



## ***S-range***

ACTUATORS FOR POWER AND  
WATER APPLICATIONS  
AND OIL AND GAS INDUSTRY

**DREHMO**  
VALVE ACTUATORS

# Valve actuators for multiple applications



Wherever material flows through pipelines in liquid, gas or powder form, several kinds of valves are used to shut off or to regulate the rate of flow or pressure. For reliable remote operation of these valves, whether they be globe, gate, ball or butterfly valves or dampers, DREHMO have been successfully employed electromechanical actuators all over the world for several decades.

DREHMO actuators are used in power generation, water industry, oil and gas production, distribution, storage as well as chemical and petrochemical process industries. Actuators have to move the valve to a mechanically defined final position or to intermediate positions and





avoid excessive torque that overload the valve during travel between the final position. According this special devices ensure that the actuator is switched off in dependence of the position, angle of rotation or torque. Special variants include part-turn actuators and thrust actuators, which transform the torque into an axial thrust by means of a thrust unit.

In plant areas in which explosive gases may be present, actuators must have type-tested and certified explosion protection. The variety of torques and actuator speeds required in practice is met by a wide range of DREHMO actuators. DREHMO actuators can be fitted with torque and position sensor and signal processing systems to suit the various remote control requirements. The following product lines are available for this purpose:

> **S-RANGE ACTUATORS**

with limit and torque switches

> **C-MATIC ACTUATORS**

with integrated control unit

> **I-MATIC ACTUATORS**

with smart integrated control unit and non-intrusive settings as well as predictive maintenance features.  
X-matic actuators are especially designed for the oil gas industry. The i-matic type range functionalities are enhanced by a flameproof enclosure.

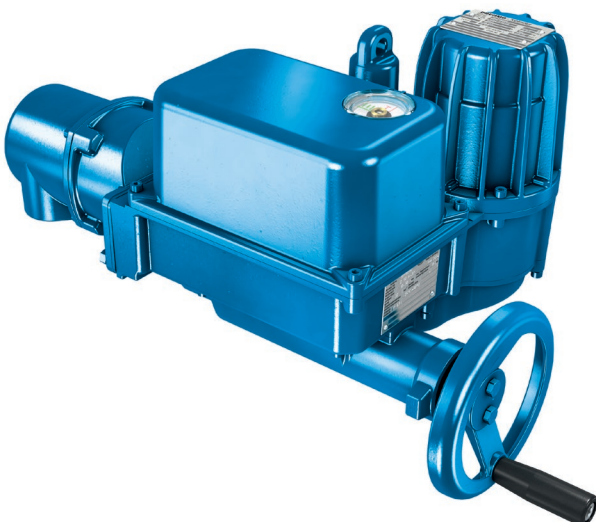


**DREHMO s-range**

... for use in motor control units.

s-range actuators for conventional systems are created with parallel hard wired signals. Torque and position measurement by microswitch. Intermediate position via conductive plastic potentiometer and analogue position transducer as option. For optimum integration of s-range actuators into a plant, additional components such as reversing contactor combinations, PLC (hardware and software function blocks), power supply units (for heating, contactors and signals), and positioners have to be installed externally into the process control system and the low voltage switchboard.

- > valve attachment according to EN ISO 5210 or EN ISO 5211
- > DREHMO 3-phase AC squirrel cage motor, insulation class F, 3 thermoswitches
- > Enclosure protection IP68 according to IEC 60529
- > Corrosion protection K3
- > -25°C to +80°C ON/OFF duty  
-25°C to +60°C Modulating duty  
(low temperature range -50°C to +40°C available)
- > Handwheel for manual operation/  
switch-over mechanism is not needed
- > Electrical connection:  
plug/socket connector with screw-type connection



# Overview

## MULTI-TURN ACTUATORS



The design principle of multi-turn actuators is to turn a multiple of 360 degrees at the output drive.

They are designed to operate valves with 2 up to 14500 revolutions per stroke.

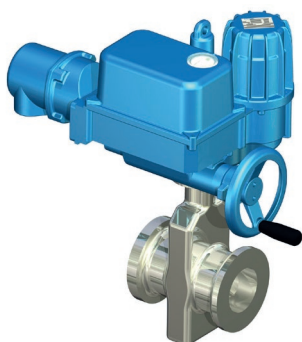
Multi-turn actuators are fitted mainly to gate and globe valves which transform the multiple rotation of the actuator's output drive into linear movement via a threaded spindle.

Multi-turn actuators for open-close mostly operate shut-off valves with only a few open-close cycles per month. Flanges and output drive designs of the multi-turn actuators are standardized in accordance with DIN EN ISO 5210 respectively and therefore fit on any modern valve design.

