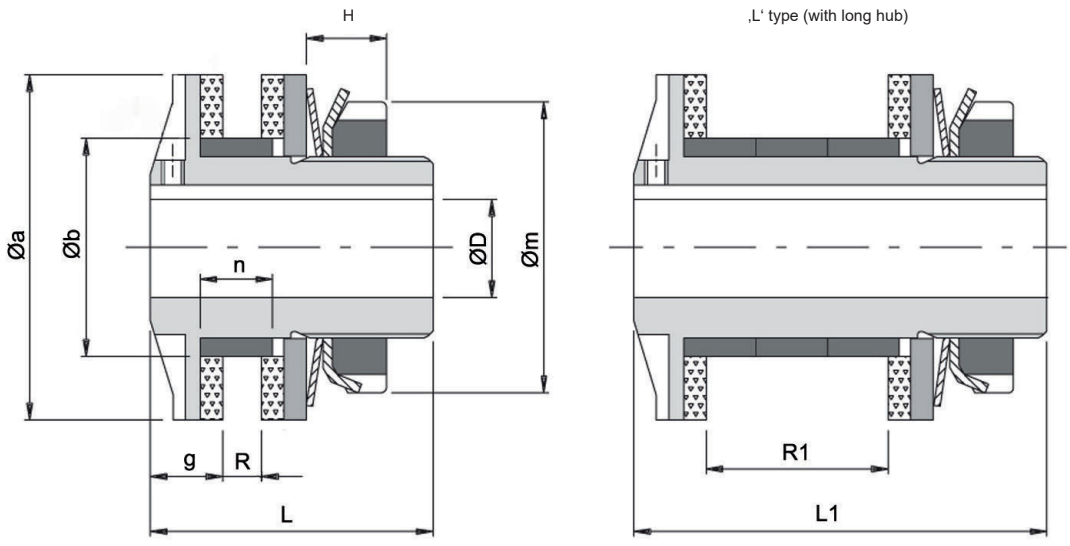
Operating Manual Slip Clutch
ECS_ES

Content

1. Assembly drawing



ECS_ES slip clutch
left-hand side with short hub / right-hand side with

2. Structural design and function

2.1 Design

A slip clutch is a mechanical device in which an output element, sandwiched between two friction linings, transmits torque from the input shaft to the output shaft.

2.2 Function

In the event of overload, the transmission element slips, thereby interrupting the power transmission.

3. Design of the slip clutch

Various output elements, such as sprockets or toothed discs, can be integrated into the ECS_ES slip clutch for torque transmission.

3.1 Torque rating

The following formula can be used to calculate the torque:

$$T_K\,(Nm) = \frac{9550 \times P \times K\,(kW)}{n\,(min^{-1})}$$

Notes:

P = Engine power
n = Engine speed
K = Impact factor
T_K = Clutch torque
T_A = Clutch release torque

3.2 Determining the bore diameter

The fit between the hub and the shaft is to be designed as an interference fit, with the hub bore having an H7 fit. Keyways in accordance with DIN 6885, Part 1.

3.3 Design of the sprocket

The power transmission components used (sprockets, gears, pulleys, etc.) must possess certain properties in order to ensure backlash-free torque transmission during normal operation and overload protection in the event of a fault (e.g. surface roughness Ra=0.8/1.6). They must also be dimensionally compatible with the torque limiter.

The table below shows a small selection of suitable sprockets. If other sprockets are used, a minimum clearance of 3 mm in diameter must be maintained between the inner diameter of the chain 'ØV' and the outer diameter of the coupling 'ØA' to prevent the chain from engaging with the torque limiter (see Fig. 3)

In addition, the sprocket width 'G' and the bushing width 'N' must be taken into account (see Fig. 1)
Nmin = S + G + 1

For wider sprockets, we recommend a free rotation (see Fig. 2). Øfree = ØA + 1; x = N - Nstd.

3.4 Compatible sprockets

This is just a small selection of the sprockets available; many more combinations are available on request.

