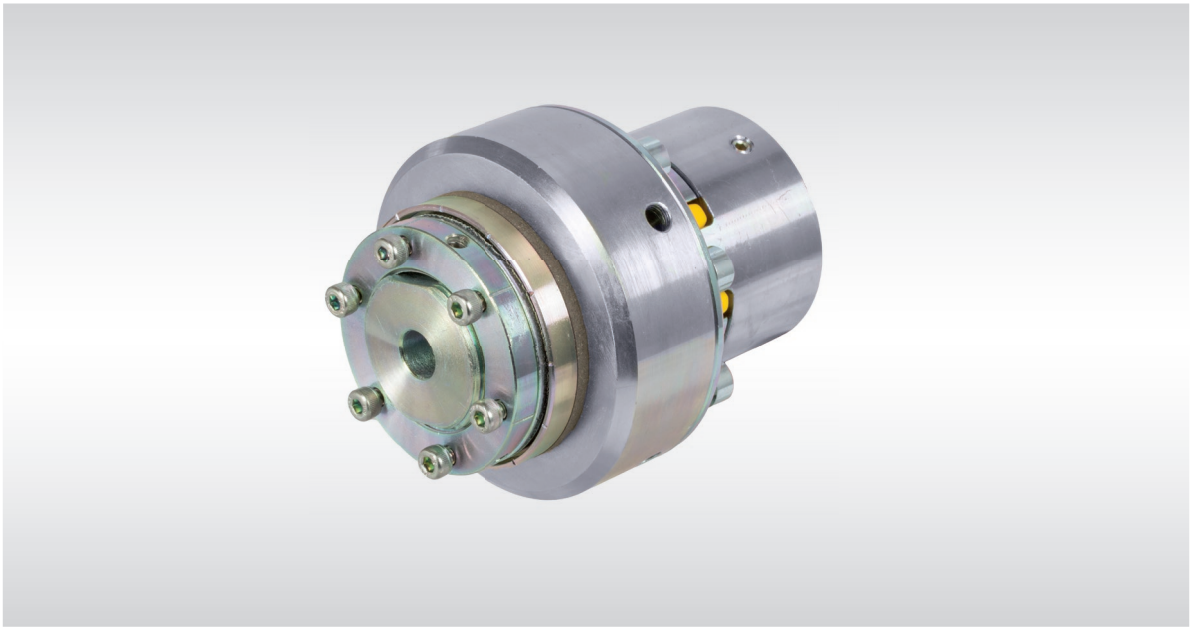
Mounting and Operating Instructions

Sliding Hub with Elastic Coupling RNR



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General information

Carefully read through this installation manual before installing the sliding hub with elastic coupling. Pay particular attention to the safety instructions! The installation manual is an important document. Store it carefully and in the vicinity of the coupling. The copyright for this installation manual shall remain with MÄDLER GmbH Stuttgart, Germany. The language of the origin manual is German.

Safety and information symbols

	Danger	Risk of injury to personnel
	Caution	Damage could occur to the machine
	Note	Note regarding important information
	Caution	Notes / instructions on use in Ex zones

General hazard warnings

The bore sizes of the sliding hub with elastic coupling must not be bored bigger than the max. bore specified in the MÄDLER® catalogue. Bigger bores would reduce the hub strength. A breaking hub could damage machines and injure persons.

During installation and removal of the MÄDLER® sliding hub with elastic coupling, make sure that the entire drive train is secured to prevent accidental activation, and that the system is depressurised. Failure to handle rotating parts in the proper manner can cause serious injury. For this reason, the following safety instructions should be read and followed without exception.

- All work on the product should be performed from the perspective of "Safety first".
- Switch off the drive unit before carrying out work on the shaft coupling.
- Secure the drive unit to prevent unintentional activation, e.g. by attaching information signs to the switch-on points or removing the fuse at the power supply.
- Do not reach into the working area of the machine while it is still in operation.
- Protect the rotating parts to prevent accidental touching. Attach the relevant protective devices and covers.

Intended use

The sliding hub is to be used as a safety element, which slips, when the transmitted torque is higher than the adjusted torque. The slipppping may occure only for a short time and only rarely in case of overload. The elastic coupling has the ability to compensate angular, radial and axial displacement caused by manufacturing and assembly tolerances.

You may only install and maintain the product if you

- have carefully read and understood the installation manual
- are authorised and trained to do so.

