting the speed of e.g.

- descending weight or persons
- industrial applications
  (e. g. safety- and fire doors)
- leisure applications
  (e. g. Go Kart to a safe level)

What are the key criteria when selecting and designing a centrifugal clutch / brake:

Performance data:

- The power which needs to be transmitted (kW)
- Engagement speed [rpm]
- Operating speed [rpm]
- The max. allowable size

By knowing the max. size and power, the most suitable clutch model can be chosen, as all models do have a different performance factor

Additional required information for centrifugal brakes:

- Load in kg
- Max. braking time and braking frequency

Design and dimensions:

Input design:

- Shaft diameter

Output design:

There are different output designs possible. So we need to know if you use

- Only core version
- Flex coupling
- Belt Pulley design
- Ball bearings or not

Please refer to pages 14-15 for further information.

General technical information on centrifugal clutches and brakes

Calculating the torque:

M = torque [Nm]
n = speed of rotation [rpm]
P = power [kW or hp]

$$M = 9550 \cdot \frac{P}{n} \ [kW]$$

$$M = 7121 \cdot \frac{P}{n} \ [hp]$$

Criteria	F-Type	S-Type	W-Type	P-Type
Page	16	18	20	22
Compact design	●	●	○	
Noisefree operation		●	●	●
Easy replaceable parts	●		●	
Performance factor	2.5	1.5	1.0	1.75 - 1.25

Selection matrix of SUCO centrifugal clutches

Performance factor

The performance factor is a measure to compare the power transmission of clutches. The **W-Type** clutch has a performance factor of 1.0. The **F-Type** at the same size and the same flyweight mass can transmit 2.5x more torque.

Engagement speed:

The engagement speed of centrifugal clutches indicates the speed at which the centrifugal forces overcome the retaining forces of the spring and the friction pads touch the outer drum.

From the first engagement until the operating speed the friction pads will slip, what will cause wear of the pads.

To minimise wear of the friction pads, the target is to pass quickly through the engagement speed band to the operating speed.

General tolerance for engagement speed ± 100 rpm.

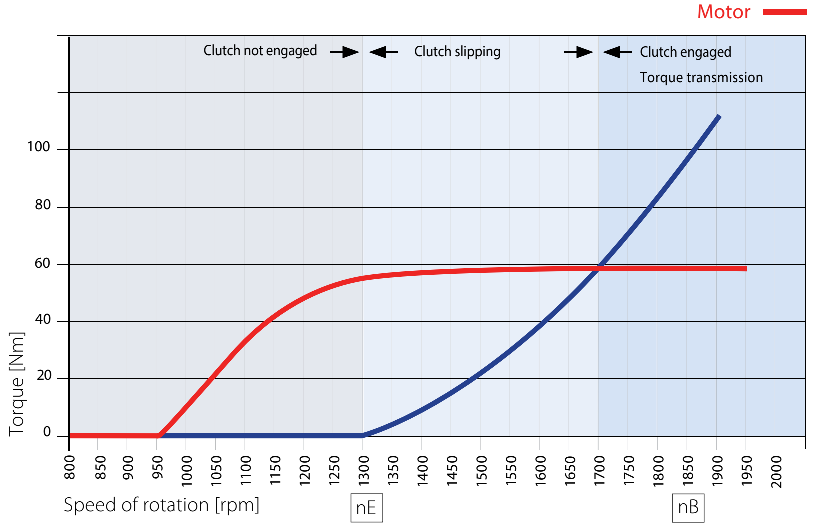
Operating speed:

At the operating speed the friction pads are in full contact with the drum and transfer the torque without slipping.

Variances in the motor speed must be considered when determining the operating speed. Therefore SUCO uses a safety factor which ensures a non-slipping application.

All SUCO clutches are dry-operated.

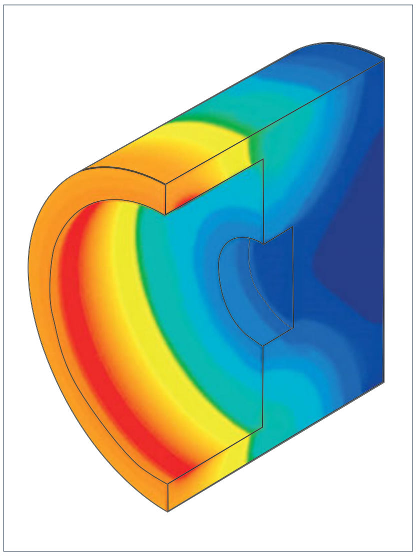
Example of engagement behaviour



nE = engagement speed, nB = operating speed

Centrifugal brakes:

Standard centrifugal brakes are used to limit speed – they cannot bring a system to standstill. The basic principle is to keep a balance between the load of the driving side and the braking torque. During the operation there is a constant friction which generates heat.



Friction produces heat

Centrifugal brakes convert mechanical energy into heat, which is generated between the linings and the brake drum, and mostly heats up the latter.

The temperature distribution illustrated above on a sectioned brake drum clearly shows the higher heating of the drum in the region over the flyweights.

The amount of generated heat depends on various factors:

- Transmitted braking torque
- Brake speed
- Duration of the braking operation
- Size of the friction surface
- The mass of the brake drum that has to be heated

Over the braking time the temperature curve rises very steeply at the start and then gradually approaches a maximum. The temperature at the friction surface (T_2) is substantially higher than the temperature (T_1) at the outer surface of the brake drum.

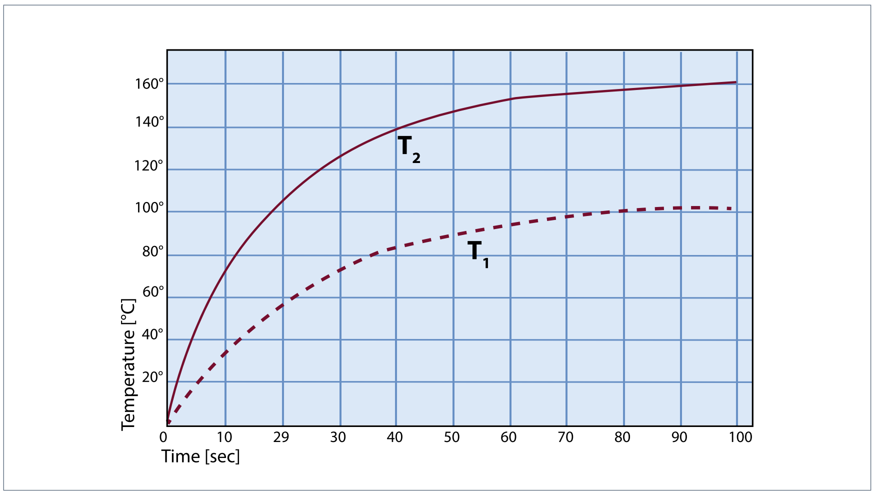
Nevertheless, the brake drum can become very hot during operation and is a source of danger. The authority responsible for operation of the machine is solely responsible for ensuring that suitable protective measures are taken.

The maximum temperature must not exceed the manufacturer's maximum permitted temperature for the friction material, otherwise the linings may be damaged. This can lead to a loss of effectiveness of the brake and, in the worst case, to destruction of the brake.

To prevent this, detailed data about the application is required when designing centrifugal brakes:

- Operating speed of the system to be braked
- Engagement speed of the centrifugal brake
- Braking torque required at the braking speed
- Changes in the braking torque
- Braking times and frequency
- Field of application

Centrifugal brakes are speed limiting devices and are finding increased use in lowering equipment. In such cases, the speed of lowering corresponds to the balanced condition between the speed governed by load torque and the speed governed by braking torque.



Different solutions, driven-side

To accommodate the variety of transmission requirements, SUCO offers a wide and flexible product range. Both axial and radial drives can be supplied.

All centrifugal brakes and clutches must only be used in conjunction with a suitable drum or belt pulley. The operation of a clutch or brake without a suitable drum or belt pulley is forbidden. Non-compliance can result in injury to persons.

