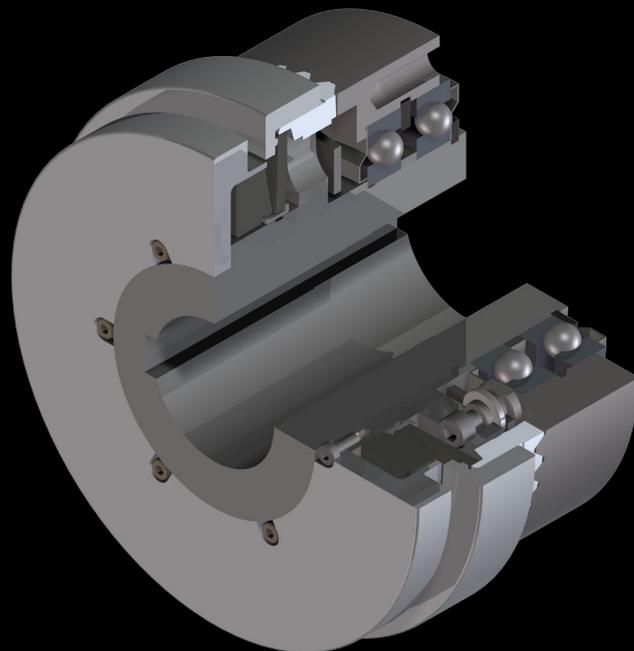




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SecMatic Plus
Type 588**



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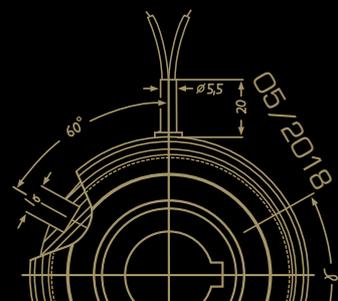
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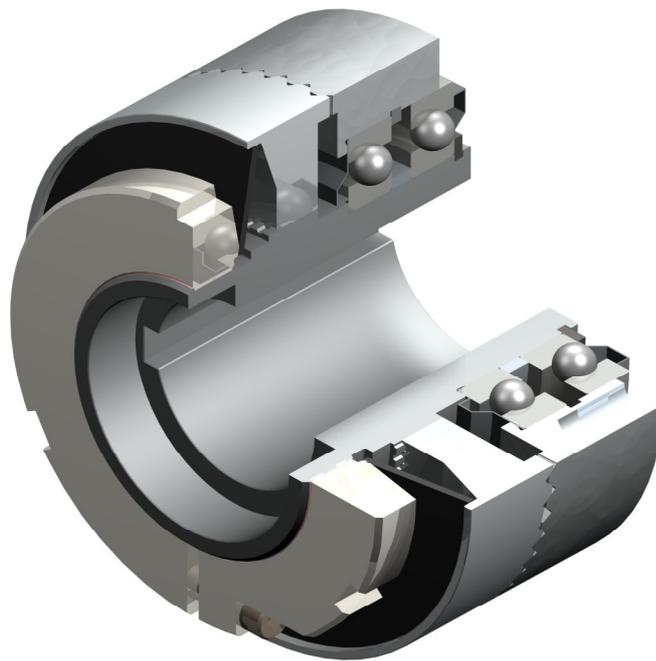
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Operating and Assembly Instructions

SecMatic clutches

Type 588.xx



Doc-ID: T24.0235_e
as of: 12/2018

**Read these operating instructions before
starting any kind of work!**

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1. General

1.1. Information about these instructions

These instructions enable safe and efficient handling of the SecMatic type 588.xx clutch, hereinafter referred to as clutch.

These instructions are a part of the clutch and must be kept in the immediate vicinity of the clutch and be accessible to staff at all times. Staff must read and understand these instructions carefully before beginning any work. Compliance with all safety instructions stated in these instructions constitute the basic requirement for safe working practices.

In addition, local accident prevention regulations and general safety rules apply to application area of the combination.

1.2. Explanation of symbols

Warnings

All warnings in these operating instructions are also marked with a warning symbol.

The following warning symbols are used throughout these operating instructions:

Symbol	Meaning
	General warning
	Danger of crushing!
	Danger due to hot surfaces
	Danger of environmental pollution
	General instructions and useful suggestions on handling

Safety precautions

The safety instructions are indicated in these instructions by symbols. The safety instructions are introduced by signal words that are intended to indicate the extent of the danger.

The warning symbol also indicates the type of danger.

The following warnings are used throughout these instructions:

	⚠GEFAHR
	<p>Danger to life</p> <p>Consequences upon non-observance of the instructions...</p> <p>▶ In order to avoid these...</p>

A warning of this category indicates an impending dangerous situation.

If the dangerous situation is not avoided, it may lead to serious injury or even death.

Follow the instructions in this warning to avoid possible danger of serious injury or even death.

	⚠WARNING
	<p>Risk of injury</p> <p>Consequences upon non-observance of the instructions...</p> <p>▶ In order to avoid these...</p>

A warning of this category indicates a potentially dangerous situation.

If the dangerous situation is not avoided, it may lead to serious injury or even death.

Follow the instructions in this warning to avoid possible danger of serious injury or even death.

	⚠CAUTION
	<p>Injury to persons due to...</p> <p>Consequences upon non-observance of the instructions...</p> <p>▶ In order to avoid these...</p>

A warning of this category indicates a potentially dangerous situation.

If the dangerous situation is not avoided, it may lead to light or minor injuries.

Follow the instructions in this warning to avoid possible danger of serious personal injuries.

	ATTENTION
	<p>Damage to property due to...</p> <p>Consequences upon non-observance of the instructions...</p> <p>▶ In order to avoid these...</p>

This warning level indicates potential damage to property.

If the situation is not avoided, it may lead to damage to property.

Follow the instructions in this warning to avoid damage to property.

Tips and recommendations

	NOTE
	Descriptive text...

