

User's Manual

Goniometer series 400

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The present product documentation was constructed and checked with biggest care. However, a guarantee with regard to accuracy can not be taken over. Specification changes reserve. These indications raise no claim to completeness. In doubtful case, please address to the Huber Diffraktionstechnik GmbH & Co. KG.

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The following symbols will be used:

This symbol indicates a potential dangerous situation with consequential danger of personal injuries or damage to property.

This symbol indicates important information for proper operation. Ignoring this may result in malfunction of the equipment.

Liability does not apply to damages resulting from:

- Improper mounting, operation, service or storage
- Operation with damaged or inappropriately attached safety devices
- Unauthorized modifications of the goniometer and its accessories

Huber gives a two year warranty on mechanical and a one year warranty on electronic components from the date of shipment. In case of defect during warranty period, the goniometer will be either replaced or repaired at Huber.

Please be aware of the fact that warranty does not apply to damages resulting from improper use of the goniometer:

- Improper handling
- Applying loads and torques exceeding the specified limits
- Mounting to a surface, which is not in accordance with the specified parameters
- Unauthorized modification of the goniometer or parts of it
- Removal of sealing-wax/sealing paint

For warranty claims, write or call your local agent or get into touch with Huber directly.

We hereby declare that the machinery is designed and built according to machinery directive 98/37/EC.

The Goniometer is only a part of a machine. So that the whole system corresponds to the valid EU directives, the required measures must be met by the manufacturer of the overall system

Faulty products which were valued with an economic write-off are disposed after return in our work free of charge.

1.1 Symbols

1.2 Liability

1.3 Warranty

1.4 Conformity

1.5 Disposal

2.1 Environmental conditions



For optimum performance of your Goniometer you should consider the following:

- Temperature variation
Temperature variation (mainly caused by the stepper motor) during long term measurements affects the positioning accuracy due to thermal expansion of the worm gear. To minimize the thermal power loss it is strongly recommended to keep the motor power supply as low as possible. Keep external temperature variations to a minimum.
- Humidity
Some parts of the Goniometer are not corrosion-resistant. To operate or to storage the Goniometer in damp environments would substantially impair the Goniometer in its operation, in the worst case make it unusable.
- Handling
Handle the system only in clean environment (without dirt, dust, or metallic chips etc.).

2.2 Intended purpose



Goniometer series 400 are precision turntables for positioning mechanical, optical or electronic set-ups or samples

All interaction on the Goniometer as for example assembly, operation and maintenance should be exclusively performed by qualified personnel.

If modifications on the goniometer are required, please contact one of our representations or Huber directly.

2.3 Packaging



In case of return, the goods should be packed (if possible) in their original package to guarantee safe transportation. Keep the packaging carefully and store it in dry surroundings.

To support the protection of environment Huber takes care to use recyclable packing materials. Nevertheless the use of other packaging materials is partly inevitable in order to achieve best protection for the product during the transportation process. We ask for your understanding.

2.4 Loss of warranty claim

Damages during the return transport caused by inappropriate packaging are upon shippers risk and void warranty claims.

For motorized systems please, pay attention particularly to the following security indications:

- The connection of the motor must be done by qualified personnel only
- Immediately switch off the motor power supply when:
 - the goniometer comes in contact with liquids
 - the motor emits smoke or smells
 - the motor emits unusual noise
 - the goniometer has been damaged

In above mentioned cases, please, get in touch with one of our Huber representations or Huber directly.

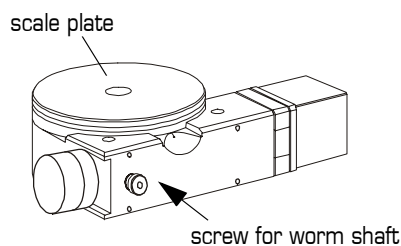
- The function of goniometers and corresponding assemblies may contain risks for the operators. You should consider the installation of a safety system to prevent persons from accessing the device during operation.
- Before working on the goniometer (making attachments etc.), please switch off the motor and disconnect the power supply.
- Injuries to health or material damages can occur from changes made to the device as for example removing safety covers.

2.5 Safety remarks



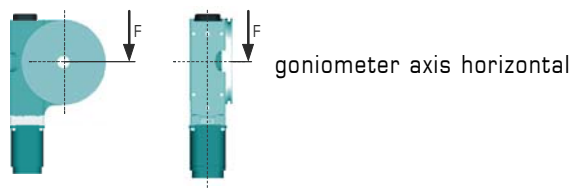
- The flatness of the mounting surface of parts to be adapted to the goniometer must not exceed 10 μm . Otherwise the system could warp, not keeping the guaranteed specifications
- When adapting parts on the goniometer always use proper screw lengths. Screws which exceed the length of the mounting holes might cause damage and malfunction of the goniometer.
- The hole pattern of the mounting surfaces of the goniometer and its support or setup needs to be identical. Otherwise the system could warp not keeping the guaranteed specifications.
- For motorized systems a circuit diagram is included in the shipment

The top scale plate of all goniometers can be turned manually after uncoupling the worm shaft. Open the screw shown on the picture below and press the worm shaft in direction of the screw until you are able to move the top scale plate by hand.



The thickness of the washer of this screw is individually adjusted for each Goniometer. Do not change or remove this washer.

If there is excessive load on a vertically mounted goniometer, one should support it, otherwise the "teeth" may grind.



To engage the worm shaft, move the top scale plate back and forth within a range of approx. 1 degree while gently pressing the worm shaft towards the worm wheel until it snaps in distinctly. Then tighten the screw.

Never apply excessive force, when you engage the worm shaft because the position of worm wheel and worm shaft might be "tooth on tooth". This may damage the drive.

3.1 Mounting

3.2 Coupling and uncoupling



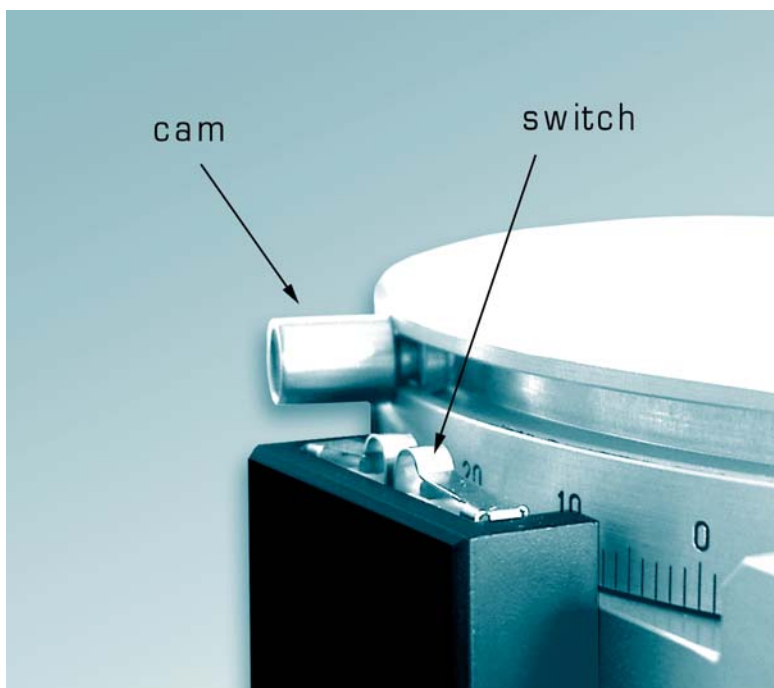
3.3 Adjustment of limit switches



All goniometers (except: 408) are equipped with mechanical switches to limit the travel range if necessary. A control unit should monitor the status of the connected switches permanently and stop the motor movement if the switch is triggered.

At the circumference of the top scaleplate you will find two switching cams guided by a T-slot (see picture below). These cams can be fixed in various positions. If the cam actuates the switch, the contact opens. This ensures that damaged cables or switches cannot cause safety problems

We strongly recommend to check the function of the limit switches frequently!!! Actuate the switch manually. You should hear a click. Check the function of the switches again manually with your control unit.