Model K

Core version -K-

This version without a drum is supplied when a clutch or brake drum already exists in the customer's set up, or a suitable component for this purpose is available on the output side.

- The drum must be accurately centred and securely mounted.
- For higher torque transmission a clutch can be equipped with several rows of flyweights.
- The shaft diameter can be varied and tapered mountings are possible.

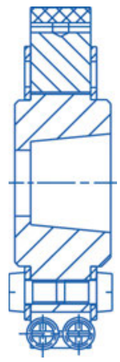


Figure 1

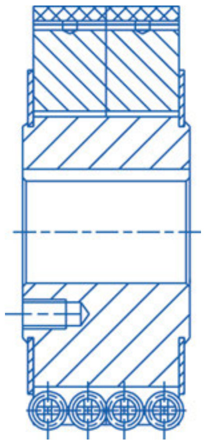


Figure 2

Model G

Core version with drum -G-

This version can be used to connect **two shaft ends**.

- The installation must have the lowest possible misalignment in both radial and angular directions.
- Excessive misalignment can result in rapid wear of the linings or complete failure of the clutch.

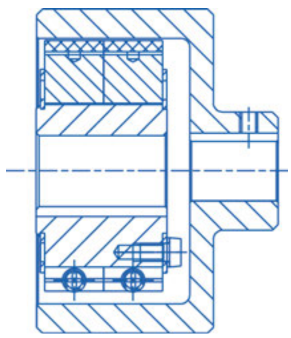


Figure 3

Unit version -E-

Where it is not practical to align both shaft ends or one shaft end and the drum, a bearing can be used between hub and drum.

As shown in Figure 4, the output drive can be directed through a tolerance ring on to which a belt pulley, a timing-belt pulley, or a mounting flange can be pressed.

Figure 5 shows a go kart clutch with a drive flange for a chain sprocket.

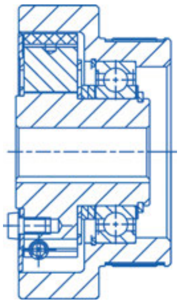


Figure 4

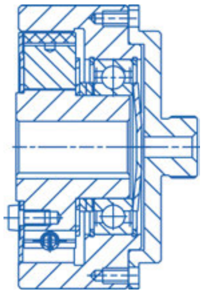


Figure 5

Model E

Unit version with flexible coupling -A-

The easiest way of compensating radial and angular misalignments between two shafts is to use a **flexible shaft coupling**.

The flexible coupling can be installed and located either radially or axially.

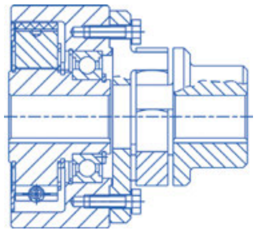


Figure 6

Model A

Belt-pulley version -R-

Where torque is transmitted through a **V-Belt**, the belt groove(s) can be machined in the drum. Single, duplex or multiple groove pulleys can be produced in this way.

Depending on the clutch size, effective pulley diameters from ca. **80 to 270 mm** can be incorporated.

Common groove forms are: **SPA, SPB, SPZ**, and **Poly-V according to DIN/EN**.

Figure 7 to 10 show different **belt-drive** clutch versions.

The clutch shown in Figure 9 with a split pulley allows **elimination of a tensioning pulley.** The V-Belt is tensioned by changing the spacer shims between the two pulley halves.

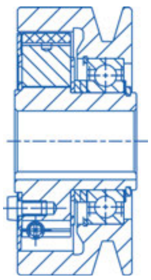


Figure 7

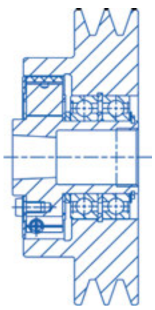


Figure 8

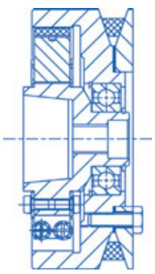


Figure 9

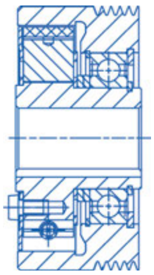


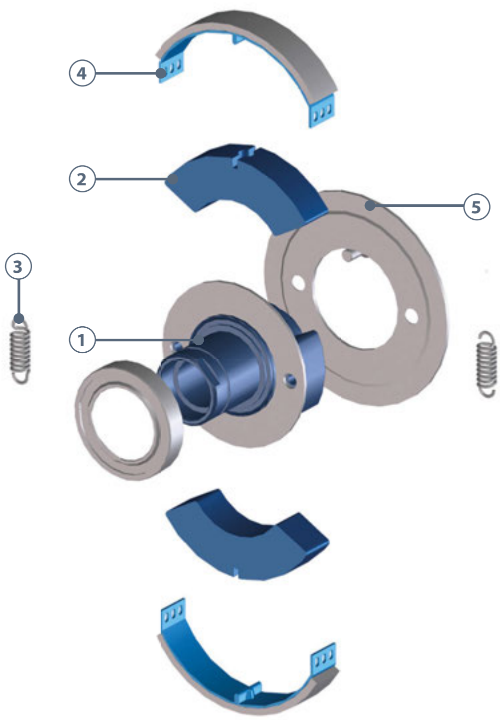
Figure 10

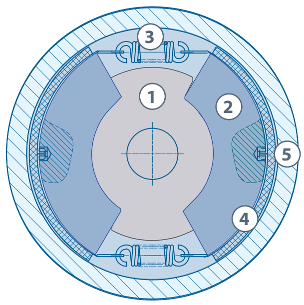
Model R

F-Type

Self-increasing clutch

Construction and mode of operation



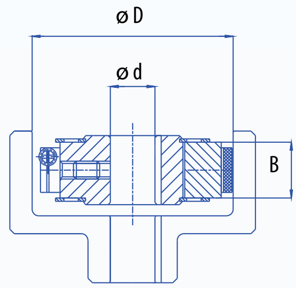


①	=	Driving hub
②	=	Flyweights
③	=	Tension spring
④	=	Friction pads
⑤	=	Outer drum

- High efficiency with a self-increasing effect
- Performance factor of 2.5
- Compact design
- Easy to service

Performance data and dimensions

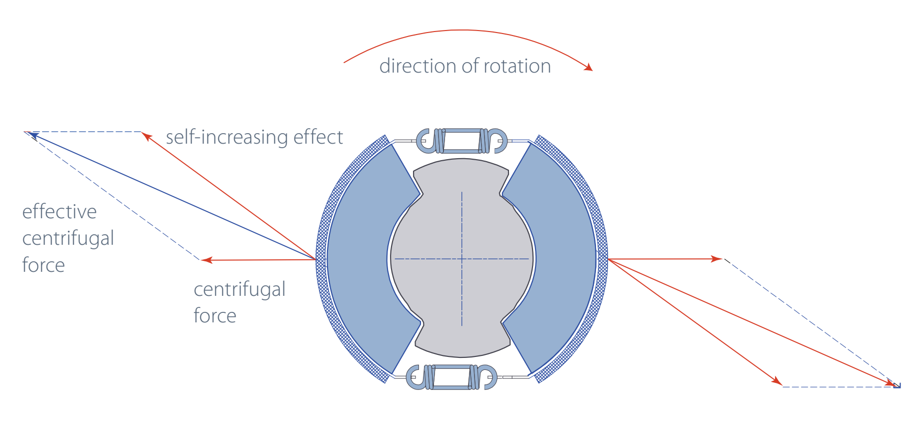
Type Number	D [mm]	B [mm] [1]	d max. [mm]	standard bore diameter d [mm] (inch) [2]	Standard rotational speed					
					low		normal		high	
					M at nE 750 and nB 1500 [Nm]	recommended motor power [kW] [3]	M at nE 1250 and nB 2500 [Nm]	recommended motor power [kW] [3]	M at nE 1500 and nB 3000 [Nm]	recommended motor power [kW] [3]
F01	50	10	14	12			1.3	0.17	2	0.3
F02	60	15	18	15 (5/8)			4	0.5	5	0.8
F03	70	15	22	15; 20 (7/8)			7	0.9	10	1.6
F04	80	15	28	14 - 25 (3/4; 7/8)	4	0.3	11	1.4	16	2.5
F05	90	20	35	18; 20; 25 (3/4; 1)	10	0.8	26	3.4	40	6.3
F06	100	20	35	20; 24; 28 (3/4; 1)	16	1.3	42	5.5	60	9.4
F07	110	20	40	28; 35; 40 (1)	25	2.0	70	9.0	100	15.7
F08	125	20	50	25; 38; 49 (3/4; 1)	40	3.2	120	15.7	180	28.3
F09	138	25	55	30; 38; 48 (1)	90	7.0	240	31.0	320	50.0
F10	150	25	60	38; 48; 49	125	10.0	340	44.5	470	74.0
F11	165	30	65	42; 50; 55 (1 7/16)	220	17.2	620	81.0	870	136.0
F12	180	40	75	50; 60 (2 3/8)	460	36.0	1200	157.0	1700	267.0
F13	200	30	75	35; 55; 65 (2 3/8)	520	41.0	1300	170.0	1850	290.0



