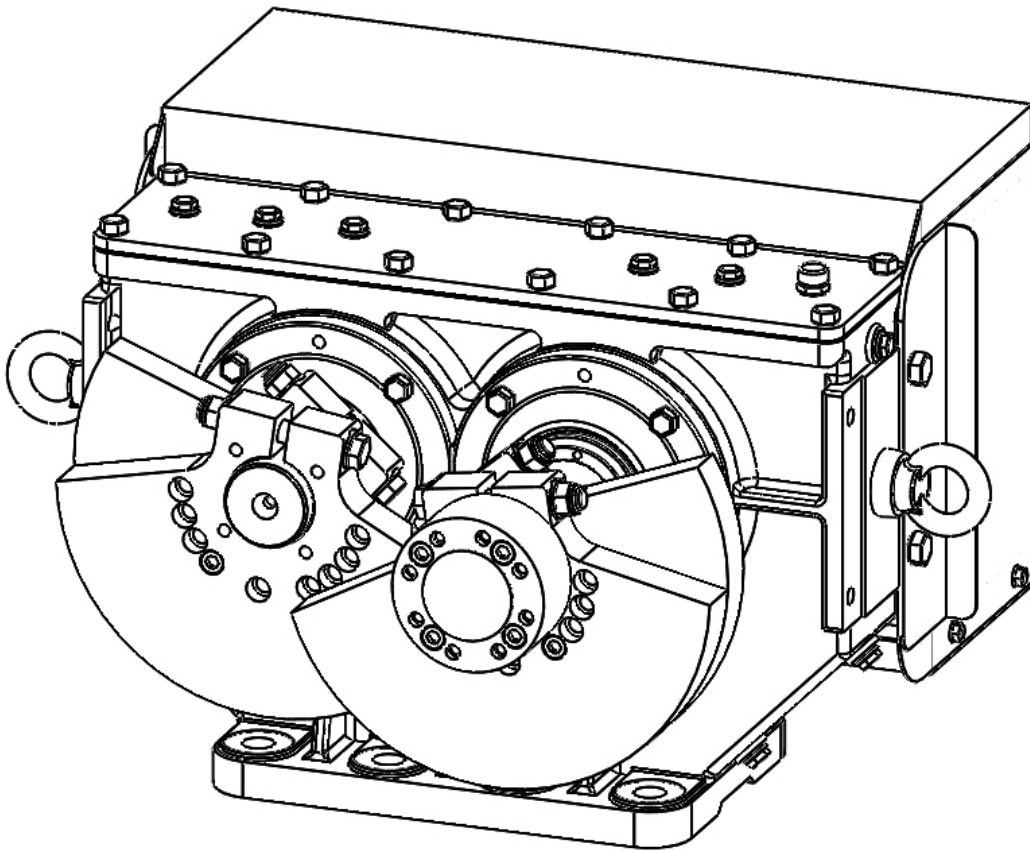


# Assembly and operating instructions

(Translated original)

## Unbalance exciter Type F 16/F 17

Issue 03.19



**FRIEDRICH**  
SCHWINGTECHNIK GmbH

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# Contents

<b>1. Notes on using these technical instructions</b> .....	<b>4</b>
1.1 Who needs to be familiar with these technical instructions .....	4
1.2 Points for special considerations .....	4
1.3 Explanation of pictographs used .....	5
<b>2. General</b> .....	<b>6</b>
<b>3. Correct use</b> .....	<b>7</b>
<b>4. Safety notes</b> .....	<b>7</b>
<b>5. Transport</b> .....	<b>8</b>
<b>6. Assembly</b> .....	<b>9</b>
6.1 Unpacking and checking delivery contents .....	9
6.2 Installation guidelines .....	9
6.3 Assembling on location .....	10
6.4 Assembling propeller shaft and drive motor connection piece .....	12
6.4.1 Coupled unbalance exciters .....	12
6.5 Assembling the protective boxes .....	15
6.6 Drive .....	16
6.7 Electrical connection .....	16
<b>7. Testing guidelines</b> .....	<b>17</b>
<b>8. Storage and internal preservation</b> .....	<b>18</b>
<b>9. Alteration of swing</b> .....	<b>18</b>
<b>10. Adjustment of centrifugal weights</b> .....	<b>20</b>
10.1 Data sheets for unbalance setting .....	21
<b>11. Dimensions</b> .....	<b>42</b>
<b>12. Technical data</b> .....	<b>44</b>
<b>13. Lubrication instructions</b> .....	<b>44</b>
13.1 Propeller shaft .....	45
<b>14. Oil change intervals</b> .....	<b>46</b>
14.1 Ventilation plug .....	46
<b>15. Selection of used gear oils</b> .....	<b>47</b>
<b>16. Oil level charts</b> .....	<b>48</b>
16.1 How to understand the following angle specifications .....	48
<b>17. Spare parts and repairs, maintenance intervals</b> .....	<b>53</b>
17.1 Spare parts .....	53
17.2 Repairs .....	53
17.3 Maintenance .....	54
<b>18. Warranty</b> .....	<b>54</b>
<b>19. Declaration of incorporation</b> .....	<b>55</b>

# 1. Notes on using these technical instructions

Please read the following pages in order to improve your understanding and utilization of these technical instructions.



## **Always observe the following rules:**

These technical instructions must be read prior to use, assembly or taking into operation. General and local health and safety regulations must also be observed.

## 1.1 Who needs to be familiar with these technical instructions

All persons in whose area the oscillating machine and the unbalance exciter are set up must be familiar with these technical instructions.

Users must also be conversant with these operating instructions.



The electrician must be aware of the specifications on electrical instructions.

Service personnel must know the maintenance and repair instructions.

The following generally applies:

Any person working on the unbalance exciter must be familiar with the contents of these technical instructions. Personnel must be qualified and given proper instructions. The operator is obliged to instruct his personnel accordingly.

## 1.2 Points for special considerations

Please ensure that these technical instructions ...

- may generally not be separated or altered. Only FRIEDRICH Schwingtechnik GmbH may amend the instructions.
- must be maintained complete in vicinity of the oscillating machine; missing pages or complete technical instructions can be requested from FRIEDRICH Schwingtechnik at any time.
- must be available at all times to personnel operating the unbalance exciter/oscillating machine.
- must be read and understood by service personnel prior to commencing maintenance or repair work on the unbalance exciter.
- conforms to the unbalance exciter`s technical specification level at the time of delivery; subsequent amendments must be sufficiently documented and kept with the technical instructions. This also applies to all other copies of the technical instructions issued by us with the ubalance exciter.
- is not, and may not amend part of an earlier or existing statement, agreement or legal relation. All obligations on the part of FRIEDRICH Schwingtechnik towards the customer are contained in the purchase agreement also containing the complete and solely valid guarantee rules. These contractual guarantee conditions are neither complemented nor limited by the technical instructions.

## 1.3 Explanation of pictographs used

The following pictographs are used to facilitate work on these technical instructions and to help you find what you are looking for.

In principle, you should inform other users of the oscillating device as to all warnings.



### Information

This involves basic information and recommendations from FRIEDRICH Schwingtechnik. The following paragraph is to promote understanding or make your work easier. This paragraph does not have to be read. Failing to consider this will not result in direct danger or adverse affects.



### Tests and checks

Notes on the necessity of regular checks on oil levels and bolt fittings. Failure to observe this sign may lead to danger or damage.



### Avoiding material damage

Refers to increased danger of damage to the unbalance exciter, e.g. due to the use of incorrect tools, wrong type of oil, contaminated parts in contact with driving components, incorrect assembly sequence or inadequate transport. The opposite paragraph must be read and understood. Failure to observe this sign may lead to danger or damage.



### Special tools

This refers to the requirement to use special tools.



### Please read

This refers to standards and documents that must be read and understood.



### General warning

This pictograph gives a general warning. This refers to dangers, possible malfunctions, incorrect use or other things concerning work safety. The opposite paragraph must be read and understood. Failure to observe this sign may lead to danger or damage.



### Warning of danger of injury

This pictograph warns of a possible danger of injury. This refers to dangers, incorrect use or other things regarding work safety. This point requires careful attention and special measures must be taken. The opposite paragraph must be read and understood. Failure to observe this sign may lead to danger or damage.



### Warning of high voltage

This pictograph warns of electrical currents and resulting dangers. Appropriate measures must be taken against this. The opposite paragraph must be read and understood. Failure to observe this sign may lead to danger or damage.



### Warning when transporting

This pictograph warns of increased dangers that may occur when transporting the unbalance exciter. The opposite paragraph must be read and understood. Failure to observe this sign may lead to danger or damage .



### Important advice

This pictograph indicates an important recommendation or explanation. The opposite paragraph must be read and understood. Failure to observe this will not lead to immediate danger but can affect the machine`s operation.

## 2. General

FRIEDRICH unbalance exciter machines are designed for operation in the interior of oscillating machines, sieving machines or other vibration equipments with particularly high payloads and/or very high transport performance.

The unbalance exciter machines consist of a robust cast iron housing with two shafts connected by gearwheels housed in generously proportioned special roller bearings with increased carrying force and bearing play. Lubrication of the bearings and gearwheels is carried out by a combination of immersion in oil and oil mist lubrication.

Centrifugal weights are fitted on the end of each shaft. On all four shaft ends centrifugal weights can be found in pairs. By turning the specific inner centrifugal weight it is possible to adjust in steps. Always turn all four pairs at the same time and mirror-inverted towards the middle. Adjustments are to be done as described in Chapter 10.

The centrifugal weights linked by force synchronization are set into operation in opposing directions by an external standard drive motor via a propeller shaft. The propeller shaft is linked via a connection piece with a centrifugal weight from the long shaft. In contrast to unbalanced motors, unbalance exciter machines do not experience transverse vibrations when starting up or coasting due to asynchronous running.

There is the possibility of deploying speed-adjustable drive motors when using FRIEDRICH unbalance exciter machines in a regulated vibration equipment. Pole changing motors and motors with electric speed adjustment can be used or a variable speed gear inserted between the unbalance exciter and the standard revolution engine.

As rotary motors, all commercially normal motors of 50 Hz and 60 Hz may be used at the stated voltages. Pay attention not to exceed the highest permissible revolutions (see chapter 12. Technical data).

All FRIEDRICH unbalance exciters are put through an internal test run in our factory prior to delivery.

Each FRIEDRICH Schwingtechnik unbalance exciter is fitted with the following type plate:



### 3. Correct use



The unbalance exciter is designed exclusively to drive an oscillating machine.

**Dimensioning of the oscillating equipment must correspond to the parameters of the unbalance exciter.**

The operation of the unbalance exciters is only permitted if the shafts are in a horizontal position.

Any other or extended use is deemed inappropriate. No claim may be made against FRIEDRICH Schwingtechnik for damage resulting from this.

Correct use also entails observing the operating instructions and in particular the inspection and maintenance instructions.

### 4. Safety notes



The unbalance exciter may only be taken into use if it has been correctly installed with the respective machine and all protective devices.

All maintenance and adjustment work on the unbalance exciter may in principle to be carried out with the machine at a standstill. Steps must be taken to ensure the unbalance exciter cannot be turned on by accident or by unauthorized personnel prior to starting this work.



**Important:** When using and working with the unbalance exciter, its centrifugal weights may turn over unexpectedly. There is a danger of knocking or pressing.

## 5. Transport



In order to avoid danger to persons and damage to the unbalance exciter, the appliance should be transported with the necessary care. As well as the following points, general and local health and safety rules must be observed.

The following is of special importance:

- **When transporting out of Europe, the centrifugal weights must be secured or dismantled, otherwise the bearings may be damaged because of mechanical shocks.**
- The correct use of transport and lifting devices must be ensured.
- When transporting unbalance exciters on pallets, make sure they cannot tip over.
- Only DIN 580 ring bolts must be used for installing the unbalance exciter. Ropes, shackles, etc. may only be fitted to these ring bolts.
- Lifting gear must be approved, undamaged and suitable for transport.
- No additional weight may be fitted to the exciter as the ring bolts are only designed for the exciter's own weight.
- For safety reasons, devices for lifting the unbalance exciter must have double the lifting capacity of weight of the unbalance exciter.
- The unbalance exciter may only be placed on its footing.
- All transport damage must be reported to the manufacturer. Special care must be taken to ensure bearing surfaces and protective covers are undamaged.



**It is not allowed to use protective covers, shafts or centrifugal weights for suspension of the unbalance exciter.**

Heavy knocks or falls will damage the bearings in the exciter and reduce the exciter's life span. The centrifugal weights and the shafts may not come into contact with the lifting device. Do not use damaged exciters.

**Table 1: Capacity of lifting devices**

Type	Permitted capacity of lifting devices [kg]	Ring bolt DIN 580
UE 5,3-6 F16	295	M 16
UE 6-6 F16	300	M 16
UE 8-6 F16	415	M 16
UE 10-6 F16	425	M 16
UE 16-6 F16	570	M 16
UE 24-8 F16	645	M 16
UE 12-4 F16	665	M 20
UE 17-6 F16	745	M 20
UE 20-6 F16	765	M 20
UEV 30-6 F16	1053	M 20
UEV 36-6 F16	1105	M 20
UEV 40-8 F16	1160	M 20
UEV 45-8 F16	1215	M 20
UE 50-6 F17	1670	M 24
UE 58-6 F17	1730	M 24
UE 67-8 F17	2015	M 24
UE 80-8 F17	2110	M 24
UE 65-6 F 17	1835	M 24
UE 88-6 F17	2270	M 30
UE 125-8 F17	2590	M 30



## 6. Assembly

**The unbalance exciters are delivered ready for installation but without oil filling. When installing, the following must be observed :**

- Check the delivery for completeness in accordance with chapter 6.1 - "Unpacking and checking the delivery contents".
- Transport the unbalance exciter in accordance with chapter 5 "Transport" to the installation location.
- Ensure the dimensional accuracy and suitability of the installation location in accordance with chapter 6.2 - "Installation guidelines".
- Carry out the fitting onto the oscillating machine in accordance with chapter 6.3 - "Assembly on location".
- Adjustment of centrifugal force or adjustment of the centrifugal weights according to Chapter 10.
- The operation of unbalance exciters is only permitted if the shafts are in a horizontal position.



**Important:** Carefully remove all paint, grease and oil from bearing surfaces of the unbalance exciter and surfaces onto which the oscillating machine is to be fitted prior to installation.



In principle, when installing unbalance exciters, local and national health and safety rules must be observed.



**Important: When using and working with the unbalance exciter, its centrifugal weights may turn over unexpectedly. There is a danger of knocking or pressing.**

### 6.1 Unpacking and checking delivery contents

Unpack the unbalance exciter and check the delivery contents against the delivery note.

Dispose of the packaging material in accordance with respective disposal conditions.

### 6.2 Installation guidelines

Requirements of the installation location:

The terminal to which the unbalance exciter is fitted must be:

- level
- vibration free
- free of paint, rust, grease and oil
- flat

## 6.3 Assembling on location

The unbalance exciters are installed as follows:



- Assembly of the unbalance exciter requires a level, vibration-free drive bracket. This base must be mechanically processed in order to maintain a perfect bearing surface.
- The unbalance exciter machines are secured with DIN 931 or DIN 933 - 8.8 hexagon bolts and DIN 982 or 985 - 8 self-locking hexagon bolts. It is not allowed to use neither split lock washers, serrated lock washers nor something like this. If washers are used, they must be high-strength washers, e.g. HV-washers according to DIN6916 are suitable.
- All the fastening elements can be used only one time.



- Fastening screws require a certain minimum grip of bolt in order to achieve preliminary tension. Minimum grip of bolt must be triple of the nominal diameter.
- The required length of bolt and projection is calculated according to DIN 13.  
Bolt end projection  $v = \text{length of nut} + 3 \times \text{thread pitch } P$
- The hexagon bolts with clamping part should in principle be on the stand side of the unbalance exciter.

The hexagon bolts with clamping part should be tightened using a torque key in accordance with table 2 unless instructions from the vibration machine manufacturer state otherwise. In any case however, instructions from the manufacturer must be observed. If in any doubt, please contact the manufacturer or FRIEDRICH Schwingtechnik.

**Table 2: Fastening screws for fastening the UEs on the traverse**

Type	Bolts 8.8	Nuts 8	Number	Torque [Nm]
UE 5,3-6 F16	M 20	M 20	6	410
UE 6-6 F16	M 20	M 20	6	410
UE 8-6 F16	M 20	M 20	6	410
UE 10-6 F16	M 20	M 20	6	410
UE 16-6 F16	M 24	M 24	6	710
UE 24-8 F16	M 24	M 24	6	710
UE 12-4 F16	M 24	M 24	8	710
UE 17-6 F16	M 24	M 24	8	710
UE 20-6 F16	M 24	M 24	8	710
UEV 30-6 F16	M 24	M 24	8	710
UEV 36-6 F16	M 24	M 24	8	710
UEV 40-8 F16	M 24	M 24	8	710
UEV 45-8 F16	M 24	M 24	8	710
UE 50-6 F17	M 36	M 36	8	2530
UE 58-6 F17	M 36	M 36	8	2530
UE 67-8 F17	M 36	M 36	8	2530
UE 80-8 F17	M 36	M 36	8	2530
UE 65-6 F17	M 36	M 36	8	2530
UE 88-6 F17	M 36	M 36	8	2530
UE 125-8 F17	M 36	M 36	8	2530

**Table 2a: Fastening screws, centrifugal weights**

Type	Bolt 8.8	Nut 8	Torque [ Nm ]
UE 5,3-6 F16	M 12	M 12	90
UE 6-6 F16	M 12	M 12	90
UE 8-6 F16	M 12	M 12	90
UE 10-6 F16	M 12	M 12	90
UE 16-6 F16	M 12	M 12	90
UE 24-8 F16	M 12	M 12	90
UE 12-4 F16	M 16	M 16	210
UE 17-6 F16	M 16	M 16	210
UE 20-6 F16	M 16	M 16	210
UEV 30-6 F16	M 20	M 20	410
UEV 36-6 F16	M 20	M 20	410
UEV 40-8 F16	M 20	M 20	410
UEV 45-8 F16	M 20	M 20	410
UE 50-6 F17	M 20	M 20	410
UE 58-6 F17	M 20	M 20	410
UE 67-8 F17	M 20	M 20	410
UE 80-8 F17	M 20	M 20	410
UE 65-6 F17	M 20	M 20	410
UE 88-6 F17	M 20	M 20	410
UE 125-8 F17	M 20	M 20	410



- If the use of a torque key on the screws is not possible because of space restrictions, suitable steps must be taken to achieve the necessary torque. Hydraulic screwdrivers must be used if in doubt (e.g. PLARAD)
- The bolts` torque must first be checked after 40 operating hours. Further checks must be carried out every 1000 hours.