Under normal operating conditions, the Huber goniometers series 400 and their mechanical components do not require any service or maintenance. However, some operating conditions lead to increased strain on the driving mechanism of the goniometer as:

- extreme ambient conditions (humidity, temperature, dust)
- non horizontal mounting position
- uncompensated torque – unbalanced load
- very fast positioning over long distances - high speed operation
- oscillating over a small angle range

In this case please check the drive components (worm shaft, worm wheel) frequently for sufficient lubrication.

For visual inspection of the worm wheel, just remove the cover (shown on the following pictures), uncouple the worm shaft and turn the scale plate by hand.

Especially those areas showing a blackening of the lubricant film should be lubricated. Use a small brush and apply only a very small amount.

After lubrication move the goniometer several times over its full positioning range to spread the lubricant all over the worm gear.
Even if you did not add any lubricant, we recommended to execute this procedure from time to time.

Goniometer 408, 409, 410, 411

Remove the M14x1 screw. In some case the screw is hidden by limit switch housing. In order to access the screw you have to remove this part first by loosen the lower two screws



Goniometer 420, 430, 440, 480

Remove the black cover plate, labeled as "Lubrication". It is near by the 360° Zero-Point Control



After the reassembly of the limit switch housing, check the proper function of the switches.

Before you start, please pay attention to the following indications:

Always use lubricants of the same type. Mixing different types of lubricant may reduce or neutralize the lubricant effect. When required, please, contact Huber directly or one of our representations.

4.1 Interval



4.2 Lubrication

4.3 Position of lubrication covers

4.4 Type of lubricant



5.1 Definition

■ Resolution

The minimum controllable motion interval that the system is capable of producing

The resolution depends on the following factors:

- motor-steps, encoder-signals per revolution
- worm gear reduction of the goniometer
- additional gear reduction with optional gear box

■ Accuracy

The maximum expected difference between the actual and the ideal (desired) position for a given input.

The accuracy of each goniometer is individually reported by an angle error protocol

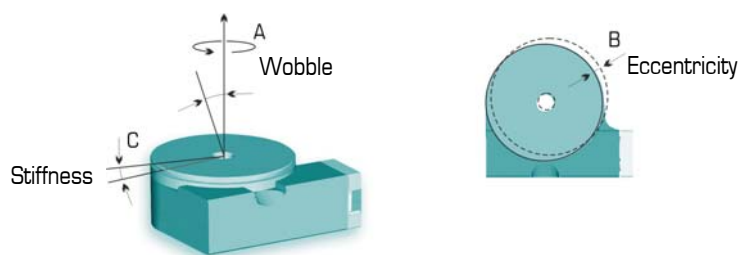
■ Repeatability

The ability of a device to return to a desired position from the same direction of movement

■ Reversal error

A difference in the absolute position of an object after travelling in one direction and then reversing to return by the opposite way.

■ Wobble, Eccentricity, Stiffness:



5.2 Specification, load and dimension

- The goniometer series 400 have two load levels as option. The standard type corresponds to the class W1. The class W2 with reinforced bearing, is capable to carry higher loads and torques.

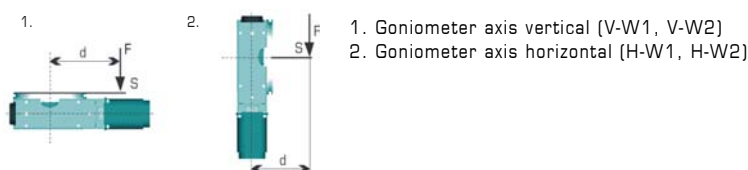
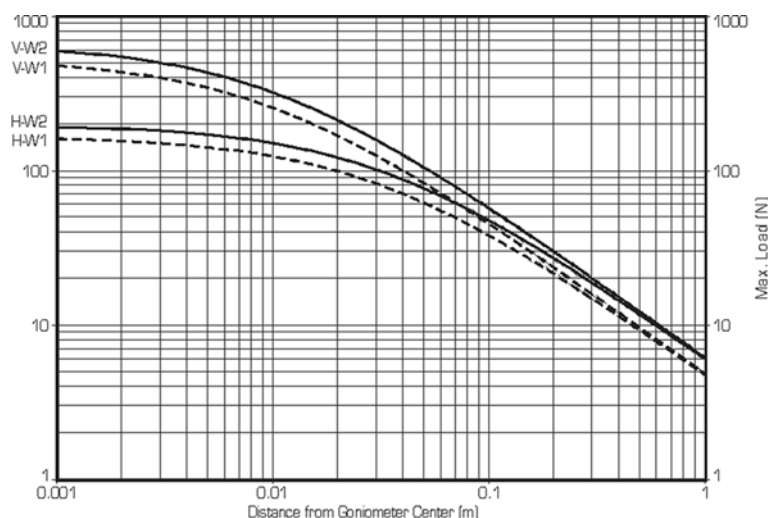
Specification

■ 408

Travel range [°]:	360
Diameter scale plate [mm]:	80
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	180:1
Resolution [°]:	0,01 (stepper motor with 200 steps/rev.) to 0,0001
Mininput (min) [Nm]:	0,05
Moutput (max) [Nm]:	1,2
Stiffness [μ rad/Nm]:	22
Weight [kg]:	1,5
Flange size[mm]	32
Max. through hole [mm]	20 (Standard) - 32 (max.)

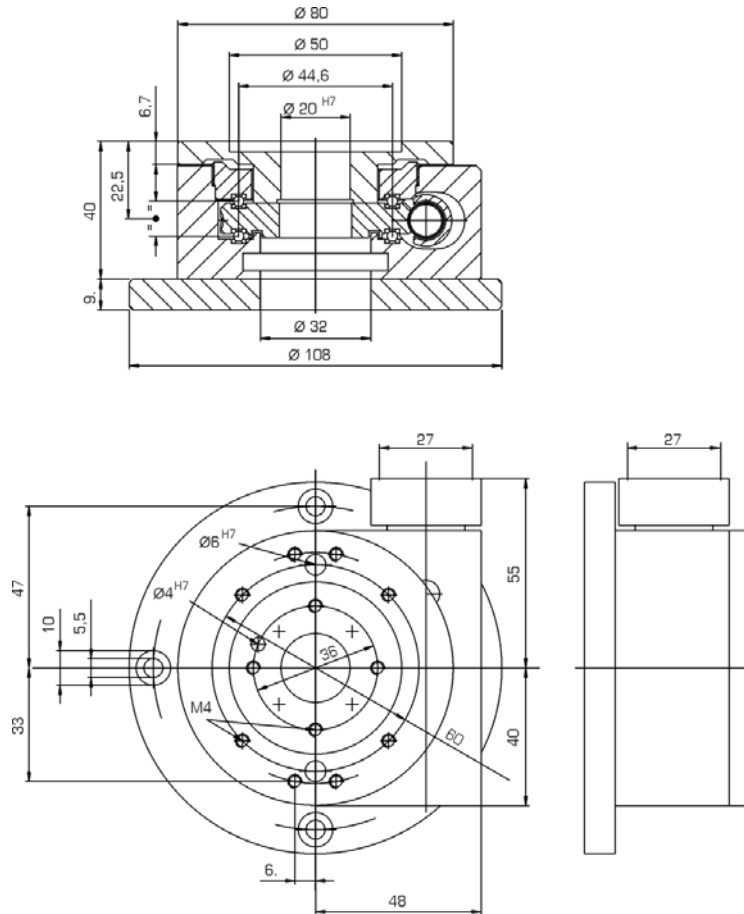
Accuracy ["]:	≤ 40
Repeatability (unidir.) ["]:	≤ 2
Reversal Error["]:	≤ 20
Eccentricity ["]:	≤ 5
Wobble ["]:	≤ 10