d = bore dia.
D = inside dia. of drum
B = flyweight width

d max. = max. bore dia.
M = torque
nE = engagement speed
nB = operating speed

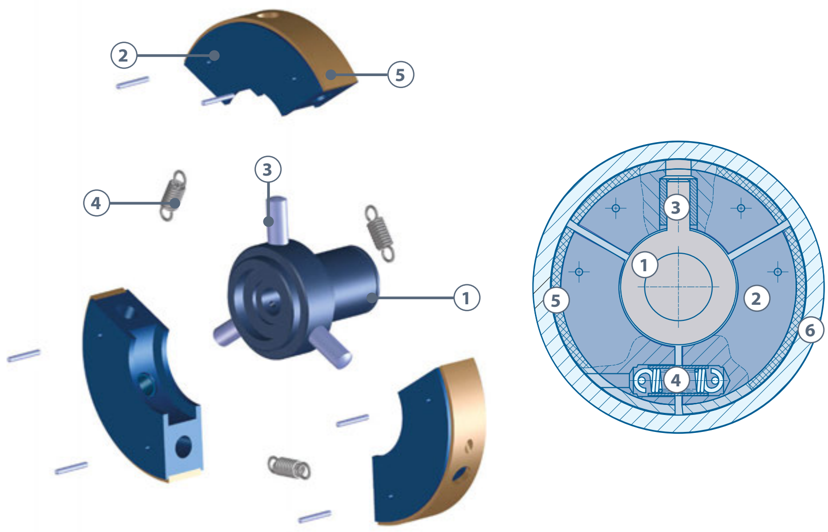
1) The transmitted power increases as the width B is increased.
2) Tapered bores and special dimensions can be manufactured on request.
3) Motor power is calculated using a safety factor of 2.
Final selection of the clutch should be accomplished by SUCO!



S-Type

Pin-guided clutch with three flyweights

Construction and mode of operation



①	=	Shaft	④	=	Tension spring
②	=	Flyweights	⑤	=	Lining
③	=	Cylindrical pin	⑥	=	Clutch drum / Cover disc

- Low noise level by guided pins
- Performance factor of 1.5
- Compact design

Performance data and dimensions

Type Number	D [mm]	B [mm] [1]	d max. [mm]	standard bore diameter d [mm] (inch) [2]	Standard rotational speed					
					low		normal		high	
					M at nE 750 and nB 1500 [Nm]	recommended motor power [kW] [3]	M at nE 1250 and nB 2500 [Nm]	recommended motor power [kW] [3]	M at nE 1500 and nB 3000 [Nm]	recommended motor power [kW] [3]
S04	80	25	24	15 (3/4; 7/8)	4.3	0.3	12	1.6	17.5	2.8
S05	90	25	30	14; 30 (3/4; 1)	7.5	0.6	212	2.8	31	4.9
S06	100	25	24	20; 24; 28 (3/4; 7/8)	11	0.8	30	4.0	43	7.0
S07	110	25	30	28; 30 (1)	15	1.2	45	6.0	64	10.0
S08	125	25	40	20; 30 (1; 1/2)	30	2.4	85	11.0	124	20.0
S09	138	25	30	17; 30 (1; 1 1/8)	40	3.0	112	15.0	160	25.0
S10	150	35	40	38; (1 1/8)	78	6.0	216	28.0	310	49.0

d max. = max. bore dia.
M = torque
nE = engagement speed
nB = operating speed

1) The transmitted power increases as the width B is increased.
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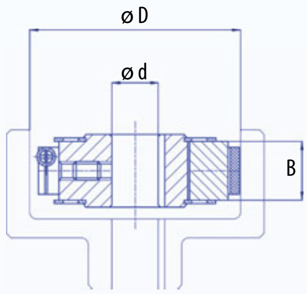
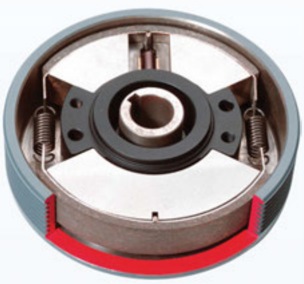
3) Motor power is calculated using a safety factor of 2.
Final selection of the clutch should be accomplished by SUCO!



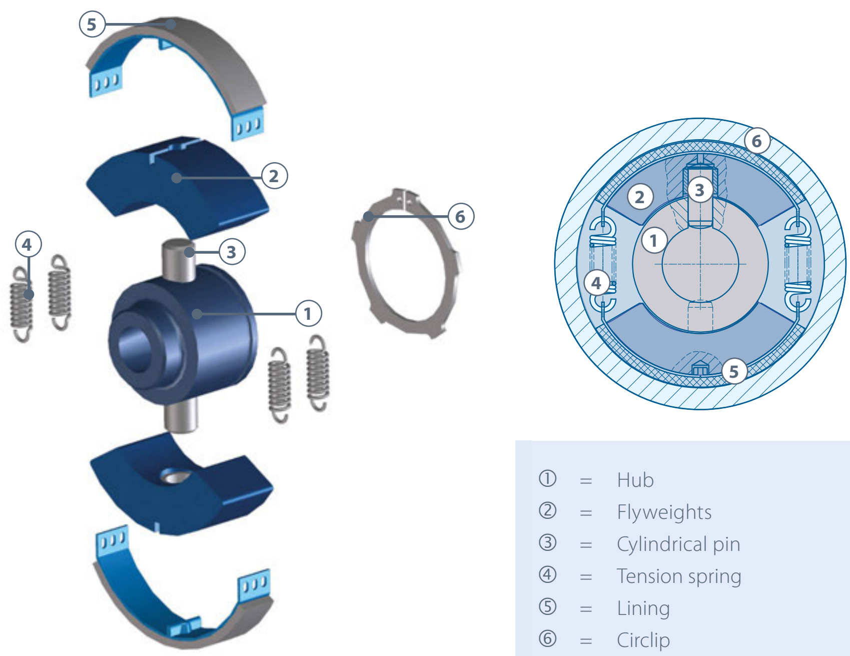
d = bore dia.
D = inside dia. of drum
B = flyweight width

W-Type



Pin-guided clutch with two flyweights

Construction and mode of operation



①	=	Hub
②	=	Flyweights
③	=	Cylindrical pin
④	=	Tension spring
⑤	=	Lining
⑥	=	Circlip

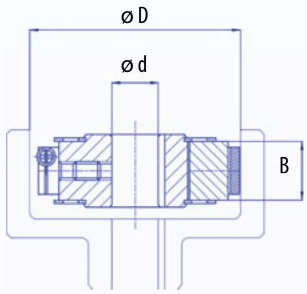
- Low noise level by guided pins
- Easy to service
- Performance factor 1.0

