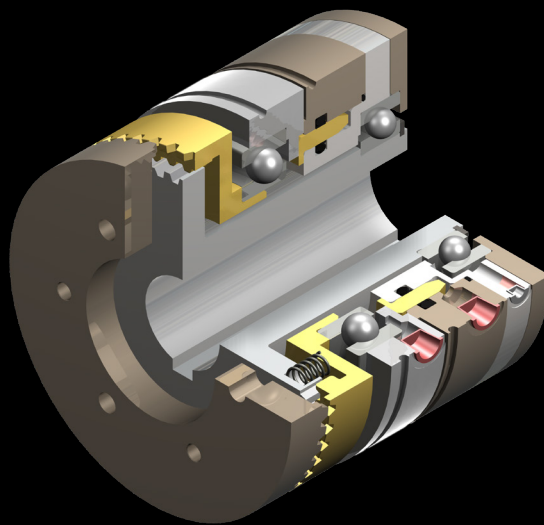


**Mönninghoff**

# **Pneumatic tooth clutch**

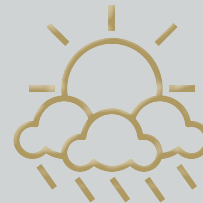
## **Type 675**



## Pneumatic tooth clutch - Type 675

### Characteristics and features

- positive-locking transmission of torque without slip
- designs up to 2200 Nm possible
- no additional energy supply necessary
- oil running or dry running
- 1/8" ISO 228 thread compressed air connection point located on the outer envelope of the cylinder exterior
- engageable also at low relative speed
- high range of temperatures
- application-related customized tooth geometries
- synchronized switching with fixed engagement positions
- under certain circumstances available as torque limiter
- uncompromizing need for safety and reliability
- integrated, easy-to-assemble system solution
- condition monitoring on demand



Mönninghoff power transmission represents an infinite variant diversity that is applied by all areas of modern mechanical engineering.

Our technologies are mostly designed to operate under extreme conditions. We offer high precision products for medical robotics, fail-proof security for aerospace technology or synchronization solutions for the packaging or printing industry.

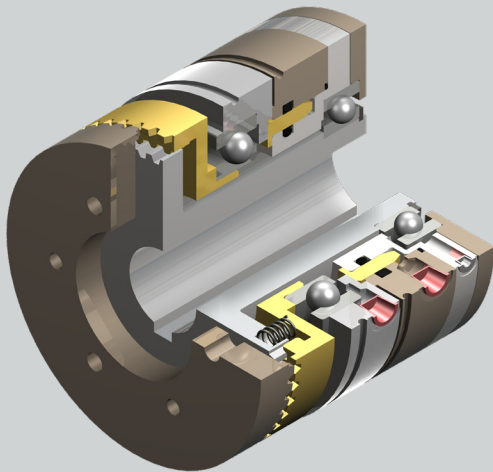
We thus address customers who have the highest standards for their own machines or systems. To them, we can offer highly complex, application-specific solutions.



## Pneumatic tooth clutch - Type 675

### Match code

Mönninghoff pneumatic tooth clutches are indicated by the following match code:



#### **675 . A . B . C**

- A** clutch size
- B** design
- C** indicator plate

Other individual characteristics:

- tothing geometries
- bore size with keyway

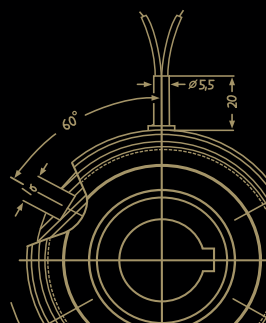
According to these characteristics, we design individual solutions concerning transmitted torque, engaging behavior or rotation speed.

Our engineers can assist with finding an application-specific clutch at any time. Together, we can develop individual and innovative solutions for extreme operating conditions.