The product may only be used in accordance with the technical specifications. Unauthorised structural changes to the product are prohibited. We will not accept any liability for damage occurring as a result of this. In the interest further development, we reserve the right to make technical changes. The sliding hub with elastic coupling described here corresponds with the latest technical standards at the time of publication of this installation manual. The sliding hub with elastic coupling RNR is usually delivered without bore or with pilot bore. Reworking can be done at MÄDLER® at extra charge.

Selection and dimensioning

Dimensioning

The dimensioning is the responsibility of the user. For the sliding hub dimensioning, you must consider the torque you have to transmitt. Then you have also to check the torque and the displacement values of the elastic coupling. At drives rotating with high speed, you must pay attention to resonant virbrations. Necessarily, you have to consider the following factors:

Operating Factors for the Elastic Coupling

Type of Shock Load	Type of Drive Unit Electric Motors Steam Turbines Shaftings	 4 - 6 Cylinder Combustion Engines	 1 - 3 Cylinder Combustion Engines
Weak shock load **Low starting torque, uniform operation** small light generators, small centrifugal pumps, small blowers, light machine tools, light transmissions	1.0	1.25	1.75
Medium shock load **Medium starting torque, slight torque fluctuations** larger conveying machinery, large blowers, centrifugal pumps and generators, large machine tools and wood working machines, rapid presses, flower mills and food grinders, shears, punches, grinding machines, washing machines, transmissions	1.25	1.5	2.0
Strong shock load **High starting torque, strong shocks, alternating sense of rotation.** centrifuges, gang saws, paper calender, roller tables, wet presses, ball and rod mills, heavy rolling mills for metal, rubber rolling mill, reciprocating machines without flywheel, cement mills, stone breakers	1.5	2.0	2.5

Temperature Factors for the Elastic Coupling

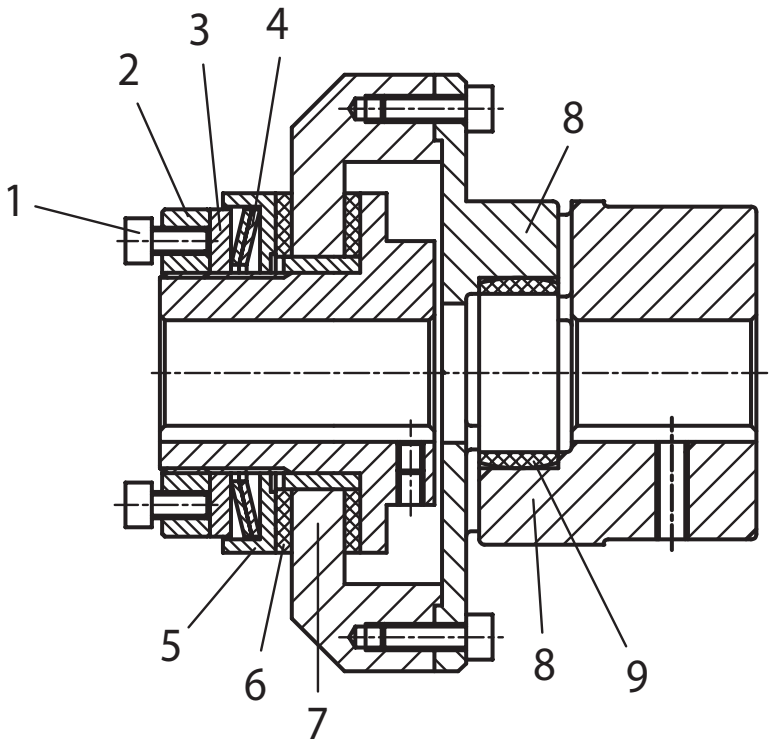
Temperature	–30 °C to +30 °C	up to +40 °C	up to +60 °C	up to +80 °C
Factor	1.0	1.2	1.4	1.8

Starting Factors for the Elastic Coupling

Starts per hour	100	200	400	800
Factor	1.0	1.2	1.4	1.8

Components of the sliding hub with elastic coupling RNR

1 Adjustment screws
2 Adjustment nut
3 Pressure plate
4 Disc spring
5 Pressure ring
6 Friction disc
7 Friction flange
8 Hubs of the elastic coupling
9 Spider (elastic element)



Function

The disc spring (4) pressures the friction discs (6) against the friction flange (7). Up to the adjusted torque, there is a positively torque transmission. When the torque gets higher than adjusted, the friction flange begins to slip between the friction discs. But the drive will not be switched off. As soon as the torque is lower again on the level of the adjusted torque, the rotation will be continued again without slip. The elastic coupling compensates the shaft displacement caused by tolerances and damps shock loads.