Performance data and dimensions

Type Number	D [mm]	B [mm] [1]	d max. [mm]	standard bore diameter d [mm] (inch) [2]	Standard rotational speed					
					low		normal		high	
					M at nE 750 and nB 1500 [Nm]	recommended motor power [kW] [3]	M at nE 1250 and nB 2500 [Nm]	recommended motor power [kW] [3]	M at nE 1500 and nB 3000 [Nm]	recommended motor power [kW] [3]
W04	80	15	15	15	1.7	0.14	4.6	0.6	6.6	1.0
W05	90	20	25	14 (5/8)	3.7	0.3	10.3	1.4	14.8	2.3
W06	100	20	30	30	5.7	0.45	16.0	2.0	23.0	3.6
W07	110	20	40	–	8.6	0.7	24.0	3.2	34.5	5.5
W08	125	20	40	20; 30 (1 1/2)	14.0	1.0	38.5	5.0	55	8.5
W09	138	25	55	–	27.0	2.2	75.0	9.8	110	17
W10	150	25	60	38 (1 1/8)	36.5	3.0	102	13	145	23

d max. = max. bore dia.
M = torque
nE = engagement speed
nB = operating speed

1) The transmitted power increases as the width B is increased.
2) Tapered bores and special dimensions can be manufactured on request.
3) Motor power is calculated using a safety factor of 2.
Final selection of the clutch should be accomplished by SUCO!

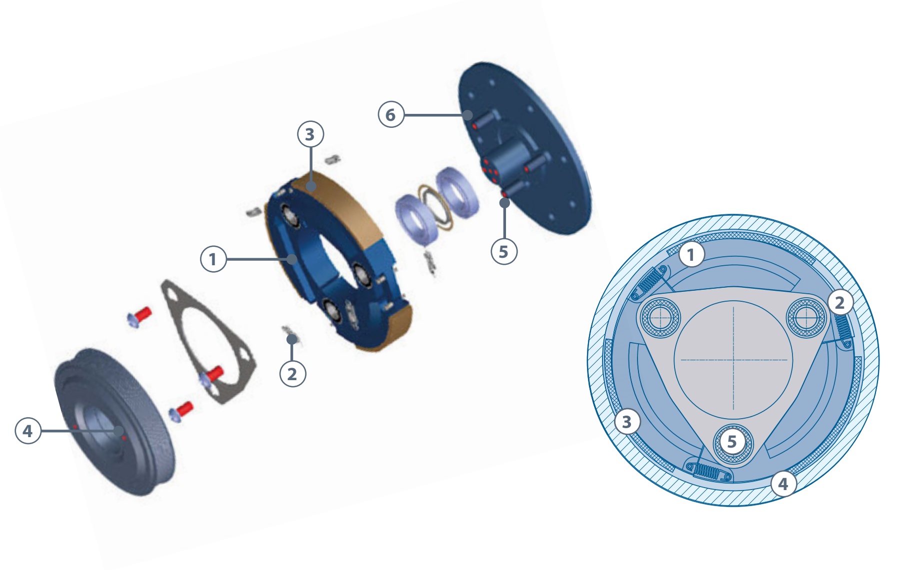


d = bore dia.
D = inside dia. of drum
B = flyweight width

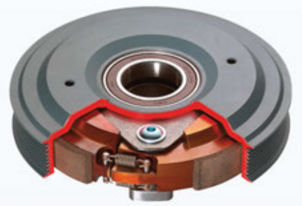
P-Type

Asymmetric pivot clutch

Construction and mode of operation



①	=	Flyweight	④	=	Clutch drum / Cover disc
②	=	Tension spring	⑤	=	Shoe pivot
③	=	Lining	⑥	=	Flange



- Extremely narrow design
- Lowest noise level of SUCO clutches
- Performance factor between 1.75 and 1.25 (depending on direction of rotation)

P-Type

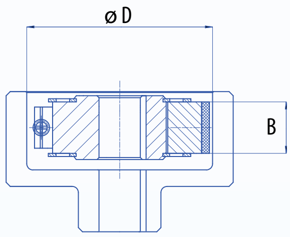
Performance data and dimensions

Type Number	D [mm]	B [mm][1]	Standard rotational speed			
			low		high	
			M at nE 750 and nB 1500 [Nm]	recommended motor power [kW] [2]	M at nE 1500 and nB 3000 [Nm]	recommended motor power [kW] [2]
P11	187	30	175	13	460	60
P12	193	30	180	14	500	70

Other sizes are available on request.

M = torque
nE = engagement speed
nB = operating speed

[1] The transmitted power increases as the width B is increased.
[2] Motor power is calculated using a safety factor of 2.
Final selection of the clutch should be accomplished by SUCO!



D = inside dia. of drum
B = flyweight width

Key to model codes

Type designation:
F – Type
S – Type
W – Type
P – Type

Size:
See table "Performance data and dimensions" on pages 17, 19, 21, 23

Models driven side:
K – Core
G – Core with drum
E – Unit version with bearing
R – Belt pulley version
A – Axial output with flexible coupling
S – Customer special

F 08 E 1 1 – XXXX

Quantity
(depending on model driven side)
K, G, E, A, S: Number of rows of flyweights
R: Number of grooves

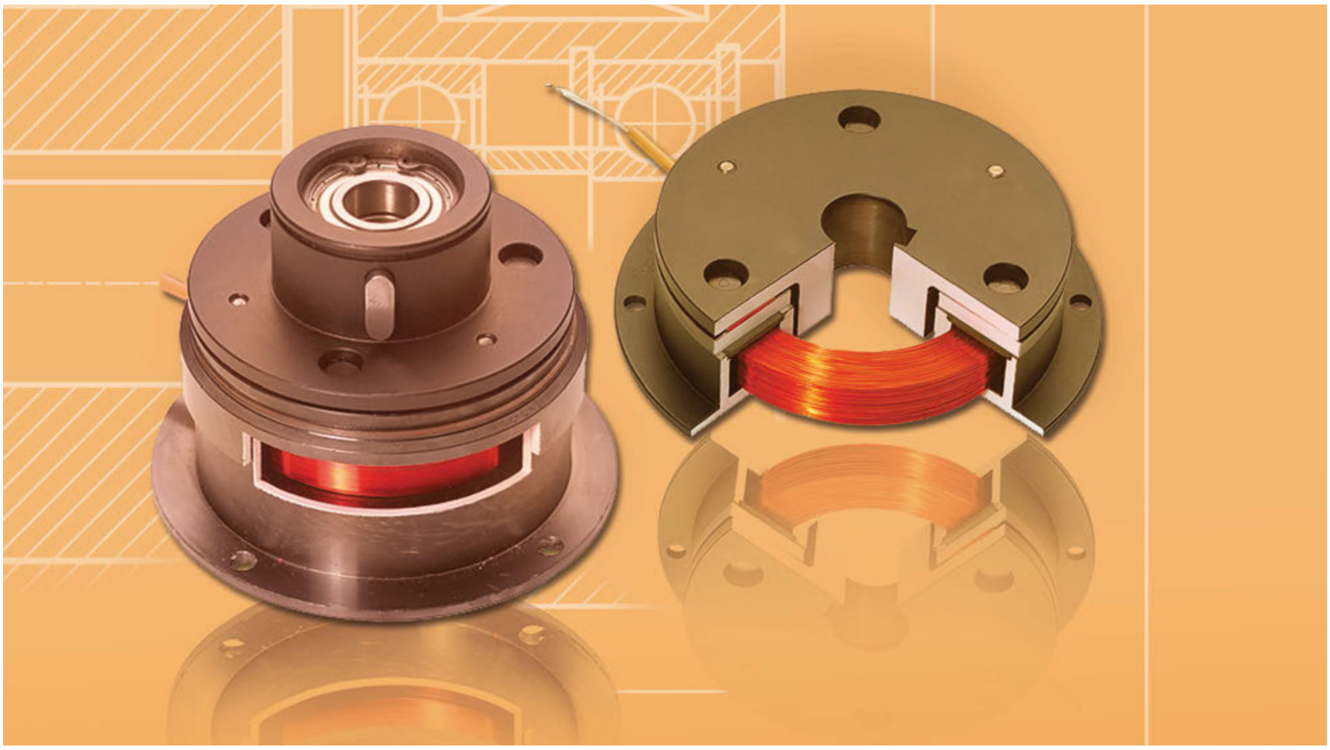
Bore, Input Side,
1 – Cylindrical hole
2 – Tapered hole (core side)
3 – Tapered hole (bearing side)
4 – Gear teeth
5 – Thread
6 – Flange
9 – Special form

Consecutive number

Electromagnetic clutches and brakes

Electromagnetic clutches and brakes

General technical information on electromagnetic clutches and brakes



How do electromagnetic clutches or brakes work?