### Ordering example

Mönninghoff pneumatic tooth clutch  
Type 675.21.1.4

|             |                                     |
|-------------|-------------------------------------|
| Tothing     | standard                            |
| Bore size d | 30 mm H7, keyway acc to. DIN 6885/1 |



## Pneumatic tooth clutch - Type 675

### Clutch size

When dimensioning a Mönninghoff pneumatic tooth clutch, several technical preconditions should be considered:

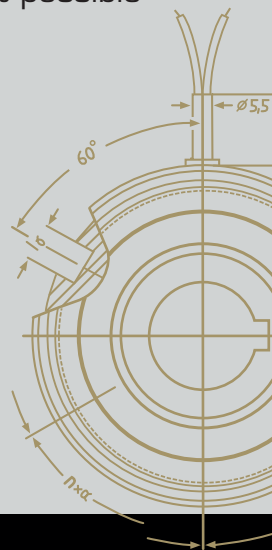
- for the selection of the correct size, not only the peak load but also the dynamic behavior of the drive have to be taken into account
- tooth clutches - contrary to friction clutches - must never be overloaded and safety factors must be considered
- generally, the selection of the correct clutch is based on torque:

$$M = 9550 \frac{P}{n} \cdot K \text{ [Nm]}$$

$$M = (M_L + M_B) \cdot K \text{ [Nm]}$$

- the transmittable torque of the clutch must always be higher than the largest possible occurring torque:

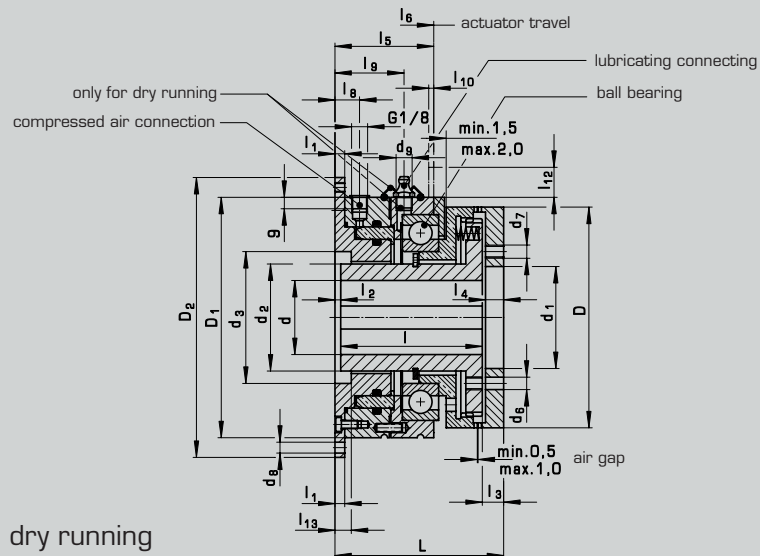
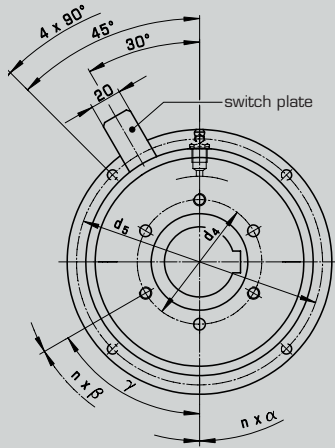
$$\text{Requirement } M_{\bar{U}} > M$$



|                |   |   |
|----------------|---|---|
| P              | = | power of motor [kW]                           |
| n              | = | rotating speed [min <sup>-1</sup> ]           |
| K              | = | safety factor 1,5 ... 2,5                     |
| M              | = | required torque                               |
| M <sub>L</sub> | = | load torque                                   |
| M <sub>B</sub> | = | acceleration torque                           |
| M <sub>Ü</sub> | = | nominal torque of clutch (see enclosed chart) |