- The unbalance exciter must be filled up with the necessary amount of oil in accordance with chapter 16 - "Oil level chart" and as per the installation position.
- **The unbalance exciters are not supplied with oil!**



- **The ventilation plug must always be situated on the uppermost place of the unbalance exciter.**



**Important:** if improper bolts, nuts and torques are used, the unbalance exciter may unfasten and cause huge damages.



**Possible danger for life!**



**Important:** Note that most malfunctions and breakdowns occur due to incorrect or loose bolt fittings!

## 6.4 Assembling propeller shaft and drive motor connection piece

The propeller shaft and the connection piece are fitted between the unbalance exciter and the drive motor.

FRIEDRICH Schwingtechnik does not deliver the propeller shaft and the connection piece to the drive motor as standard.



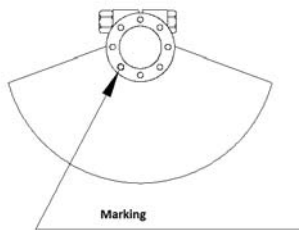
### **FRIEDRICH Schwingtechnik recommendation**

We strongly recommend the use of a protective box for the propeller shaft to prevent physical injury.

### 6.4.1 Coupled unbalance exciters

If two unbalance exciters are coupled together, following notes must be respected.

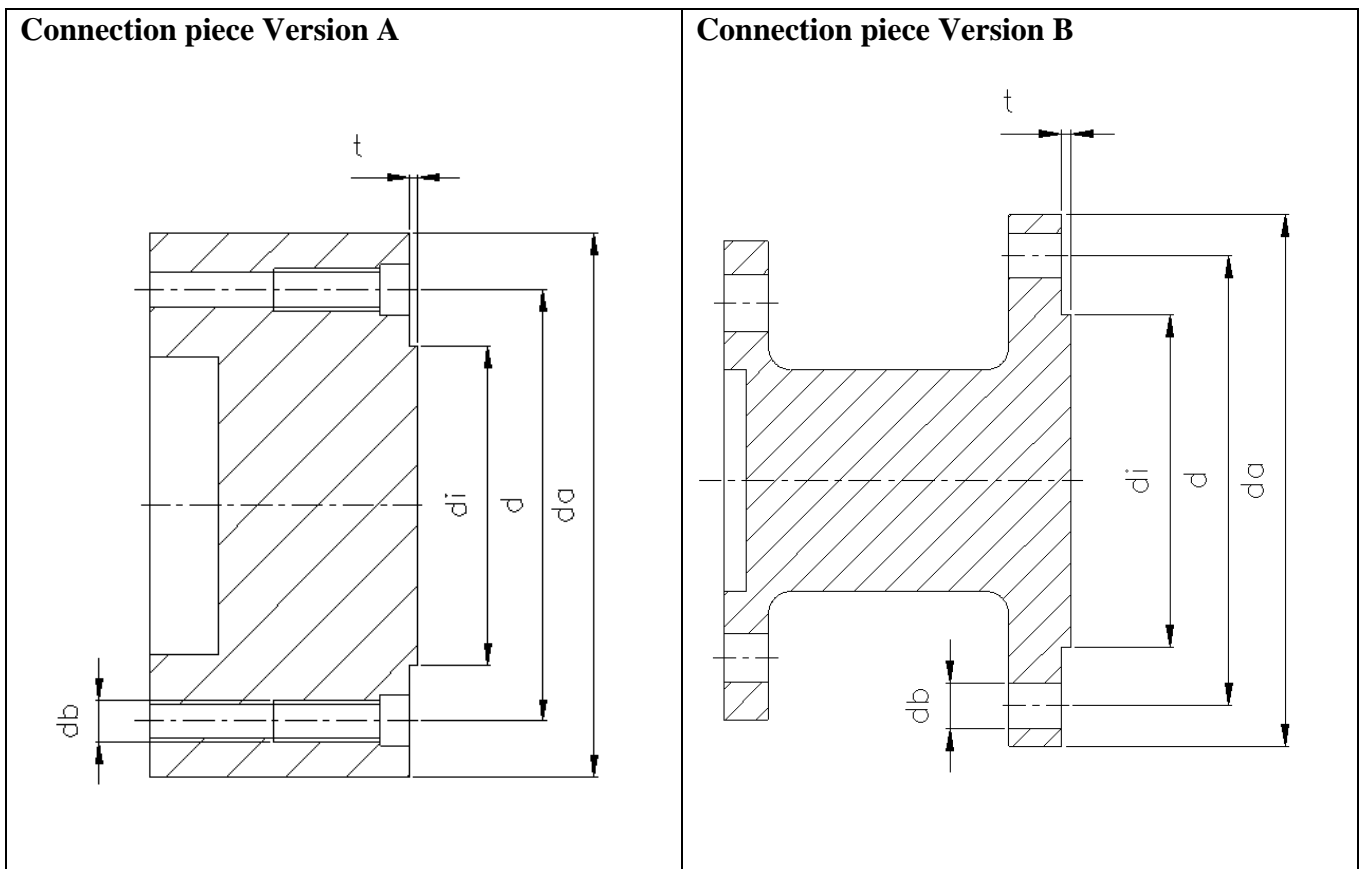
- The centrifugal weights of both exciters must be adjusted the same way. Be sure the unbalances of both exciters are exactly in the same position after mounting the propeller shaft. There are marks on the connection piece. The marks must be situated under the shaft.



- The drive motor and the propeller shaft must be adequately dimensioned. Contact us in case of doubt.

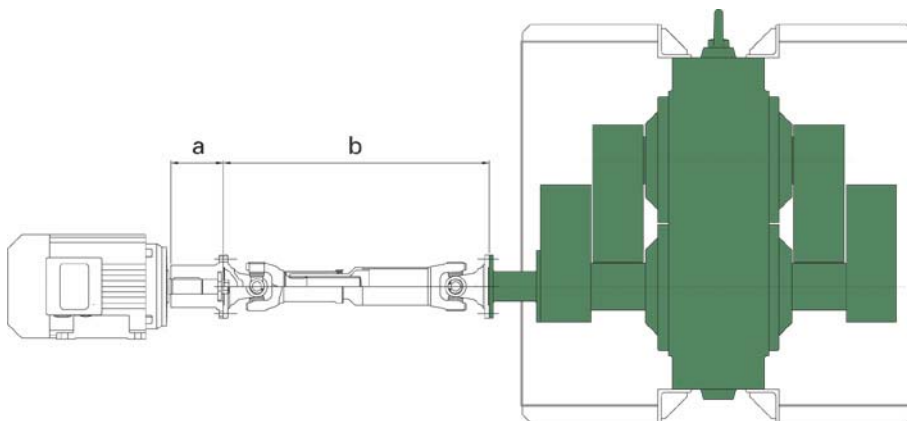
**Table 3: Connection piece on the unbalance exciter side**

Type		db [ mm ]	d [ mm ]	da [ mm ]	di [ mm ]	t [ mm ]	Version
UE 5,3-6 F16 UE 6-6 F16	61070105 61070106	M6	Ø 62 6xM6x30-10.9	96	42h6	1,5	A
UE 8-6 F16 UE 10-6 F16	61070110 61070111	M8	Ø 84 6xM8x30-10.9	102	57h6	2,0	A
UE 16-6 F16 UE 24-8 F16	61070116	Ø10c12	Ø 101,5 8xM10x40-10.9	120	75h6	2,0	B
UE 12-4 F16	61070116	Ø10c12	Ø 101,5 8xM10x40-10.9	120	75h6	2,0	B
UE 17-6 F16 UE 20-6 F16	61070120 61070121	M 10	Ø 101,5 8xM10x40-10.9	128	75h6	2,0	A
UEV 30-6 F16 UEV 36-6 F16 UEV 40-8 F16 UEV 45-8 F16	61070130 61070131 61070130 61070131	M10	Ø 101,5 8xM10x40-10.9	145	75h6	2,0	A
UE 50-6 F17 UE 58-6 F17 UE 67-8 F17 UE 80-8 F17	61070150 61070158 61070167 61070180	M12	Ø 130 8xM12x40-10.9	164	90h6	2	A
UE 65-6 F17	61070165	M 12	Ø 130 8xM12x40-10.9	164	90h6	2	A
UE 88-6 F17 UE 125-8 F17	61070080	Ø12c12	Ø 130 8xM12x50-10.9	150	90h6	2	B



**Table 4: Propeller shaft for connection of a single unbalance exciter**

Type	Propeller shaft	Fitting length b [mm]	Flange (DIN)	Weight [kg]
UE 5,3-6 F16 UE 6-6 F16	GF 1-350 67010008	350 +/- 12	Ø 62 6xM6x30-10.9 $M_A = 14\text{Nm}$	3
UE 8-6 F16 UE 10-6 F16	GF 5-450 67010020	450 +/- 15	Ø 84 6xM8x30-10.9 $M_A = 35\text{Nm}$	5,7
UE 16-6 F16 UE 24-8 F16 UE 12-4 F16 UE 17-6 F16 UE 20-6 F16 UEV 30-6 F16 UEV 36-6 F16 UEV 40-8 F16 UEV 45-8 F16	GF 2-480 67010009	480 +/- 15	Ø 101,5 8xM10x40-10.9 $M_A = 69\text{Nm}$	8,4
UE 50-6 F17 UE 58-6 F17 UE 67-8 F17 UE 80-6 F17 UE 65-6 F17 UE 88-6 F17 UE 125-8 F17	GF 3-600 670100010	600 +/- 15	Ø 130 8xM12x40-10.9 $M_A = 120\text{Nm}$	14,2



List of standard FRIEDRICH propeller shafts. Other fitting lengths by request.

## 6.5 Assembling the protective boxes

The protective boxes must be assembled prior to taking the unbalance exciter into use.

The fitting locations on the unbalance exciter and the protective boxes must be cleaned prior to assembly.

The following sequence must be observed on installation:

- Both main segments are fitted with the lower closing sheets first.
- The 2 plates are then placed over the slots. Make sure that a shorter plate is fitted to the side on which the connecting flange is mounted. This should be mentioned when ordering coupled unbalance exciters or a shorter plate ordered separately. Operation, including test runs are not permitted without fully mounted protective box and will release FRIEDRICH Schwingtechnik from any liability.
- The cover of the propeller shaft must be assembled. This is not supplied with the protective box.



**Important:** The protective box must be completely assembled to be enough rigid. Otherwise, damage to the protective box cannot be excluded.



The distance between the protective box and the fixed parts must be a minimum of 30mm. Please pay careful attention to this, especially in cases where the protective box is damaged (dents).



All bolts must be assembled without gaps and tightened up using a torque screw. The values for this are to be taken from table.

The bolts` torque must first be checked after 40 operating hours. Further checks must be carried out every 1000 hours.

Use only original parts provided by FRIEDRICH Schwingtechnik, otherwise mechanical and physical injury may occur.

**Table 5: Fastening torque for bolts on the protective box**

Bolt	Fastening torque
M 8	22 Nm
M 12	80 Nm
M 16	210 Nm



**The unbalance exciter may not be taken into use without a completely assembled protective box. This also applies to test runs. The protective box protects against malfunction of the unbalance exciter as well as from rotating parts. Operation without the protective box will release FRIEDRICH Schwingtechnik from any liability.**

## 6.6 Drive

FRIEDRICH Schwingtechnik does not include the drive motor in the delivery.

Both electrical motors and hydraulic motors can be used. The hydraulic motors must provide slow start, The motors can be connected with the unbalance exciter via a propeller shaft or a V-belt.

Note the following on the design of the unbalance exciter drive motor for the oscillating machine provided:

- Please see chapter 12 - "Technical data" for the electric drive motor required. The fastening torque in the range 0-300 min<sup>-1</sup> must be 2.5 times the nominal torque.
- Please see chapter 12 - "Technical data" or the type plate for the highest permitted range.

### Important:



- The minimum range  $n_{\min}$  may only fall short of 500 min<sup>-1</sup> with written permission from FRIEDRICH Schwingtechnik.
- The maximum range  $n_{\max}$  in accordance with chapter 11 may only be exceeded with written permission from FRIEDRICH Schwingtechnik.
- **Failure to observe this may result in material or physical damage.**
- **The falling short or exceeding of permissible ranges without prior written permission will release FRIEDRICH Schwingtechnik from any liability.**



After switching off the drive motor, the exciter goes through the machine's frequency range and outlet vibration occur. This will lead to a slowing down of the transported material or vibrating of the oscillating machine. These undesired outlet vibrations can be avoided to a large extent by slowing down the motor whereby the brake may be operated at will. FRIEDRICH Schwingtechnik recommends braking via a DC brake.

The braking torque must not be greater than the motor's starting torque.

The unbalance exciter may only be started up if the oscillating machine is at a complete standstill.

## 6.7 Electrical connection



Electrical connection of the unbalance exciter drive motor may only be carried out by authorized specialist personnel according to the regulations and standards applying at the installation location.



**On the ground of safety reasons an emergency circuit breaker must be used.**

**Important:** Earth the drive motor according to the relevant protective regulations.



## 7. Testing guidelines



**Important:** Oscillating machines may in principle only be switched on at a standstill to avoid vibrations in the resonance range.

Check the following points before commencing the test run:

- Free movability of all vibrating parts.
- Proper oil and grease filling for the driving components according to details in chapter 15 - "Selection of available gear oils" and chapter 13 and 14 - "Oil level chart".
- Installation location of the unbalance exciter within permissible environmental temperatures of -40°C and +50°C.



The test run may only be started from a local control station so intervention is possible at any time in the event of physical or material danger. An acoustic and if necessary, a visual signal of sufficient length must be given before starting the unbalance exciter.

The unbalance exciter should initially run one to two hours unloaded. The machine can be taken into use under load after checking the bolts for secure seating. Ensure the maximum operating temperature of +80°C is not exceeded.



**The unbalance exciter may not be taken into use without a completely assembled protective box. This also applies to test runs. The protective box protects against malfunction of the unbalance exciter as well as from rotating parts. Operation without the protective box will release FRIEDRICH Schwingtechnik from any liability.**

## 8. Storage and internal preservation

After successful finishing of the test run performed on our testing stand, all the unbalance exciters are given preservation for at least 12 months.

It is intended to store the exciters inside closed dry stores under normal environmental conditions.

In case of aggressive, moist environmental conditions, e.g. in tropics, storage life is reduced to 6 months.



In order to prevent damage in storage, unbalance exciters should be stored without the centrifugal weights.

When using an unbalance exciter after long time of inactivity, it is not necessary to wash it out. It must be filled with oil according to tables chapter 16. Free movement of the shafts must be checked by hand.

If the shafts are not free to move, we recommend to let the unbalance exciter dismantle and clean at the producer.

If an unbalance exciter should be stored also after expiration of the storage life, you must keep to the following way.

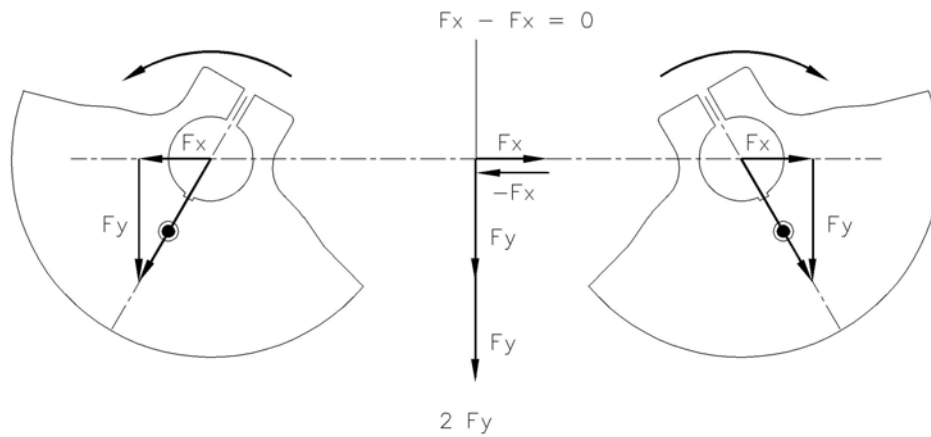
Fill up the unbalance exciter with oil and rotate the shafts by hand. After that, get the oil out again.

If vapour proof packaging is used, it is absolutely essential that as much of the solvent as possible be evaporated from the interior. It is advisable not to seal available ventilation devices for transport - including sea transport - and subsequent storage. Packaging must be agreed with the supplier or the packaging company as regards destination and storage time.

## 9. Alteration of swing

The unbalance exciter machines have two gearwheel force-synchronized shafts fitted with unbalances. The circulating masses produce a circulating radial power  $F$  of the same frequency on both shafts. An alternating force of value  $F_y + F_y = 2F_y$  in the direction of the exciter stand is produced due to the inverse synchronous circulation of the imbalances. An important characteristic for the selection of unbalance exciters is the so-called "static torque". The static torque of unbalance exciters is defined as the weight of all unbalances multiplied by the radius of the centre of gravity. FRIEDRICH Schwingtechnik uses working torque instead of static torque. This is calculated by doubling the static torque. Working torque is normally expressed in [kgcm].