A descriptive text contains additional information, which is important for further processing or for simplifying the procedure step.

1.3. Limitation of liability

All specifications and notes in these instructions were compiled according to all standards and regulations, the current state of technology and many years of knowledge and experience.

The manufacturer assumes no liability for damages resulting from:

- Failure to observe the operating and assembly instructions
- Other use than for the intended purpose
- Deployment of insufficiently qualified staff
- Unauthorized modifications
- Technical modifications
- Use of non-approved spare parts
- Faulty assembly

The responsibilities as agreed in the delivery contract, the general terms and conditions, the delivery conditions specified by the manufacturer as well as the applicable statutory regulations apply.

We reserve the right to make technical modifications resulting from improvements and further development.

1.4. Copyright protection

This documentation is protected by copyright.

The contents and instructions are for internal use only and may not be transferred to a third party, reproduced in any form or manner, either in whole or in part, utilized or communicated without the written permission of the manufacturer.

Infringement obligates damage compensation. We reserve the right to impose further claims.

1.5. Spare parts

	▲WARNING
	<p>Danger of injury due to wrong or faulty spare parts!</p> <p>Incorrect or defective replacement parts can lead to injury, damage, malfunction or total breakdown.</p> <ul style="list-style-type: none">▶ Use original spare parts from the manufacturer only.

	NOTE
	<p>The use of spare parts other than original Mönninghoff spare parts or use of spare parts not purchased directly from Maschinenfabrik Mönninghoff GmbH & Co. KG invalidates all commitments of Maschinenfabrik Mönninghoff GmbH & Co. KG such as guarantee, service contracts etc. without prior notice.</p> <ul style="list-style-type: none">▶ Obtain spare parts from authorized dealers or directly from the manufacturer. See page 8 for the address.

1.6. Guarantee conditions

The guarantee conditions are included in the general terms and conditions of the manufacturer.

1.7. Customer service

Technical information is available from our customer service department

Maschinenfabrik Mönninghoff GmbH & Co. KG

Bessemerstraße 100

Postfach 101749

D – 44793 Bochum

D – 44717 Bochum

Tel.: +49 (0) 234 3335-0

E-Mail: service@moenninghoff.de

Internet: www.moenninghoff.de

Moreover, our employees are always interested in new information and experiences, which result from the use of our products or can lead to the improvement of our products.

1.8. Declaration of Incorporation

Declaration of Incorporation
according to EC Machine Directive 2006/42/EC,
Annex II B

Name of the manufacturer: **Maschinenfabrik Mönninghoff GmbH & Co. KG**

Address of the manufacturer: **Maschinenfabrik Mönninghoff GmbH & Co. KG**
Bessemerstrasse 100
D - 44793 Bochum

We hereby declare that the product

Model: SecMatic clutch

Type 588.xx

Project no.:

are intended for installing into a system/machine. Startup is not permitted until it is determined that the system/machine in which this SecMatic clutch is installed, complies with the requirements of the EC directives.

The following harmonized standards were applied:

- DIN EN 60204-1** Safety of machines - electrical equipment of machines - part 1: general requirements
- DIN EN ISO 12100-1** Safety of machines - basic terms, general principles of design - part 1: basic terminology, methodology
- DIN EN ISO 12100-2** Safety of machines - basic terms, general principles of design - part 2: technical principles

Full technical documentation is available.

The corresponding operating instructions for the machine/machine part are available.

- in their original version and
- in the national language of the user in their original version and in the national language of the user

Bochum, 21.09.2018

Signature.....

Managing director: Dipl.-Kfm. Bodo Finger

2. Safety

2.1. General aspects

This section provides an overview on all safety aspects for optimum protection of staff during assembly and startup as well as safe and trouble-free operation.

	▲GEFAHR
	<p>Danger due to failure to observe the safety instructions!</p> <p>Failure to observe the safety and instructions listed in these assembly instructions can lead to considerable danger.</p> <p>▶ Always pay attention to all warnings and instructions specified here.</p>

2.2. Staff requirements

2.2.1. Qualifications

	▲WARNING
	<p>Risk of injury due to insufficient qualification!</p> <p>Improper use can result in considerable damage to persons or property.</p> <p>▶ All activities shall only be performed by qualified staff.</p>

The following qualifications are stated in the operating instructions for various different fields of activities.

- **Instructed person**
was given instruction by the operator on his/her assigned tasks and possible dangers resulting from improper conduct.
- **Specialist staff**
is able to carry out assigned work tasks as well as recognize and prevent possible dangers based on his/her technical training, knowledge and experience, including knowledge of applicable regulations.

Only those staff members are permitted who can be expected to reliably perform their task. Those staff members whose responsiveness is affected by substances such as drugs, alcohol or medication shall not be permitted.

	NOTE
	Observe age and occupational-specific regulations at the location of the clutch when selecting staff.

2.2.2. Unauthorized persons

	⚠WARNING
	<p>Danger due to unauthorized persons!</p> <p>Unauthorized persons who do not fulfil the requirements described here, are not familiar with the dangers in the work area.</p> <ul style="list-style-type: none"> ▶ Do not permit unauthorized persons to be in the vicinity of the work area. ▶ In case of doubt, approach the persons and instruct them to leave the work area. ▶ Interrupt all work as long as the unauthorized person is in the work area.

2.3. Intended use

The clutch was conceived and constructed for exclusive use as a frictional connection between shafts.

The clutch may only be used according to the technical data and operating conditions defined by the manufacturer and DIN VDE 0580.

- No potentially explosive or aggressive atmosphere
- Ambient temperature -40°C to +80°C

	⚠WARNING
	<p>Danger due to use for other than the intended purpose!</p> <p>Any use other than for the intended purpose of the combination can lead to dangerous situations.</p> <ul style="list-style-type: none"> ▶ Only use the clutch for its intended purpose. ▶ All information contained in these operating instructions must be strictly complied with.

The operator is liable for all damage caused due to use for other than the intended purpose.