Max. load



■ 408

Dimension



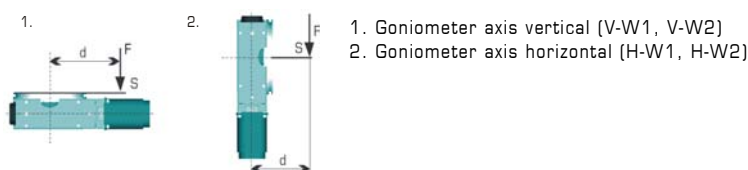
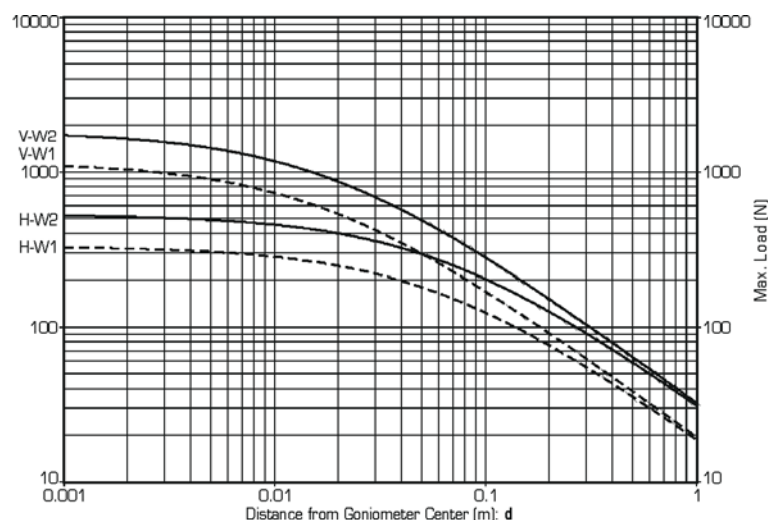
Specification

■ 409

Travel range [°]:	360
Diameter scale plate [mm]:	110
Material (body/wormwheel):	Aluminium/Bronze
Gear reduction:	180:1
Resolution [°]:	0,01 (stepper motor with 200 steps/rev.) to 0,0001
Mininput (min) [Nm]:	0,12
Moutput (max) [Nm]:	4,0
Stiffness [μ rad/Nm]:	6
Weight [kg]:	2,2
Flange size[mm]	42
Max. through hole [mm]	20 (Standard) - 61 (max.)

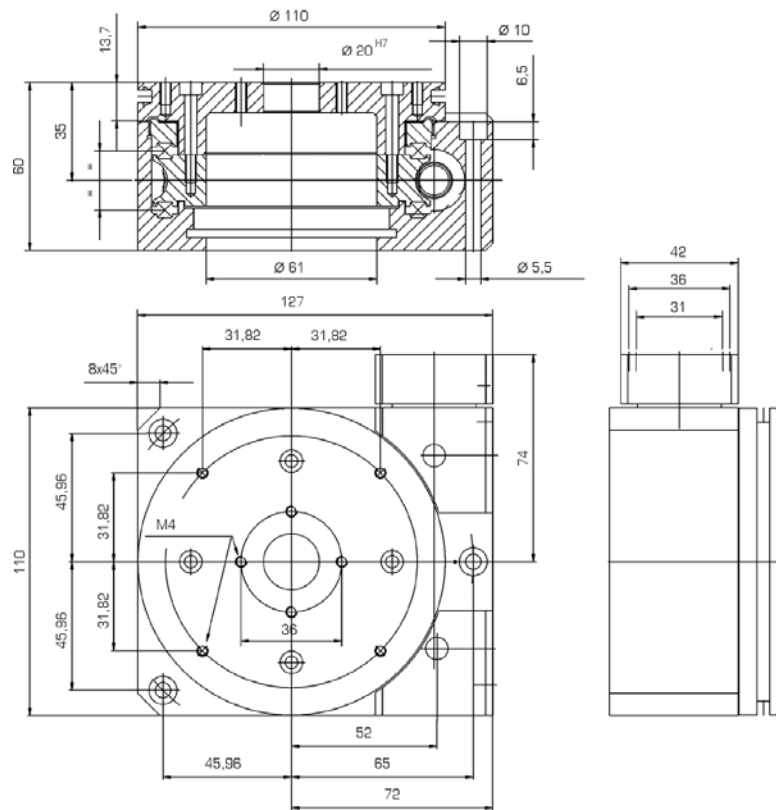
Accuracy ["]:	≤ 30
Repeatability (unidir.) ["]:	≤ 2
Reversal Error["]:	≤ 15
Eccentricity ["]:	≤ 3
Wobble ["]:	≤ 5

Max. load:



■ 409

Dimension

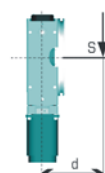
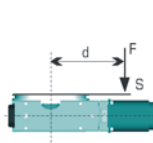
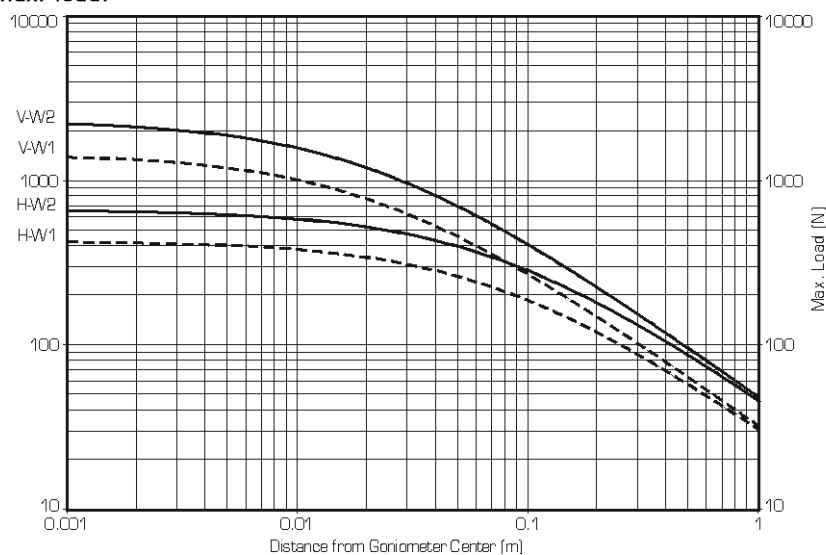


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	138
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) to 0,00005
Mininput (min) [Nm]:	0,10
Moutput (max) [Nm]:	3,0
Stiffness [μrad/Nm]:	3
Weight [kg]:	4
Flange size[mm]	56
Max. through hole [mm]	20 (Standard) - 80 (max.)

Accuracy ["]:	<= 30
Repeatability (unidir.) ["]:	<= 2
Reversal Error["]:	<= 10
Eccentricity ["]:	<= 3
Wobble ["]:	<= 4

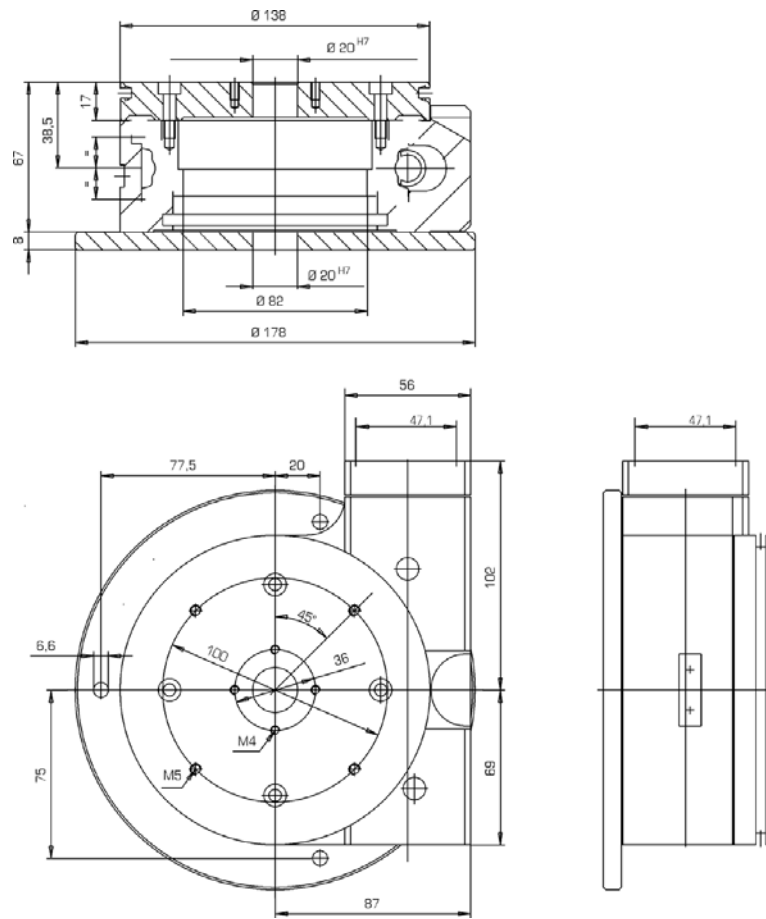
Max. load:



1. Goniometer axis vertical (V-W1, V-W2)
2. Goniometer axis horizontal (H-W1, H-W2)

■ 410

Dimension

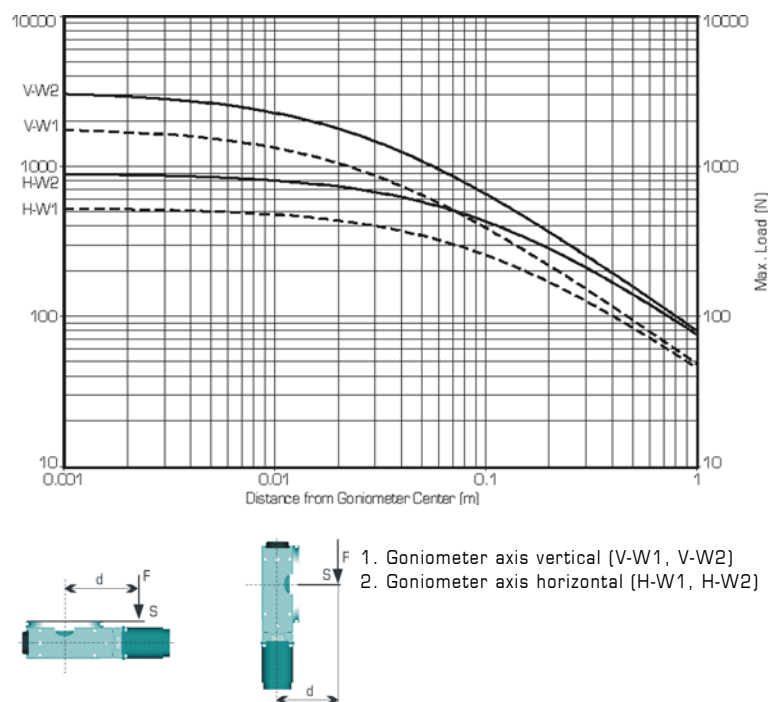


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	179
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) bis zu 0,00005
Mininput (min) [Nm]:	0,40
Moutput (max) [Nm]:	15,0
Stiffness [μ rad/Nm]:	1
Weight [kg]:	6
Flange size[mm]	56
Max. through hole [mm]	20 (Standard) - 101 (max.)

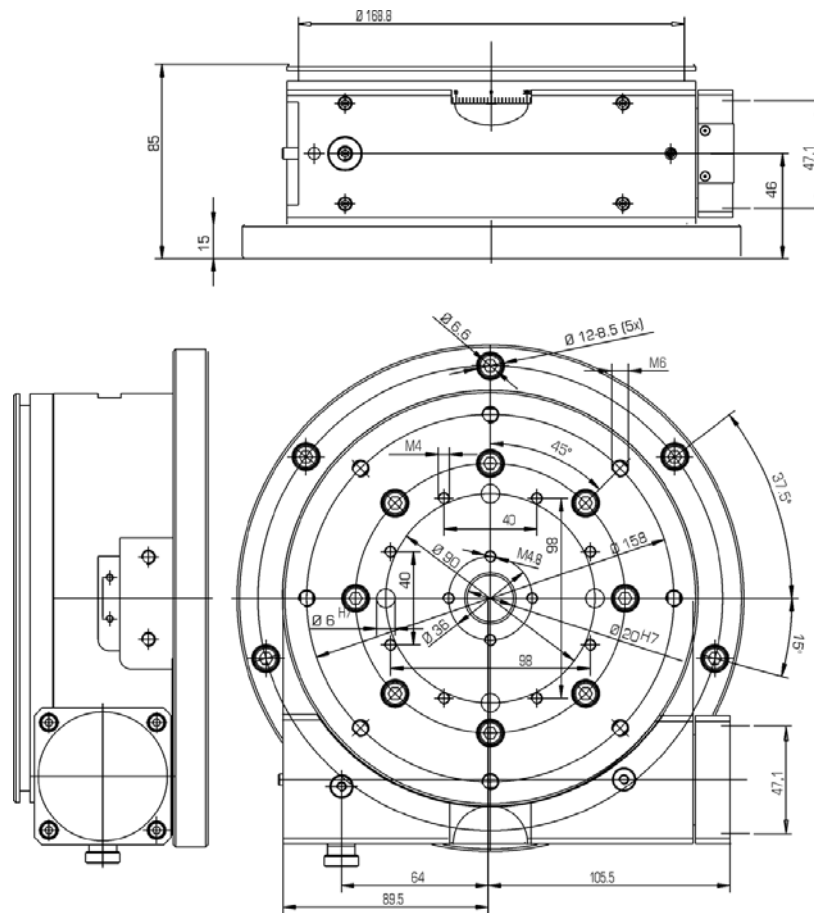
Accuracy ["]:	≤ 30
Repeatability (unidir.) ["]:	≤ 2
Reversal Error["]:	≤ 8
Eccentricity ["]:	≤ 3
Wobble ["]:	≤ 4

Max. load:



411

Dimension

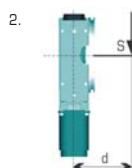
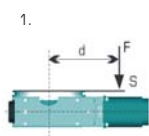
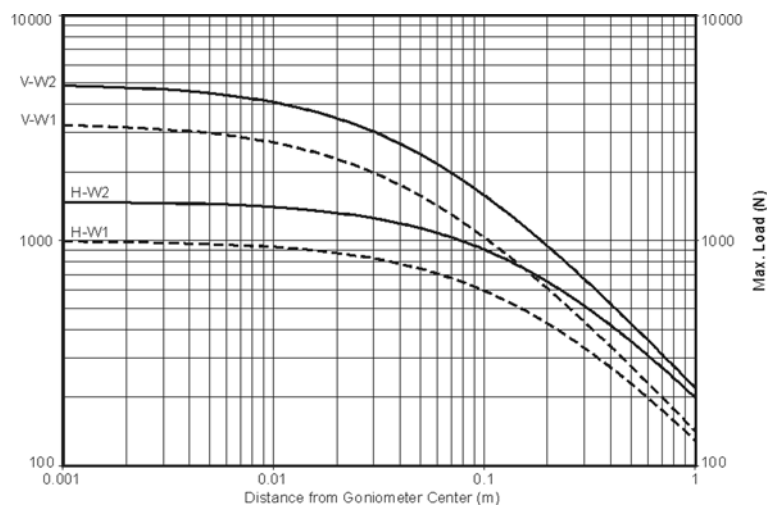


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	290
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) to 0,00005
Minput (min) [Nm]:	1,0
Moutput (max) [Nm]:	40,0
Stiffness [μ rad/Nm]:	0,2
Weight [kg]:	33
Flange size[mm]	82
Max. through hole [mm]	20 - 190 (Standard)

Accuracy ["]:	≤ 25
Repeatability (unidir.) ["]:	≤ 2
Reversal Error["]:	≤ 4
Eccentricity ["]:	≤ 3
Wobble ["]:	≤ 3