Furthermore a multitude of special flange designs is available. The multi-turn actuators are classified in four housing sizes according to their rated torque:

- 5 Nm to 60 Nm:  
actuator size D...30, 59
- 20 Nm - 250 Nm:  
actuator size D...60, 120, 249
- 80 Nm - 1000 Nm:  
actuator size D...250, 500, 1000
- 800 Nm – 2000 Nm:  
actuator size D...2000

Torque values exceeding 2000 Nm are realized by additional spur or bevel gearboxes.



## PART-TURN ACTUATORS



Part-turn actuators are a special type of multi-turn actuator for operating butterfly, ball valves or damper, for instance, with an output drive movement of less than 360°. Normally, the internal gear of the part-turn actuator is designed for travel of 90°; special ranges, such as 120° or 180° are also available.

All the advantages of the planetary gear such as handwheel operation without changeover, self-locking gear, long service life, lifetime lubrication, as well as the features already described, are likewise applicable to the part-turn actuators.

The flange dimensions and the different output drives, such as plug bush with bore and groove, square bore and dihedron, all correspond to the usual standards, e.g. DIN EN ISO 5211. This means that direct mounting on the valve is possible. Accessories such as foot and lever with ball joints make indirect operation of butterfly valves possible depending on the structural and design conditions of the valves. Torque values exceeding 1800 Nm are realized by multi-turn actuators with additional planetary gears.



## THRUST ACTUATORS



DREHMO thrust actuators can be fitted to valves which require a linear movement. The thrust actuator transforms the torque of a DREHMO actuator into an axial thrust by means of an integrated thrust unit.

The required actuating force (thrust or traction) can be adjusted continuously and reproducibly. Thrust actuators are mainly used to operate plug valves.

Thrust units fitted to the flange of a multi-turn actuator consist mainly of a trapezoid threaded spindle, a metric screw bolt to join the valve shaft and an enclosure to protect the spindle from environmental influences. The version described is used for direct mounting of the actuator to the valve. However, "fork joint" versions of the thrust actuators (indirect mounting) primarily operate butterfly valves for which direct mounting of a 90° part turn actuator is not possible or efficient for design reasons. Cardanic suspension of the thrust unit at the fork joint is also available.





### OPERATION MODES – OPEN-CLOSE, POSITIONING AND MODULATING DUTY

Valves are driven in compliance with the required application and their design. Actuator standard EN 15714-2 distinguishes between three cases:

> **Class A: OPEN-CLOSE duty.**

The actuator is required to drive the valve through its entire travel from the fully open position to the fully closed position or vice versa.

> **Class B: Inching/positioning or positioning duty.** The actuator is required to occasionally drive the valve to any position (fully open, intermediate and fully closed).

> **Class C: Modulation or modulating duty.** The actuator is required to frequently drive the valve to any position between fully open and fully closed.

### SWITCHING FREQUENCY AND MOTOR OPERATION MODE

Modulating duty and open-close duty subject the actuator to different mechanical loads. Consequently, special actuator types are available for each operation mode.

The types of duty for actuators in compliance with IEC 60034-1 and EN 15714-2 are typical distinction criteria. For modulating duty, additional indication is made of the permissible number of starts.

### ACTUATORS FOR OPEN-CLOSE DUTY AND POSITIONING DUTY

(classes A and B or types of duty S2 - 10 min/15 min) DREHMO actuators for open-close and positioning duty are identified by type designations D/DP:

> D 30 - D 2000

> DP 75 - DP 1800

### ACTUATORS FOR MODULATING DUTY

(class C or types of duty S4 - 25 %/50 %) DREHMO actuators for modulating duty can be identified by type designations DR/DPR:

> DR 30 - DR 2000

> DPR 75 - DPR 1800

## Electrical connection

The plug-in electrical connector is a key element of the modular actuator design. The connector is a separate unit. The different connection types are compatible throughout all type ranges and can be used for actuators with or without integral controls.

During maintenance work, the wiring remains undisturbed; electrical connections can be quickly separated and reconnected. This reduces downtimes and avoids wiring faults when reconnecting.