2.4. Technical modifications

NOTE	
i	In order not to endanger the operational safety of the clutch, unauthorized modifications and alterations are prohibited!

2.5. Personal protective equipment

To minimize health risks during work, it is necessary to wear personal protective equipment.

- The protective equipment corresponding to the work being carried out must be worn at all times.
- Pay attention to all notices on personal protective equipment within the work area.

Only wear

The following must be worn for every work:

	Close-fitting protective clothing with a low tear strength and no protruding parts. These clothes are principally designed to protect against being caught by moving machine parts. Do not wear rings, bracelets or other jewellery.
	Goggles to protect the eyes from flying parts and liquids
	Protective footwear with steel caps and oil-resistant soles

2.6. Specific dangers

The following section specifies residual hazards identified during risk assessment

Pay attention to the safety instructions and warning notes specified in following sections of these operating instructions in order to reduce the risk of damage to health and avoid dangerous situations.

Moving components

	⚠CAUTION
	<p>Risk of injury due to moving parts!</p> <p>Rotating and/or linearly moving parts can cause injury.</p> <ul style="list-style-type: none"> ▶ Do not reach into moving parts with your hands or tamper with these parts during operation. ▶ Do not open the covers during operation. ▶ Wear close-fitting protective clothing in the danger zone.

2.7. Safety appliances

The clutch is intended for use within a system. It has no self-contained control system and no automatic emergency stop function.

Before putting the clutch into operation, install the EMERGENCY STOP device for the clutch and integrate this into the safety chain of the system control.

The emergency stop device must be connected in such a way that interruption or re-activation of the power supply following such an interruption does not represent a dangerous situation for persons or property.

The EMERGENCY STOP devices must be accessible at all times.

The operator must install safety devices that will shut down the machine/system as soon as a person enters the danger area of the device.

2.8. Signs

The following symbols and signs are located in the working area. These apply to the area immediately surrounding where they are mounted.

	⚠WARNING
	<p>Risk of injury due to illegible symbols!</p> <p>Due to dirt or other causes, stickers and signs can become illegible.</p> <ul style="list-style-type: none"> ▶ All safety, warning and operating instructions must remain legible. ▶ Damaged signs or stickers must be replaced immediately.

3. Technical Specifications

3.1. Designs 1.1 and 1.5

Size		12	13	15	21
Torque [Nm]	T_{k1}	5 - 10	10 - 25	25 - 50	50 - 100
	T_{k2}	10 - 20	20 - 40	40 - 75	75 - 150
	T_{kB}^*	30	60	120	225
Max. rotating speed [rpm]		250	250	250	250
Moment of inertia [10^{-3} kg m²]	Design 1.1	0.25	0.36	0.71	1.61
	Design 1.5	0.33	0.46	1.05	2.35
Weight [kg]	Design 1.1	0.53	0.6	1	1.5
	Design 1.5	0.62	0.66	1.1	1.7
Spring force [N]		350	600	1200	1700
Stroke [mm]		0.53	0.69	0.8	0.9
Bore diameter d H7 [mm]	Min.	8	10	12	14
Slot according to DIN 6885/1 ** [mm]	Max.	12	15	22	30
Slot according to DIN 6885/3 [mm]	Max.	15	18	25	35
* only for TwinArc tooth gear ** KW to BS 4235					

Size		23	25	31	32
Torque [Nm]	T_{k1}	100 - 200	200 - 400	400 - 800	800 - 1600
	T_{k2}	150 - 300	300 - 600	600 - 1200	1000 - 2000
	T_{kB}^*	450	900	1800	2400
Max. rotating speed [rpm]		250	250	250	250
Moment of inertia [10⁻³ kg m²]	Design 1.1	3.86	9.16	23.8	46.2
	Design 1.5	5.63	11.98	29.8	66.1
Weight [kg]	Design 1.1	2.5	4.4	6.6	9.3
	Design 1.5	2.9	4.9	7.2	11
Spring force [N]		3000	5000	8000	14000
Stroke [mm]		1.02	1.27	1.6	1.9
Bore diameter d H7 [mm]	Min.	18	24	28	45
Slot according to DIN 6885/1 ** [mm]	Max.	40	45	65	80
Slot according to DIN 6885/3 [mm]	Max.	45	50	70	85
*only for TwinArc tooth gear **KW to BS 4235					

3.2. Designs 3.1 and 3.5

Size		12	13	15	21
Torque [Nm]	T_{k1}	5 - 10	10 - 25	25 - 50	50 - 100
	T_{k2}	10 - 20	20 - 40	40 - 75	75 - 150
	T_{kB}^*	30	60	120	225
Max. rotating speed [rpm]		250	250	250	250
Moment of inertia [10⁻³ kg m²]	Design 3.1	0.35	0.52	1	2.33
	Design 3.5	0.43	0.62	1.34	3.07
Weight [kg]	Design 3.1	0.8	0.9	1.4	2.1
	Design 3.5	0.86	0.96	1.5	2.3
Stroke [mm]		0.53	0.69	0.8	0.9
Bore diameter d H7 [mm]	Min.	8	10	12	14
Slot according to DIN 6885/1 ** [mm]	Max.	12	15	22	30
Slot according to DIN 6885/3 [mm]	Max.	15	18	25	35
* only for TwinArc tooth gear ** KW to BS 4235					

Size		23	25	31	32
Torque [Nm]	T_{k1}	100 - 200	200 - 400	400 - 800	800 - 1600
	T_{k2}	150 - 300	300 - 600	600 - 1200	1000 - 2000
	T_{kB}^*	450	900	1800	2400
Max. rotating speed [rpm]		250	250	250	250
Moment of inertia [10⁻³ kg m²]	Design 3.1	5.42	11.73	33.1	60.7
	Design 3.5	7.2	14.56	39.1	80.6
Weight [kg]	Design 3.1	3.5	5.6	9.5	13.1
	Design 3.5	3.9	6.1	10.1	14.8
Stroke [mm]		1.02	1.27	1.6	1.9
Bore diameter d H7 [mm]	Min.	18	24	28	45
Slot according to DIN 6885/1 ** [mm]	Max.	40	45	65	80
Slot according to DIN 6885/3 [mm]	Max.	45	50	70	85
*only for TwinArc tooth gear **KW to BS 4235					