The working principles of electromagnetic clutches and brakes are very similar.

Electromagnetic clutches:

The stator body ① contains the field coil ②, which is a copper coil cast in synthetic resin. The clutch is activated by applying a direct current to the field coil. This creates a magnetic field, which electromagnetically attracts the armature plate ④ towards the input drive hub ⑦ with its friction lining ③, and so allows torque to be transmitted from the input side to the output.

The axially-located output drive hub ⑥ separates from the input side when the current is cut off. A return spring ⑤ ensures that the armature plate separates from the input hub.

Electromagnetic brakes:

The stator body ① contains the field coil ②, which is a copper coil cast in synthetic resin. When current is applied a magnetic field is created, which attracts the armature plate ④ towards the friction lining ③, and so transmits a braking torque to the output hub ⑥.

When the current is off, the return spring pulls the armature plate back to its original position.

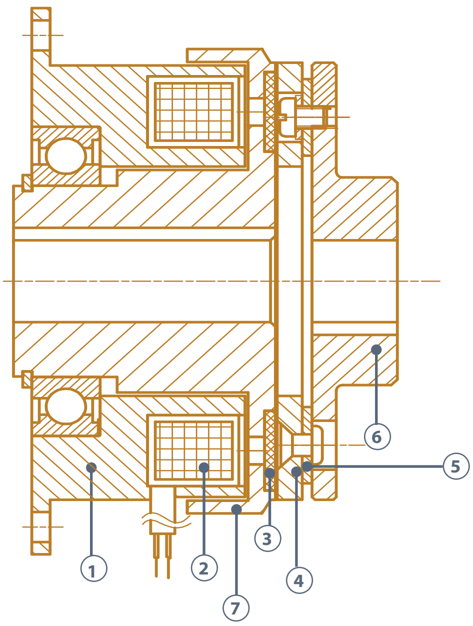
SUCO is your perfect partner when you require a specifically fitted design for an electromagnetic clutch or brake, which matches perfectly with your application and design needs.

As SUCO manufactures electromagnetic as well as centrifugal clutches and brakes, we can even combine the two principles to provide you with a solution which uses the advantages of both technologies.

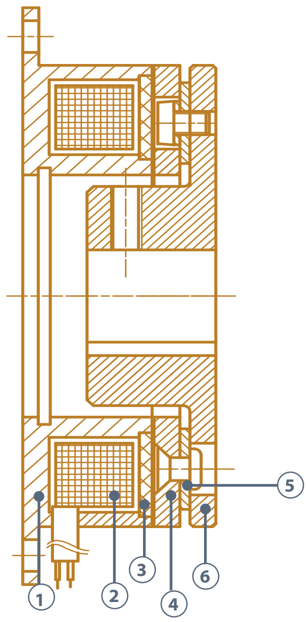
You will find these special solutions starting from page 39.

Typical applications

Among many other applications, SUCO electromagnetic clutches and brakes are used in construction machines, agricultural machinery, machine tools, pumps and compressors, centrifuges, belt conveyors and cleaning machines.



Electromagnetic clutch



Electromagnetic brake

① = Stator body
② = Field coil
③ = Friction lining
④ = Armature plate
⑤ = Return spring
⑥ = Hub
⑦ = Input drive hub

Construction and mode of operation of a electromagnetic clutch /brake

Technical explanations and important installation notes:

When SUCO electromagnetic clutches and brakes are correctly selected, they are trouble-free, require no maintenance, and are extremely reliable.

SUCO clutches are dry-running clutches. To ensure correct operation, grease and oil must be kept away from the clutches' and brakes' friction surfaces.

Electromagnetic clutches and brakes require a DC power supply. They normally operate on a 24 VDC supply, but can also be supplied for other voltages (6, 12, 48 and 190 VDC). As standard the power supply is via a 2-core cable 0.4 m long.

All SUCO clutches and brakes are normally open.

Depending on the size of a clutch or a brake, the installation must provide for an air gap of between 0.2 and 0.5 mm between the drive hub and the armature plate. The purpose of this air gap is to ensure complete separation of the input and output drives when no current is applied.

SUCO electromagnetic clutches and brakes can be installed on flanges or shafts. Flange-mounted versions require a suitable flange surface. The magnet component of the shaft-mounted models must be secured against rotation, the torque support must not be rigidly fixed.

If a SUCO output drive is not used, it is important to ensure that there are clearance holes to accommodate the rivet heads when installing the armature plate.

The armature plate is centred by the screws which hold the return spring to the output component. When the armature plate is installed, it must remain free to move axially against the return spring.

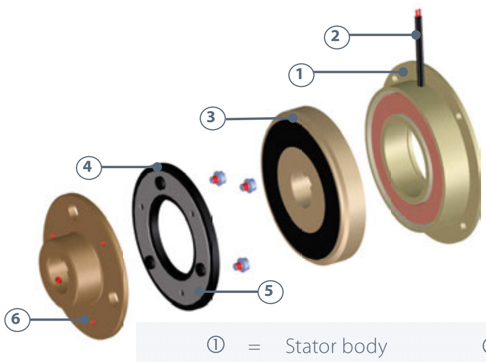
The standard form of output is an axial drive with a bore and keyway, which passes through a flange. On the subsequent pages also other variants are shown.

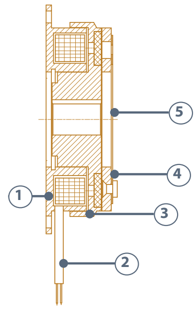
E-Type

Electromagnetic clutch without bearing

Construction and mode of operation

When assembling, the stator must be accurately centred on the input drive hub, otherwise the hub may rub on the stator body and cause damage to the clutch. For further installation advises and technical details, please refer to page 28 .



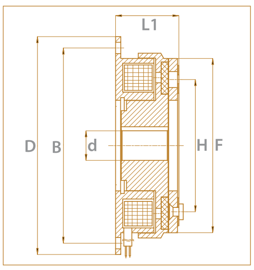


①	=	Stator body	④	=	Armature plate with ⑤
②	=	Connection cable	⑤	=	Return spring
③	=	Input drive hub	⑥	=	Output drive hub

Model A

Clutch with input drive hub

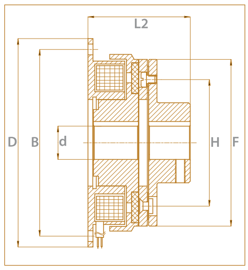
Basic version without output drive hub. Connection to output side by screws.



Model C

Clutch with input & output drive hub

Basic version with axial output drive (shaft - shaft).