Fig. 1



The amplitude of oscillation of vibrating movement of the vibration device is calculated from the unbalanced exciter's working torque and the weight of the vibrating parts on the vibration device as follows :

$$\text{Swing} = \frac{\text{Working torque [kgcm]}}{\text{Mass of oscillating parts [kg]}} = 2 * \text{Amplitude [cm]}$$

In order to modify the vibration amplitude it is possible to adjust the unbalance setting in steps.

The values for the specific types can be found in the data sheets under point 10.1. The adjustment process for the centrifugal weights is described in detail under point 10 and depicted in Fig. 2. The settings of each of the four centrifugal weights must be exactly the same. Adjustment must be carried out mirror-inverted towards the middle.



Attention: If the settings of the centrifugal weights differ, transverse vibrations will occur which could damage the machine and the unbalance exciter.



A risk of injury exists.

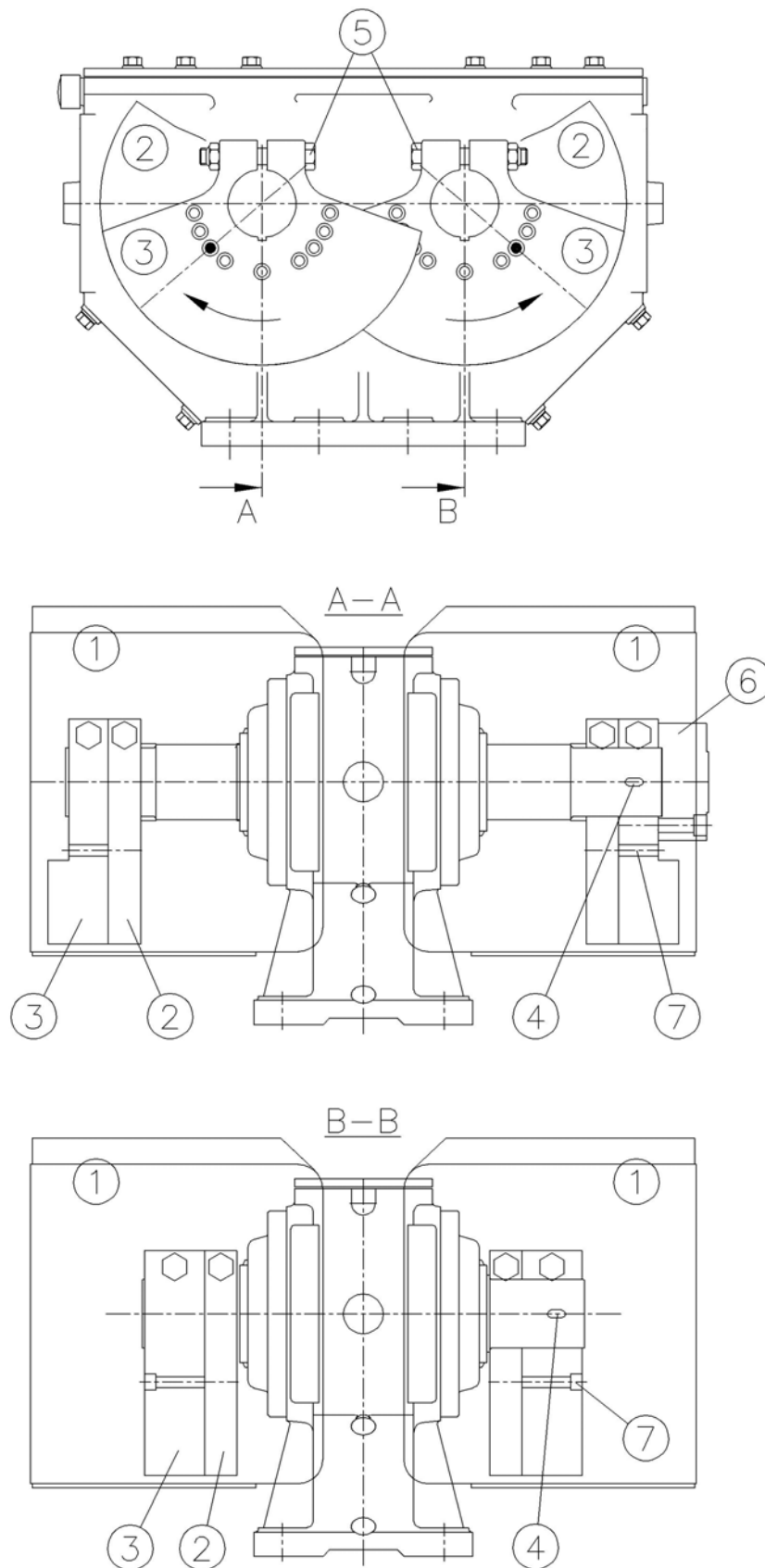
The warranty will become invalid if operated with different settings.



If unbalance exciters are linked together the settings of the centrifugal weights must be the same on all individual exciters and in the same position through the way they are linked.

## 10. Adjustment of centrifugal weights

Fig. 2



On the short and the long shaft there are two centrifugal weights each on the shaft ends to generate centrifugal force. If changes are made to the unbalance then these four centrifugal weights must each be adjusted in exactly the same way and parallel to the middle.

In this process it is always only the inner centrifugal weights that are rotated (2).

The outer centrifugal weights (3) are positioned by a fitting key (4) and clamped to the shaft by the clamp screw (5).

It is not necessary to loosen the outer centrifugal weight or to dismantle the connection piece (6) to be able to change the centrifugal force setting.

The centrifugal forces can be set as follows to modify the output:

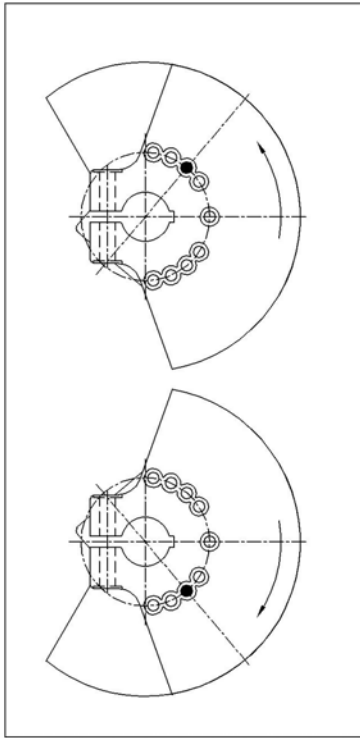
- 1) Remove the protective boxes (1) from both sides.
- 2) Undo the connection screw (7) of the pairs of centrifugal weights – four of them.
- 3) Undo the clamp screw (5) of the inner centrifugal weights (2) – four of them.
- 4) Rotate the inner centrifugal weights (2) from the middle to the outside. Refer to arrow in Fig. 2.
- 5) Connect the centrifugal weight pairs together with the connection screw (7). Refer to table 2a for tightening torque.
- 6) Tighten the clamp screws (5) with tightening torque according to table 2a.
- 7) Before beginning operation check the following:
  - Are all pairs of centrifugal weights in the same position and facing mirror-inverted towards the middle?
  - Have the four clamp screws (5) and connection screws (7) been properly tightened?
- 8) Mount the protective boxes (1)



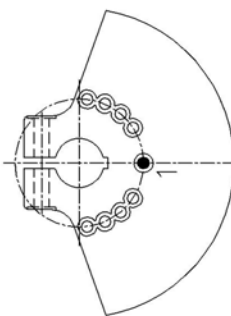
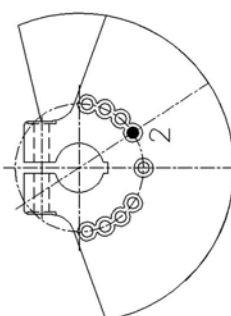
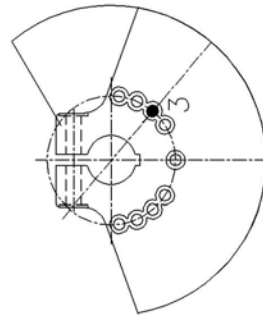
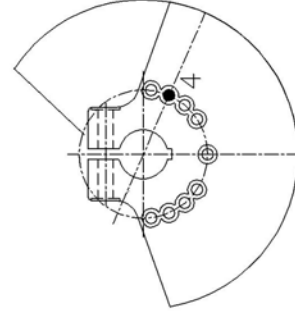
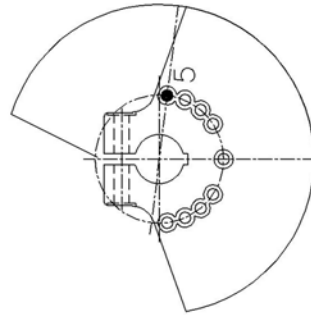
## 10.1 Data sheets for unbalance setting

As follows a data sheet describes the maximum operation speed permitted (a minimum is  $500 \text{ min}^{-1}$ ) for each unbalance exciter, and for all potential settings:

- Percentage of the unbalance setting
- Torque for this setting
- Centrifugal force for this setting

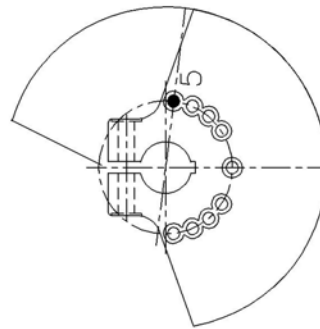
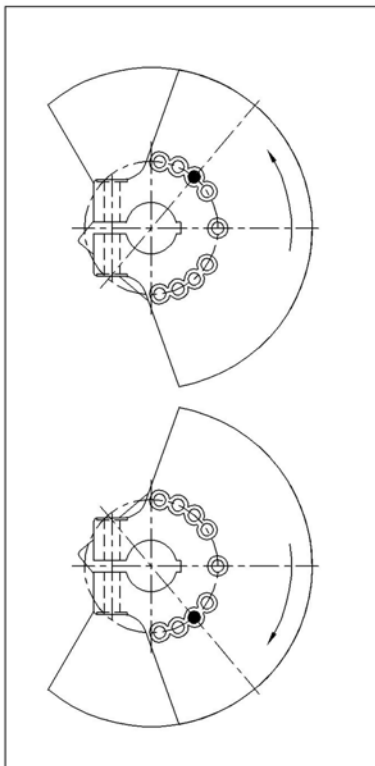


# UE5,3-6F16

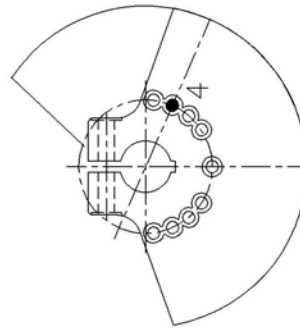


100%	max. 1.000 RPM	540 kgcm	29,6 KN
92%	max. 1.000 RPM	497 kgcm	27,2 KN
82%	max. 1.000 RPM	443 kgcm	24,3 KN
70%	max. 1.000 RPM	378 kgcm	20,7 KN
56%	max. 1.000 RPM	302 kgcm	16,6 KN

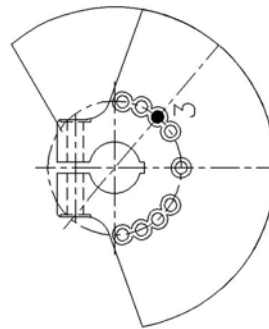
# UE6-6F16



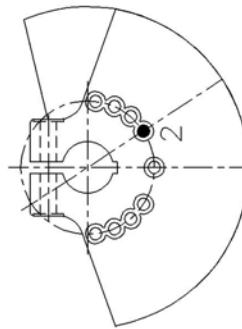
62%  
max. 1.000 RPM  
384 kgcm  
21,1 KN



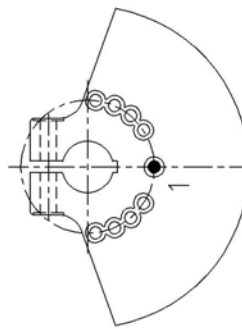
74%  
max. 1.000 RPM  
459 kgcm  
25,2 KN



84%  
max. 1.000 RPM  
521 kgcm  
28,6 KN

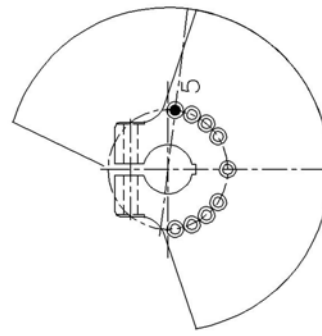
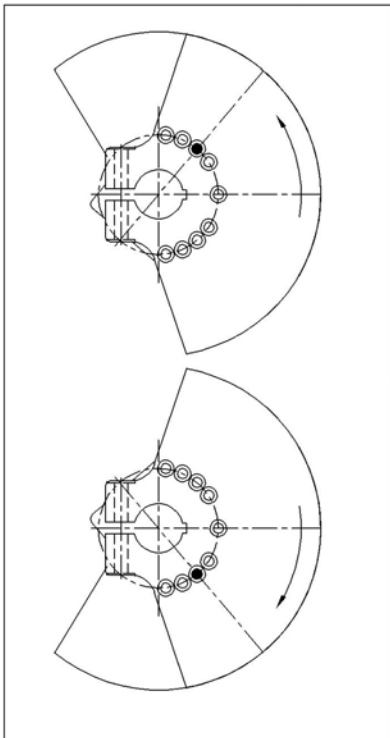


93%  
max. 1.000 RPM  
577 kgcm  
31,6 KN

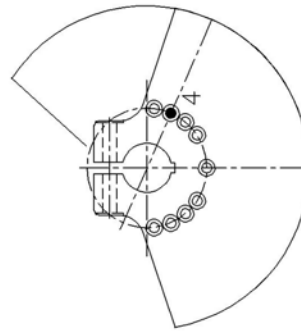


100%  
max. 1.000 RPM  
620 kgcm  
34,0 KN

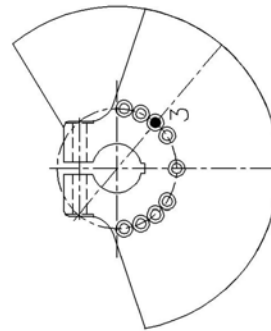
# UE8-6F16



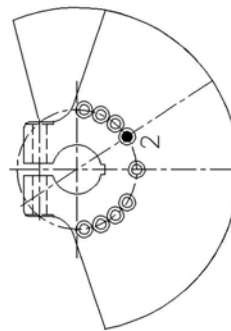
56%  
max. 1.000 RPM  
482 kgcm  
26,4 KN



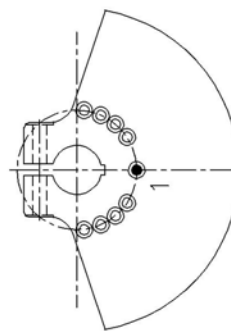
70%  
max. 1.000 RPM  
602 kgcm  
33,0 KN



82%  
max. 1.000 RPM  
705 kgcm  
38,6 KN



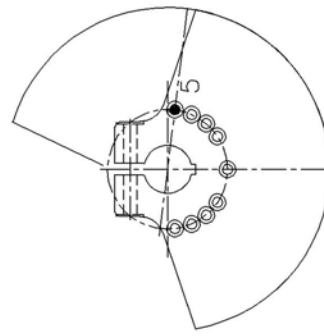
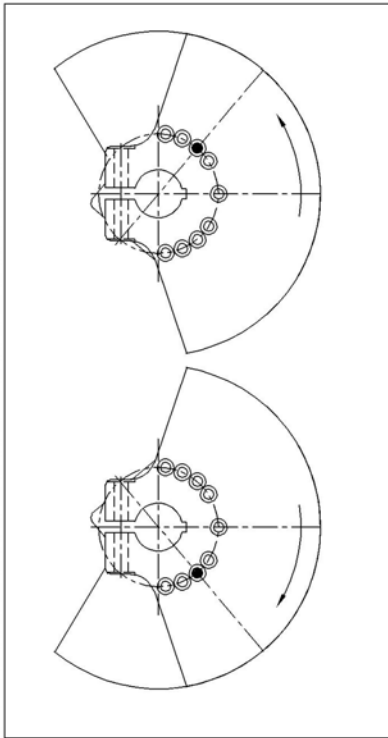
92%  
max. 1.000 RPM  
791 kgcm  
43,3 KN



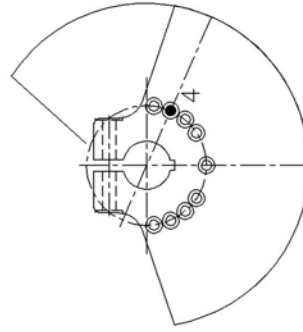
100%  
max. 1.000 RPM  
860 kgcm  
47,1 KN



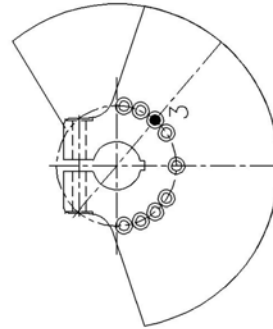
# UE10-6F16



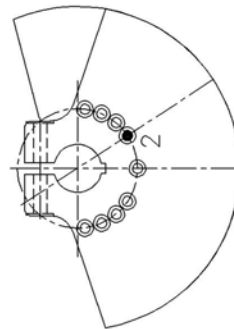
62%  
max. 1.000 RPM  
626 kgcm  
34,3 KN