3.3. Designs 4.1 and 4.5

Size		21	23	25	31	32
Torque [Nm]	T_{k1}^*	50 - 100	100 - 200	200 - 400	400 - 800	800 - 1200
Max. rotating speed [rpm]		250	250	250	250	250
Moment of inertia [10⁻³ kg m²]	Design 4.1	4.63	10.72	21.3	63.5	116.6
	Design 4.5	5.37	12.5	24.1	69.5	136.5
Weight [kg]	Design 4.1	3.8	6.3	9.6	17.8	23.7
	Design 4.5	4	6.7	10.3	18.4	25.4
Stroke [mm]		0.53	0.69	0.8	0.9	1.02
Bore diameter d H7 [mm]	Min.	14	18	24	28	45
Slot according to DIN 6885/1 ** [mm]	Max.	30	40	45	65	80
Slot according to DIN 6885/3 [mm]	Max.	35	45	50	70	85
Bore diameter d₁ H7 [mm]	Min.	14	19	22	24	30
Slot according to DIN 6885/1 ** [mm]	Max.	32	38	48	60	70

*The HexaFlex clutch can only transmit torques within Range 1.
Range 2 on request.

**KW to BS 4235

3.4. Designs 5.1 and 5.5

Size		12	13	15	21	23
Torque [Nm]	T_{k1}	5 - 10	10 - 25	25 - 50	50 - 100	100 - 200
	T_{k2}	10 - 20	20 - 40	40 - 75	75 - 150	150 - 300
	T_{kB}^*	30	60	120	200	450
Max. rotating speed [rpm]		250	250	250	250	250
Moment of inertia [10^{-3} kg m ²]	Design 5.1	4.63	10.72	21.3	63.5	116.6
	Design 5.5	5.37	12.5	24.1	69.5	136.5
Weight [kg]	Design 5.1	3.8	6.3	9.6	17.8	23.7
	Design 5.5	4	6.7	10.3	18.4	25.4
Stroke [mm]		0.9	1.02	1.27	1.6	1.9
Bore diameter d H7 [mm]	Min.	8	10	12	14	18
Slot according to DIN 6885/1 ** [mm]	Max.	12	15	22	30	40
Slot according to DIN 6885/3 [mm]	Max.	15	18	25	35	45
Bore diameter d ₁ H7 [mm]	Min.	12	14	16	16	20
Slot according to DIN 6885/1 ** [mm]	Max.	28	35	48	48	60

*only for TwinArc tooth gear

NOTE	
i	<p>For additional technical data, refer to the sectional drawing in section 4 "Setup and method of function" as well as the assembly drawing.</p> <p>The assembly drawing can be requested from the manufacturer.</p>

3.5. Connection dimensions, connection fixings

Refer to the assembly drawing for connection dimensions and information on connection fixings.

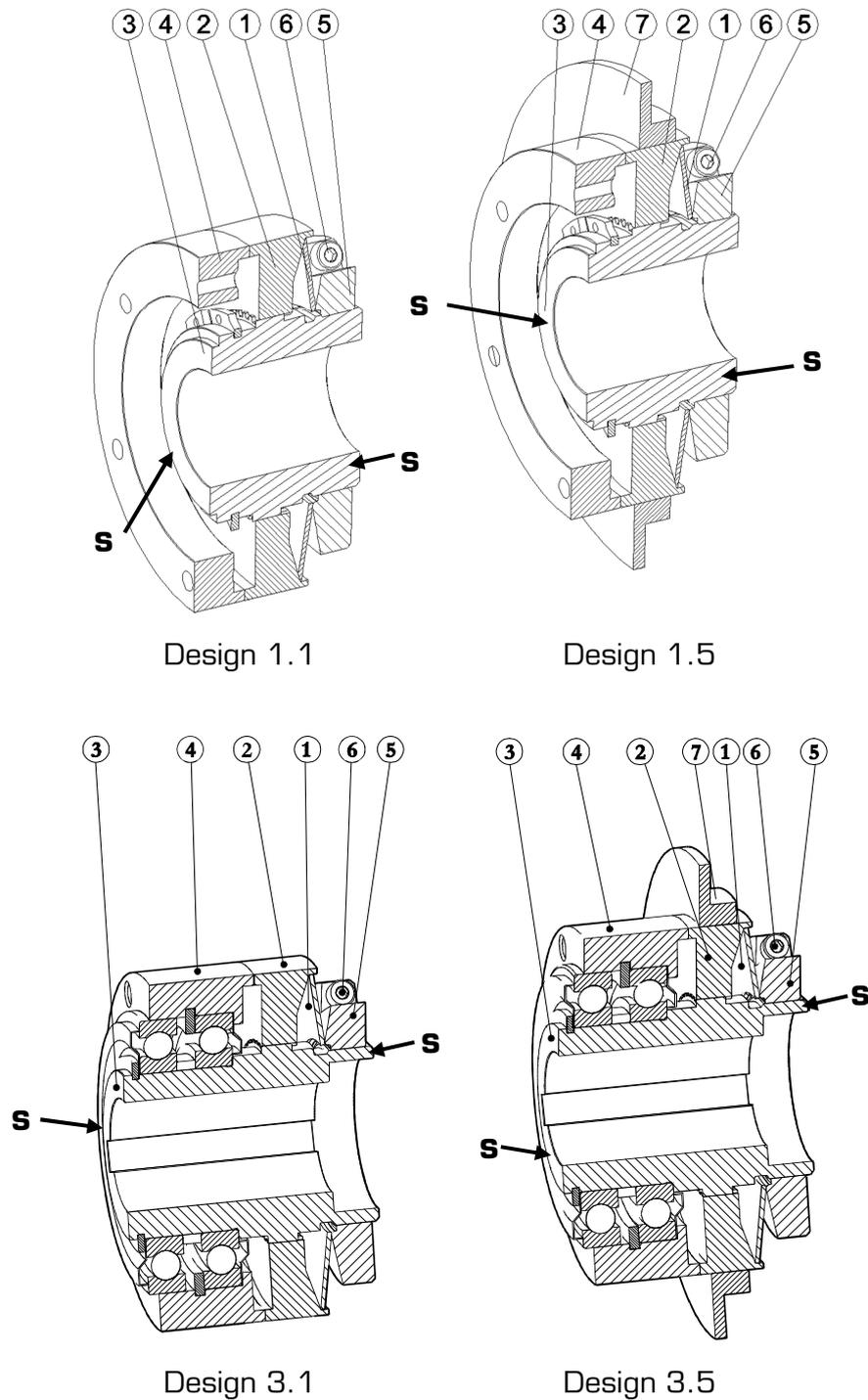
i	NOTE
	The assembly drawing can be requested from the manufacturer.