Performance data and dimensions

Size	E02	E03	E04	E05	E06	E07	E08	E09
Torque [Nm] For reference purposes[1)]	1.0	4.5	8.0	20.0	38.0	80.0	150.0	280.0
Speed of rotation max. [rpm]	10.000	8.000	6.000	5.000	4.000	3.000	3.000	2.000
Power [W] T = 20° C	9	12	20	23	32	40	55	72
d max. [mm][2)]	10	20	25	30	40	50	70	80
D [mm]	60	80	100	125	150	190	230	290
L1 [mm]	26.5	28.0	31.0	36.0	40.5	46.5	55.4	64.0
L2 [mm]	38.5	43.0	51.0	61.0	70.5	84.5	103.0	119.0
B [mm]	52	72	90	112	137	175	215	270
F [mm]	42	63	80	100	125	160	200	250
H [mm]	29	46	60	76	95	120	158	210

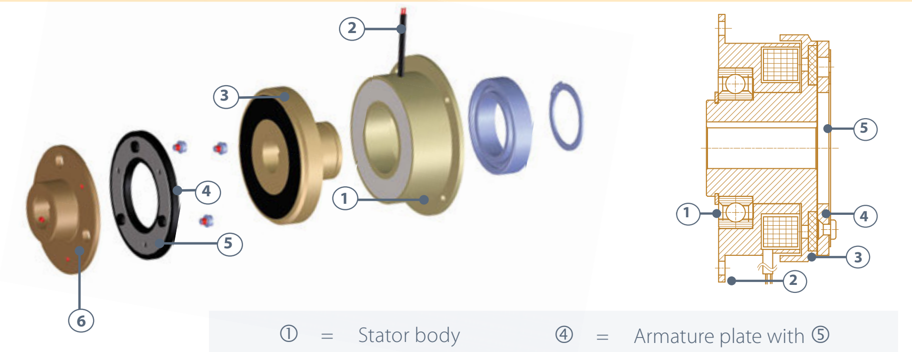
1) Depending on design of installation, operating and ambient conditions

2) Keyway to DIN 6885/1

Electromagnetic clutch with bearing

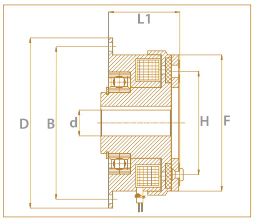
Construction and mode of operation

Due to the containing bearing, the stator body does not have to be centred on the input drive.
For further installation advises and technical details, please refer to page 28 .



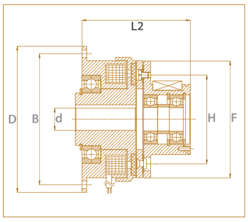
①	=	Stator body	④	=	Armature plate with ⑤
②	=	Connection cable	⑤	=	Return spring
③	=	Input drive hub	⑥	=	Output drive hub

Model A



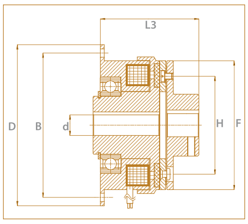
Clutch with input drive hub
Basic version without output drive hub. Connection to output side by screws.

Model C



Clutch with input and output drive hub
Basic version with axial output drive (mounted on one shaft). Output drive hub with bearings.

Model D



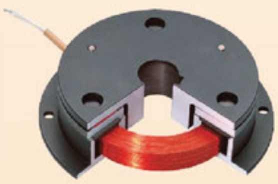
Clutch with input & output drive hub
Basic version with axial output drive (shaft - shaft).

Performance data and dimensions

Size	G03	G04	G05	G06	G07	G08	G09
Torque [Nm] For reference purposes[1]	4.5	8.0	20.0	38.0	80.0	150.0	280.0
Speed of rotation max. [rpm]	8.000	6.000	5.000	4.000	3.000	3.000	2.000
Power [W] T = 20° C	12	20	23	32	40	55	72
d max. [mm][2]	20	25	30	40	50	70	80
D [mm]	80	100	125	150	190	230	290
L1 [mm]	41.0	45.0	52.0	56.5	67.0	75.4	90.0
L2 [mm]	68.0	72.5	92.0	102.5	112.0	130.5	153.0
L3 [mm]	56.0	65.0	77.0	86.5	105.0	123.4	145.0
B [mm]	72	90	112	137	175	215	270
F [mm]	63	80	100	125	160	200	250
H [mm]	46	60	76	95	120	158	210

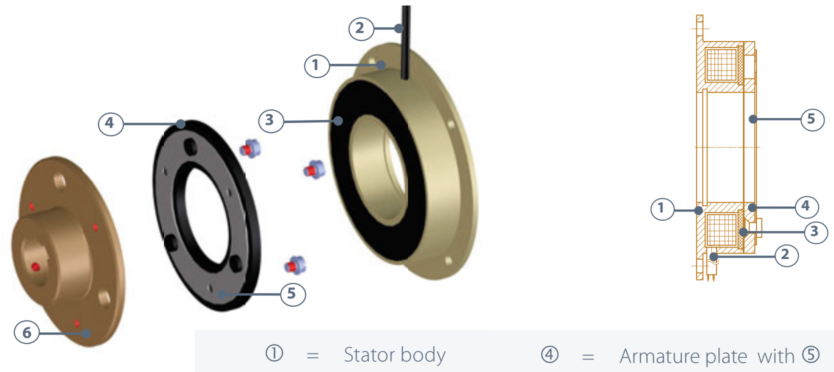
[1] Depending on design of installation, operating and ambient conditions
[2] Keyway to DIN 6885/1

Electromagnetic brakes



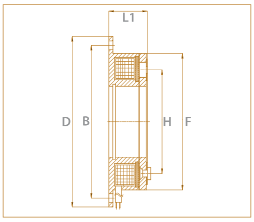
Construction and mode of operation

The stator body must be installed concentrically with the output side. For further Installation advises and technical details, please refer to page 28.



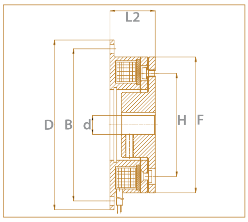
①	=	Stator body	④	=	Armature plate with ⑤
②	=	Connection cable	⑤	=	Return spring
③	=	Friction lining	⑥	=	Output drive hub

Model A



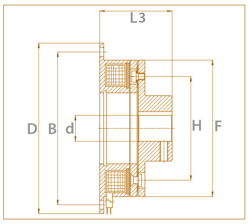
Brake without hub
Basic version without drive hub.
Connection to output side by screws.

Model B



Brake with internal hub
Basic version with axial output drive. Internal hub.

Model C



Brake with external hub
Basic version with axial output drive. External hub.

Performance data and dimensions

Size	B02	B03	B04	B05	B06	B07	B08	B09
Torque [Nm] For reference purposes[1]	1.0	4.5	8.0	20.0	38.0	80.0	150.0	280.0
Speed of rotation max. [rpm]	10.000	8.000	6.000	5.000	4.000	3.000	3.000	2.000
Power [W] T = 20° C	9	12	20	23	32	40	55	72
d max. [mm][2]	8	17	20	30	35	42	50	75
D [mm]	60	80	100	125	150	190	230	290
L1 [mm]	21.0	22.0	24.5	28.0	31.0	35.0	41.5	48.0
L2 [mm]	24.0	25.5	28.5	33.0	37.5	42.0	50.4	59.0
L3 [mm]	33.0	37.0	44.5	53.0	61.0	73.0	89.5	103.0
B [mm]	52	72	90	112	137	175	215	270
F [mm]	42	63	80	100	125	160	200	250
H [mm]	29	46	60	76	95	120	158	210

[1] Depending on design of installation, operating and ambient conditions

[2] Keyway to DIN 6885/1

Key to model codes

Type designation:
E - Type
G - Type
B - Type

Size:
See table "Performance data and dimensions" on pages 28-30

Model:
A
B
C
D

Voltage:
A - 6 VDC
B - 12 VDC
C - 24 VDC
D - 48 VDC
G - 190 VDC

E 02 A – C – 08 – 00 – XXX

BORE DIA. INPUT DRIVE HUB
Important!
The number is a code, not the diameter.

BORE DIA. OUTPUT DRIVE HUB
Important!
The number is a code, not the diameter.

Consecutive number

Different solutions, driven-side

To accommodate the variety of transmission requirements, SUCO offers a wide and modular product range. Special customized versions are available on request.

Clutch-brake combination (L-Type)

This model can be manufactured on request in the standard sizes. For performance data and dimensions, see E-Type (page 30) and B-Type (page 32).