#### 1 Plug/socket connector

The 50 contact plug/socket connector is the core element for all connection types. Incorrect connection is prevented by special code pins. Power cable 2,5 ... 6,0 mm<sup>2</sup>, Control cable 0,75 ... 2,5 mm<sup>2</sup>

#### 2 Cover for electrical connection S

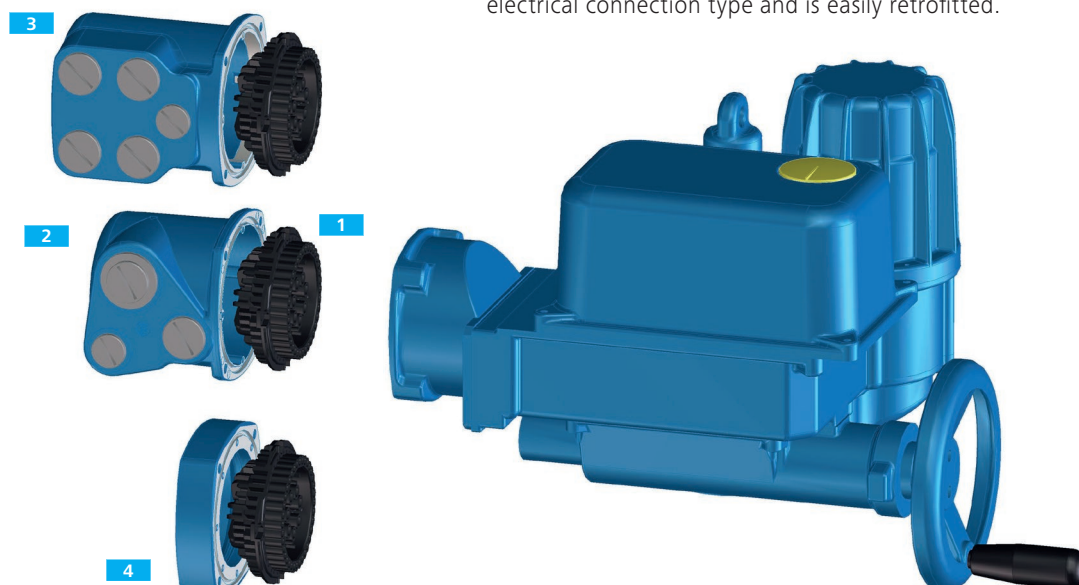
With three cable entries. Basic version: 1 x M20 x 1,5, 1 x M25 x 1,5, 1 x M32 x 1,5

#### 3 Cover for electrical connection SH

With additional cable entries, offers 75 % more space than standard version.

#### 4 Intermediate frame DS for double sealing

Preserves the enclosure protection even if the electrical connection is removed and prevents ingress of dirt or humidity into the housing. Can be combined with any electrical connection type and is easily retrofitted.



# Gear design and operating functions

The DREHMO actuators basically consist of a motor, planetary gear arranged with a torque-bearing displacement worm, a handwheel and an integral switching device. All parts of the planetary gear are arranged around the hollow shaft. As several teeth always mesh simultaneously with this planetary gear (unlike normal worm gears), it is possible to realize a very compact gear with a long service life.

## METHOD OF FUNCTIONING FOR MANUAL OPERATION

Changeover from motorized to manual operation is not necessary. During manual operation via the handwheel, the forces are transmitted via the worm (9), the sun wheel (11) and the planet wheel (4) to the driver plate (5) and then to the output drive (6).