Mounting onto the shafts

The procuct is on stock with pilot bores. Reworking like finished bores, keyways and setscrew threads can be done against extra charge.

The sliding hub and the plug-in hub of the elastic coupling must be fixed on the shafts with setscrews against axial movement.

Mounting

Note: Shaft couplings or couplings in use with other add-on parts could produce heat, sparks and static charges. For use in Ex-zones, there are strictly regulations. Please contact us for further information.

Assembly instructions

i	We recommend checking the dimensional accuracy of the bore, shaft, slot and feather key before commencing assembly.
i	At press fit or tight fit, gently heating the hubs to approx. 80 °C makes it easier to fit them onto the shaft.
✕	Touching the heated coupling hubs can cause burns. Wear safety gloves.
!	During assembly, make sure that dimension E is adhered to, so that the coupling sleeve can still move axially during use. If this instruction is not observed, the coupling cannot work properly and may be damaged.
Ex	It is vital that you pay attention to hazards from ignition sources in areas where there is a risk of explosion!

Disc springs arrangement

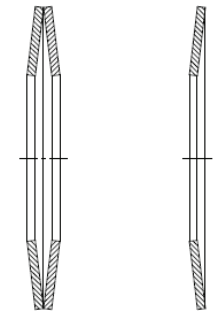
Size 00 has two disc springs.

All other sizes have only one disc spring. The smaller spring diameter must point in the direction to the adjustment nut. By mounting additional springs, the torque range can be increased (additional springs have to be ordered separately). By using the double quantity of springs, the transmittable torque will be double (see table on page 6).

Disc springs arrangement 1TF

At 1TF, the size 00 has two disc springs.

All other sizes have only one disc springs.



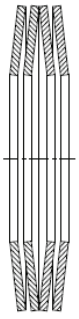
1TF Size 00

1TF Size 0-2

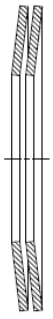
Disc springs arrangement 2TF

At 2TF, the size 00 has four disc springs.

All other sizes have only two disc springs.

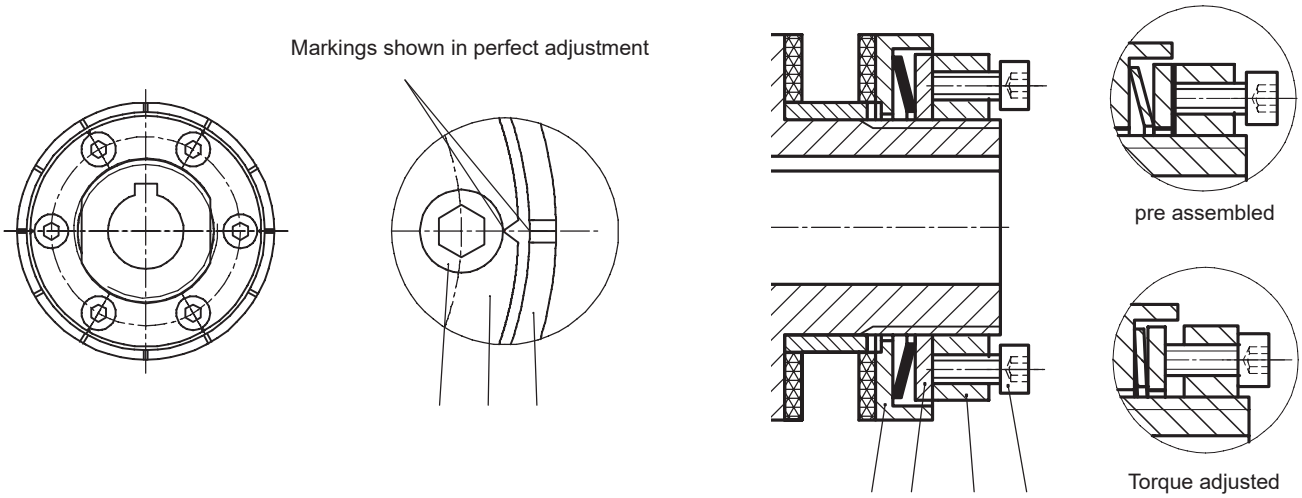


2TF Size 00



2TF Size 0-2

Torque adjustment



On the face side of the pressure ring (5) and on the outer side of the adjustment nut (2) are markings. These are necessary for the adjustment of the torque as follows. To begin with, the adjustment screws (1) are being screwed out of the nut so far, that they do not stand out.