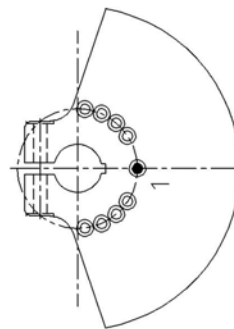
74%  
max. 1.000 RPM  
747 kgcm  
40,9 KN



85%  
max. 1.000 RPM  
859 kgcm  
47,1 KN

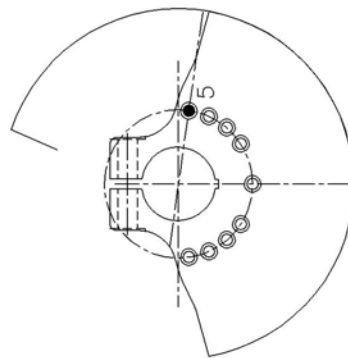
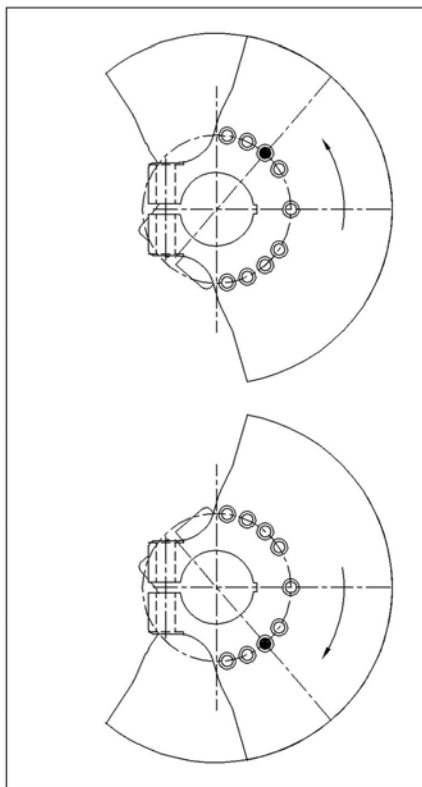


93%  
max. 1.000 RPM  
939 kgcm  
51,5 KN

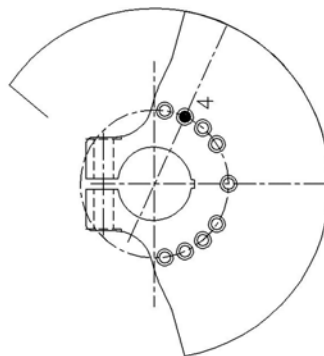


100%  
max. 1.000 RPM  
1.010 kgcm  
55,4 KN

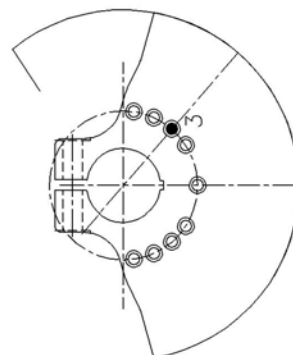
# UE16-6F16



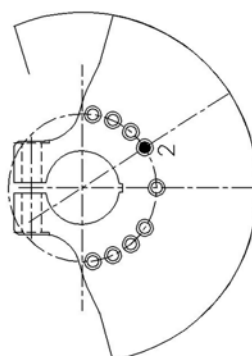
56%  
max. 1.000 RPM  
896 kgcm  
49,1 KN



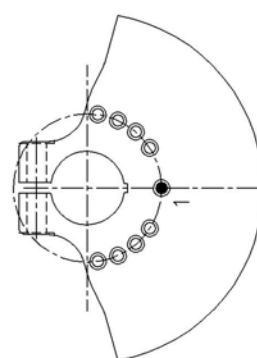
70%  
max. 1.000 RPM  
1.120 kgcm  
61,4 KN



83%  
max. 1.000 RPM  
1.328 kgcm  
72,8 KN

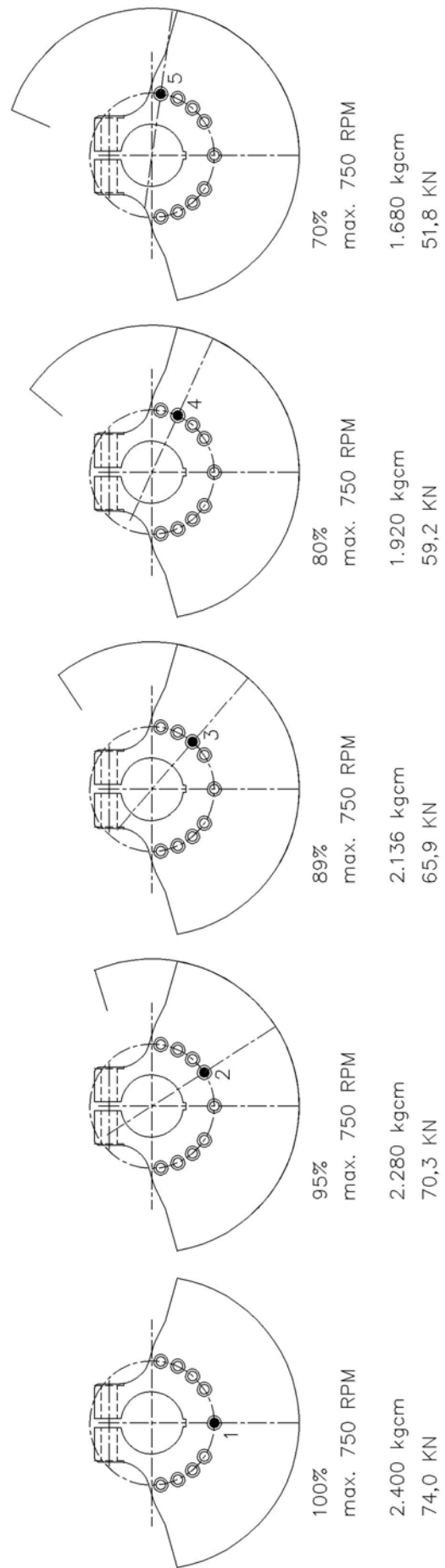
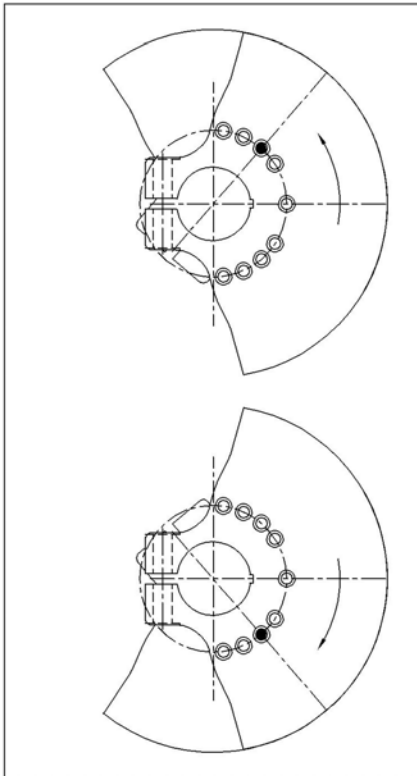


93%  
max. 1.000 RPM  
1.488 kgcm  
81,6 KN

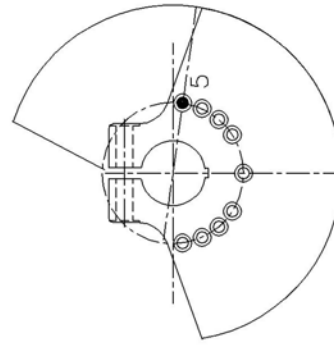
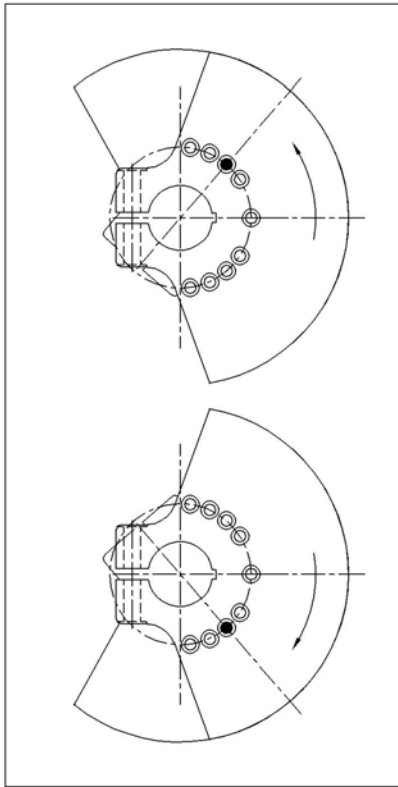


100%  
max. 1.000 RPM  
1.600 kgcm  
87,7 KN

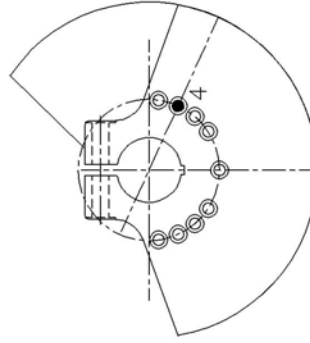
# UE24-8F16



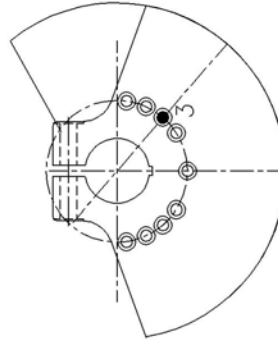
# UE12-4F16



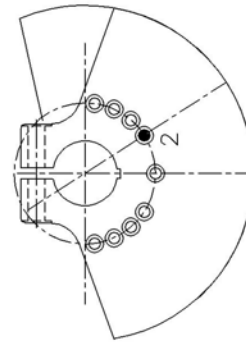
60%  
max. 1.500 RPM  
714 kgcm  
88,1 KN



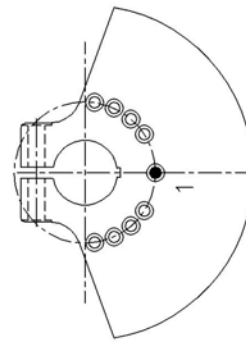
73%  
max. 1.500 RPM  
869 kgcm  
107,2 KN



84%  
max. 1.500 RPM  
1.000 kgcm  
123,3 KN

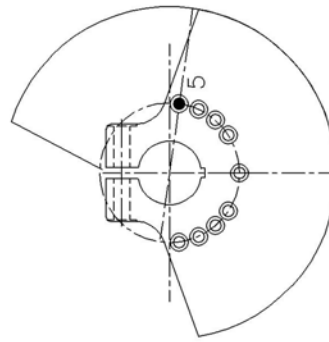
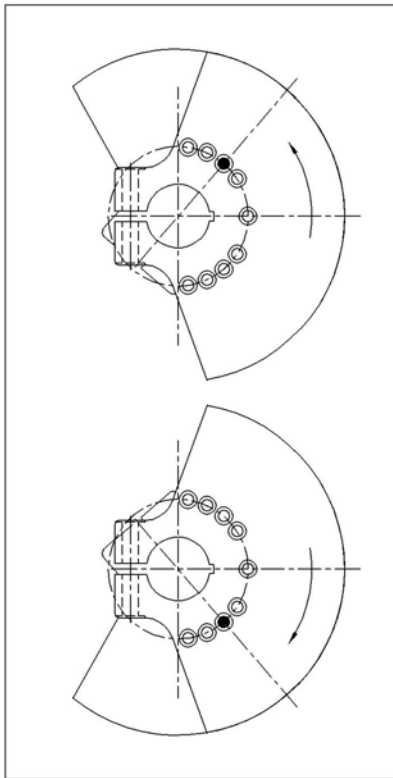


93%  
max. 1.500 RPM  
1.107 kgcm  
136,5 KN

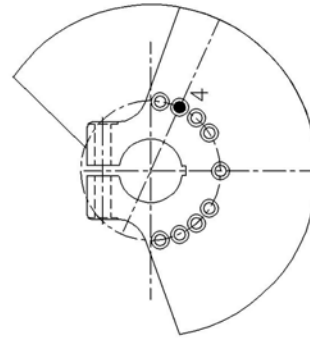


100%  
max. 1.500 RPM  
1.190 kgcm  
146,8 KN

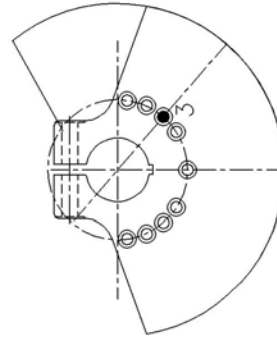
# UE17-6F16



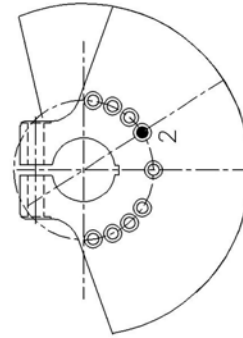
60%  
max. 1.000 RPM  
1.068 kgcm  
58,6 KN



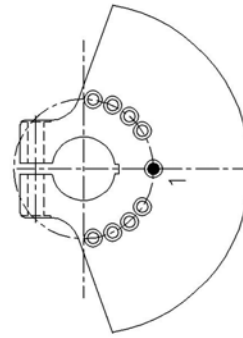
73%  
max. 1.000 RPM  
1.299 kgcm  
71,2 KN



84%  
max. 1.000 RPM  
1.495 kgcm  
82,0 KN

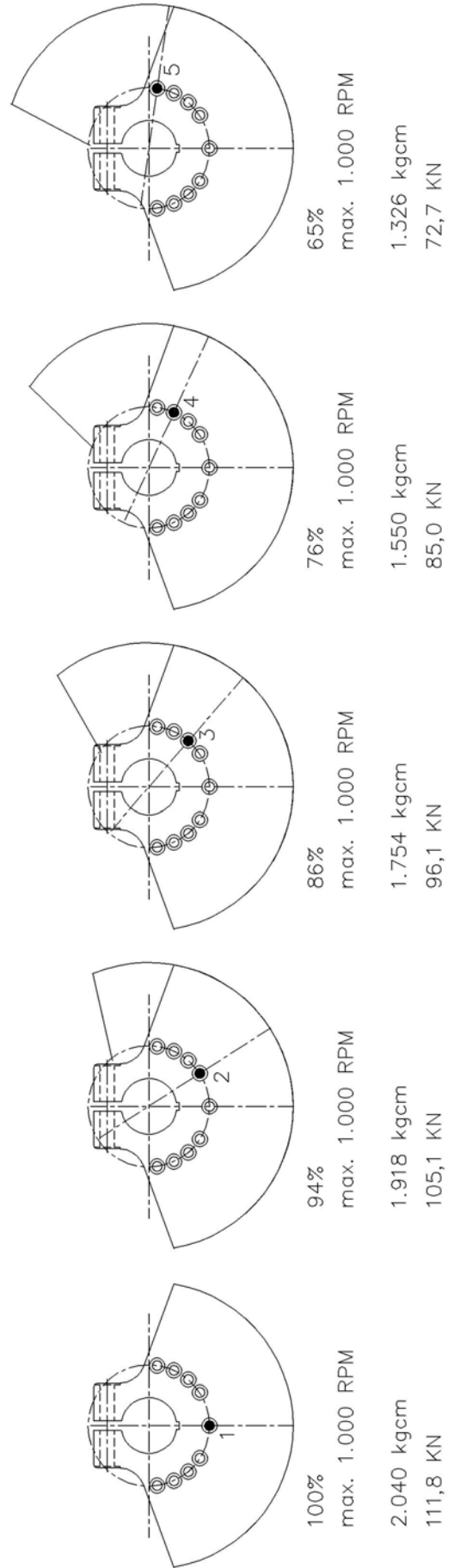
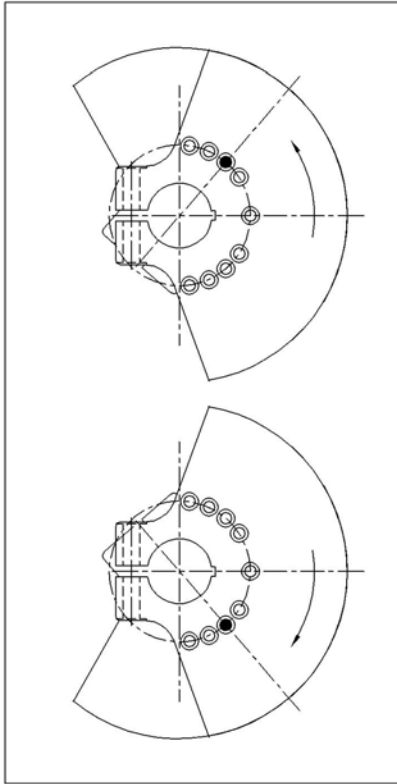