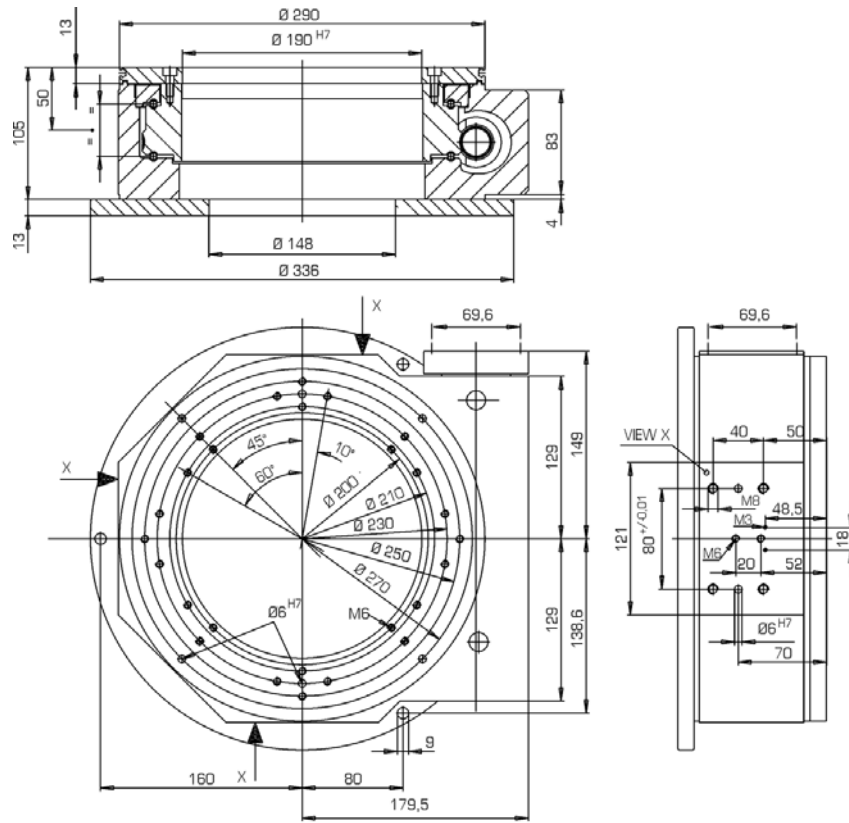
Max. load:



1. Goniometer axis vertical (V-W1, V-W2)
2. Goniometer axis horizontal (H-W1, H-W2)

■ 420

Dimension

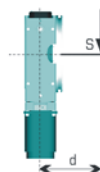
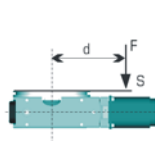
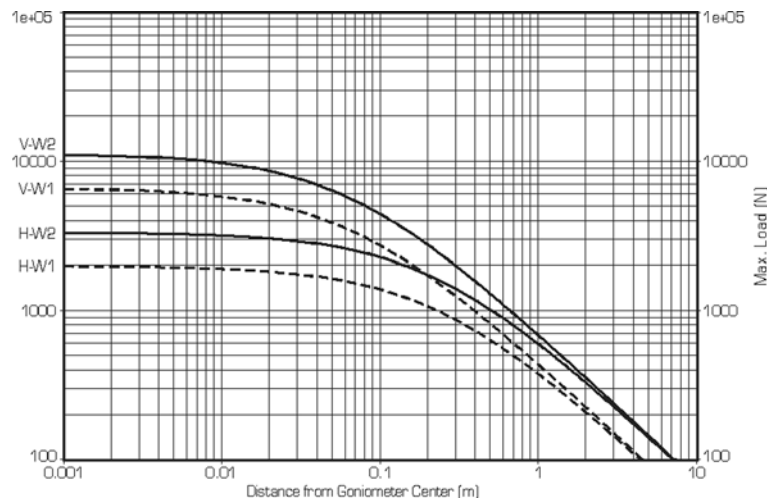


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	400
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) to 0,00005
Mininput (min) [Nm]:	1,5
Moutput (max) [Nm]:	100
Stiffness [μrad/Nm]:	0,1
Weight [kg]:	55
Flange size[mm]	82
Max. through hole [mm]	20 - 260 (Standard)

Accuracy ["]:	<= 20
Repeatability (unidir.) ["]:	<= 2
Reversal Error["]:	<= 4
Eccentricity ["]:	<= 3
Wobble ["]:	<= 2

Max. load:

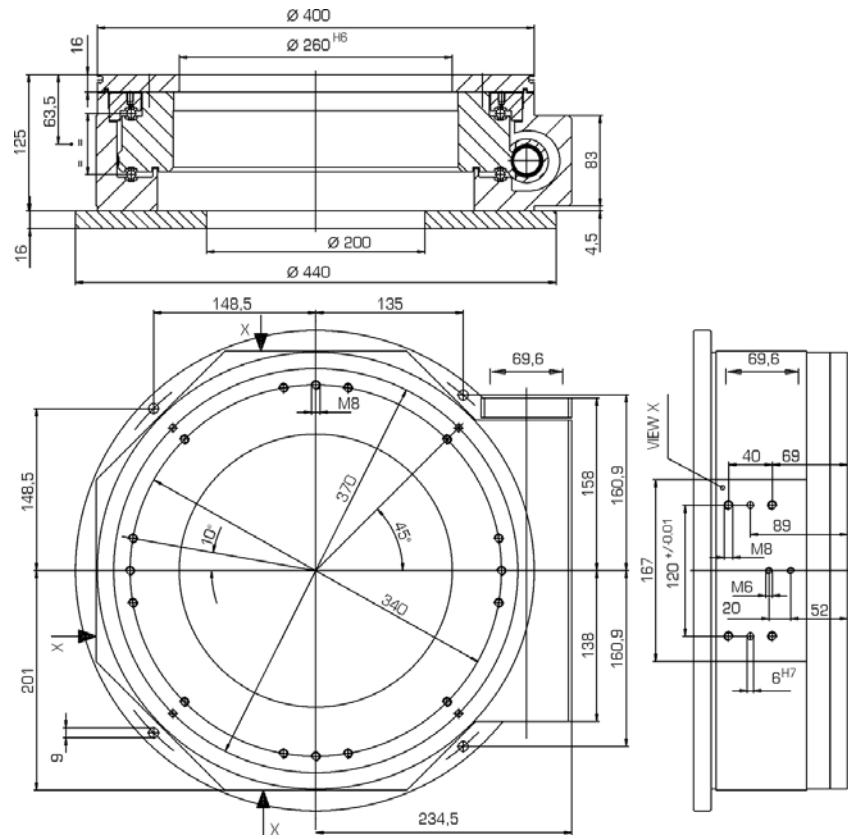


1. Goniometer axis vertical (V-W1, V-W2)
2. Goniometer axis horizontal (H-W1, H-W2)

■ 430

■ 430

Dimension

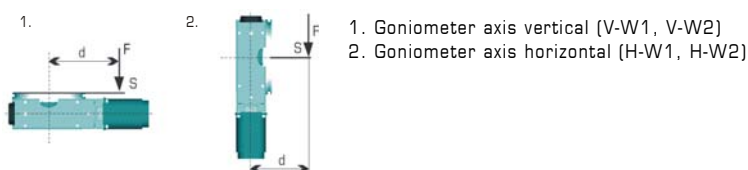
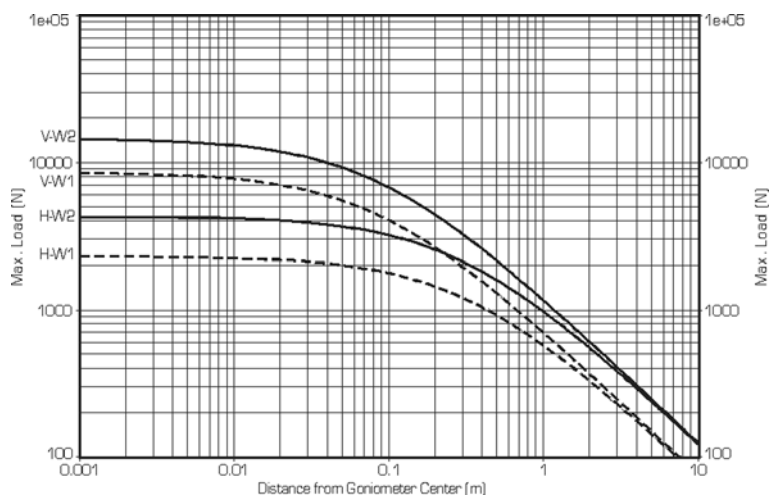


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	500
Material (body/wormwheel):	Aluminium/bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) bis zu 0,00005
Minput (min) [Nm]:	2,0
Moutput (max) [Nm]:	125
Stiffness [μ rad/Nm]:	0,07
Weight [kg]:	77
Flange size[mm]	82
Max. through hole [mm]	20 - 370 (Standard)