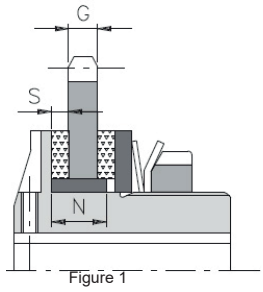


Figure 1

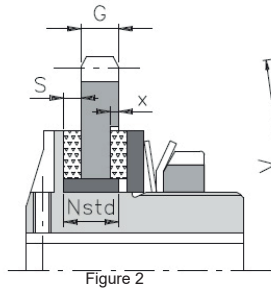


Figure 2

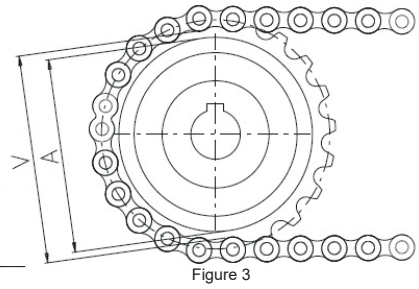


Figure 3

Size	Division p ["]	Number of teeth z	G [mm]	S [mm]	N_{std} [mm]	ØA [mm]	ØV [mm]	Order number
15	3/8	12	5,1	2	5,5	25	28	580419851P05
25	3/8	16	5,1	2,5	8	38	41	580406900P05
65	3/8	20 22	5,1	3	10	50	53	580406400P05 580406500P05
150	1/2x5/16 5/8	22 19	7 8,9	4	15	70	73	580403700P05 580404200P05
350	1/2x5/16 3/4	26 18	7 10,9	4	17	90	94	580404700P05 580440100P05
700	3/4 1	23 17	10,9 16	4	21	115	119	580404900P05 580440200P05
900	3/4 1	28 20	10,9 16	5	25	140	144	580405500P05 580440300P05
1800	1 1 1/4	24 20	16 18,3	5	28	170	175	580440400P05 580417200P05

4. Precautions

Before installation, always ensure that the coupling's characteristics and specifications are appropriate and suitable for the intended use. There must be sufficient space available for installation and future maintenance. Ensure that the equipment cannot cause any danger to people and/or property, and always work in accordance with current safety regulations.

In accordance with the current EU Machinery Directive, ENEMAC couplings are not classified as machinery. Their operation is therefore subject to compliance with all the requirements of the machine in which the device is installed. If the instructions are not followed correctly, the manufacturer shall not be held liable.

When used correctly, ENEMAC slip clutches protect mechanical components and end products from damage in the event of a sudden overload.

ENEMAC slip clutches are NOT safety devices designed to protect people from moving parts!

If you have any questions that are not answered in this guide, or if you require details regarding specific applications, please always contact ENEMAC GmbH.

5. Use and assembly

5.1 Preparing for installation

If you have opted for the version with pre-drilled holes, please refer to section 3.3. The output element must be positioned between the friction rings and must be compatible with the dimensions of the selected coupling (see 3.1 to 3.4); furthermore, the flat surfaces of the transmission element should have a surface roughness of Ra = 0.8 / 1.6.

If the hub is supplied pre-drilled, the coupling must first be removed. To do this, start by removing the adjusting nut. Please note that the individual parts must be refitted in the reverse order.

When dismantling the slip clutch, the parts that come into contact with the friction linings must be cleaned with a degreasing agent and their surface finish restored.

The coupling can be secured axially using a screw and a washer, or radially using a threaded pin. Alternatively, a clamping hub or a shrink disc fastening can also be used.

PLEASE NOTE:

ENEMAC slip clutches are not self-supporting devices! It is therefore important that the shafts on which they are mounted are supported by bearings and that the maximum misalignment tolerance is observed.

5.2 Usage

Unless otherwise stated, the standard mounting is a hub with a keyway in accordance with DIN 6885/1.

5.3 Disc spring configuration

The torque adjustment range is achieved using one or more springs in various combinations:

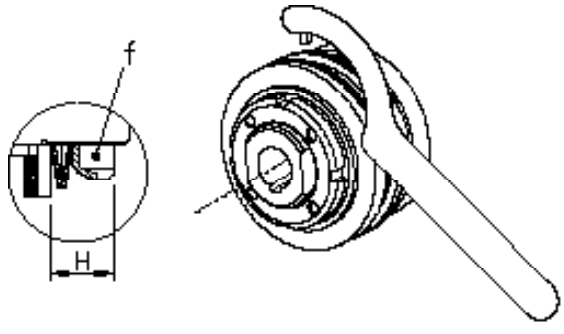
Size	A1S1)	A2S2))	A3S3)))	A1M1)	A1G1)	A2G2))	A3G3)))
15	1 - 8	2 - 12	5 - 20				
25	1 - 14	4 - 22	15 - 34				
65	2 - 12				9 - 42	25 - 70	46 - 90
150	4 - 20				15 - 80	30 - 150	80 - 230
350				12 - 85	55 - 160	95 - 290	175 - 450
700				65 - 265	130 - 380	200 - 700	290 - 950
900					95 - 700	200 - 1300	280 - 1650
1800					100 - 850	600 - 1900	800 - 2800

When commissioning the clutch for the first time, or after a long period of inactivity, we recommend allowing it to slip for a short while to allow the surface of the friction rings to bed in against the driven component.

5.4 Adjustment of the release torque

Check the release torque before starting up the machine.
The dimension ‘H’ has been introduced to make it easier to set the release torque. The following explains how to calculate the dimension ‘H’:

- Select the nearest torque value with the correct spring size and configuration from the adjustment table.
- Select the appropriate ‚H‘ value
- Turn the adjustment nut to set the value shown in the table



5.5 The dimension ‚H‘

To make it easier to set the disengagement torque, the dimension ‘H’ has been introduced; this can be found in the tables below. (See figure under section 5.4)

Size 15

H (mm)	A1S1	A2S2	A3S3
6	8		
6,1	7		
6,2	5		
6,3	4		
6,4	1		
7		12	
7,1		10	
7,2		7	
7,3		5	
7,4		2	
7,9			20
8			16
8,1			12
8,2			9
8,3			5