93%  
max. 1.000 RPM  
1.655 kgcm  
90,8 KN

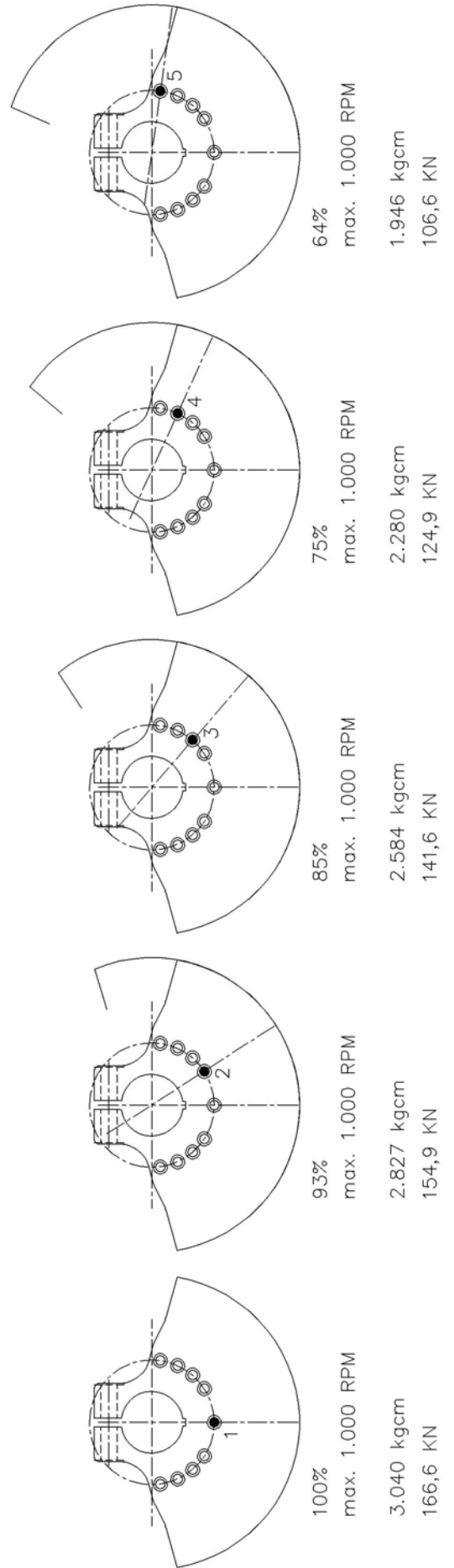
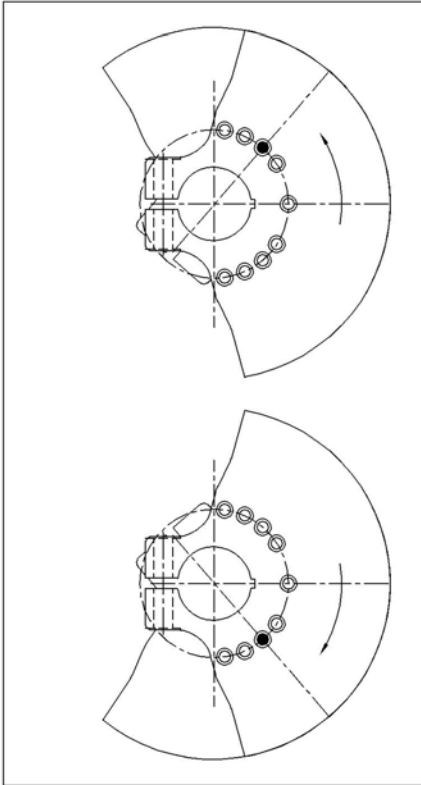


100%  
max. 1.000 RPM  
1.780 kgcm  
97,6 KN

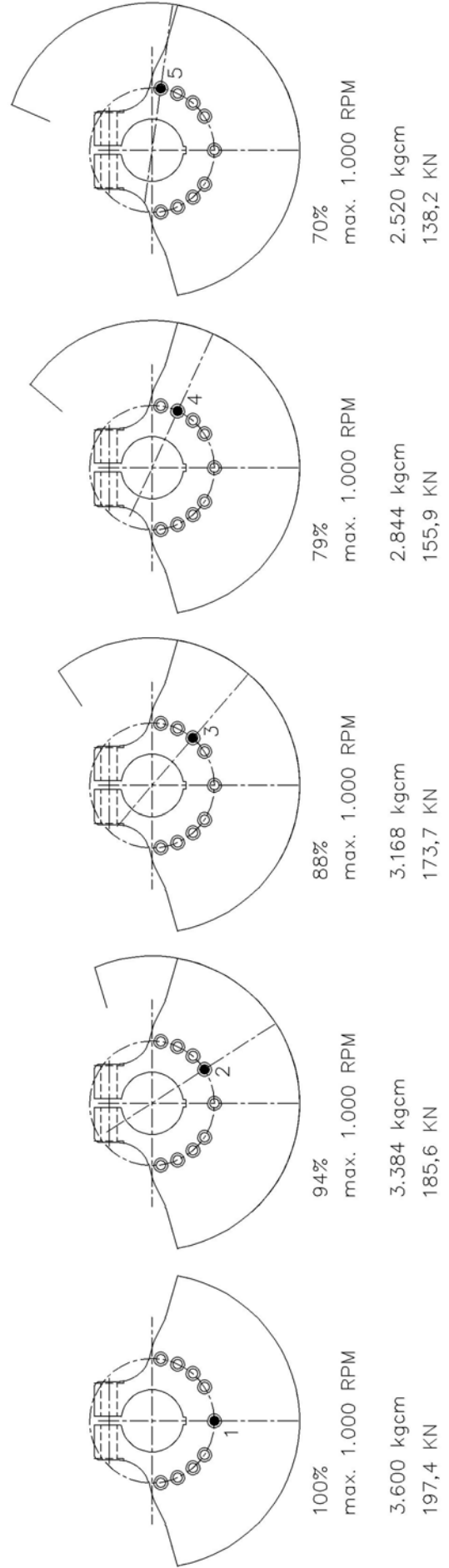
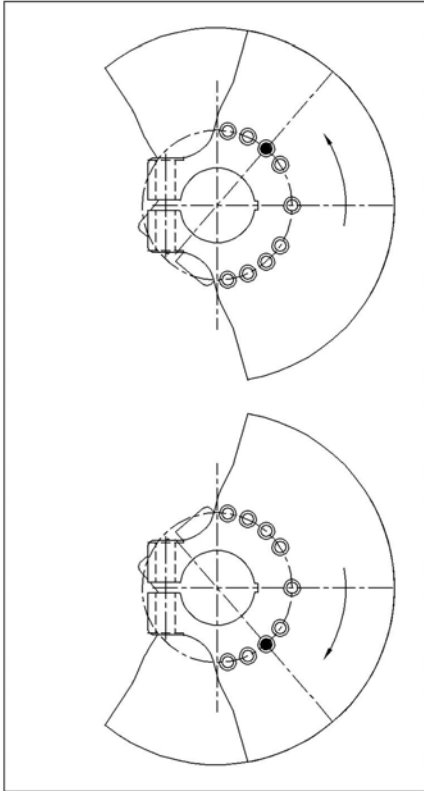
# UE20-6F16



# UEV30-6F16

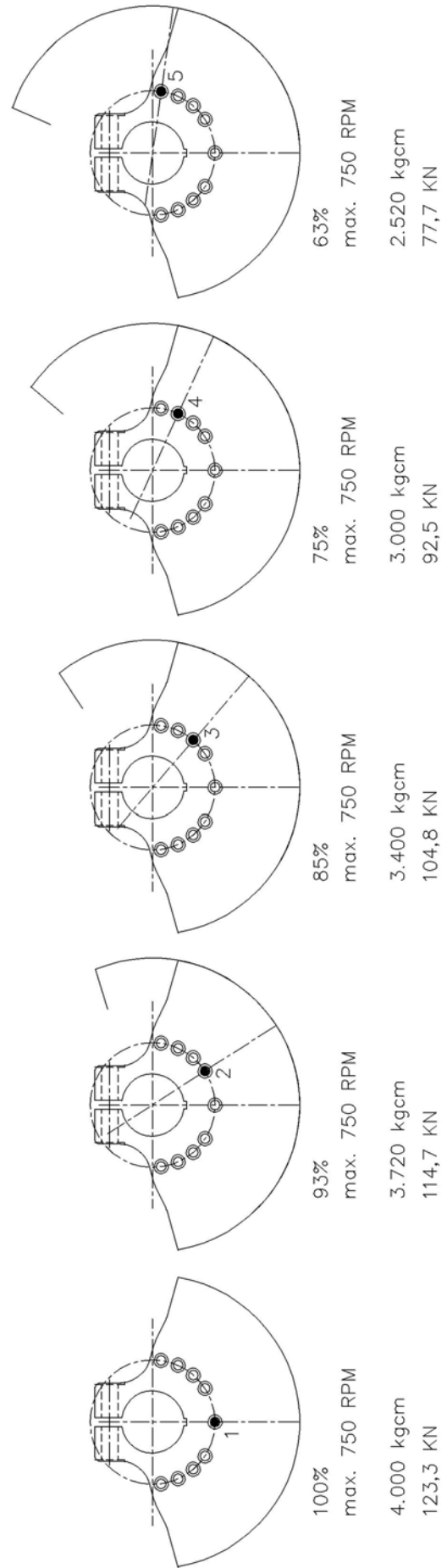
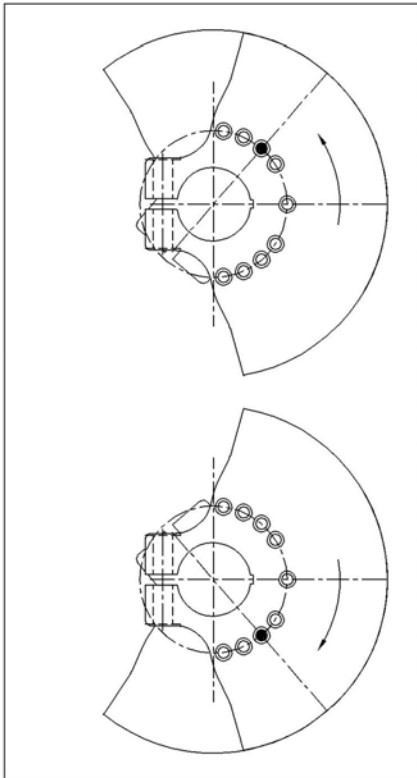


# UEV36-6F16

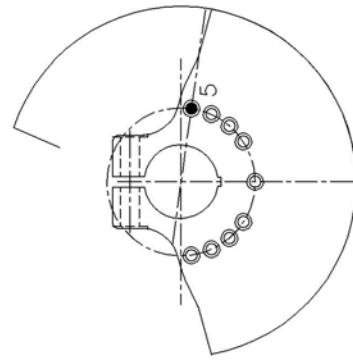
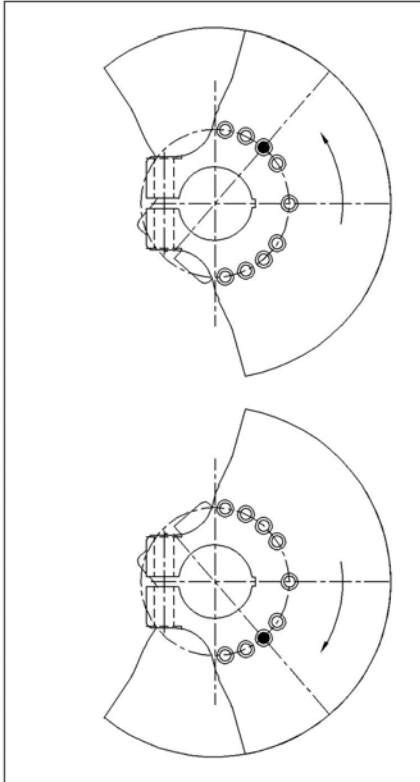




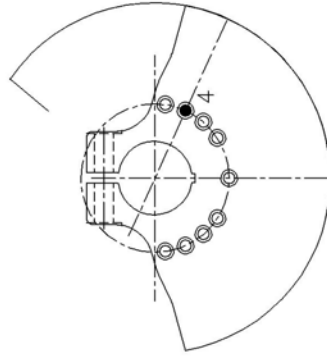
# UEV40-8F16



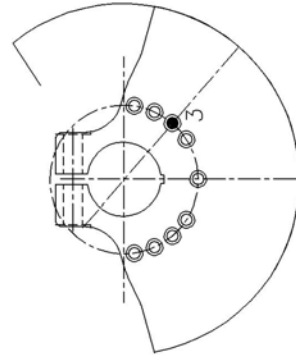
# UEV45-8F16



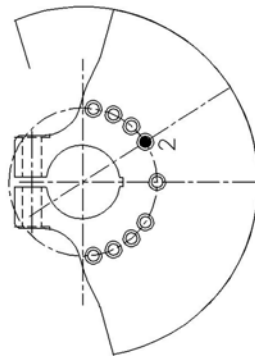
58%  
max. 750 RPM  
2.587 kgcm  
79,8 KN



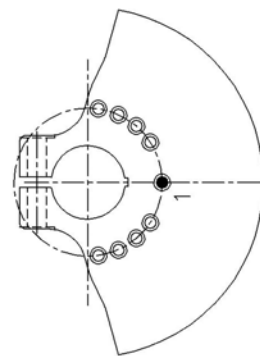
71%  
max. 750 RPM  
3.167 kgcm  
97,6 KN



83%  
max. 750 RPM  
3.702 kgcm  
114,1 KN

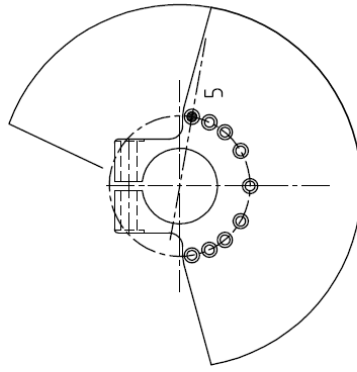
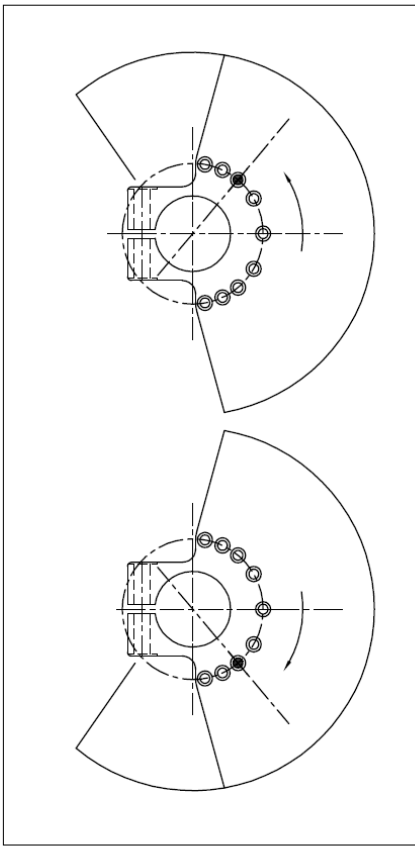


92%  
max. 750 RPM  
4.403 kgcm  
126,5 KN



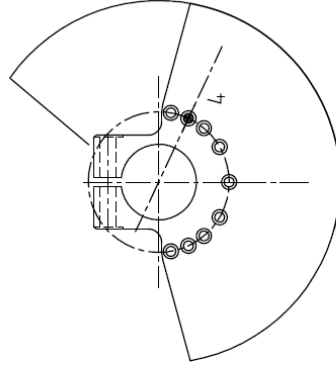
100%  
max. 750 RPM  
4.460 kgcm  
137,5 KN

# UE50-6F17



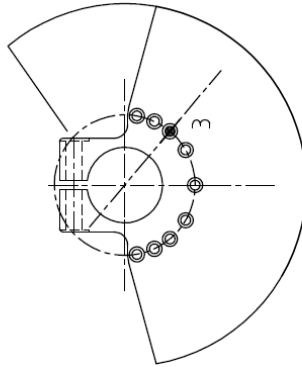
60%  
max. 1.000 RPM

3.085 kgcm  
169,1 KN



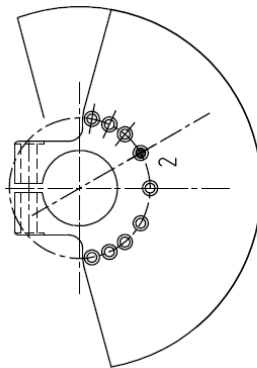
72%  
max. 1.000 RPM

3.691 kgcm  
202,4 KN



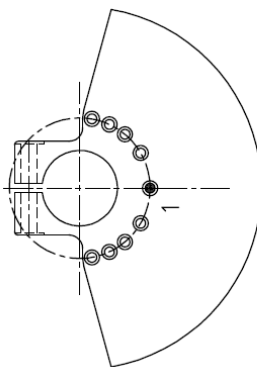
83%  
max. 1.000 RPM

4.229 kgcm  
231,8 KN



94%  
max. 1.000 RPM

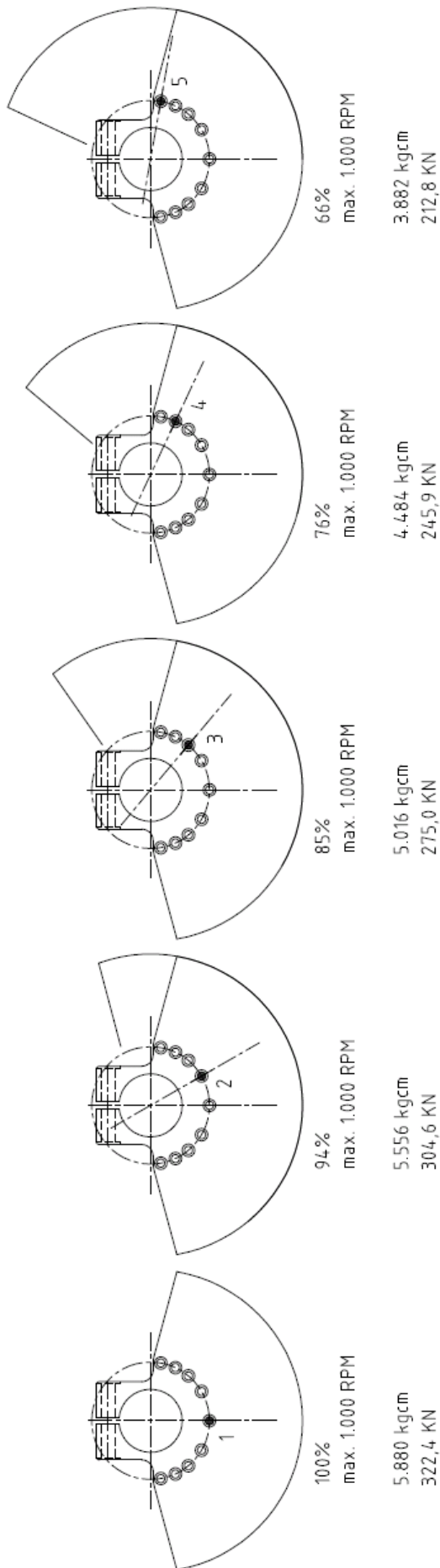
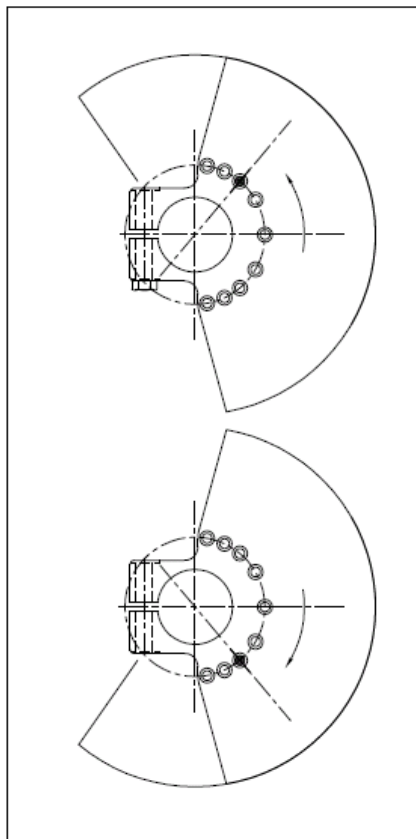
4.773 kgcm  
261,7 KN



