



Mounting and Operating Instructions

Multi-Plate Friction Clutches PD



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1 General information



Carefully read through this installation manual before installing the Multi-Plate Friction Clutch PD. Pay particular attention to the safety instructions! The installation manual is an important document. Store it carefully and in the vicinity of the clutch. The copyright for this installation manual shall remain with MÄDLER GmbH Stuttgart, Germany. The language of the origin manual is German.

1.1 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

1.2 General hazard warnings

  The bore sizes of the Multi-Plate Friction Clutch PD 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® Multi-Plate Friction Clutch PD, 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 shaft coupling should be performed from the perspective of "Safety first".
- Switch off the drive unit before carrying out work on the clutch.
- 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.

2 Intended use

The Multi-Plate Friction Clutch PD has the ability to compensate torque peaks, which may occur at the start of machines with high inertial masses. Furthermore, it may be used as a safety clutch: At a blockage of the driven machine, the clutch will slip and the driving torque will get converted into heat.

You may only install and maintain the shaft coupling if you

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

The Multi-Plate Friction Clutch PD may only be used in accordance with the technical specifications. Unauthorised structural changes to this 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 Multi-Plate Friction Clutch PD described here corresponds with the latest technical standards at the time of publication of this installation manual. It is usually delivered with pilot bore. Reworking can be done at MÄDLER® at extra charge.

3 Selection and Dimensioning

3.1 Selection

The Multi-Plate Friction Clutch PD can be used, if the shafts must not be in a defined position after a slipping is finished. After slipping, the shaft position is randomly oriented. If you need a defined position after slipping, please ask for a synchronous safety clutch. The occurring torque peaks are levelled out by friction plates. For slipping, the friction plates do only a small axial movement on the hub. By this, the clutch cannot operate an emergency-stop switch.

3.2 Dimensioning

The dimensioning is the responsibility of the user. The clutch can be operated dry or wet with oil. At dry operating, the slipping should be not so often and only at short time. At wet operating, the slipping time can be much longer. But at wet operating, the transmittable torque is only approx. 42% of the dry running value (at insertion depth of 30% in mineral oil ISO VG 32). The minimum adjustable torque is at about 50% of the maximum value. The slipping time is limited by the maximum temperature of the friction plates. The temperature increasing mainly depends on the kind of operating (dry or wet) and on the torque and speed. Temperature limit: +250°C. Exceptionally and at short time, it may be up to +400°C (without guarantee).

3.3 Dimensions and Torques

Product No.	Torque*		Bore. A		B mm	D mm	G ^{H7} mm	H mm	L mm	L ₁ mm	O mm	Speed max. min ⁻¹	Weight kg	Product No. Spare Plates Compl. Set
	Dry Nm	Wet Nm	Pre-bore mm	H7 max. mm										
611 001 00	14	6	10	20 ¹⁾	3x for M5	55	22	34	28	36	22	3000	0,44	611 011 00
611 002 00	33	14	12	25 ²⁾	3x for M5	67	32	44	35	43	28	3000	0,81	611 012 00
611 003 00	62	26	12	40 ³⁾	4x for M6	82	45	58	40	48	30	3000	1,45	611 013 00
611 004 00	126	54	25	42	4x for M6	100	62	76	45	53	36	2500	2,24	611 014 00
611 005 00	230	100	25	55	4x for M8	120	72	90	55	65	42	2500	3,97	611 015 00
611 006 00	380	160	25	70	6x for M10	145	85	110	65	77	53	2500	5,82	611 016 00

¹⁾ From Bore 17 mm only with flat feather key-grooves according to DIN 6885/3.

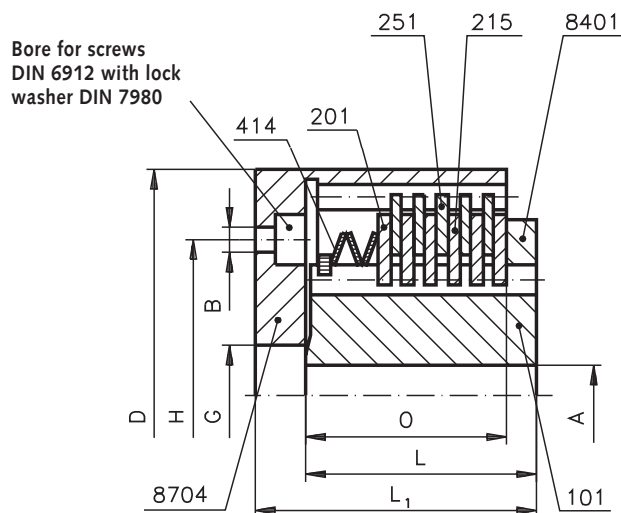
²⁾ From Bore 22 mm only with flat feather key-grooves according to DIN 6885/3.

³⁾ From Bore 38 mm only with flat feather key-grooves according to DIN 6885/3.