3.6. Inductive proximity switch (optional)

Type	M8 9961-0300
Operating voltage	10 - 30 Vdc (including ripple)
Current carrying capacity	max. 200 mA (also briefly)
Voltage drop	2.4 V (at max. load)
Switching frequency	max. 2 kHz
Switch status display	LED or customer display
Degree of protection	IP 67
Ambient temperature	-25 °C to +70 °C
Nominal switching distance	1.5 mm flush mountable
Housing	Brass (nickel-plated)
Connecting cable	2 m / 3 x 0.14 mm ² PVC
Switching behaviour	npn (n/o contact) negative-switching
Connecting cable length	2000 mm

4. Setup and method of function

4.1. Setup



- 1 Plate spring
- 2 Sprocket
- 3 Hollow shaft
- 4 Switching ring

- 5 Adjusting nut
- 6 Clamping screw
- 7 Switching disk

Figure 1: sectional drawing and individual parts

4.2. Description

4.2.1. Features

Mönninghoff SecMatic clutches are tooth-faced overload clutches. A cardan flexible disc serves as a central element. The SecMatic clutches distinguish themselves by the following features:

- Overload protection
- Frictional torque transmission during engagement
- Minimal reaction time
- High transmittable torques

4.3. Functioning

On the hollow shaft (3), the axially-movable sprocket (2) is pressed against the switching ring (4) by the plate spring (1).

The switching ring transmits the torque during engagement via a fixed point executable gear facing and only snaps exactly into one position.

The tension of the plate springs (1) and therefore the overload torque can be adjusted continuously by the adjustable nut (5).

When overload occurs, the gear facing is pressed apart axially until the gears slip through. Sprocket (2) and switching ring (4) slide onto each other until the clutch engages after one complete revolution.

Design 1.1 and 1.5:

The axial force created by the plate spring must be absorbed by the customer bearing, refer to table 1 on page 33.

5. Transport, packaging and storage

5.1. Safety instructions for transport

Improper transport

	ATTENTION
	<p>Damage due to improper transport!</p> <p>Improper transport can cause considerable damage.</p> <ul style="list-style-type: none"> ▶ When unloading the packaged items on delivery, as well as during in-house transport, proceed with care and pay attention to the symbols and instructions on the packaging. ▶ Protect the clutch against heavy knocks as well as all types of force during transport. ▶ Avoid strong ambient temperature fluctuations to prevent formation of condensation. ▶ Remove the packaging immediately prior to installation.

5.2. Transport inspection

The delivery should be checked immediately for completeness and for transport damage.

	NOTE
	<p>Failure to observe the following instructions will invalidate claims to the insurer for damage.</p>

In the event of obvious visible transport damage, proceed as follows:

- Even if damage is only suspected, sign receipt of delivery (e.g. on the shipping document) with corresponding information under reservation.
- Determine and adhere to deadlines for submission of claims.
- Report the insurance claim immediately to the insurer and provide him with complete documentation of the damage as soon as possible (however, at the latest before possible exclusion and/or limitation periods for compensation claims against third parties expire) to enable acceleration of the claim processing procedure.

	NOTE
	Register any claim as soon as a defect is detected. Claims for damage can only be accepted within the valid reclamation period.

5.3. Packaging

Regarding the packaging

The individual packages are packed according to the expected transport conditions. Environmentally compatible materials have been used exclusively for packing.

Packaging should protect the individual components from transport damage, corrosion and other damage up until installation. For this reason, do not destroy the packaging and remove it only just prior to installation.

Handling packaging material

The packaging protects the device against damage during transit. The packaging materials were selected according to environmental and waste disposal aspects and can therefore be recycled.

Recycling the packaging material for further use saves raw materials and reduces waste. When no longer required, dispose of the packaging materials according to local environmental regulations.

5.4. Removing from the packaging

Carefully remove the individual parts of the clutch from the packaging.

5.5. Storing the packaged items

Anticorrosion oil was applied to clutch parts, which are not protected against corrosion and must be stored in the original packaging.

Check the corrosion protection when the duration of storage exceeds six months. If the corrosion protection was removed during control of freshly received goods, the conservation shall be renewed (e.g., with Tectyl 472 from Valvoline).

Store packaged items under the following conditions:

- Do not leave outdoors.
- Store at a dry and dust-free location.

- Do not subject to aggressive media.
- Protect against solar radiation
- Avoid mechanical shocks and damage.
- Storage temperature: +5 to +45 °C.
- Relative humidity: max. 60 %.
- When the storage exceeds 3 months regularly check the general condition of all components and packaging.

NOTE	
i	It is possible that instructions for storage are on the packaging that go beyond the stated requirements. Follow these instructions accordingly.