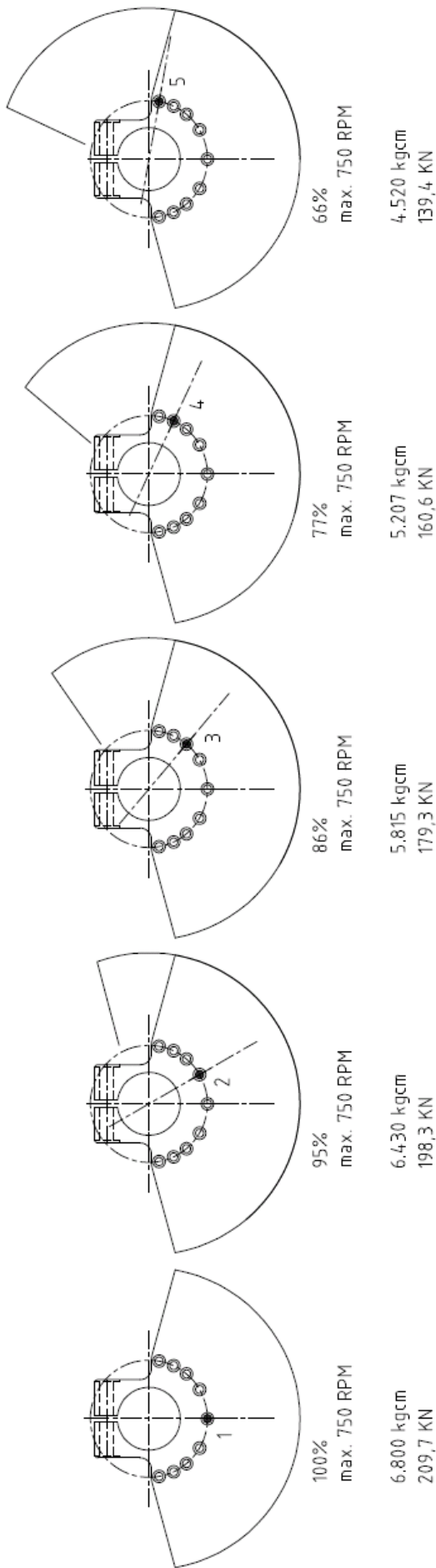
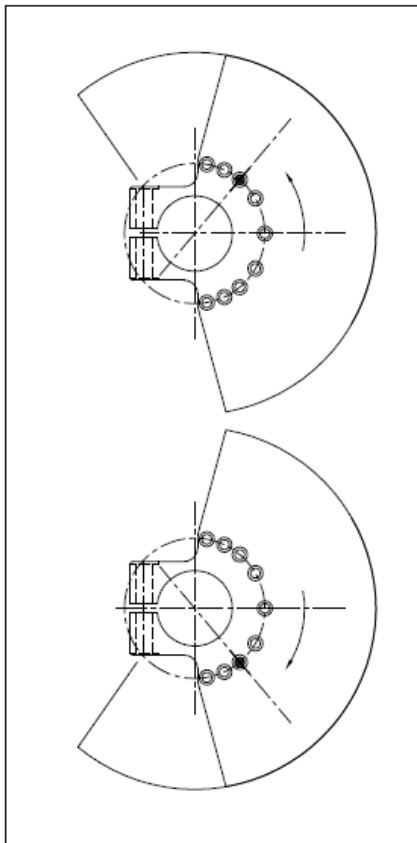
100%  
max. 1.000 RPM

5.100 kgcm  
279,6 KN

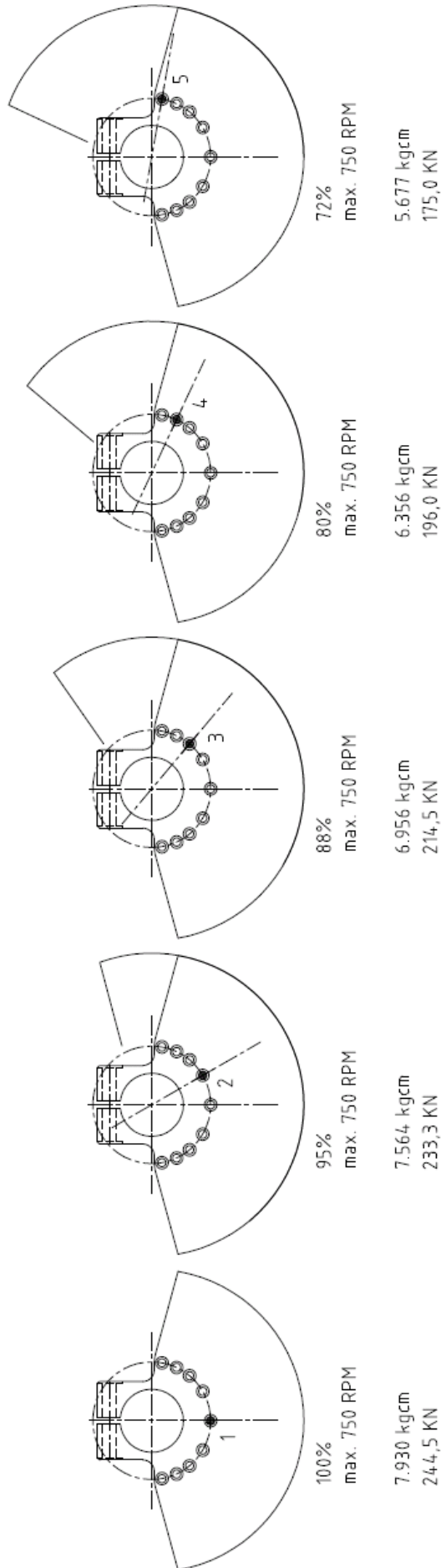
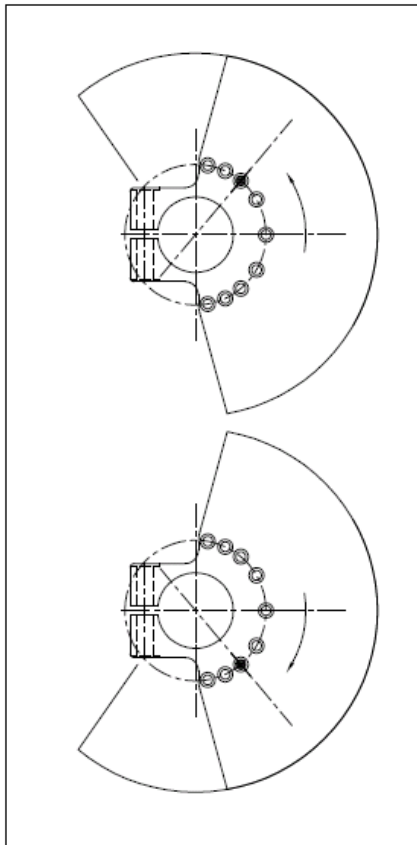
# UE58-6F17



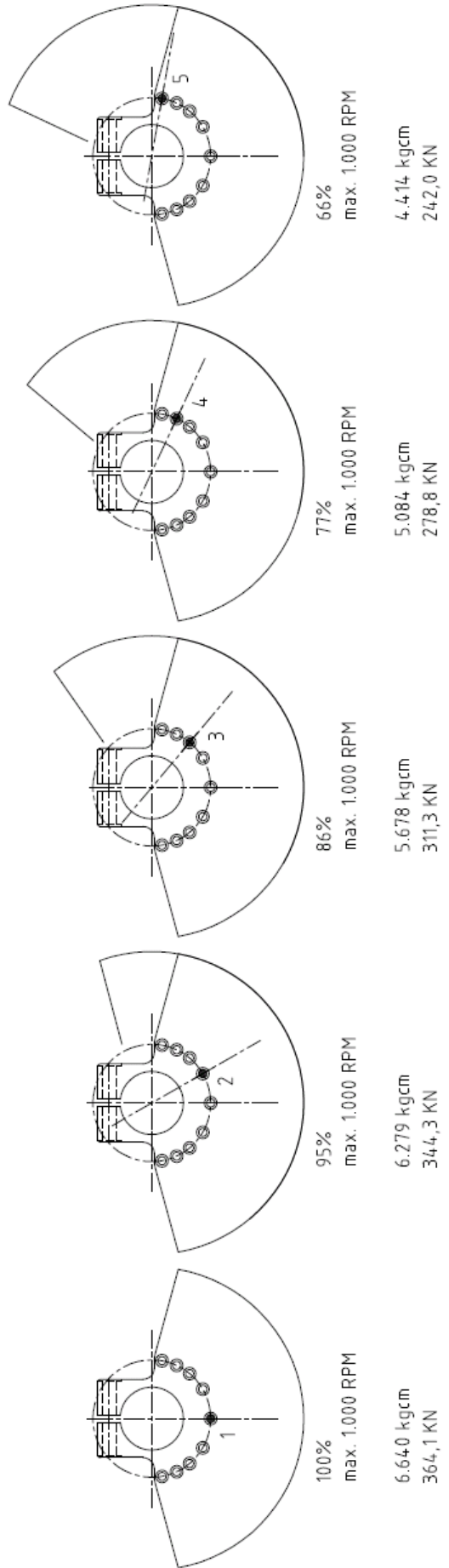
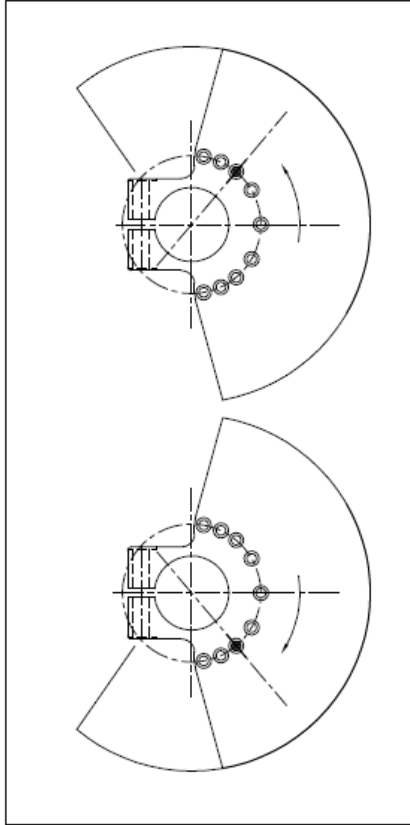
# UE67-8F17



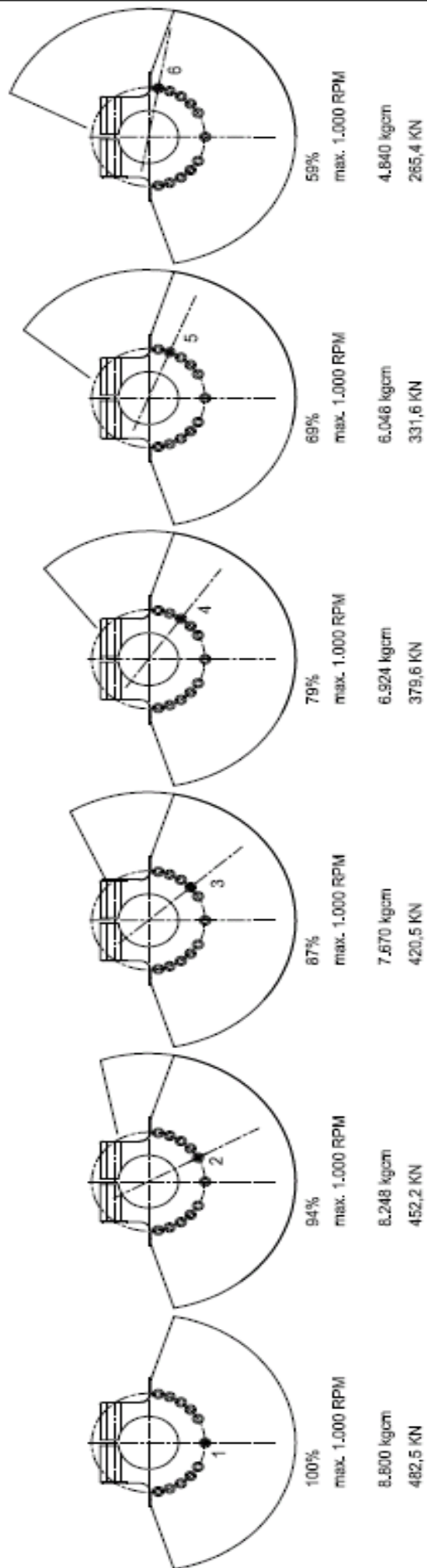
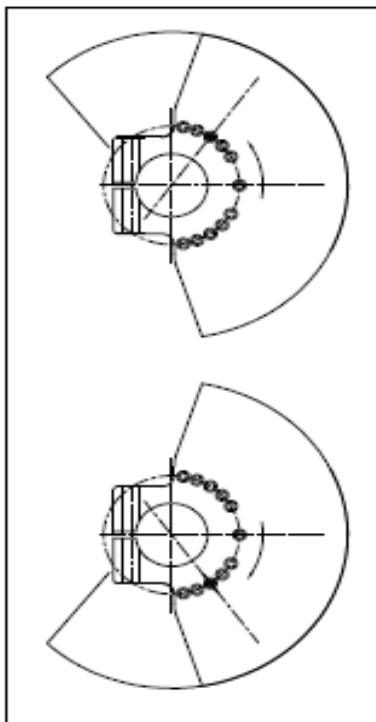
# UE80-8F17



# UE65-6F17

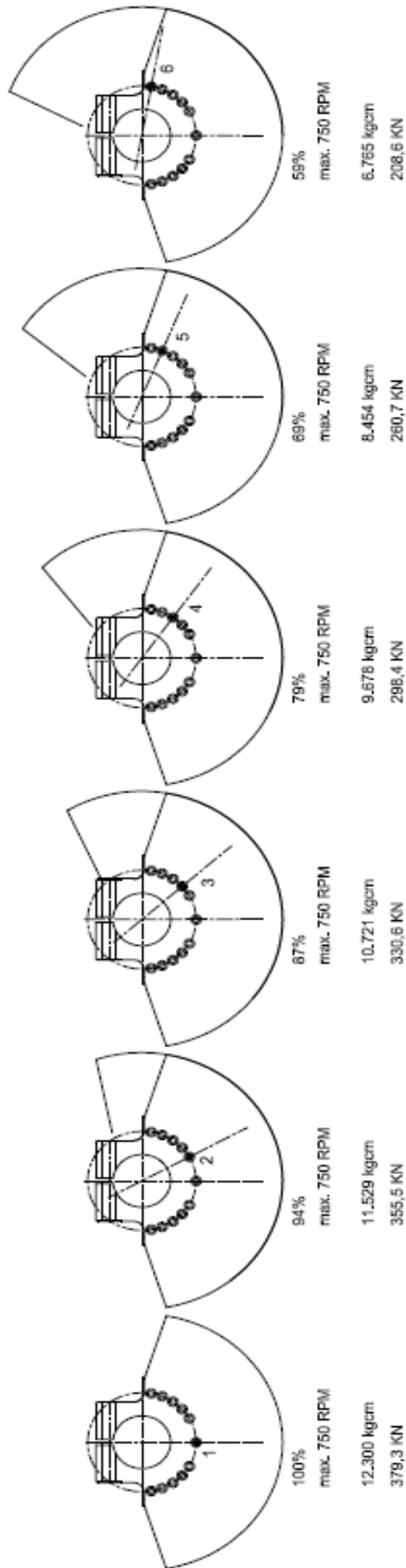
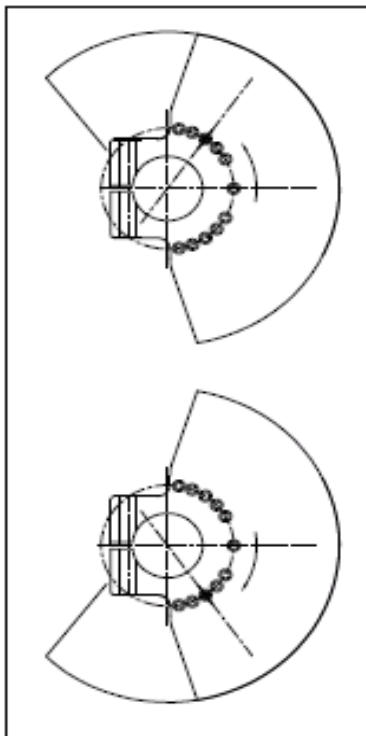