After this the adjustment nut (2) will be screwed hand tight against the pressure disc (3). At the same time the markings on the adjustment nut (2) will be matched with the nearest marking on the pressure ring (5). Now the adjustment screws (1) are being tightened completely into the adjustment nut (2) and the maximum torque is obtained.

Is a lower torque adjustment required, the adjustment nut (2) has to be turned back to the corresponding markings after the initial adjustment. After this the adjustment screws (1) have to be tightened again.

Generally a stepless torque adjustment even between markings, is possible. For adjustments in the lower torque area a clamping nut is recommended.

General notes

The break loose moment of torque limiters is in the average about 20% above the dynamic slippage. The torque depends greatly on the surface quality of the sliding flange, the break-in period and the manufacturing tolerances.

Very negative are the effects of oil, fat and dampness for the set torque.

Adjustment tables for torque limiters RNR

The torque listed in these tables is for torque limiters which haven't been broken-in and can therefore change the torque during operation. The torque depends especially on the surface quality of the part in the torque limiter (ground or smooth surface Ra= 3.2), the tolerances of the standard parts and the break-in time. The parallelism of the surfaces of the part in the torque limiter may only deviate by maximal 0.03 mm. Rust or particles as well as the influence surrounding the torque limiter, (as for instance temperature, moisture, oil, fat or others, not exactly known factors) can affect the torque negatively. The adjustment values in these tables have been obtained by theoretic calculations, and can, due to various factors, differ from one to another torque limiter. To obtain adjustment values for torque limiters with three disc springs (RNR 01- RNR 2), the vertical values of one disc spring and two disc springs have to be added.

Rutschnabe RNR 00 Torque Limiter RNR 00

Teildrehung (TD) der Mutter Partial Turn (TD) of Nut	Handfest = max. Moment Adjusted by hand max. torque	Teildrehung zurück (X x 60°) Partial reverse turn (X x 60°)											
		1	2	3	4	5	6	7	8	9	10	11	12
1TF Moment (Nm) One disc spring torque	5	4,6	4,1	3,6	2,9	2,1	1,2	0,5	-	-	-	-	-
2TF Moment (Nm) Two disc spring torque	10	9,2	8,2	7,2	5,8	4,2	2,4	1,0	-	-	-	-	-

Rutschnabe RNR 0 Torque Limiter RNR 0

Teildrehung (TD) der Mutter Partial Turn (TD) of Nut	Handfest = max. Moment Adjusted by hand max. torque	Teildrehung zurück (X x 30°) Partial reverse turn (X x 30°)											
		1	2	3	4	5	6	7	8	9	10	11	12
1TF Moment (Nm) One disc spring torque	10	9	7	6	4	-	-	-	-	-	-	-	-
2TF Moment (Nm) Two disc spring torque	20	18	14	12	8	-	-	-	-	-	-	-	-

Rutschnabe RNR 01 Torque Limiter RNR 01

Teildrehung (TD) der Mutter Partial Turn (TD) of Nut	Handfest = max. Moment Adjusted by hand max. torque	Teildrehung zurück (X x 30°) Partial reverse turn (X x 30°)											
		1	2	3	4	5	6	7	8	9	10	11	12
1TF Moment (Nm) One disc spring torque	35	28	25	22	18	14	10	7	5	-	-	-	-
2TF Moment (Nm) Two disc spring torque	70	56	50	44	16	28	20	14	10	-	-	-	-