## Pneumatik tooth clutch - Type 675

## Design 1 & 2 - flange mounted



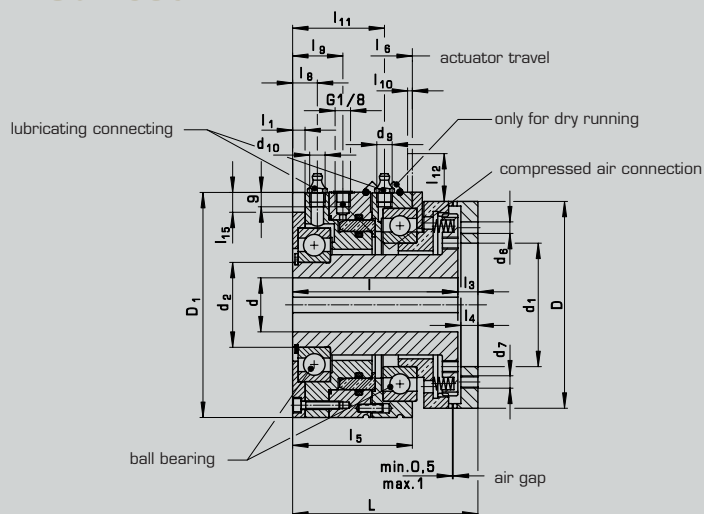
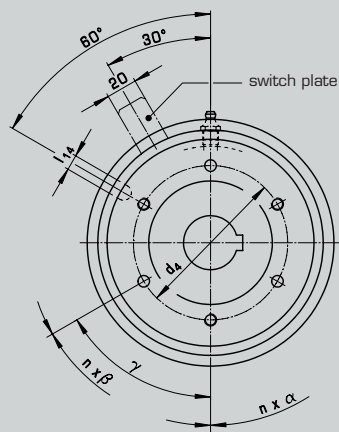
Type 675, design 1/2: oil running / dry running

## Technical data for flange mounted types

| Size   |  |                          | 21                  | 23             | 25       | 31       | 32       |          |
|--|--|--------------------------|---------------------|----------------|----------|----------|----------|----------|
| torque   |  | [Nm]                     | 100                 | 250            | 500      | 1000     | 2200     |          |
| max. speed   |  | [min <sup>-1</sup> ]     | 3000                | 3000           | 2500     | 2500     | 2000     |          |
| operating pressure   |  | min. [bar]               | 4,5                 | 5              | 5        | 5        | 5        |          |
| axial force  | engaged  | [Nm]                     | 645                 | 1210           | 1880     | 2900     | 5410     |          |
| inertia  | hub  | [10 <sup>-3</sup> kg m²] | 2,7                 | 6,7            | 16       | 39,7     | 80,4     |          |
|  | toothed ring   |                          | 1,1                 | 2,5            | 6,5      | 16,4     | 38       |          |
| weight   |  | [kg]                     | 5,5                 | 11             | 14       | 24       | 36       |          |
| min. bore  | keyway acc. to DIN 6885/1  | d H7                     | 20                  | 25             | 30       | 40       | 45       |          |
| max. bore  |  |                          | 35                  | 45             | 55       | 70       | 85       |          |
| dimensions   |  | D                        | 114                 | 134            | 166      | 204      | 235      |          |
|  |  | D <sub>1</sub>           | 115                 | 146            | 162      | 204      | 235      |          |
|  |  | D <sub>e</sub>           | 140                 | 170            | 186      | 234      | 265      |          |
|  |  | d <sub>1</sub> H7        | 52                  | 62             | 72       | 90       | 100      |          |
|  |  | d <sub>e</sub>           | 48                  | 65             | 75       | 90       | 107      |          |
|  |  | d <sub>3</sub> H7        | 62                  | 80             | 90       | 110      | 130      |          |
|  |  | d <sub>4</sub>           | 70                  | 80             | 95       | 120      | 130      |          |
|  |  | d <sub>5</sub>           | 128                 | 158            | 174      | 220      | 250      |          |
|  | for locating pin   | d <sub>6</sub>           | 5,5                 | 7,5            | 9,5      | 9,5      | 11,5     |          |
|  |  | n x α                    | 3 x 120°            | 3 x 120°       | 3 x 120° | 3 x 120° | 3 x 120° |          |
|  |  |                          | d <sub>7</sub>      | M8             | M8       | M12      | M12      | M12      |
|  |  |                          | n x β               | 3 x 120°       | 3 x 120° | 3 x 120° | 6 x 60   | 6 x 60   |
|  |  |                          | γ                   | 60°            | 60°      | 60°      | 30°      | 30°      |
|  |  |                          | d <sub>8</sub>      | 6,6            | 6,6      | 6,6      | 9        | 9        |
|  |  |                          | d <sub>9</sub>      | M 10 x 1       | M 10 x 1 | M 10 x 1 | M 10 x 1 | M 10 x 1 |
|  |  |                          | L +0,5              | 93             | 102,5    | 114      | 127      | 143      |
|  |  |                          | l <sub>-0,1</sub>   | 77             | 86       | 94       | 105      | 118      |
|  |  |                          | l <sub>1</sub>      | 6              | 6        | 7        | 7        | 7        |
|  |  |                          | l <sub>2</sub> +0,3 | 3              | 3,5      | 4        | 4        | 4        |
|  |  |                          | l <sub>3</sub> +0,2 | 13             | 13       | 16       | 18       | 21       |
|  |  |                          | l <sub>4</sub>      | 11             | 11       | 13       | 15       | 16       |
|  |  | disengaged               | l <sub>5</sub>      | 53             | 60       | 65       | 71       | 82       |
|  |  | actuator travel          | min.                | l <sub>6</sub> | 1,4      | 1,5      | 1,8      | 2,1      |
| max.   |  |                          |                     | 1,9            | 2,0      | 2,3      | 2,6      | 2,9      |
|  |  | l <sub>8</sub>           | 15                  | 15             | 16       | 16       | 16       |          |
| disengaged   | l <sub>9</sub>   | 38                       | 42                  | 44             | 46       | 51       |          |          |
|  | l <sub>10</sub>  | 3                        | 3                   | 4              | 4        | 4        |          |          |
|  | l <sub>12</sub>  | 25,5                     | 31                  | 28             | 29       | 30       |          |          |
|  | l <sub>13</sub>  | 9                        | 10                  | 11,5           | 12       | 12,5     |          |          |