## METHOD OF FUNCTIONING FOR MOTORIZED OPERATION

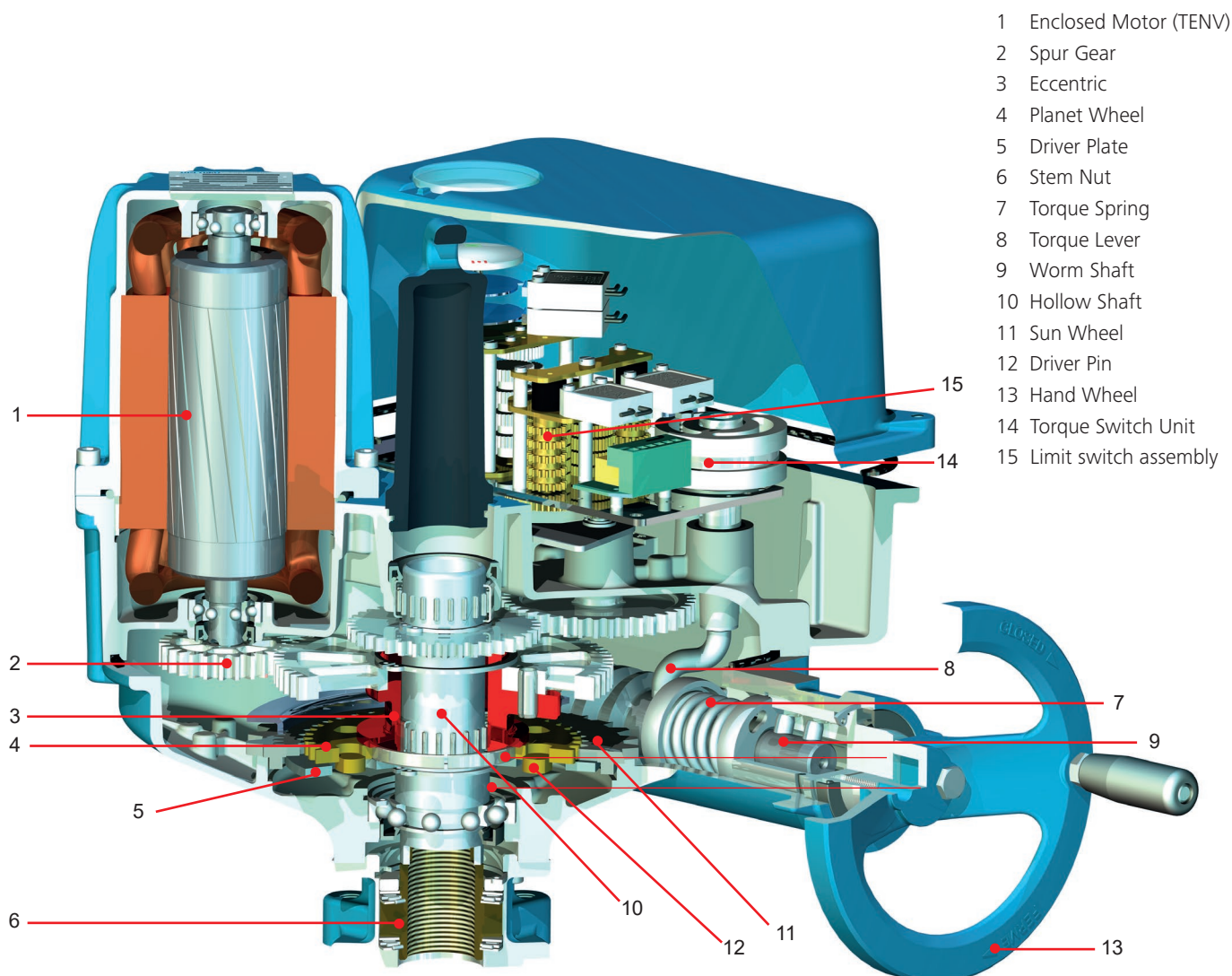
The motor (1) drives the eccentric (3) via the spur gear (2). The planet wheel (4), which meshes into the inner gear of the sun wheel (11), is pivoted on the eccentric (3). As the two wheels have a different number of teeth, a relative speed is generated which is transferred by driver pins (12) to the driver plate (5), which is mounted on the planet wheel (4). The driver plate (5) is interlocked with the hollow shaft (10) via serration.

## TORQUE-DEPENDENT TRIPPING

In addition to the inner gear tooth system, the sun wheel (11) also has an outer gear tooth system which meshes with the axial displacement worm (9). The displacement worm (9) is held in its central position by pretensioned springs (7). If a higher torque is exerted on the actuator than the torque created by the pretensioned springs, the peripheral force on the sun wheel (11) moves the displacement worm (9) from its central position and actuates the torque lever (8). The torque lever (8) activates the torque switch unit (14).

## FEATURES OF THE GEAR

- Lifetime lubrication
- No mechanical switchover for handwheel operation is required
- No starting problems, even at low temperatures
- Long service life, even in modulating operation, due to low surface pressure combined with little relative movement between the meshing gears and optimum lubrication
- Can be mounted in any position
- Selflocking up to 80 rpm at 50 Hz and up to 96 rpm at 60 Hz







# Characteristic features

## MANUAL OPERATION

As the handwheel is always in operation, manual operation is possible even if the equipment is temporarily seized e.g. if a valve is jammed in the end position. The handwheel can be operated remotely without difficulty for inaccessible actuators via corresponding linkages and bevel gears.

## TENV MOTORS

DREHMO actuators are fitted with totally enclosed non-ventilated motors (3-phase asynchronous motor TENV) as standard. This design guarantees the greatest possible protection against humidity and dust ingress and is therefore suitable for operation in extreme environmental conditions. Operating mode: Short-time duty S2 – 10 / 15 min; in modulating operation, S4 intermittent service max. 35 % ED. Insulation class F.

## IEC MOTORS AND SPECIAL MOTORS

Standard motors, such as single-phase or DC motors, can be supplied on request instead of TENV motors.

## THERMAL PROTECTION FOR THE MOTOR

Three thermal switches (or alternative PTC thermistors) are connected in series in the end windings of the motor.