Accuracy ["]:	≤ 20
Repeatability (unidir.) ["]:	≤ 2
Reversal Error["]:	≤ 4
Eccentricity ["]:	≤ 3
Wobble ["]:	≤ 2

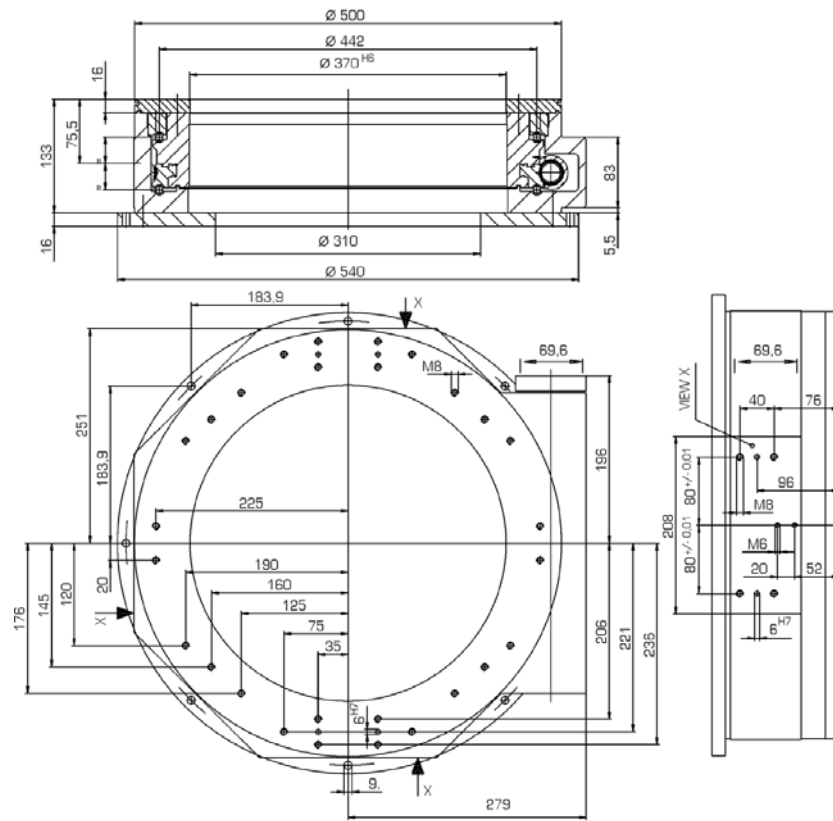
Max. load:



■ 440

440

Dimension

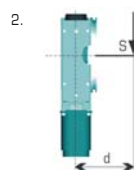
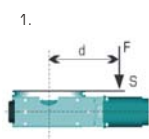
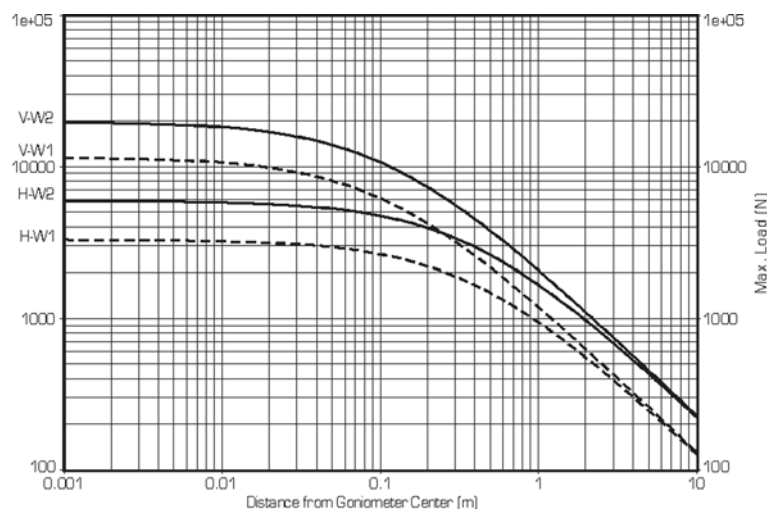


Specification:

Travel range [°]:	360
Diameter scale plate [mm]:	800
Material (body/wormwheel):	Aluminium/Bronze
Gear reduction:	360:1
Resolution [°]:	0,005 (stepper motor with 200 steps/rev.) to 0,00005
Minput (min) [Nm]:	3,8
Moutput (max) [Nm]:	250
Stiffness [μrad/Nm]:	0,02
Weight [kg]:	200
Flange size[mm]	82
Max. through hole [mm]	20 - 500 (Standard)

Accuracy ["]:	<= 20
Repeatability (unidir.) ["]:	<= 2
Reversal Error["]:	<= 4
Eccentricity ["]:	<= 3
Wobble ["]:	<= 4

Max. load:

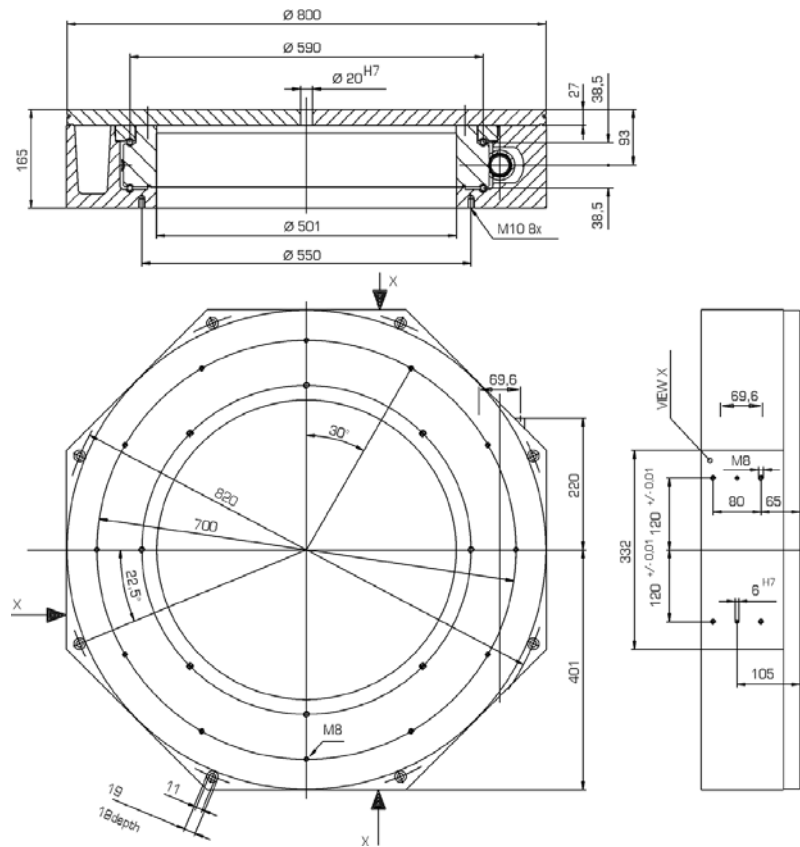


1. Goniometer axis vertical (V-W1, V-W2)
2. Goniometer axis horizontal (H-W1, H-W2)

■ 480

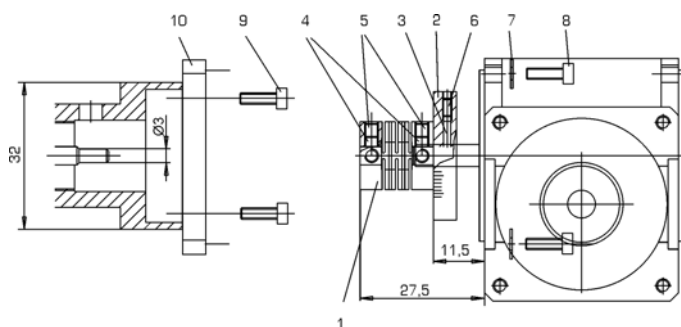
■ 480

Dimension



Please note: Before you mount the gear box on the motor you should adapt the gear box to the positioning system.