# UE88-6F17





# UE125-8 F17



## 11. Dimensions [mm]

Type	Fig.	a	b	b1	c	e	f	g	h	k	l	m	n	Fastening screws
UE 5,3-6 F16 UE 6-6 F16	B	100	170	-	25	260	230	539	387	257,5	475	85	230	6x M20-8.8
UE 8-6 F16 UE 10-6 F16	B	100	200	-	30	270	270	604	422	266	495	100	240	6x M20-8.8
UE 16-6 F16 UE 24-8 F16	B	100	200	-	40	270	270	670	500	303 353	520 620	120	285	6x M24-8.8
UE 12-4 F16 UE 17-6 F16 UE 20-6 F16	C	110	200	80	35	400	270	700	485	366	710	112	280	8x M24-8.8
UEV 30-6 F16 UEV 36-6 F16	C	110	200	100	35	400	270	770	520	424	842	125	300	8x M24-8.8
UEV 40-8 F16 UEV 45-8 F16	C	110	200	100	35	400	270	770	520	484	956	125	300	8x M24-8.8
UE 50-6 F17 UE 58-6 F17	D	140	250	140	35	700	380	860	585	453	871	150	330	8x M36-8.8
UE 67-8 F17 UE 80-8 F17	D	140	250	140	35	700	380	860	585	513	931 1019	150	330	8x M36-8.8
UE 65-6 F17	D	140	250	140	35	700	380	860	585	475	931	150	330	8x M36-8.8
UE 88-6 F17 UE 125-8 F17	D	165	310	177	53	750	400	1060	675	499 579	902 1062	175	370	8x M36-8.8

Abbildung B  
Illustration B

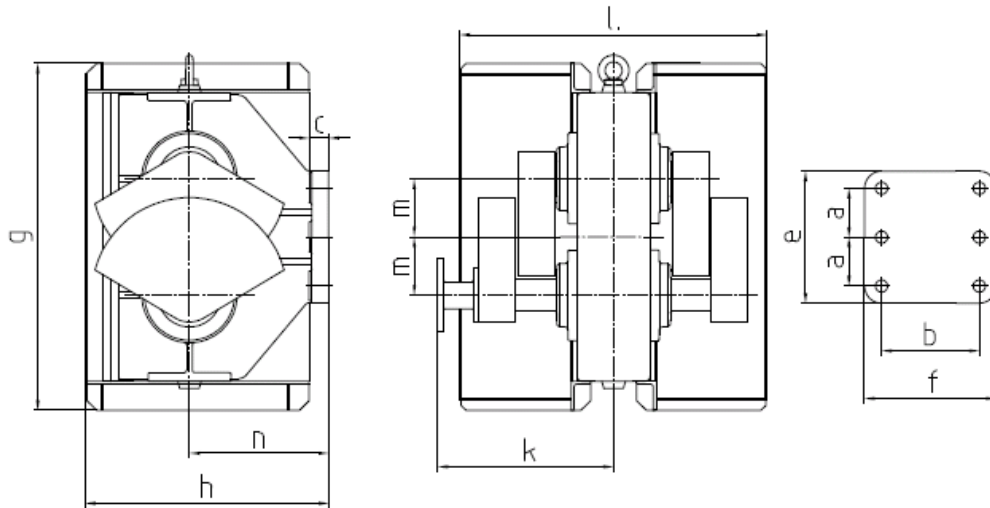


Abbildung C  
Illustration C

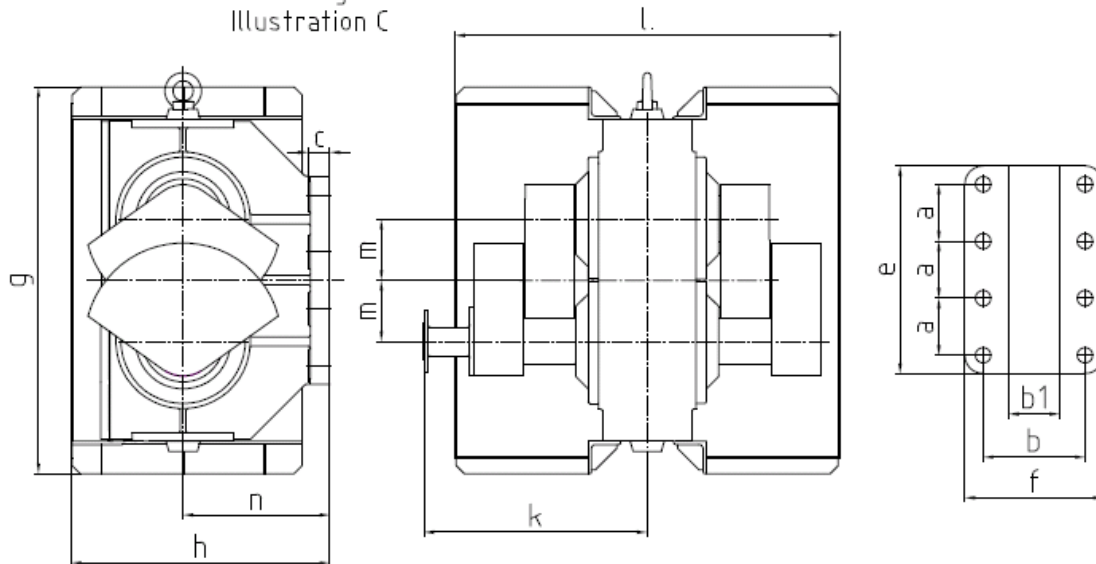
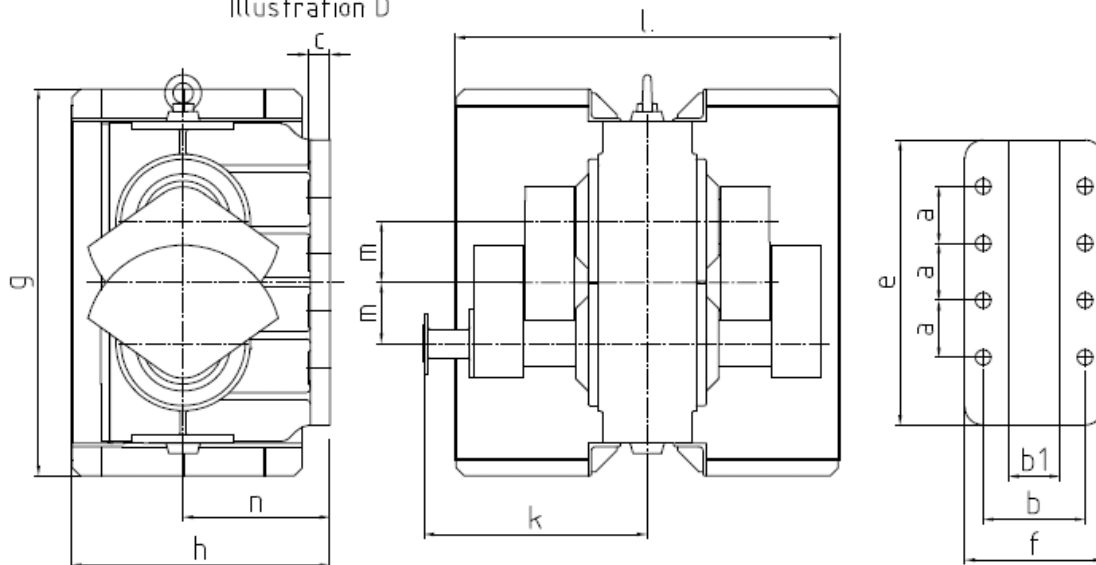


Abbildung D  
Illustration D



## 12. Technical data

Type	Speed [min <sup>-1</sup> ]	Working torque [kgcm]		Centrifugal force [kN]		Nominal power of drive motor [KW]	Weight [kg]	Protective boxes [kg]
		min	max	min	max			
UE 5,3-6 F16	1000	302	540	16,6	29,6	2,2	126	16
UE 6-6 F16	1000	384	620	21,2	34,0	2,2	129	16
UE 8-6 F16	1000	482	860	26,4	47,1	3,0	183	20
UE 10-6 F16	1000	626	1010	34,3	55,4	3,0	189	20
UE 16-6 F16	1000	896	1600	49,1	87,7	5,5	255	27
UE 24-8 F16	750	1680	2400	51,8	74,0	5,5	288	30
UE 12-4 F16	1500	714	1190	88,1	146,8	7,5	297	31
UE 17-6 F16	1000	1068	1780	58,6	97,6	7,5	335	31
UE 20-6 F16	1000	1326	2040	72,7	111,8	7,5	346	31
UEV 30-6 F16	1000	1946	3040	106,6	166,6	11,0	478	40
UEV 36-6 F16	1000	2520	3600	138,2	197,4	11,0	503	40
UEV 40-8 F16	750	2520	4000	77,7	123,3	15,0	525	44
UEV 45-8 F16	750	2587	4460	79,8	137,5	15,0	554	44
UE 50-6 F17	1000	3085	5100	169,1	279,6	15,0	769	51
UE 58-6 F17	1000	3882	5880	212,8	322,4	15,0	804	51
UE 67-8 F17	750	4520	6800	139,4	209,7	15,0	939	54
UE 80-8 F17	750	5677	7930	175,0	244,5	18,5	983	58
UE 65-6 F17	1000	4414	6640	242,0	364,1	15,0	855	54
UE 88-6 F17	1000	4840	8800	265,4	482,5	22,0	1040	98
UE 125-8 F17	750	6765	12300	208,6	379,3	22,0	1188	109

## 13. Lubrication instructions



**Important: Unbalance exciter machines are delivered without oil.** They must be filled with oil in accordance with the oil level and oil type charts before putting them into operation.



**Important:** The dipstick is only used to check the oil level and must again be replaced with a screwed sealing plug for operating the unbalance exciter.

**Important:** The operation of unbalance exciters is only permitted if the shafts are in a horizontal position.



Please follow the information in the following chapters:

- 14. Oil change intervals
- 15. Selection of available gear oils
- 16. Oil level chart



**Important:** Only fill or refill with oil after the unbalance exciter or its motor has been switched off and measures have been taken to prevent accidental or unauthorized switching on. Otherwise, there is a danger of knocking or pressing!

The unbalance exciter is equipped with several screwed sealing plugs, a magnetic sealing plug, and a ventilator plug. The magnetic sealing plug is marked with an M. The ventilator plug must be fitted above the oil level of the unbalance exciter, as high as possible. Here, a screwed sealing plug is replaced by the ventilator plug. Depending on the installation position, the magnetic sealing plug is to be used as oil-drain plug. Here, the lowest possible position is to be chosen.

The metal grit that is produced by the gears during the initial operating time is removed from

the oil bath by the magnetic oil-drain plug. All the screwed sealing plugs are provided with a magnet for extracting metal debris from the gearing out of the oil bath occurring during the initial operation period.



The seal rings according to DIN 7603 must be replaced each time the screwed sealing plugs are loosened. **There is otherwise the risk of oil leaking and thus damage to the unbalance exciter!**

Only high quality doped oils in accordance with DIN 51519 and DIN 51502 are to be used.

If an unbalance exciter is operated using a certain oil from a certain manufacturer and the intention is to change to the same quality oil from a different producer, we recommend the unbalance exciter be completely drained and only then filled up with the new oil as oils are not always mixable due to oil additives that differ according to producers.

The oil level depends on the installation situation of the unbalance exciter and is shown in chapter 16. It is important that a quantity of oil should always be visible up to the middle of the dipstick in the unbalance exciter's housing.



Too much oil in the housing can lead to an oil blockage leading to overheating and damage to the bearings. Moreover the oil runs out. On the other hand, too little oil will lead to seizure and damage to the gearing and the roller bearings.

- The oil level should be checked via the dipstick about half an hour after switching off the vibration device.



**Important! The oil level should be checked once a month.**

- When changing the oil, make sur that as much old oil is removed as possible and the metal debris cleaned from the magnetic oil-drain plug.
- When filling with oil, ensure that no dirt particles get into the ubalance exciter. Use a funnel with finely woven screen cloth.



- Before the appliance is taken into use, check the oil-drain plug and the oil sealing plugs are seated firmly. This should be repeated after 40 hours and later at longer intervals.

## 13.1 Propeller shaft

Please observe the lubrication intervals as indicated in the operating manual of the manufacturer.

As follows are the ongoing lubrication intervals for propeller shafts of the firm FRIEDRICH Schwingtechnik:

Series	Ongoing lubrication intervals	
	Articulated joints	Shift section
GF1-350	Every 3 months	Every 3 months
All others	Every 12 months	



Unfavourable conditions such as temperature, dirt, water or similar could make shorter lubrication intervals necessary. Principally we recommend that the lubrication intervals are adapted to the respective operating conditions.

## 14. Oil change intervals

We recommend the following oil change intervals:

- First oil change after ca. 500 operating hours, no later than three months
- Second oil change after ca. 1,000 operating hours, no later than six months
- All other oil changes after 1,000 operating hours

The above oil change intervals are reference values. These intervals can be reduced or extended if necessary, according to environmental conditions. Exact oil change intervals can be set on consultation with the oil supplier and the respective oil checks can be carried out by taking occasional samples.



The oil should be changed at shorter intervals if the oil is heavily soiled by unfavourable operating conditions by the time the first oil change is carried out. **More frequent oil changes increase the life span of the unbalance exciter.**

### 14.1 Ventilation plug

The ventilation plug must be mounted at the highest point.



Because of the vibrations, a slight amount of oil discharge is normal. For the proper functioning of the gear mechanism the ventilation plug must not be obstructed.



The functionality of the ventilation plug is to be checked and the ventilation plug cleaned at regular intervals or replaced if necessary by a new one, depending on the amount of dirt and dust at the place of use. We recommend an interval of 4 weeks.



**Attention: If dirt causes the ventilation plug to cease functioning properly it can lead to damage to the unbalance exciter, such as oil discharge on the shafts, and the entry of dirt in the bearings. The unbalance exciter's normal pressure equalization during operation then occurs through the gap between the shaft and the bearing plate, instead of through the ventilation plug.**



If a substantial amount of oil comes out of the ventilation plug, please check the oil level, mount the ventilation plug at a different position, or change the direction of rotation of the unbalance exciter.

## 15. Selection of used gear oils

Gear oil with required viscosity is determined according to table 7 depending on environmental temperatures.

**Table 7: Viscosity class depending on environmental and operating temperatures**

Environmental temperature °C	Operating temperature °C	Identification to DIN 51519 ISO 3498	Identification to DIN 51502
-40°C to -25°C	-10°C to +5°C	VG 5	
-30°C to -10°C	0°C to +20°C	VG 10	
-15°C to +20°C	+15°C to +50°C	VG 68	CLP 68
+15°C to +50°C	+45°C to +80°C	VG 100	CLP 100

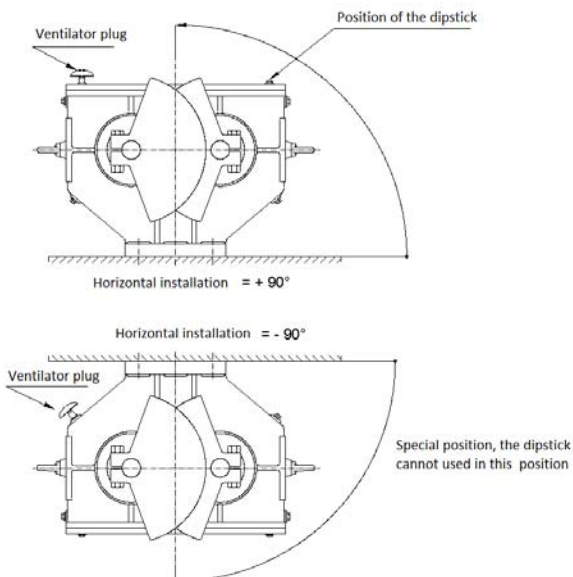
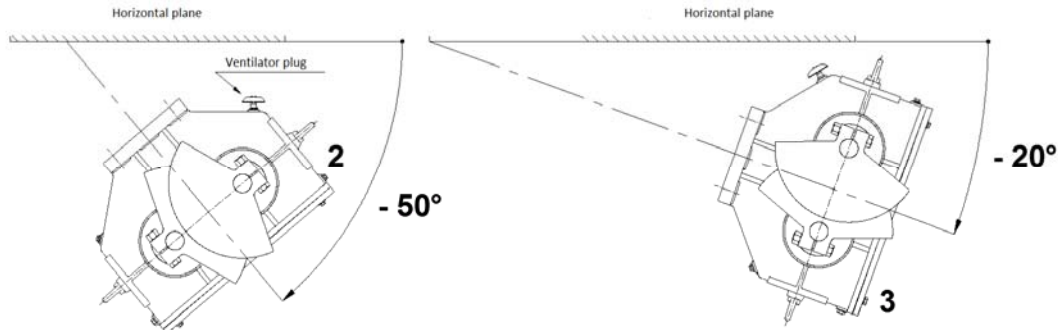
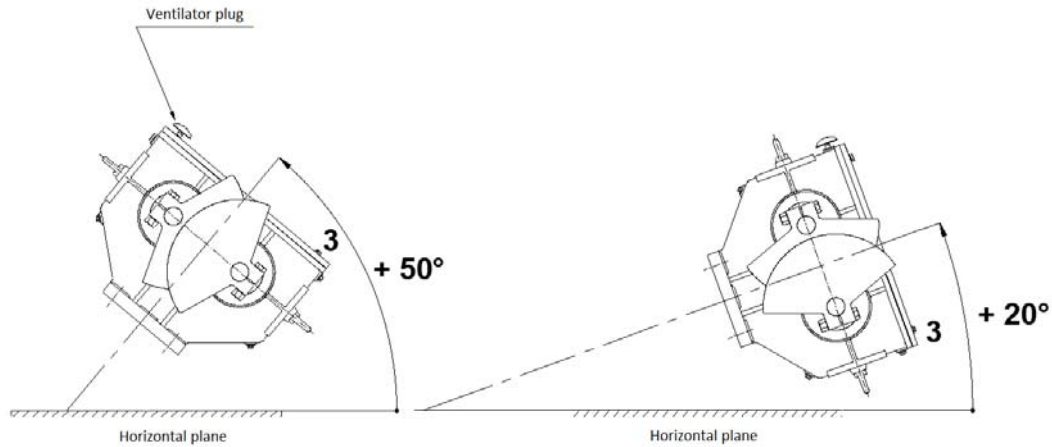
For an ambient temperature of +15 °C to +50 °C, for example, we recommend the following gear oil: Mobilgear 600 XP 100. If different gear oil is used, please ask your oil supplier if the specifications match those of the gear oil we recommend.