* Max. transmittable torque for dry or wet operation. The minimum adjustable torque is at about 50% of the maximum value.

4 Components of the friction clutch

The Multi-Plate Friction Clutch PD exists from the hub 101 (disk mount), the pressure plate 201, the inner friction plates 215 (sinter lining disks), the outer counter plates (steel disks) 251, the adjusting screw 8401, the disc springs 414 and the casing 8704. The hub 101 has a toothing to hold the friction plates 215. The casing 8704 has an internal toothing to hold the counter plates 251.




5 Storage

The Multi-Plate Friction Clutch PD is not corrosion resistant. It should be stored in a covered, dry place. Make sure that no condensation is produced. A favourable relative humidity level would be below 65 %. If the storage will be longer than 6 months, it is recommended to conserve the clutch with preservation oil.

6 Function

With the pressure plate 201, the disc springs 414 press the friction plates and counter plates against the adjusting screw 8401. So the driving torque can be transmitted by the frictional connection between the plates from the hub 101 to the casing 8704. If the driving torque exceeds the adjusted torque, the plates begin to slip.

 The slipping period should be short to prevent damages caused by overheating.

7 Assembly

7.1 Assembly instructions



We recommend checking the existence and dimensional accuracy of the bore, shaft, keyway, feather key, set screw thread and grub screw (if required) before commencing assembly.



At press fit or tight fit, gently heating the hub to approx. 80 °C makes it easier to fit it onto the shaft.



Touching the heated clutch hub can cause burns. Wear safety gloves.



The hub and the casing must be securely fixed in axial direction onto the shafts.



It is vital that you pay attention to hazards from ignition sources in areas where there is a risk of explosion!

7.2 Assembly

The Multi-Plate Friction Clutch PD is usually delivered with pilot bore. Reworking can be done at MÄDLER® at extra charge. The hub 101 (disk mount) must have a finished bore, fitting to the shaft. There must be a positive connection with keyways and feather key DIN 6885 between the hub and the shaft.

Fix the hub securely in axial direction onto the shaft. This can be done by a grub screw DIN EN ISO 4029.

The casing must be fixed on the counterpart (wheel hub or shaft support) of the driven machine. The counterpart must have a bearing on its shaft and must get securely fixed in axial direction. It must not touch the hub while running. There must not be any misalignment between casing and hub. The hub may touch the inner ring of the counterpart's bearing. The driven machine part (a wheel hub or shaft support) can be fixed on the casing by Allen screws DIN 912 from the inside of the casing (fastening torques are shown in the table below). For dry operation, be sure that the plates are clean and really free of oil. Protect the inside of the clutch against dirt and lubricate. If the plate set was disassembled, mind the correct order of the plates: The first plate beside the adjusting screw must be a friction plate (inner disk).

Tightening torques in Nm for fixing a counterpart onto the casing of the clutch with Allen screws DIN 912 strength 8.8.

Note: The strength of the customer's counterpart must be checked.

Size	1 - 2	3 - 4	5	6
Thread	M5	M6	M8	M10
Nm	6	10	25	50

Torque adjustment

Adjusting and re-adjusting the slipping torque:

At the adjusting screw, the locking screw (clamp screw) must be loosened, so that the adjusting screw can be turned.

Turning right will increase the transmittable torque, turning left reduces the torque. After adjusting, always re-tighten the locking screw. When the adjusting screw is tightened lightly by hand, you need approx. 1.5 turns more to reach the maximum transmittable torque. Note: The force of disc springs is not linear. And the torque is not only defined by the force of the disc springs but also by the operation (wet or dry). At wet operation, the torque also depends on the kind of oil and the insertion depth. So we cannot provide exactly information for number of turns needed for each torque. You have to find out the correct adjustment for your application by varying the adjustment in small steps.

Disassembly

For replacement of the friction plates and counter plates, the hub must be removed out of the casing and from the shaft.

Don't forget to loosen the grub screw, if present. After removing the adjusting screw 8401, the plates can be replaced.

The first plate beside the adjusting screw must be a friction plate (inner disk with sinter lining). The second plate must be a counter plate (outer disk from steel) and so on, in alternating sequence.

Maintenance

At normal operating with rarely slipping at short time, the clutch is maintenance-free in the long term. But often slipping for long time produces more wear and will require an re-adjustment of the slip torque. For torque adjusting see § 8.

Spare Parts

Spare friction plates are available as complete sets. Content of set: All friction plates 215, all counter plates 251 and the pressure plate 201. For these spare plates sets, please refer to the product no. shown on page 4, at the right end of the table. For other spare parts, please tell us the product no. of the clutch and the part no. shown on the drawing on page 4.

Important information for Ex-zones



Clutches used 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 the information for EX zone applications.

Additional information



The customer bears sole responsibility for all subsequent machining on the clutch components, which are not performed by MÄDLER®. All claims for warranty are excluded.