## PAINT COATING, CORROSION PROTECTION

Standard colour: RAL5015 (skyblue)  
According to EN ISO12944-2 we have rated our corrosion protection system as follows:  
K 3: for operation in occasionally aggressive atmospheres => C3  
K 4: for operation in permanently aggressive atmospheres => C4  
K 5: for operation in extremely aggressive atmospheres, such as off-shore platforms or cooling towers. => C5-M, C5-I  
Other protection grades and colours on request.

## AMBIENT TEMPERATURES

Basic design:  
-25 °C to + 80 °C (S2-Operation)  
-25 °C to + 60 °C (S4-Operation)  
Explosion proof actuators:  
-25 °C to + 60 °C (S2-Operation)  
-25 °C to + 60 °C (S4-Operation)

## MOUNTING POSITION

Mounting and operation in any position permitted.

## EXPLOSION PROOF ACTUATORS

Standards: Directive 2014/34/EC (ATEX)  
EN 60079-0: 2012+A11:2013  
EN 60079-1: 2014  
EN 60079-7: 2015  
EN 60079-11: 2012  
Label Ex: II 2 G Ex db eb ib IIC, IIB T4, T3 Gb  
In accordance with EN 13463 II 2 G c T4

## ENCLOSURE TYPE

According to EN 60529 and EN 60034 DREHMO actuators with enclosed motors are supplied as standard with enclosure type IP 68 (5m for 24h).

## CONFORMITY TO CE RULES

DREHMO actuators comply with the EC Machinery Directive 2006/42/EC, EC Low-Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

## ELECTRICAL CONNECTION

Electrical connection is accomplished by means of a plug/socket connector which connects the control and signal wires as well as the power supply. Method of connection is screw terminals for control signals and for power supply.

## GEAR DESIGN

The gears are self-locking at all speeds up to 80/96 rpm, also at manual operation. Low surface loading of gear-tooth system because several teeth are always in mesh. Long life time is guaranteed because of permanent lubrication and air-tight oil chamber, therefore the oil cannot oxidise.

## MECHANICAL COUPLING TYPES

Multi-turn actuators: Matched to the valve using coupling types and flange dimensions in accordance with DIN EN ISO 5210 or DIN 3210. Hollow shaft for ascending valve stem. Coupling types: stem nut, plug bush, bore with keyway, pawl clutch, free shaft extension. Special designs for special installation conditions are possible. Part-turn actuators: Coupling types and flange dimensions in accordance with DIN EN ISO 5211. Coupling types: bore with keyway, dihedron, square bore. Thrust actuators: Coupling type in accordance with DIN 3358.

## 'BUILDING BRICK' PRINCIPLE

Additional units such as switches, transducers, mechanical position indicators, plug connectors, control and indication devices can be fitted after work or after installation. Simple speed changes by changing the pick-off gear. Full insulation when cathodic protection required.

## TORQUE SWITCH

Position related switch-off is necessary when certain types of valve must be loaded in their mechanical end positions. Equally position signalling can only be done via limit switches. The switching instruction is initiated in relation to the setting distance of valve when it reaches a switching point. Either a roller counter unit or cam switch unit is used to operate the limit switches.

## LIMIT SWITCH VIA COUNTER GEAR

The counter gear consists of 2 roller units that work independently of one another. Each unit is fitted with a microswitch which is assigned to a certain direction of rotation (clockwise or anticlockwise rotation).

## LIMIT SWITCH VIA CAMSHAFT GEAR

Another 4 limit switches are possible in combination with a cam switch unit and reduction gear. These switches can also perform switching functions for both intermediate and limit positions.

## MECHANICAL POSITION INDICATOR

The mechanical position indicator continuously shows the valve position on the device.

## BLINKER SWITCH

The blinker switch is a microswitch that indicates the movement of the DREHMO actuator. The signal it issues can be processed as a running message in the control unit.

## HEATER

Heating is provided to prevent condensation from forming in the switch housing of the DREHMO actuator.

## RESISTANCE TRANSDUCER

## ELECTRONIC POSITION TRANSDUCER

For remote electrical indication of a valve position: Their function is to convert the particular position of the actuator into an electrical signal. This signal is passed either to an indicating instrument or for further processing into the control electronics.

## REDUCTION GEAR

The following accessories require a gear that reduces the entire actuator travel of the valve to an angle of rotation  $\leq 290^\circ$ :  
Limit switch in combination with camshaft gear, mechanical position indication, potentiometer for remote continuous position indication and current position transmitter.