Size 25

H (mm)	A1S1	A2S2	A3S3
7,8	14		
8	13		
8,2	12		
8,4	11		
8,6	8		
8,8	5	22	
9	1	21	
9,2		17	
9,4		13	
9,6		8	34
9,8		4	33
10		2	29
10,2			23
10,4			15

Size 65

H (mm)	A1S1	A1G1	A2G2	A3G3
8	12			
8,2	10			
8,4	7	40		
8,6	4	38		
8,8	2	32		
9		25		
9,2		15		
9,4		4		
10			70	
10,2			57	
10,4			39	
10,6			17	
11,2				100
11,4				84
11,6				56
11,8				23

Size 150

H (mm)	A1S1	A1G1	A2G2	A3G3
9,4	18			
9,6	15			
9,8	12			
10	9	60		
10,2	6	56		
10,4		51		
10,6		45		
10,8		37		
11		29		
11,2		19		
11,8			120	
12			111	
12,2			96	
12,4			75	
12,6			54	
12,8			34	
13,2				210
13,4				199
13,6				176
13,8				150
14				122
14,2				91
14,4				60

Size 350

H (mm)	A1M1	A1G1	A2G2	A3G3
11	105			
11,4	99	140		
11,8	89	124		
12,2	74	101		
12,6	49	74		
13	13	40		
13,4			280	
13,8			256	
14,2			213	
14,6			158	
15			90	
15,4				450
15,8				415
16,2				353
16,6				276
17				185

Size 700

H (mm)	A1S1	A1M1	A1G1	A2G2	A3G3
13,6	100				
14	99	280	360		
14,4	87	277	348		
14,8	63	263	324		
15,2	26	234	289		
15,6	12	192	243		
16		135	186		
16,4		65	120		
17,2				700	
17,6				635	
18				558	
18,4				461	
18,8				344	
19,2				207	
20,4					950
20,8					842
21,2					672
21,6					462
22					210

Size 900

H (mm)	A1S2	A1M1	A1G1	A2G2	A3G3
15,5	140				
16	135	240			
16,5	130	200	550		
17	120	150	485		
17,5	95	100	420		
18	80		360		
18,5			300		
19			240		
19,5			180		
20,5				950	
21				900	
21,5				830	
22				750	
22,5				660	
23				550	
23,5				420	
24				260	
25					1200
25,5					1100
26					1000
26,5					820
27					630
27,5					390

Size 1800

H (mm)	A1G1	A2G2	A3G3
17	700		
18	640		
19	550		
20,5	410		
21,5	270		
22	240		
22,5	160		
23,5		1450	
24,5		1300	
25,5		1000	
26		800	2600
26,5		580	2500
27		300	2400
27,5			2350
28,5			2100
29,5			1675
30			1400
30,5			1000

6. Maintenance

Maintenance work on the slip clutch is required to restore the clutch's disengagement torque, as the friction rings wear out due to constant slipping. To do this, readjust the setting nut by turning it.

The friction rings must be replaced before the pressure flange comes into contact with the bearing.

With ENEMAC slip clutches, it is important to bear in mind that various factors can affect the service life of the unit:

- Exceeding the maximum torque
- The frequency and duration of the overload situation
- Temperature
- Speed
- Operating environment

Please note:

Regardless of the rotational speed, as soon as the torque limiter engages, the process must be stopped as quickly as possible. This can be achieved by using a proximity switch or an electronic switch.

7. Addendum

7.1 Warranty

The warranty period is 12 months from the date of delivery, provided the coupling is used for its intended purpose in single-shift operation, or depending on the choice of friction linings (Longlife or Standard). The warranty claim shall lapse if damage is caused by improper operation. Any warranty claims shall lapse as a result of repair work or interventions carried out by unauthorised persons, and the use of accessories and spare parts for which the slip clutch is not designed.

7.2 Important information regarding safety regulations

In addition to the instructions set out in this operating manual, the statutory safety and accident prevention regulations apply. Any person appointed by the operator to operate, maintain or repair the slip clutch must have read and understood the operating manual before commissioning. Those carrying out repairs to the slip clutch are personally responsible for their own safety at work. Compliance with all applicable safety regulations and legal requirements is essential to prevent injury to persons and damage to the coupling during maintenance and repair work. The proper repair of ENEMAC slip clutches requires suitably trained specialist personnel. The responsibility for training lies with the operator or repair technician. They must ensure that operators and future repair technicians are properly trained in the use of the coupling.

7.3 Copyright

7.4 Spare parts

Only spare parts that meet the requirements specified by the manufacturer or supplier may be used. This is always guaranteed with genuine spare parts. Improper repairs and the use of incorrect spare parts will result in the exclusion of product liability or warranty. When ordering spare parts, it is essential to specify the type and size of the slip clutch in order to avoid incorrect deliveries.

7.5 Reservation

We reserve the right to make technical changes. Changes, errors and misprints do not give rise to any claim for compensation.