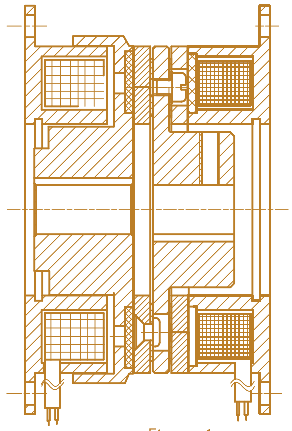


Figure 1

With bearing-supported flange

A flange supported on a hollow shaft and bearings is used for the output side connection.

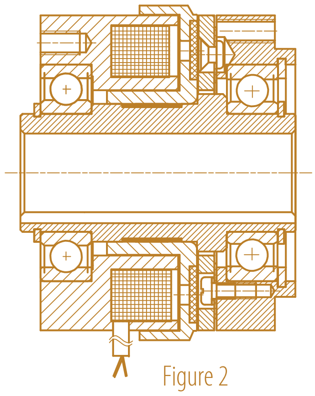


Figure 2

With a flexible coupling

If an axial or angular misalignment is to be expected between two shafts, a flexible coupling can be attached.

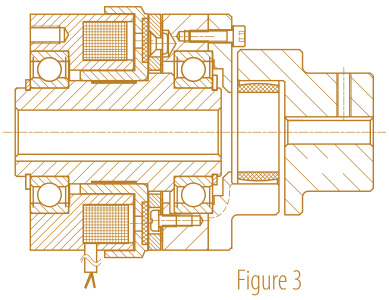


Figure 3

With bearing-supported belt pulley

The output drive is a single-groove belt pulley which is supported on a hollow shaft.

The pitch diameter can be supplied to the customers' requirements. Multiple-groove pulleys can also be supplied.

Common groove forms are: SPA, SPB, SPZ, and Poly-V or DIN/EN.

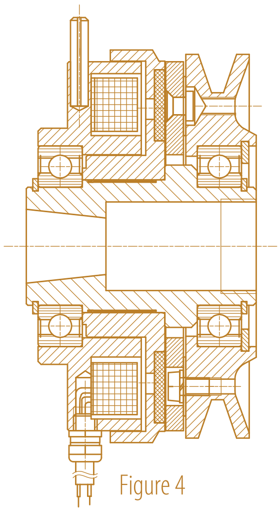


Figure 4

With belt pulley supported on separate bearings

Here the output drive is a single or multiple groove belt pulley which is separately supported, not on the hollow shaft of the electromagnetic clutch.

The pitch diameter of the pulley can be supplied to the customers' requirements.

Common groove forms are: SPA, SPB, SPZ, or Poly-V or DIN/EN.

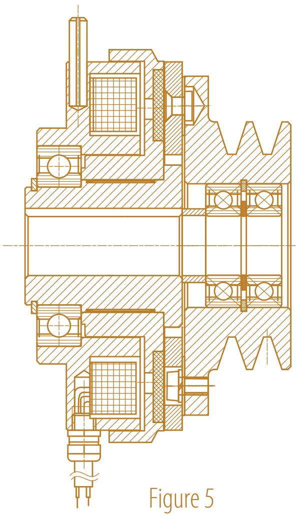


Figure 5

With sprockets

A chain sprocket mounted on a bearing supported flange transmits torque on the output side.

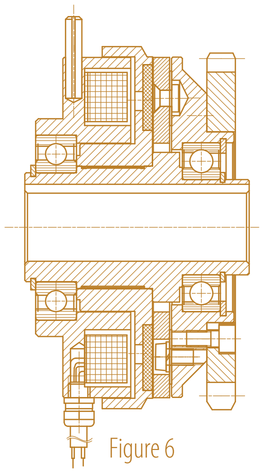
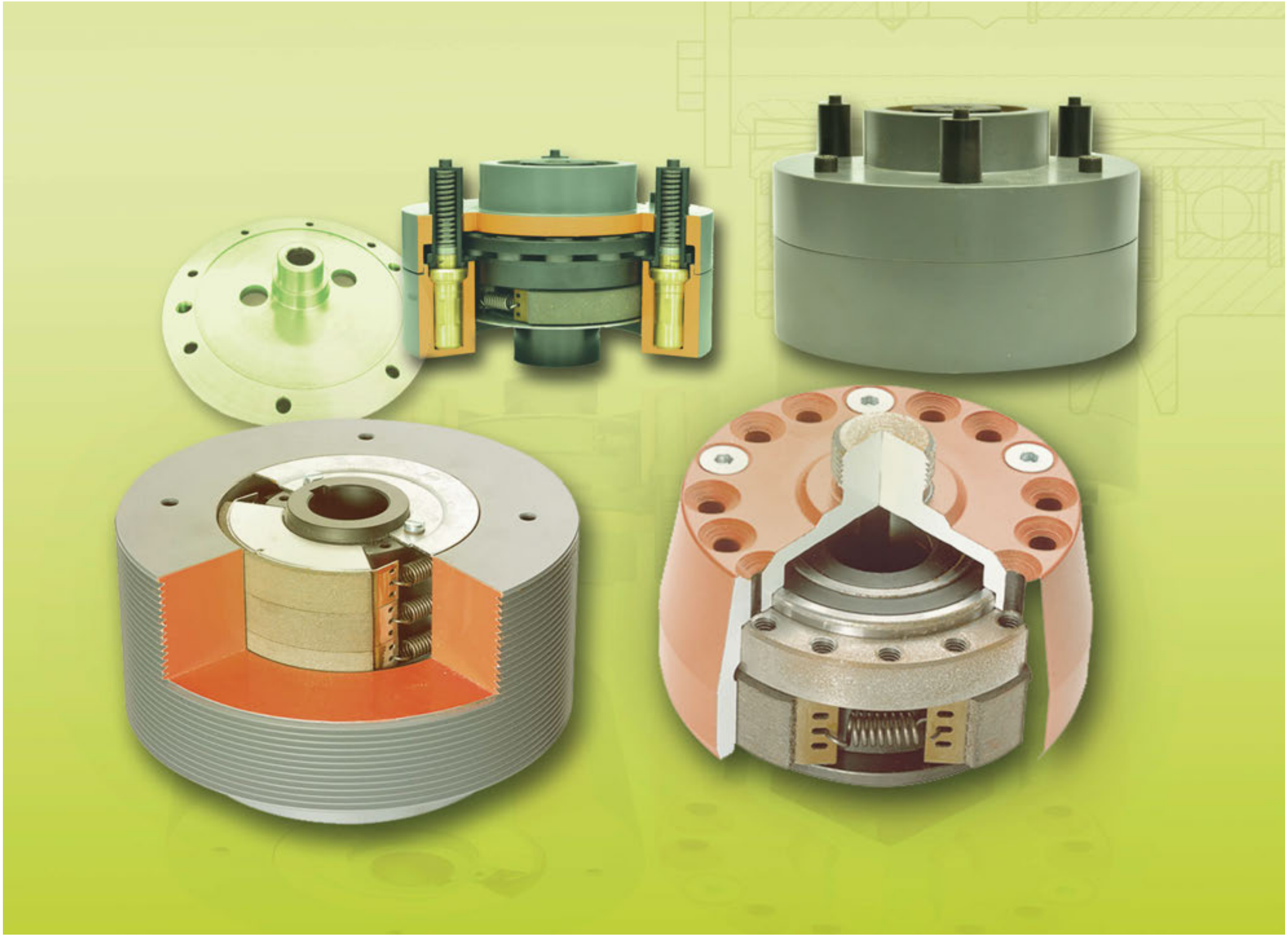


Figure 6

Customized solutions

General information on special designs and customized solutions



Customized solutions from SUCO

Where the use of a standard version is not practical or the power capacity inadequate, one of our customer-specific designs can provide a solution. Here, SUCO has many years of experience.