6. Installation

6.1. Safety

Personnel

Installation and initial startup may only be carried out by specifically-trained specialist staff.

Personal protective equipment

Wear the following protective equipment during all work on installation and initial startup:

	Close-fitting protective clothing with a low tear strength and no protruding parts. These clothes are principally designed to protect against being caught by moving machine parts. Do not wear rings, bracelets or other jewellery.
	Goggles to protect the eyes from flying parts and liquids
	Protective footwear with steel caps and oil-resistant soles

Improper installation and initial startup

	⚠CAUTION
	<p>Risk of injury due to improper installation and initial startup!</p> <p>Improper installation and initial startup can lead to personal injury or material damage.</p> <ul style="list-style-type: none"> ▶ Before beginning work ensure that sufficient workspace is available for assembly. ▶ Be careful when handling exposed, sharp-edged components. ▶ Pay attention to tidiness and cleanliness at the workplace! Components and tools lying around or on top of each other may cause accidents. ▶ Assembly components must be properly installed. Adhere to the specified screw torques.

6.2. Preparations

Before installing, check the following points:

- The clutch should not show any deformation, scratches and other damage indicating that it was dropped.

6.3. Setup

Instructions on assembly

The clutch is delivered with the customer-requested shaft bore and is ready for being mounted.

6.3.1. Mounting the clutch

Check the parts for completeness, dimensional stability and damage. Check the bore of the hollow shaft for burrs and eliminate them if necessary. Clean the shaft ends and bores thoroughly.

	NOTE
i	<p>The shaft fitting should be h7 to j6.</p> <p>The borehole of the hollow shaft for the shaft is H7 by default.</p>

	ATTENTION
	<p>Damage due to improper, forced assembly!</p> <p>Improper, forceful assembly can cause considerable damage to property.</p> <ul style="list-style-type: none"> ▶ Never forcefully strike or press the hollow shaft! ▶ Only apply assembly force to the front face of the hollow shaft!

- Push the clutch onto the drive shaft of the machine.
- Only apply assembly force to the front faces on the hollow shaft marked with “S” in order not to damage the clutch.
- Secure the clutch against axial shifting.

Design 3.1 and 3.5:

- The customer screws the switching ring (4) together.

Design 1.1 and 1.5:

The customer screws the switching ring (4) with the connecting part that must be located on the same shaft. The sprocket (2) and the switching ring (4) only move into the right position after the clutch has been properly assembled. Pay attention to dimension L2, also refer to table 1 on page 33.

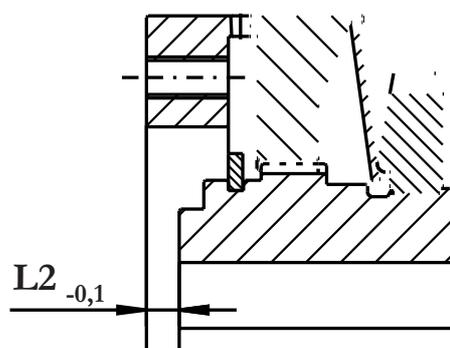


Figure 2: Dimension L2

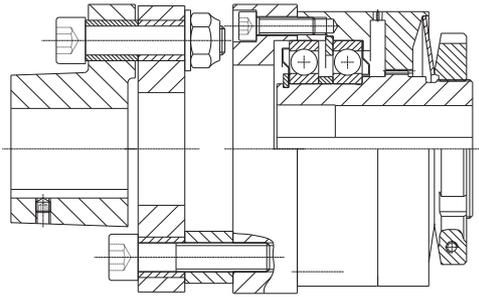
Design 4 and 5:

Figure 3: Design 4.1

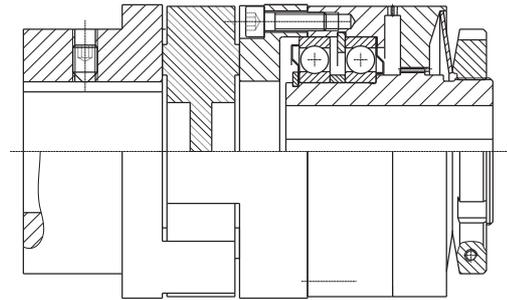


Figure 4: Design 5.1

i	NOTE
	<p>The SecMatic clutches can be combined with HexaFlex shaft couplings, LJ clutches and ArcOFlex clutches.</p> <p>Pay attention to the corresponding assembly and operating instructions.</p>

6.3.2. Checking the overload torque

i	NOTE
	<p>The dimension "Y" (see figure 5) serves as reference value for the set overload torque.</p>

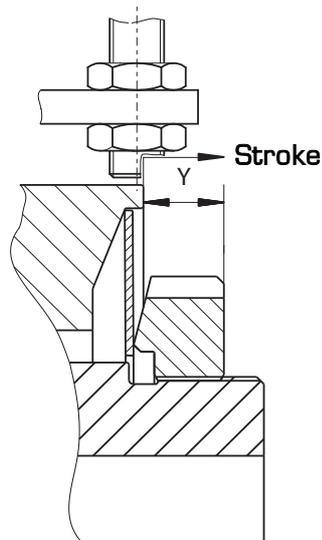


Figure 5: checking the overload torque

- Measure dimension "Y" and compare with the value stamped on the adjusting nut.
- In the event of larger deviations, check the clutch for correct assembly. If in doubt, contact the manufacturer.

6.3.3. Electrical switch-off (optional)

i	NOTE
	<p>The stroke at the switching ring (7) or the sprocket (2) can be acquired via a type M8 9961-0300 inductive proximity switch (8; see figure 3).</p> <p>Refer to the instructions on assembly and connection of the proximity switch in the corresponding operating instructions.</p>

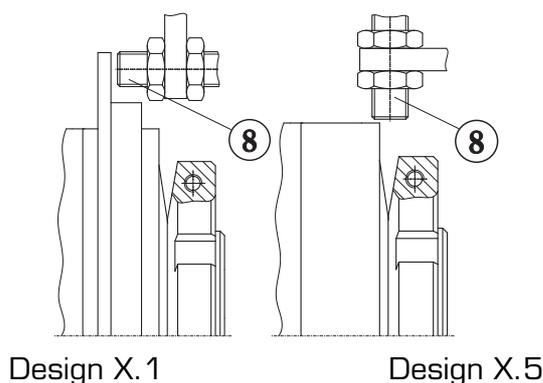


Figure 6: position of the proximity switch

- Before setting up the clutch, check the proximity switch and the related switching devices for correct assembly and perfect function.