- Please mount adapter plate (Pos. 10) on flange of Goniometer 408 with four screws (Pos. 9).
- Fix the dial (Pos. 2) on output shaft of gear box by tightening the corresponding set screw (Pos. 6). Then push coupling (Pos. 1) on gear shaft and tighten the set screws (Pos. 5) (2x).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with gear box on input shaft of Goniometer. Provide gear box with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the gear box by slight rotating motions around the Goniometer axis. The threads of the screws (Pos. 8) should not touch the through holes of the gear box but should be well centered. Tighten the screws.
- Fix coupling on input shaft of gear box temporarily. Look through the mounting hole of the Goniometer flange. Turn the coupling of the input shaft by hand until a set screw (Pos. 5) of the coupling (sitting on the output shaft) is visible. Tighten the set screw. Afterwards turn the coupling 90°.
The second set screw is now visible. Tighten the set screw.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-60L (3 x 4mm)
2	1	Dial	O-408.000-007
3	1	Pressure piece	Ø1,5 x 6,5 Ms58
4	4	Pressure piece	Ø2,4 x 2 Ms58
5	4	Set screw	DIN 913-M3 x 3
6	1	Set screw	DIN 913-M2 x 4
7	4	Washer	DIN 988-3 x 6 x 1
8	4	Screw	DIN 912-M2,5 x 8
9	4	Screw	DIN 84-M2,5 x 6
10	1	Adapter	M301.301-001

- Mounting of a
Huber gearbox
on
408



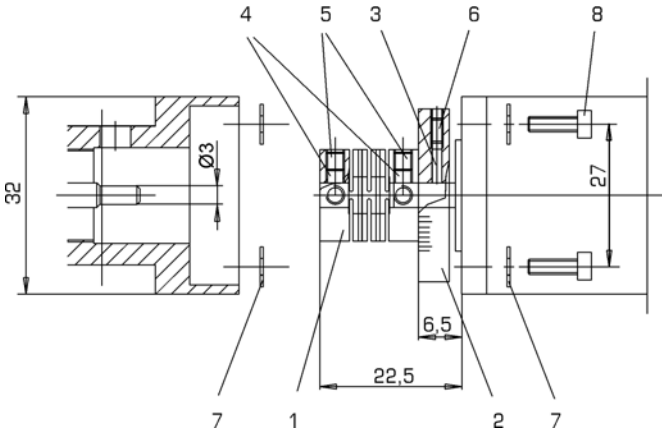


■ Mounting of
motor on

408



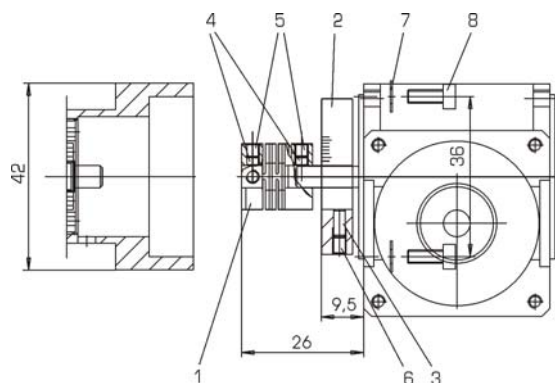
- Fix the dial (Pos. 2) on motor shaft by tightening the corresponding set screws (Pos. 6)). Then push coupling (Pos. 1) on motor shaft and tighten the set screws (Pos. 5 (2x)).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with motor on Goniometer shaft. Provide motor with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the motor by slight rotating motions around the motor axis. The threads of the screws (Pos. 8) should not touch the through holes of the motor but should be well centered. Tighten the screws.
- Unscrew the dial window of the Goniometer. Look through the mounting hole of the Goniometer flange. Turn the dial by hand until a set screw (Pos. 5) of the coupling is visible. Tighten the set screw. Afterwards turn the dial 90°.
The second set screw is now visible. Tighten the set screw and screw on the dial window.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-60L (3 x 4mm)
2	1	Dial	O-408.000-007
3	1	Pressure piece	Ø1,5 x 6,5 Ms58
4	4	Pressure piece	Ø2,4 x 2 Ms58
5	4	Set screw	DIN 913-M3 x 3
6	1	Set screw	DIN 913-M2 x 4
7	8	Washer	DIN 988-3 x 6 x 1
8	4	Screw	DIN 912-M2,5 x 10

Please note: Before you mount the gear box on the motor you should adapt the gear box to the positioning system.

- Fix the dial (Pos.2) on output shaft of gear box by tightening the corresponding set screw (Pos. 6). Then push coupling (Pos. 1) on gear shaft and tighten the set screws (Pos. 5) (2x).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with gear box on input shaft of Goniometer. Provide gear box with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the gear box by slight rotating motions around the Goniometer axis. The threads of the screws (Pos. 8) should not touch the through holes of the gear box but should be well centered. Tighten the screws.
- Fix coupling on input shaft of gear box temporarily. Look through the mounting hole of the Goniometer flange. Turn the coupling of the input shaft by hand until a set screw (Pos. 5) of the coupling (sitting on the output shaft) is visible. Tighten the set screw. Afterwards turn the coupling 90°. The second set screw is now visible. Tighten the set screw.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-60L (5 x 5mm)
2	1	Dial	O-409.000-010
3	1	Pressure piece	Ø2,4 x 11 Ms58
4	4	Pressure piece	Ø2,4 x 2 Ms58
5	4	Set screw	DIN 913-M3 x 3
6	1	Set screw	DIN 913-M3 x 4
7	4	Washer	DIN 988-3 x 6 x 1
8	4	Screw	DIN 912-M3 x 10

- Mounting of a Huber gearbox on

409

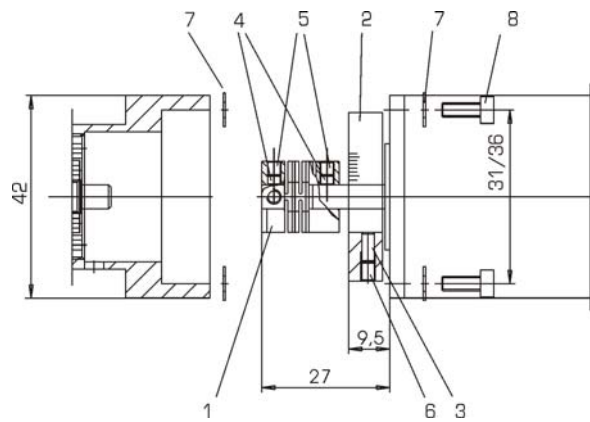


■ Mounting of motor on

409



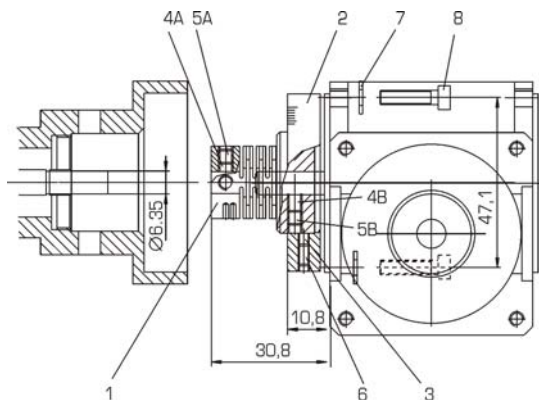
- Fix the dial (Pos. 2) on motor shaft by tightening the corresponding set screws (Pos. 6)). Then push coupling (Pos. 1) on motor shaft and tighten the set screws (Pos. 5 (2x)).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with motor on Goniometer shaft. Provide motor with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the motor by slight rotating motions around the motor axis. The threads of the screws (Pos. 8) should not touch the through holes of the motor but should be well centered. Tighten the screws.
- Unscrew the dial window of the Goniometer. Look through the mounting hole of the Goniometer flange. Turn the dial by hand until a set screw (Pos. 5) of the coupling is visible. Tighten the set screw. Afterwards turn the dial 90°.
The second set screw is now visible. Tighten the set screw and screw on the dial window.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-60L (5 x 5mm)
2	1	Dial	O-409.000-010
3	1	Pressure piece	Ø2,4 x 11 Ms58
4	4	Pressure piece	Ø2,4 x 2 Ms58
5	4	Set screw	DIN 913-M3 x 3
6	1	Set screw	DIN 913-M3 x 4
7	8	Washer	DIN 988-3 x 6 x 1
8	4	Screw	DIN 912-M3 x 10

Please note: Before you mount the gear box on the motor you should adapt the gear box to the positioning system.