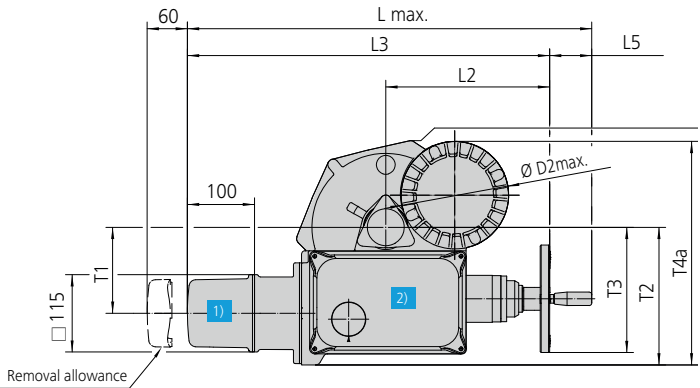
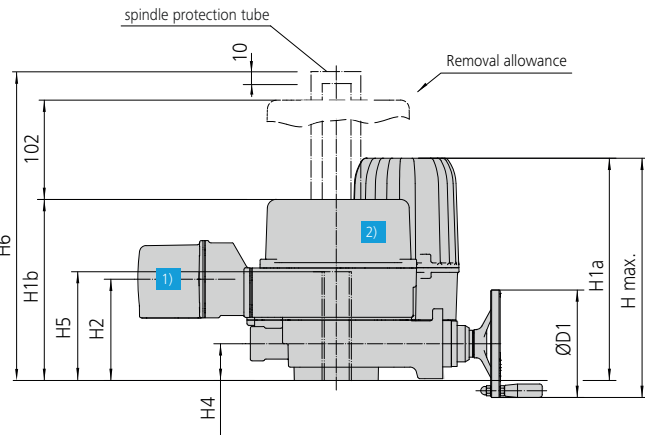
# Actuator Dimensions

MULTI-TURN ACTUATOR D

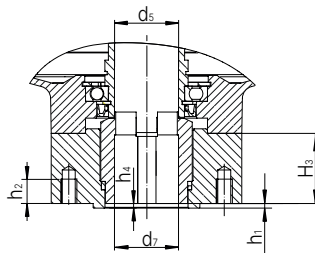
MULTI-TURN ACTUATOR FOR MODULATING DUTY DR



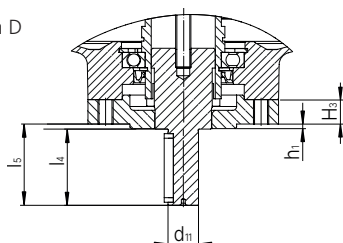
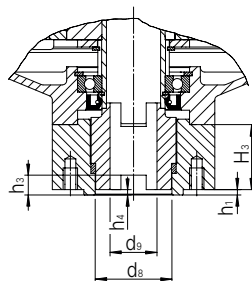
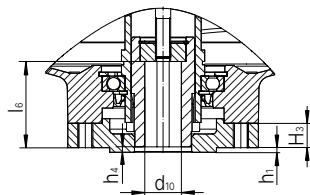
| Actuator Models<br>D, DR | 30                             | 59   | 60   | 120  | 249  | 250                         | 500  | 1000 | 2000 |
|--------------------------|--------------------------------|------|------|------|------|-----------------------------|------|------|------|
| Weight [kg]              | 18                             | 20   | 24   | 28   | 28   | 64                          | 75   | 85   | 190  |
| Dimensions [mm]          |                                |      |      |      |      |                             |      |      |      |
| L max.                   | 574                            | 574  | 603  | 608  | 608  | 661                         | 733  | 733  | 815  |
| T4 max.                  | 287                            | 287  | 334  | 360  | 360  | 455                         | 530  | 580  | 757  |
| H max.                   | 311                            | 311  | 356  | 402  | 402  | 570                         | 695  | 745  | 880  |
| D1                       | Ø160                           | Ø160 | Ø160 | Ø250 | Ø250 | Ø250                        | Ø400 | Ø500 | Ø500 |
| D2 max.                  | Ø127                           | Ø127 | Ø160 | Ø160 | Ø160 | Ø245                        | Ø245 | Ø245 | Ø245 |
| H1a                      | 280                            | 280  | 331  | 331  | 331  | 492                         | 542  | 542  | 730  |
| H1b                      | 252                            | 252  | 270  | 270  | 270  | 320                         | 320  | 320  | 386  |
| H2                       | 131                            | 131  | 151  | 151  | 151  | 200                         | 200  | 200  | 267  |
| H4                       | 49                             | 49   | 55   | 55   | 55   | 69                          | 69   | 69   | 124  |
| H5                       | 140                            | 140  | 160  | 160  | 160  | 210                         | 210  | 210  | 169  |
| H6                       | 250                            | 250  | 270  | 270  | 270  | 452                         | 452  | 452  | 500  |
|                          | 352                            | 352  | 372  | 372  | 372  | 702                         | 702  | 702  | -    |
|                          | 452                            | 452  | 472  | 472  | 472  | 952                         | 952  | 952  | -    |
|                          | 552                            | 552  | 572  | 572  | 572  | -                           | -    | -    | -    |
|                          | 652                            | 652  | 672  | 672  | 672  | -                           | -    | -    | -    |
| L2                       | 209                            | 209  | 244  | 232  | 232  | 264                         | 311  | 311  | 348  |
| L3                       | 511                            | 511  | 540  | 528  | 528  | 581                         | 628  | 628  | 710  |
| L5                       | 63                             | 63   | 63   | 80   | 80   | 80                          | 105  | 105  | 105  |
| T1                       | 104                            | 104  | 128  | 128  | 128  | 129                         | 129  | 129  | 203  |
| T2                       | 179                            | 179  | 205  | 205  | 205  | 213                         | 213  | 213  | 294  |
| T3                       | 178                            | 178  | 187  | 232  | 232  | 260                         | 335  | 385  | 450  |
| T4a                      | 287                            | 287  | 334  | 334  | 334  | 412                         | 412  | 412  | 601  |
| cover size               | 2) 233 x 153 x 102 (L x T x H) |      |      |      |      | 245 x 170 x 102 (L x T x H) |      |      |      |