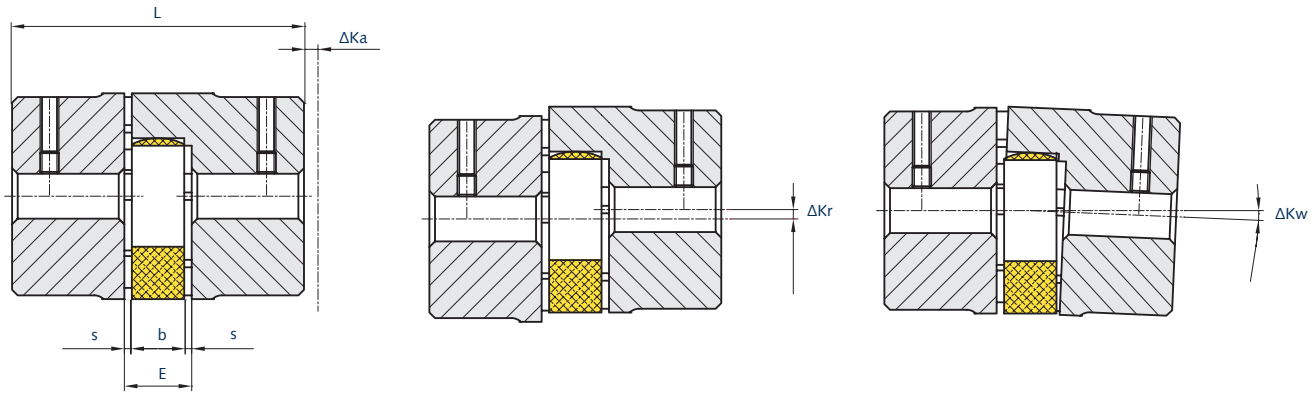
Rutschnabe RNR 1 Torque Limiter RNR 1

Teildrehung (TD) der Mutter Partial Turn (TD) of Nut	Handfest = max. Moment Adjusted by hand max. torque	Teildrehung zurück (X x 30°) Partial reverse turn (X x 30°)											
		1	2	3	4	5	6	7	8	9	10	11	12
1TF Moment (Nm) One disc spring torque	75	67	65	60	58	54	49	43	39	35	30	-	-
2TF Moment (Nm) Two disc spring torque	150	135	130	120	116	108	98	86	78	70	60	-	-

Rutschnabe RNR 2 Torque Limiter RNR 2

Teildrehung (TD) der Mutter Partial Turn (TD) of Nut	Handfest = max. Moment Adjusted by hand max. torque	Teildrehung zurück (X x 30°) Partial reverse turn (X x 30°)											
		1	2	3	4	5	6	7	8	9	10	11	12
1TF Moment (Nm) One disc spring torque	140	120	110	100	90	70	50	37	25	18	12	-	-
2TF Moment (Nm) Two disc spring torque	280	240	220	200	180	140	100	75	50	36	24	-	-

Displacement types and values for the elastic coupling



Displacement values for standard couplings (backlash type). The values depend on the speed.

Type	Dimensions [mm]				Axial displacement	Radial displacement ΔKr [mm] Speed n [min^{-1}]				Angular displacement ΔKw [°] Rotation n [min^{-1}]			
	L	E	b	s	ΔKa [mm]	750	1000	1500	3000	750	1000	1500	3000
00 (14)	35	13	10	1,5	+1,0 / -0,5	0,22	0,20	0,16	0,11	1,3	1,3	1,2	1,1
0 (19)	66	16	12	2,0	+1,2 / -0,5	0,27	0,24	0,20	0,13	1,3	1,3	1,2	1,1
01 (24)	78	18	14	2,0	+1,4 / -0,5	0,30	0,27	0,22	0,15	1,1	1,0	0,9	0,8
1 (28)	90	20	15	2,5	+1,5 / -0,7	0,34	0,30	0,25	0,17	1,1	1,0	0,9	0,8
2 (38)	114	24	18	3,0	+1,8 / -0,7	0,38	0,35	0,28	0,19	1,1	1,1	1,0	0,8

- The displacement values stated in the tables are maximum values, which must not occur at the same time at the maximun value. If radial and angular displacements do occur simultaneously, the permissible displacement values may only be used proportionately.
- Use a measuring gauge, ruler or feeler gauge to check the displacement values.

Wear and replacement

The friction discs and the spider are wear parts. The wear-off depends on the application: duration of sliding, number of starts, values of shaft displacement and so on. When the friction discs are worn to the end, the length of the centering bush will inhibit the torque transmission. Then, both friction plates have to be replaced. The elastic spider should be replaced, if the measure X in the table is exceeded.

Size	Wear-off limit X max. [mm]
00 (14)	2
0 (19)	3
01 (24)	3
1 (28)	3
2 (38)	3

The measure X can be checked with a feeler gauge.

Spare parts management

Having important spare parts in stock at the installation location is a basic requirement for ensuring the operational readiness of the coupling.