- Fix the coupling (Pos. 1) on output shaft of gear box by tightening the corresponding set screw (Pos. 5B (2x)). Then push dial (Pos. 2) on coupling and tighten the set screws (Pos. 6).
Pay attention to pressure pieces (Pos. 3/4A/4B)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with gear box on input shaft of Goniometer. Provide gear box with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the gear box by slight rotating motions around the Goniometer axis. The threads of the screws (Pos. 8) should not touch the through holes of the gear box but should be well centered. Tighten the screws.
- Fix coupling on input shaft of gear box temporarily. Look through the mounting hole of the Goniometer flange. Turn the coupling of the input shaft by hand until a set screw (Pos. 5) of the coupling (sitting on the output shaft) is visible. Tighten the set screw. Afterwards turn the coupling 90°. The second set screw is now visible. Tighten the set screw.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-63L (6,35 x 6,35mm)
2	1	Dial	O-54
3	1	Pressure piece	Ø2,4 x 2 Ms58
4A	2	Pressure piece	Ø3 x 2 Ms58
4B	2	Pressure piece	Ø3 x 4 Ms58
5A	2	Set screw	DIN 913-M4 x 4
5B	2	Set screw	DIN 913-M4 x 6
6	1	Set screw	DIN 913-M3 x 6
7	4	Washer	DIN 988-4 x 8 x 1
8	4	Screw	DIN 912-M4 x 14

■ Mounting of a Huber gearbox on

410

411

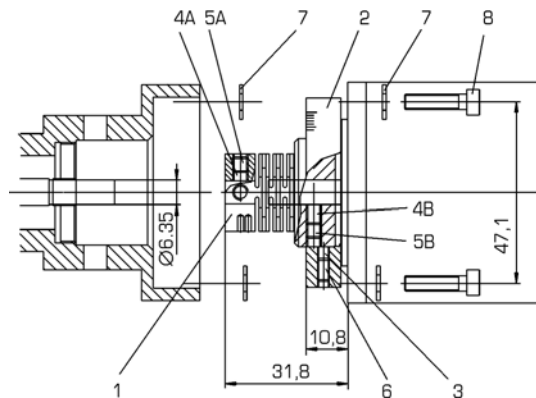


■ Mounting of motor on

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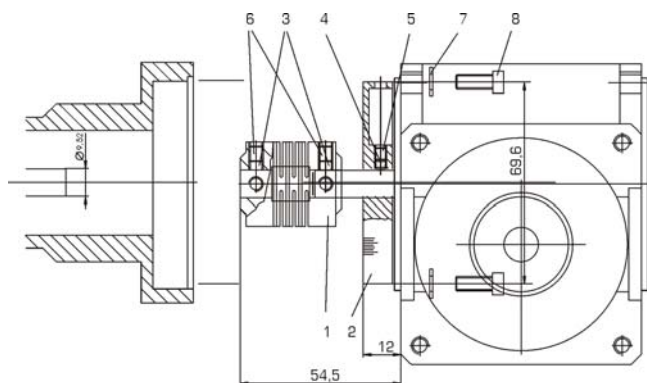
- Fix the coupling (Pos. 1) on motor shaft by tightening the corresponding set screws (Pos. 5B (2x)). Then push dial (Pos. 2) on motor shaft and tighten the set screw (Pos. 6).
Pay attention to pressure pieces (Pos. 3/4A/4B)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with motor on Goniometer shaft. Provide motor with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Centre the motor by slight rotating motions around the motor axis. The threads of the screws (Pos. 8) should not touch the through holes of the motor but should be well centered. Tighten the screws.
- Unscrew the dial window of the Goniometer. Look through the mounting hole of the Goniometer flange. Turn the dial by hand until a set screw (Pos. 5A) of the coupling is visible. Tighten the set screw. Afterwards turn the dial 90°.
The second set screw is now visible. Tighten the set screw and screw on the dial window.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-63L (6,35 x 6,35mm)
2	1	Dial	O-54
3	1	Pressure piece	Ø2,4 x 2 Ms58
4A	2	Pressure piece	Ø3 x 2 Ms58
4B	2	Pressure piece	Ø3 x 4 Ms58
5A	2	Set screw	DIN 913-M4 x 4
5B	2	Set screw	DIN 913-M4 x 6
6	1	Set screw	DIN 913-M3 x 6
7	8	Washer	DIN 988-4 x 8 x 1
8	4	Screw	DIN 912-M4 x 14

Please note: Before you mount the gear box on the motor you should adapt the gear box to the positioning system.

- Fix the dial (Pos. 2) on output shaft of gearbox by tightening the corresponding set screw (Pos. 5). Then push coupling (Pos. 1) on gear shaft and tighten the set screws (Pos. 6) (2x).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with gear box on input shaft of goniometer. Provide gear box with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Center the gear box by slight rotating motions around the goniometer axis. The threads of the screws (Pos. 8) should not touch the through holes of the gear box but should be well centered. Tighten the screws.
- Fix coupling on input shaft of gear box temporarily. Look through the mounting hole of the goniometer flange. Turn the coupling of the input shaft by hand until a set screw (Pos. 6) of the coupling (sitting on the output shaft) is visible. Tighten the set screw. Afterwards turn the coupling 90°. The second set screw is now visible. Tighten the set screw.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-61L (9,52 x 9,52mm)
2	1	Dial	O-87
3	4	Pressure piece	Ø4 x 2 Ms58
4	1	Pressure piece	Ø3 x 2 Ms58
5	1	Set screw	DIN 913-M4 x 8
6	4	Set screw	DIN 913-M5 x 6
7	4	Washer	DIN 988-5 x 10 x 1
8	4	Screw	DIN 912-M5 x 16

- Mounting of a Huber gearbox on

420
430
440
480

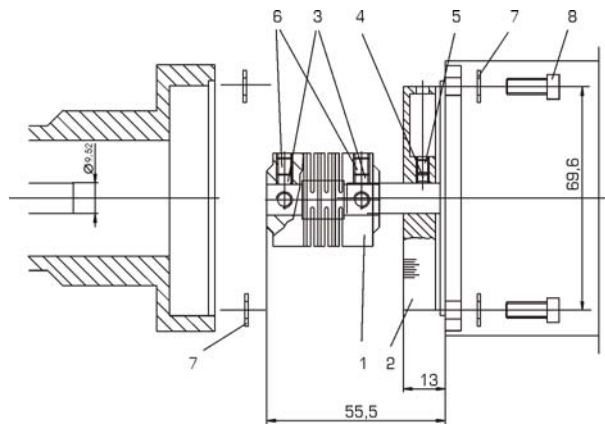
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■ Mounting of motor on

420
430
440
480



- Fix the dial (Pos. 2) on motor shaft by tightening the corresponding set screws (Pos. 5)). Then push coupling (Pos. 1) on motor shaft and tighten the set screws (Pos. 6 (2x)).
Pay attention to pressure pieces (Pos. 3/4)! The absence of this part leads to damage of the shaft or the mechanics.
- Push coupling with motor on goniometer shaft. Provide motor with screws and washers (Pos. 8/7) and tighten the screws (Pos. 8) gently.
- Center the motor by slight rotating motions around the motor axis. The threads of the screws (Pos. 8) should not touch the through holes of the motor but should be well centered. Tighten the screws.
- Unscrew the dial window of the goniometer. Look through the mounting hole of the goniometer flange. Turn the dial by hand until a set screw (Pos. 6) of the coupling is visible. Tighten the set screw. Afterwards turn the dial 90°. The second set screw is now visible. Tighten the set screw and screw on the dial window.
- Disassemble in reverse order.



Pos.	Amount	Type	Description
1	1	Coupling	O-61L (9,52 x 9,52mm)
2	1	Dial	O-87
3	4	Pressure piece	Ø4 x 2 Ms58
4	1	Pressure piece	Ø3 x 2 Ms58
5	1	Set screw	DIN 913-M4 x 8
6	4	Set screw	DIN 913-M5 x 6
7	8	Washer	DIN 988-5 x 10 x 1
8	4	Screw	DIN 912-M5 x 16