# 16. Oil level charts

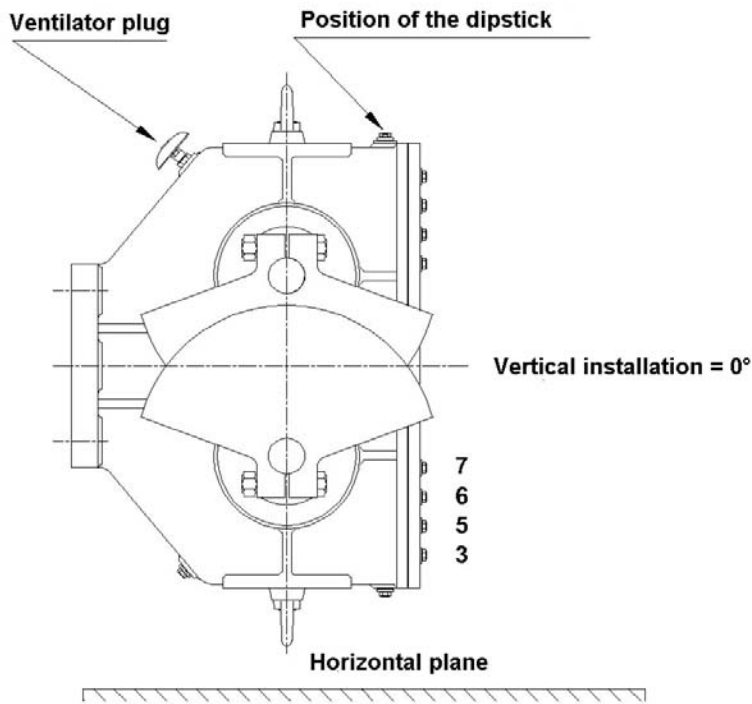
## 16.1 How to understand the following angle indications



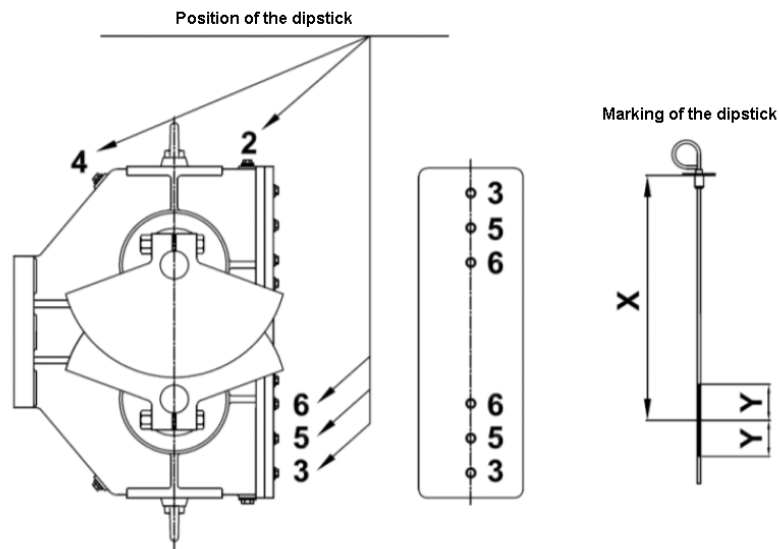
- Depending on various mounting options of the unbalance exciters, there are possible various angles of installation, where the dipstick must be used to ensure correct oil level.
- **Warning!** Angle from horizontal plane is decisive, you must add angle of the girder and tilt angle of the machine.
- **Warning!** The illustrated position for the dipstick is an example only. Correct positions are mentioned in the tables.
- The ventilator plug must be fitted as high as possible.





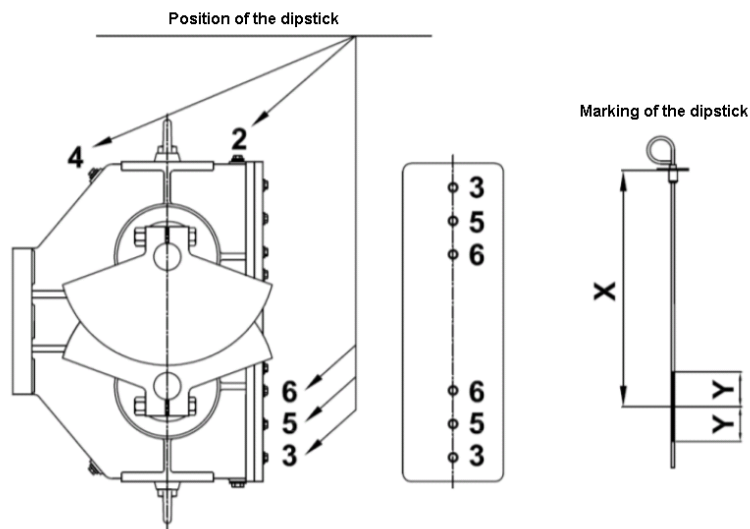


- The dipstick is delivered with maximum length and without marking. It is necessary to provide marking according to the table 7.1 and 7.2 and to cut the dipstick cca 5 mm under the minimum mark.
- Explanation for the following oil level tables:  
If a "0" is entered at the X and Y values, such as at the installation angle of 0°, then the oil level is not measured with the dipstick. In these positions the oil level is determined using the overflow. Remove the closure screw (the closure screws 5 in the case of an installation angle of 0°) and carefully pour in oil until the oil flows out of the threaded hole of the closure screw. Screw the closure screw back in as soon as oil begins to flow out. With that it is always the right amount of oil.
- When checking the oil level you remove the closure screw. If oil flows out immediately then the oil level is already correct. If no oil flows out then pour in oil until it begins to flow out, and then screw in the closure screw again.
- If possible, you can use the position of the ventilation plug for filling up oil. The advantage of this is that the ventilation plug can be directly cleaned again, as described in Chapter 14.1.



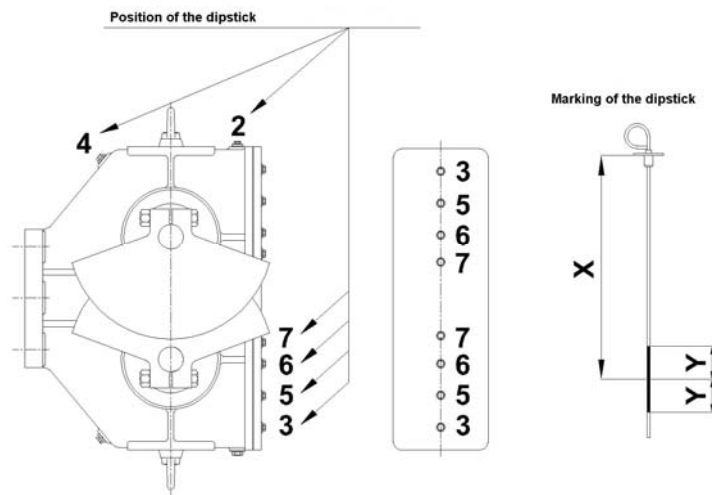
**Table 7.1**

Install. angle	UE 5,3-6 F16 UE 6-6 F16			UE 8-6 F16 UE 10-6 F16			UE 16-6 F16 UE 24-8 F16		
	Oil quantity 0,8 – 3,1 l			Oil quantity 1,1 – 1,9 l			Oil quantity 1,0 – 5,0 l		
	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw
90°	182	7	3	223	8	3	267	10	3
85°	173	7	3	213	8	3	256	10	3
80°	164	7	3	203	8	3	245	10	3
75°	155	7	3	193	8	3	235	10	3
70°	146	7	3	184	8	3	225	10	3
65°	138	8	3	175	9	3	215	11	3
60°	130	8	3	166	9	3	206	11	3
55°	121	9	3	156	10	3	196	12	3
50°	112	9	3	146	10	3	186	13	3
45°	102	10	3	135	11	3	175	14	3
40°	91	7	3	124	12	3	163	15	3
35°	79	12	3	112	14	3	150	17	3
30°	64	13	3	97	15	3	135	20	3
25°	45	16	3	77	18	3	116	22	3
20°	0	0	3	50	20	3	92	24	3
15°	415	7	2	0	0	3	0	0	3
10°	407	7	2	476	8	2	534	9	2
5°	400	7	2	467	8	2	521	9	2
0°	0	0	5	0	0	5	0	0	5
-5°	386	7	2	449	7	2	498	9	2
-10°	381	7	2	441	8	2	488	9	2
-15°	375	7	2	433	8	2	478	9	2
-20°	370	7	2	426	8	2	468	9	2
-25°	365	7	2	419	8	2	459	9	2
-30°	0	0	4	412	9	2	449	10	2
-35°	0	0	6	0	0	6	0	0	6
-40°	339	9	2	0	0	6	0	0	6
-45°	332	10	2	386	11	2	418	14	2
-50°	326	11	2	378	12	2	406	15	2
-55°	317	13	2	368	14	2	392	17	2
-60°	309	14	2	358	16	2	379	19	2
-65°	296	17	2	343	19	2	357	24	2
-70°	284	20	2	328	23	2	336	28	2
-75°	254	30	2	292	35	2	298	42	2
-80°	225	40	2	257	46	2	229	56	2
-85°	116	79	2	127	92	2	-	-	-



**Table 7.2**

	UE 12-4 F16 UE 17-6 F16 UE 20-6 F16			UEV 30-6 F16 UEV 40-8 F16 UEV 36-6 F16 UEV 45-8 F16			UE 50-6 F17 UE 58-6 F17 UE 67-8 F17 UE 80-8 F17 UE 65-6 F17		
	Oil quantity 2,2 – 5,2 l			Oil quantity 2,6 – 5,2 l			Oil quantity 2,6 – 7,8 l		
Install. angle	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw
90°	242	9	3	268	10	3	318	6	3
85°	229	9	3	254	10	3	304	6	3
80°	216	9	3	241	10	3	290	6	3
75°	203	10	3	229	11	3	275	6	3
70°	190	10	3	217	11	3	261	6	3
65°	179	11	3	204	12	3	248	6	3
60°	168	11	3	192	12	3	234	7	3
55°	154	12	3	179	13	3	220	7	3
50°	141	12	3	166	14	3	207	8	3
45°	125	15	3	150	15	3	194	8	3
40°	112	14	3	135	16	3	178	8	3
35°	93	14	3	117	16	3	159	8	3
30°	69	14	3	95	18	3	136	10	3
25°	587	10	2	66	20	3	105	11	3
20°	572	10	2	0	0	3	735	12	2
15°	558	9	2	618	10	2	715	12	2
10°	546	9	2	603	10	2	699	11	2
5°	534	9	2	590	10	2	683	11	2
0°	0	0	5	0	0	5	0	0	5
-5°	514	9	2	567	10	2	655	11	2
-10°	505	9	2	556	10	2	643	11	2
-15°	496	9	2	546	10	2	630	11	2
-20°	488	9	2	535	10	2	619	12	2
-25°	479	10	2	525	11	2	607	12	2
-30°	0	0	6	0	0	6	0	0	6
-35°	0	0	6	0	0	6	0	0	6
-40°	453	12	2	493	14	2	574	7	2
-45°	444	14	2	482	15	2	562	7	2
-50°	436	15	2	471	16	2	549	8	2
-55°	425	17	2	458	19	2	535	9	2
-60°	414	19	2	442	21	2	518	10	2
-65°	397	23	2	424	26	2	498	12	2
-70°	380	27	2	398	30	2	472	14	2
-75°	340	41	2	359	40	2	432	19	2
-80°	301	55	2	286	59	2	360	27	2
-85°	156	109	2	-	-	-	156	51	2



**Table 7.3**

UE 88-6 F17 UE 125-8 F17									
Oil quantity 4,0 - 13,7 l									
Install. angle	X [ mm ]	Y [ mm ]	Position of dipstick/ closure screw						
90°	377	5	3						
85°	360	6	3						
80°	344	6	3						
75°	329	6	3						
70°	313	7	3						
65°	299	7	3						
60°	284	7	3						
55°	269	7	3						
50°	254	7	3						
45°	238	8	3						
40°	220	8	3						
35°	200	9	3						
30°	176	11	3						
25°	147	13	3						
20°	108	15	3						
15°	688	11	4						
10°	708	11	4						
5°	728	11	4						
0°	0	0	5						
-5°	736	11	2						
-10°	723	11	2						
-15°	711	11	2						
-20°	699	12	2						
-25°	687	13	2						
-30°	0	0	7						
-35°	0	0	7						
-40°	0	0	6						
-45°	0	0	6						
-50°	631	14	2						
-55°	619	14	2						
-60°	605	14	2						
-65°	588	15	2						
-70°	567	15	2						
-75°	538	16	2						
-80°	483	17	2						
-85°	335	20	2						

## 17. Spare parts and repairs, maintenance intervals

### 17.1 Spare parts

Only use original spare parts or spare parts that conform to suitable standards.

#### Ordering spare parts

In order to ensure that the correct spare parts are delivered, they must be identified precisely using the operating manual and the relevant spare parts list before placing the order. This will prevent unnecessary delays, the delivery of the wrong parts, and enquiries at the customer by FRIEDRICH Schwingtechnik.

#### Contact:



Phone: +49 (0)2129 3790-0



Fax: +49 (0)2129 3790-37



E-mail: [info@friedrich-schwingtechnik.de](mailto:info@friedrich-schwingtechnik.de)

#### When placing the order indicate the following:

- The unbalance exciter type and serial number. This information can be taken from the nameplate.
- The name of the part in the spare parts list.
- **Important!** Please do not forget to indicate the number or the quantity of the spare parts to be supplied.

### 17.2 Repairs



- Have the unbalance exciter repaired by the manufacturer FRIEDRICH-Schwingtechnik.
- Make sure that original spare parts are used if the motor is repaired by an external workshop. FRIEDRICH-Schwingtechnik will not guarantee or assume continued liability for the proper functioning of the unbalance exciter if no original spare parts are installed.
- We recommend you always replace all bearings when replacing the bearings, even if only one bearing is defective. A defective bearing will always cause other bearings to become damaged too. The other bearings will fail within a short time.
- After every second bearing replacement, the bearing plates must be replaced too.

## 17.3 Maintenance



- **To guarantee a longer lifetime for the unbalance exciter we recommend a maintenance interval of 3 years!**
- Have the maintenance work done by an expert company, or directly at the manufacturer FRIEDRICH – Schwingtechnik.
- Clean or regularly replace the ventilation plugs
- Only use original spare parts

## 18. Warranty



For all new unbalance exciters FRIEDRICH provides a warranty of 1 year from the date of delivery.

The warranty will expire if:

- The motor is used for purposes other than the intended.
- The unbalance exciter is operated without oil, with too little oil, or with the wrong oil.
- The unbalance exciter is operated with the wrong unbalance setting.
- The unbalance exciter is operated at a defective machine.
- The unbalance exciter was not correctly connected up.
- Modifications were made to the unbalance exciter which could have an influence on the performance of the unbalance exciter.
- The unbalance exciter was operated without centrifugal plate and protective boxes.
- Damage occurred during transport.
- The unbalance exciter has not been mounted in accordance with the instructions given in section 6.



- So if in doubt, have the unbalance exciter repaired by the manufacturer FRIEDRICH-Schwingtechnik.

## 19. Declaration of incorporation

within the meaning of EU Machines Directives (2006/42/EC Article 6 Paragraph (2) ; Annex II 1.B) for installable machines, amended by Directive 2006/42/EC with special reference to Annex I.

Herewith declares the manufacturer

**Company/Name/Address:** FRIEDRICH Schwingtechnik GmbH  
P.O. Box 10 16 44  
D-42760 Haan

of the incomplete machine

**Product/Type:** FRIEDRICH unbalance exciter  
Type: UE ... -.- ... F16/F17

that this has been developed, built and manufactured in conformity with the following directive:

Machine Directive (2006/42/EG)

and meet the following basic requirements of the directive:

Annex I, Articles 1.1.2, 1.1.5, 1.3.2, 1.3.3, 1.3.7, 1.7.3

The following harmonised standards have been applied:

DIN EN ISO 12100 Part 1 and 2. Safety of Machines, Equipment and Installations

For this product the special technical documents were prepared in accordance with annex VII Part B. Complete technical documentation exists. Upon justifiable request, these documents from individual national location can be send by post, email or fax.

Operating-/installation instructions are available.

The safety instructions provided in the operating-/installation instructions must be observed.

Authorised representative to assemble and transmission of the technical documents:

Bernd Daus, Friedrich Schwingtechnik GmbH, Am Höfgen24, D-42781 Haan

**It is forbidden to start up this machine/this machine part until it has been established that the machine in which the unbalance exciter is to be installed complies with the regulations of the directive (2006/42/EG).**

City / Date of Issue

Signature and Function of the Signer

Haan

Dipl.-Ing., Dipl.-Wirt.Ing. Martin Gerth  
Managing Director