## Pneumatik tooth clutch - Type 675

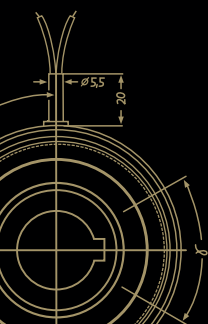
### Design 3 & 4 - bearing mounted



Type 675, design 3/4: oil running / dry running

### Technical data for bearing mounted types

| Size               |                                | 21       | 23       | 25       | 31       | 32       |
|--------------------|--------------------------------|----------|----------|----------|----------|----------|
| torque             | [Nm]                           | 100      | 250      | 500      | 1000     | 2200     |
| max. speed         | [min <sup>-1</sup> ]           | 3000     | 3000     | 2500     | 2500     | 2000     |
| operating pressure | min. [bar]                     | 4,5      | 5        | 5        | 5        | 5        |
| axial force        | engaged [Nm]                   | 645      | 1210     | 1880     | 2900     | 5410     |
| inertia            | hub                            | 2,8      | 7,0      | 17,1     | 42,2     | 93,6     |
|                    | toothed ring                   | 1,1      | 2,5      | 6,5      | 16,4     | 38       |
| weight             | [kg]                           | 6        | 12       | 18       | 28       | 48       |
| min. bore          | keyway acc. to DIN 6885/1 d H7 | 20       | 25       | 30       | 40       | 45       |
| max. bore          |                                | 32       | 42       | 55       | 70       | 85       |
| dimensions         | D [mm]                         | 114      | 134      | 166      | 204      | 235      |
|                    | D <sub>1</sub>                 | 115      | 146      | 162      | 204      | 235      |
|                    | d <sub>1</sub> H7              | 52       | 62       | 72       | 90       | 100      |
|                    | d <sub>2</sub>                 | 45       | 55       | 70       | 90       | 110      |
|                    | d <sub>4</sub>                 | 70       | 80       | 95       | 120      | 150      |
| for locating pin   | d <sub>5</sub>                 | 5,5      | 7,5      | 9,5      | 9,5      | 11,5     |
|                    | n x α                          | 3 x 120° | 3 x 120° | 3 x 120° | 3 x 120° | 3 x 120° |
|                    | d <sub>7</sub>                 | M8       | M8       | M12      | M12      | M12      |
|                    | n x β                          | 3 x 120° | 3 x 120° | 3 x 120° | 6 x 60°  | 6 x 60°  |
|                    | γ                              | 60°      | 60°      | 60°      | 30°      | 30°      |
|                    | d <sub>9</sub>                 | M10 x 1  | M10 x 1  | M10 x 1  | M10 x 1  | M10 x 1  |
|                    | d <sub>10</sub>                | M6       | M10 x 1  | M10 x 1  | M10 x 1  | M10 x 1  |
|                    | L +0,5                         | 104      | 120      | 140      | 147      | 188      |
|                    | l <sub>-0,1</sub>              | 91       | 107      | 124      | 129      | 167      |
|                    | l <sub>1</sub>                 | 7        | 8        | 9        | 9        | 11       |
|                    | l <sub>3</sub> +0,5            | 13       | 13       | 16       | 18       | 21       |
|                    | l <sub>4</sub>                 | 11       | 11       | 13       | 15       | 16       |
| disengaged         | l <sub>5</sub>                 | 64       | 77,5     | 91       | 91       | 127      |
| actuator travel    | min.                           | 1,4      | 1,5      | 1,8      | 2,1      | 2,4      |
|                    | max.                           | 1,9      | 2,0      | 2,3      | 2,6      | 2,9      |
|                    | l <sub>8</sub>                 | 12       | 16       | 26       | 18       | 43,5     |
|                    | l <sub>9</sub>                 | 26       | 32,5     | 42       | 36       | 61       |
|                    | l <sub>10</sub>                | 3        | 3        | 4        | 4        | 4        |
| disengaged         | l <sub>11</sub>                | 49       | 59,5     | 70       | 66       | 96       |
|                    | l <sub>12</sub>                | 25,5     | 31       | 28       | 29       | 30       |
|                    | l <sub>14</sub>                | 10       | 10       | 10       | 12       | 12       |
|                    | l <sub>15</sub>                | 6        | 8        | 8        | 10       | 10       |