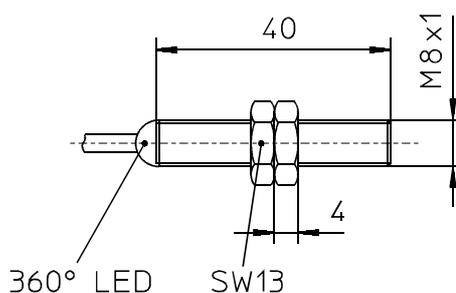


Figure 7: connection dimensions

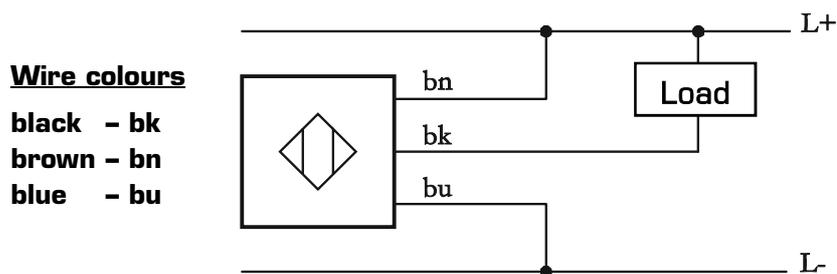


Figure 8: connection diagram

7. Startup

Danger due to rotating components

	⚠ CAUTION
	<p>Damage to persons due to moving components!</p> <p>Rotating components can cause injury.</p> <ul style="list-style-type: none">▶ Never reach into the area of the rotating clutch and shafts!▶ Protect the clutch against unintentional access during operation!

	ATTENTION
	<p>Damage due to missing switch-off device!</p> <p>Operation of the clutch without a switch-off device can cause damage to the clutch.</p> <ul style="list-style-type: none">▶ Only operate the clutch with a correctly assembled proximity switch.

- Check for correct assembly of all components before startup of the clutch.
- Perform a trial run to test the function of the clutch.
- The clutch can be put into continuous operation after checking for proper function.

8. Operation

8.1. General aspects

The clutch is operated fully automatically after startup. Manual intervention is only required for cleaning and fault rectification.

8.2. Recommendations for operation

Pay attention to all relevant safety and accident prevention regulations for the place of operation during operation.

Only operate the clutch according to the protective requirements in DIN VDE 0580.

Danger due to rotating components

	⚠ CAUTION
	<p>Damage to persons due to moving components!</p> <p>Rotating components can cause injury.</p> <ul style="list-style-type: none"> ▶ Never reach into the area of the rotating clutch and shafts! ▶ Protect the clutch against unintentional access during operation!

In the case of "wet run" clutches, only use oils with a viscosity up to $25 \times 10^{-6} \text{ m}^2/\text{s}$ at 50 °C (3°E/50 °C).

	NOTE
	<p>Only half of the clutches may be immersed into oil.</p>

To protect against inadvertent contact and heavy contamination, the rotating clutch must be covered with a hood.

8.3. Setting the overload torque

The overload torque depends on the spring force of the plate spring.

The plate spring (1) indicates a negative characteristic in the working range, see figure 9.

The setting range of the clutch as well as the preset overload torque and the control dimension (Y, see figure 5) are stamped on the adjusting nut.

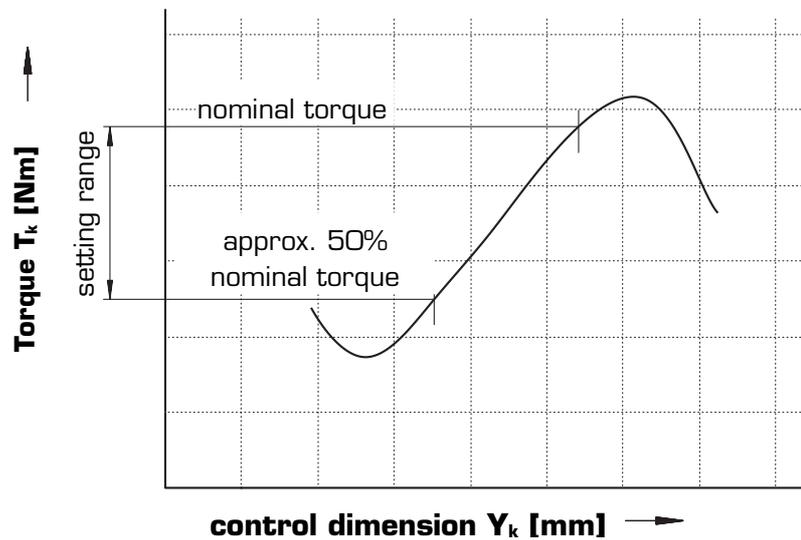


Figure 9: characteristic curve

- Loosen the clamping screw (6) by a **maximum** of one turn.

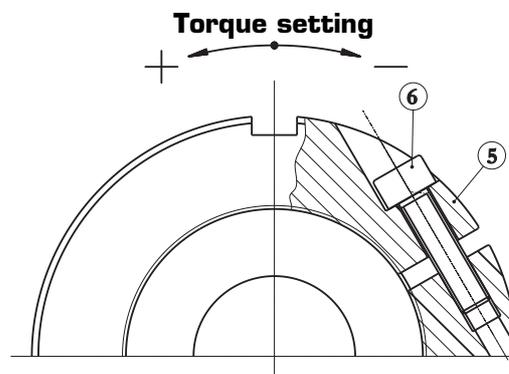


Figure 10: setting the overload torque

	ATTENTION
	<p>Damage due to improper assembly!!</p> <p>An improper operation can cause considerable damage to property.</p> <p>► Only use a hook spanner according to DIN 1810 Form A to turn the adjusting nut.</p>

- Turn the adjusting screw clockwise to reduce the overload torque or anticlockwise to increase it.