In cooperation with the customer, our engineers study enquiries for their feasibility and produce a cost-effective solution. Every effort is made to ensure that the design of the product will comply with the customers' requirements and wishes.

SUCO has its own workshop with a wide choice of different CNC machines which enable to satisfy your specific needs from single piece orders up to serial quantities.

There is a strong link between SUCO engineering and production which ensures highest efficiency by matching customer needs, product design and machinability.

On the following pages SUCO shows a small selection of the numerous ways of solving drive problems, using combinations of centrifugal clutches and brakes or electromagnetic clutches and brakes that we can offer. They can form the basis for complete system solutions realised in combination with other drive components.

SUCO has patented many designs and variants in this field.

Examples of different customized solutions

Electrically-controlled centrifugal brake

An electrically-controlled centrifugal brake allows braking at speeds below the operating speed of the system that is to be braked.

When power is not applied, the brake disc of a spring-loaded brake and the brake drum of a centrifugal brake are not free to rotate. When the engagement speed, which is below the normal operating speed, is exceeded, the centrifugal brake applies a braking torque.

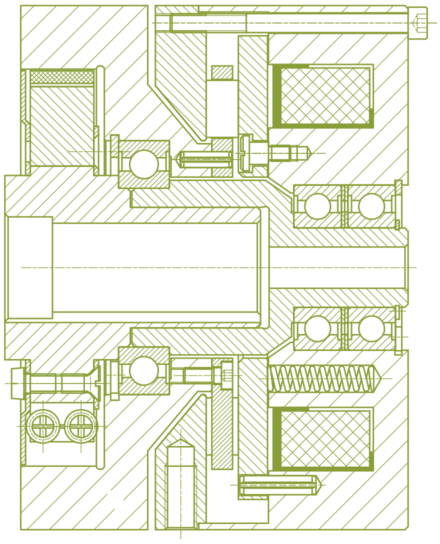


Figure 1

Centrifugal brake „SUCO-ZERO"

This brake is used to bring a system quickly to standstill if a pre-defined speed is exceeded.

The system can then be reset manually to its original condition.

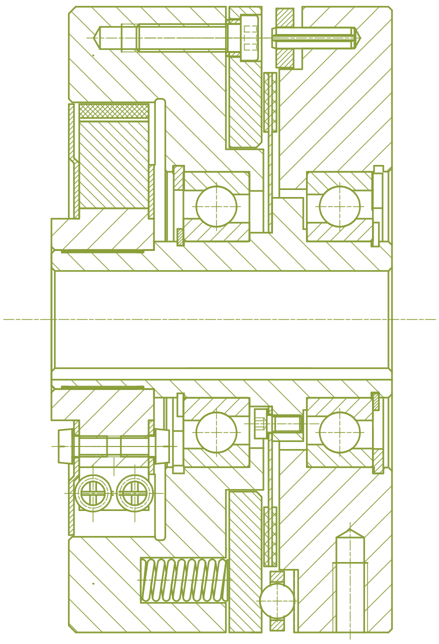


Figure 2

Examples of different customized solutions

New safety system SUCO Smartstop

SUCO Smartstop brake is a combination of a classic centrifugal brake to control the speed of a wind turbine and thermal actuated static holding brake to bring down the system to a complete stop.

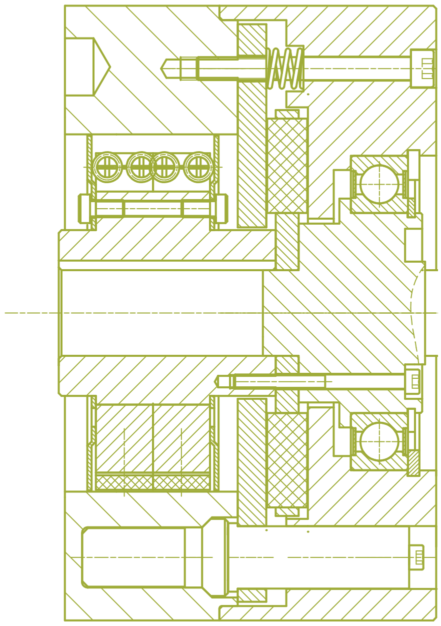


Figure 3

Electromagnetic brake in combination with a centrifugal brake

This version is used for lowering loads at a defined speed with no electric power applied (power failure in the system).

In normal operation, the load is held by the electromagnetic brake. Power failure causes the electromagnetic brake to release.

To prevent the uncontrolled descent of the load, the centrifugal brake operates to lower the load at a defined speed.

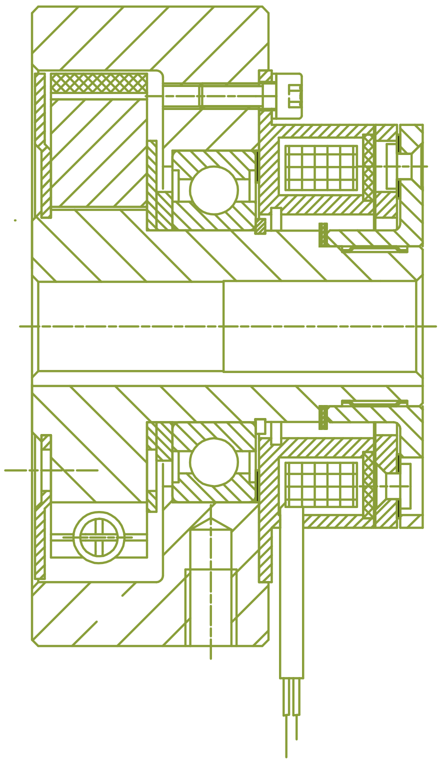


Figure 4

Centrifugal clutch with electromagnetic brake and belt drive

In this case the centrifugal clutch is used to start a heavily-loaded machine. This protects the drive, which can accelerate at no-load until the engagement speed is reached.

Power is transmitted by V-belts. When the drive is switched off, the electromagnetic brake can be used to bring it to standstill.

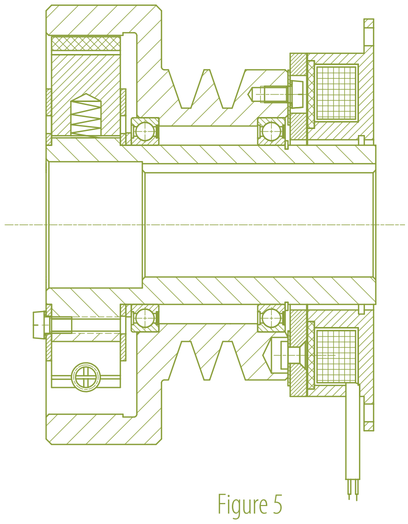


Figure 5

Self-inducing electromagnetic clutch

A belt pulley driven by an internal-combustion engine is fitted with permanent magnets and serves as the rotor of a generator. The stator consists of a pack of laminations with copper windings.

The electric current induced in the windings is fed to the coil of an electromagnetic clutch. This switches automatically at a certain speed to connect the drive to a machine (in this case via a timing-belt pulley).

Where necessary, it is possible for the electromagnetic clutch to be switched on or off at any speed manually or by a control system.

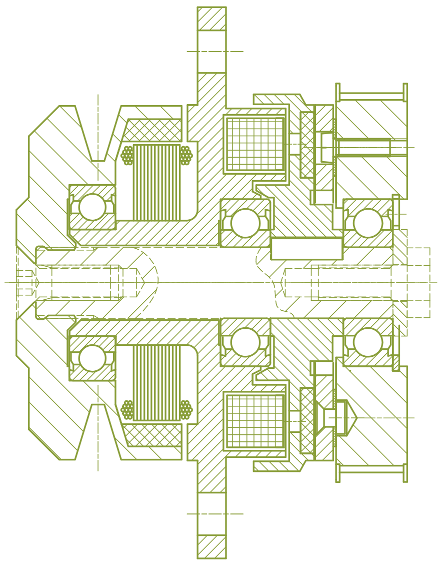


Figure 6

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