## Pneumatic tooth clutch - Type 675

### Engagement plate

If in the event of an overload the axial component from the torque is larger than the compressive force (spring force), the engaging ring will slip out of mesh. An engagement plate fitted to the clutch operates a no-contact switch (proximity switch) and switches the clutch off without any residual torque.

### Compressed air feed

- nominal pressure between 4 and 5 bar
- the 1/8" ISO 228 thread compressed-air connection point is located on the outer envelope of the cylinder exterior and protected by a factory-fitted plug

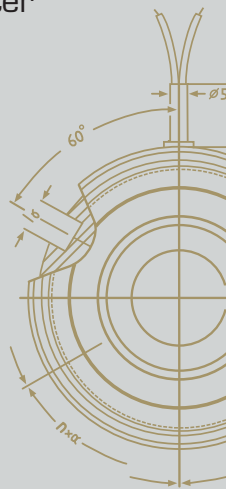
### Compressed air treatment

- treated compressed air with solid particle size of max. 40 µm
- to the standard ISO 8573-1 Class 5
- water and oil content must meet the same standard

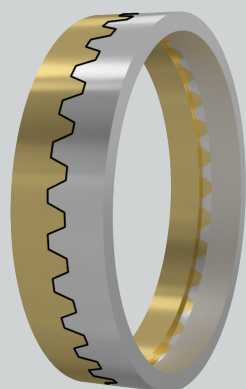
### Toothing geometries

Mönninghoff clutches offer a large variety of application-specific designs of toothing.

The amount of possible geometries or fixed points is endless and our engineers can help to design an optimized version at any time.



#### Standard



- transmits torque in both directions with little backlash
- also available backlash free
- with increased flank angle also available as torque limiter with fixed position engagement

#### Saw (counter-) clockwise



- transmits nominal torque in both directions
- in reverse direction approx. 10% of torque can be transmitted
- can be engaged at higher speeds