## MULTI-TURN ACTUATOR FOR MODULATING DUTY $D(R)$



Technical drawing of a spherical part. The drawing shows a cross-section of a sphere with a central vertical axis. The diameter of the sphere is labeled  $b_4$ . The thickness of the central vertical section is labeled  $t_3$ .



|                |            |      |      |      |      |      |      |       |
|----------------|------------|------|------|------|------|------|------|-------|
| $b1_{59}$      | FORM B1, B | 8    | 12   | 12   | 18   | 18   | 22   | 28    |
| $d_5$          |            | 26   | 30   | 40.5 | 40.5 | 52.5 | 65.5 | 85    |
| $d_{iH9}$      | B1, B      | 28   | 42   | 42   | 60   | 60   | 80   | 100   |
| $d_{jmax}$     | B2,B       | 28   | 42   | 42   | 60   | 65   | 80   | 100   |
| $H_3$          |            | 36   | 46   | 46   | 70   | 66   | 81   | 130   |
| $h_1 = h_{-4}$ |            | 3    | 3    | 3    | 4    | 4    | 5    | 5     |
| $t_1$          | FORM B1, B | 31.3 | 45.3 | 45.3 | 64.4 | 64.4 | 85.5 | 106.4 |

|                                 |            |      |      |      |      |      |      |      |
|---------------------------------|------------|------|------|------|------|------|------|------|
| b <sub>4</sub> <sup>B9</sup>    | FORM B3, E | 5    | 6    | 6    | 8    | 8    | 12   | 14   |
| d <sub>10</sub> <sup>H9</sup>   | B3, E      | 16   | 20   | 20   | 30   | 30   | 40   | 50   |
| d <sub>10 max</sub>             | B4, E      | 16   | 20   | 30   | 30   | 40   | 50   | 50   |
| H3                              |            | 18   | 17   | 16   | 22   | 23   | 28   | 30   |
| h <sub>1</sub> = h <sub>4</sub> |            | 3    | 3    | 3    | 4    | 4    | 5    | 5    |
| I <sub>6</sub>                  |            | 41   | 56   | 56   | 79   | 79   | 98   | 118  |
| t <sub>3</sub>                  | FORM B3, E | 18.3 | 22.8 | 22.8 | 33.3 | 33.3 | 43.3 | 53.8 |

|                                 |        |    |    |    |    |    |     |       |
|---------------------------------|--------|----|----|----|----|----|-----|-------|
| b2 <sup>H11</sup>               | FORM C | 14 | 14 | 14 | 20 | 20 | 24  | 30    |
| d <sub>8</sub>                  |        | 42 | 54 | 54 | 80 | 85 | 110 | 139.9 |
| d <sub>9</sub>                  |        | 26 | 28 | 28 | 38 | 38 | 47  | 85    |
| H <sub>3</sub>                  |        | 36 | 46 | 46 | 70 | 66 | 81  | 130   |
| h <sub>1</sub> = h <sub>4</sub> |        | 3  | 3  | 3  | 4  | 4  | 5   | 5     |
| h <sub>3</sub>                  |        | 11 | 11 | 11 | 14 | 14 | 17  | 16    |