Refer to the following table for the relationship between the change of the control dimension "Y" and the change of the overload torque.

i	NOTE
	The specified values apply to the clutches with a plate spring plate spring. In the case of two plate springs, the torque change is doubled.

Table 1: relationship between ΔY and Δt_k

Size	12	13	15	21	23	25	31	32
Flank angle	45°						35°	
Change of control dimension ΔY (mm)	0.2							
Change of overload torque Δt_k (mm)	3	5	10	10	20	30	40	50
Axial force F (N)*	350	600	1200	1700	3000	5000	8000	14000
Dimension L2 ± 0.1 (mm)*	3	3	4	4	5	5	6	6
* only for design 1.1 and 1.5								

- Tighten the clamping screw (6).

9. Faults

Possible causes of faults and their elimination are described in the following section.

If a fault cannot be eliminated after following the instructions provided, the manufacturer should be contacted, see service addresses on page 8.

9.1. Safety

Personnel

- Faults may only be eliminated by specially trained, qualified staff.

Danger due to rotating components

	⚠CAUTION
	<p>Damage to persons due to rotating components!</p> <p>Rotating components can cause injury.</p> <p>► Never reach into the area of the rotating clutch!</p>

Personal protective equipment

Wear the following protective equipment during work with the clutch:

	<p>Close-fitting protective clothing with a low tear strength and no protruding parts. These clothes are principally designed to protect against being caught by moving machine parts.</p> <p>Do not wear rings, bracelets or other jewellery.</p>
	<p>Goggles to protect the eyes from flying parts and liquids</p>
	<p>Protective footwear with steel caps and oil-resistant soles</p>

Improperly performed work on elimination of faults

⚠WARNING	
	<p>Risk of injury due to improperly performed work on elimination of faults!</p> <p>Improperly performed work can cause severe damage to persons and property.</p> <ul style="list-style-type: none"> ▶ Before beginning work, ensure that sufficient workspace is available for assembly. ▶ The following applies to the system, in which the clutch operates: never disable the safety devices in the system. ▶ Pay attention to tidiness and cleanliness at the workplace! Components and tools lying around or on top of each other can be sources of accidents. ▶ If components are removed, pay attention to correct assembly; replace all fixing elements and adhere to all screw tightening torques. ▶ In the event of malfunctions or irregularities, stop the system and inform the person responsible. If faults cannot be rectified, contact the service department of the Maschinenfabrik Mönninghoff GmbH & Co. KG.

9.2. Malfunctions

The following table provides an overview of possible faults and their causes. If there are any uncertainties or questions, consult the manufacturer.

Error	Possible cause	Remedy
Torque cannot be transmitted.	Overload torque not set correctly.	Set the overload torque
Bearing noise	Defective bearing or incorrect assembly.	Check for correct assembly. If in doubt, contact the manufacturer.

10. Maintenance

The clutch does not require regular maintenance work.

Work on the clutch is only necessary when rectifying a fault. Pay attention to the safety instruction in the section "**Faults**" when rectifying faults.

10.1. Checking for wear

	⚠ CAUTION
	<p>Damage to persons due to rotating components!</p> <p>Rotating components can cause injury.</p> <ul style="list-style-type: none"> ▶ Only check for wear when the machine is at a standstill! ▶ Never reach into the area of the rotating clutch!

	NOTE
	<p>The clutch is maintenance-free. Nevertheless, the torque gears must be checked regularly for wear.</p>

The intervals for wear checking depend on the conditions at the place of operation. An increased load on the clutch due to frequent overload conditions leads to shorter intervals. The intervals for checking are determined by information obtained during operation.

	NOTE
	<p>Store reserve clutches to keep system downtime as short as possible in the event of a disturbance.</p>

11. Dismantling

When the end of the service life is reached, the clutch must be dismantled and disposed of according to environment regulations.

11.1. Safety

Personnel

- Dismantling may only be performed by qualified staff.

11.2. Dismantling

Electrical system

Before dismantling:

- Switch off the system, in which the clutch is installed and secure against being switched on again.
- Physically disconnect the entire power supply.

Subsequently clean modules and components properly and dismantle in accordance with local occupational safety and environmental protection regulations.

11.3. Disposal

If no agreement was made on product return and disposal, please submit dismantled components for recycling:

- Scrap metals
- Submit plastic elements for recycling.
- Sort and dispose of other components according to material characteristics.

ATTENTION	
	<p>Environmental damage due to improper disposal!</p> <ul style="list-style-type: none"> ▶ Electrical scrap, electronic components, lubricants and other accessories are subject to special waste handling and must be disposed of by authorized specialist companies only! ▶ The local authorities or special waste disposal companies can provide information on proper disposal according to environmental regulations.

12. Applicable standards, guidelines and regulations

Standard	Designation
DIN 740 - 1	Drive technology; flexible shaft couplings; Requirements; technical delivery conditions
DIN 740 - 2	Drive technology; flexible shaft couplings; Terms and calculation bases
DIN VDE 0470	Protection class by housing (IP code)
DIN VDE 0580	Electromagnetic devices
DIN 31000	General principles for safety-conscious design of technical products
DIN 867	Reference profile for involute gears
DIN ISO 281	Dynamic load ratings and nominal life cycle calculation procedure for rolling bearings
DIN ISO 1940	Requirements on the balancing quality of rigid rotors
VDI 2230 sheet 1	Systematic calculation of heavily loaded screw connections; Cylindrical screw-in connections