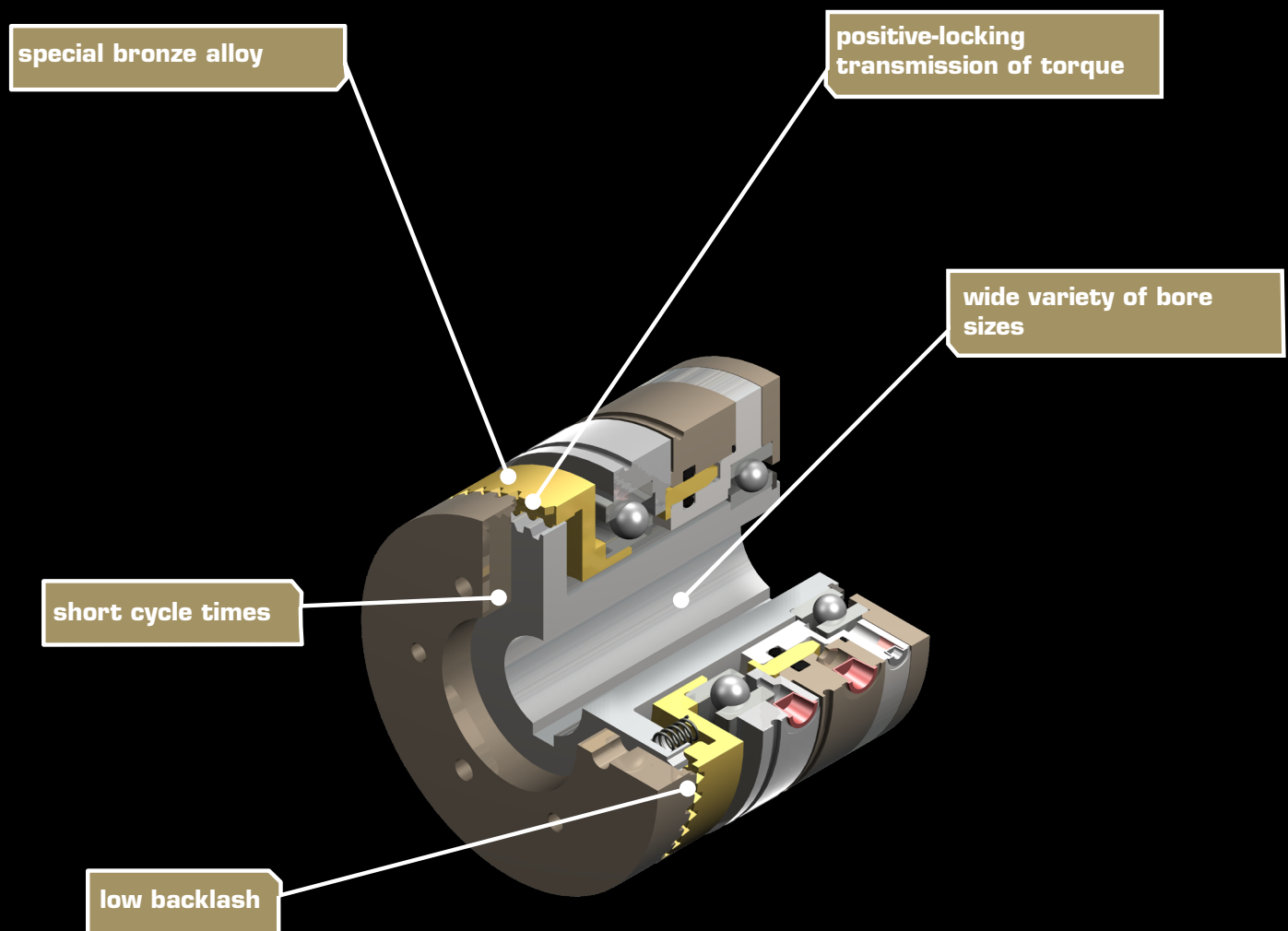


## Pneumatic tooth clutch - Type 675

### Switching characteristics

They can be used in oil or dry operation without any major changes in the engagement properties provided there are oils available with a maximum viscosity of  $25 \times 10^{-6} \text{m}^2/\text{s}$  at  $50^\circ\text{C}$ .

### At a glance

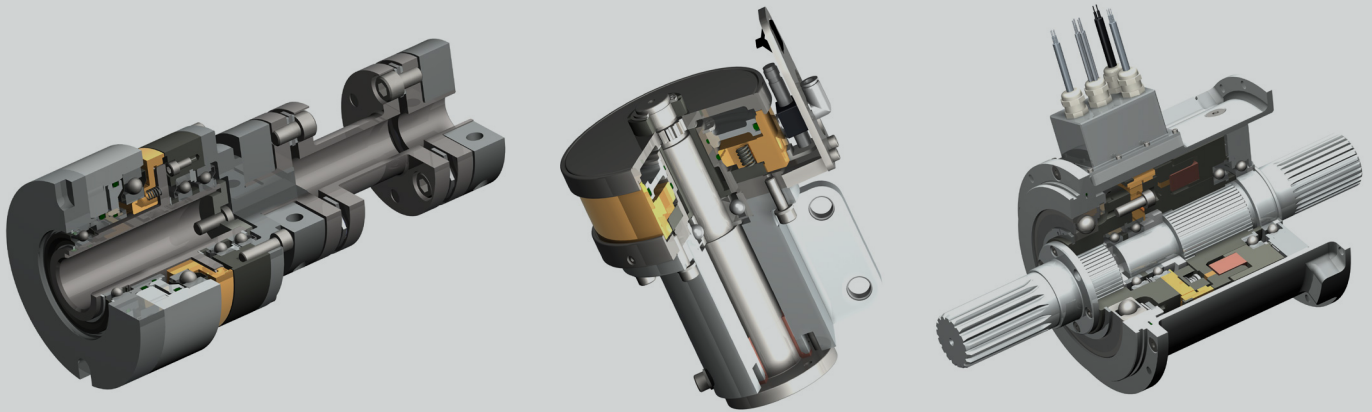




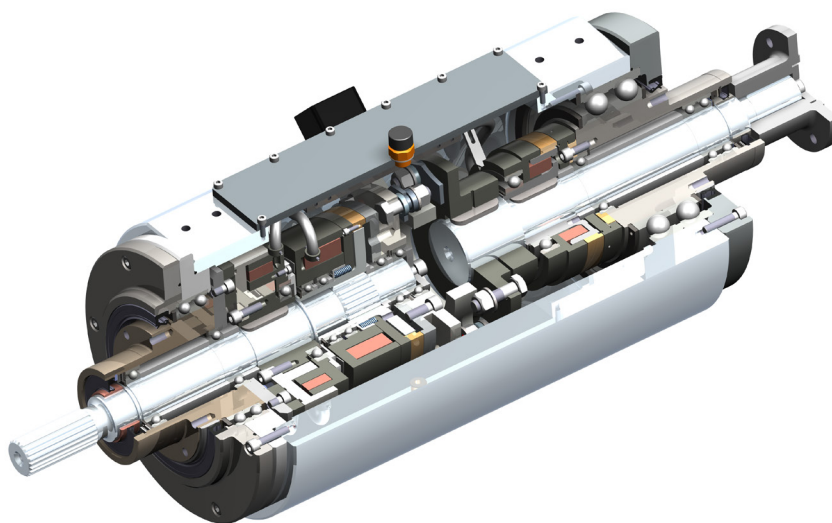
## System solutions

### You need more?

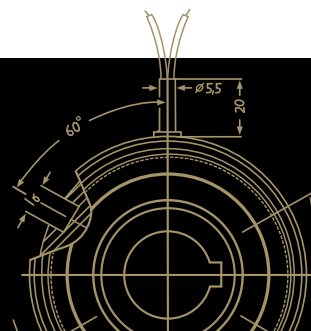
Mönninghoff clutches can be combined with a variety of many other power transmission elements. Such complex high-tech systems can solve any application-specific tasks and can fulfill any customer-specific wishes.



In many cases, a combination of different drive elements is needed to solve the applications particular problems and difficulties. Being not just supplier but technological partner to our customers, our extensive engineering is part of extraordinary and challenging power transmission projects.



**Our product is the know-how,  
with hardware as an added bonus.**



## Driven by excellence

### Why Mönninghoff

- intensive dialog with our customers' engineers
- decades of experience and competence
- deep understanding for all areas of mechanical engineering
- highly modern and flexible machine park
- enthusiasm for quality
- flexibility, inventiveness and communication skills of our employees
- commitment to Germany and Bochum as industrial location

### How to reach us

#### Sales

sales@moenninghoff.de  
+49 2327 3033-250



Helps you find a customer-specific power transmission solution for extraordinary circumstances.

#### Order Management

confirmation@moenninghoff.de  
+49 2327 3033-353



For the competent processing and smooth handling of your orders and delivery dates.

#### Service

service@moenninghoff.de  
+49 2327 3033-333



Feels committed to protect and preserve the high value of your machine and to secure its availability.