|                              |        |    |      |      |    |    |    |    |
|------------------------------|--------|----|------|------|----|----|----|----|
| b <sub>3</sub> <sub>H9</sub> | FORM D | 5  | 6    | 6    | 8  | 8  | 12 | -  |
| d <sub>11</sub>              |        | 16 | 20   | 20   | 30 | 30 | 40 | -  |
| H <sub>3</sub>               |        | 18 | 17   | 16   | 22 | 23 | 28 | 30 |
| h <sub>1</sub>               |        | 3  | 3    | 3    | 4  | 4  | 5  | 5  |
| l <sub>4</sub>               |        | 40 | 50   | 50   | 70 | 70 | 90 | -  |
| l <sub>5</sub>               |        | 45 | 55   | 55   | 76 | 76 | 96 | -  |
| t <sub>9</sub>               |        | 18 | 22.5 | 22.5 | 33 | 33 | 43 | -  |

9



# Technical data

## MULTI-TURN ACTUATOR D



| Actuator Model       | Actuator speed [rpm]                                                                     | Torque Adjustment Range [Nm] | Connection Flange According to DIN EN ISO 5210 (standard) | Connection Flange According to DIN EN ISO 5210 (special request) | Connection Flange According to DIN 3210 (special request) | Max. allowable spindle diameter at form A <sup>3)</sup> [mm] | Max. allowable axial force at form "A" [kN] | Type of Duty S 2-... [min] |
|----------------------|------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------|----------------------------|
| D 30                 | 5, 10, 16, 25, 32, 40, 50, 80 120 <sup>1,2)</sup> , 160 <sup>1,2)</sup>                  | 10-30                        | F07                                                       | F10                                                              | G0                                                        | 24<br>28                                                     | 30<br>40                                    | 15                         |
| D 59                 |                                                                                          | 20-60                        | F10                                                       | F07                                                              | G0                                                        | 28<br>24                                                     | 40<br>30                                    | 15                         |
| D 60                 |                                                                                          | 20-60                        | F10                                                       | F07                                                              | G0                                                        | 40<br>32                                                     | 60<br>40                                    | 15                         |
| D 120                |                                                                                          | 40-120                       | F10                                                       | F14                                                              | G0<br>G1/2                                                | 40<br>40                                                     | 60<br>60                                    | 15                         |
| D 249                |                                                                                          | 80-250                       | F14                                                       | F10                                                              | G1/2<br>G0                                                | 40<br>40                                                     | 60<br>60                                    | 15                         |
| D 250                |                                                                                          | 80-250                       | F14                                                       | F16                                                              | G1/2                                                      | 52                                                           | 120                                         | 15                         |
| D 500                | 5, 10, 16, 25, 32, 40, 50, 80, 120 <sup>1)</sup> , 160 <sup>1)</sup> , 200 <sup>4)</sup> | 150-500                      | F14                                                       | F16                                                              | G1/2                                                      | 52                                                           | 160                                         | 10                         |
| D 1000               | 5, 10, 16, 25, 32, 40, 50, 80, 120 <sup>1),4)</sup> , 160 <sup>1),4)</sup>               | 300-1000                     | F16                                                       |                                                                  | G3                                                        | 65                                                           | 190                                         | 10                         |
|                      | 200 <sup>4)</sup>                                                                        | 300-800                      |                                                           |                                                                  |                                                           |                                                              |                                             |                            |
| D 2000 <sup>4)</sup> | 20, 40, 80, 120, 160, 200                                                                | 800-2000                     | F25                                                       | *)                                                               | *)                                                        | 85                                                           | 380                                         | 15                         |

<sup>1)</sup> Actuators with this speed are not self-locking

<sup>2)</sup> Not available for sizes D... 249

<sup>3)</sup> For form B, B1, B2, C dimension d5 to be observed

<sup>4)</sup> Special safety provisions have to be implemented for pulling loads  
\*) on request



# Technical data

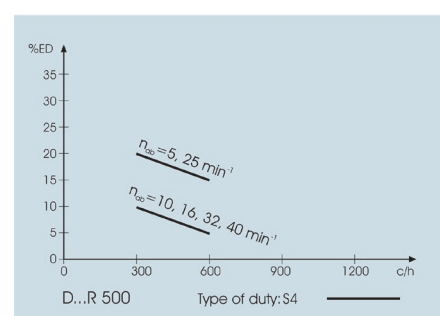
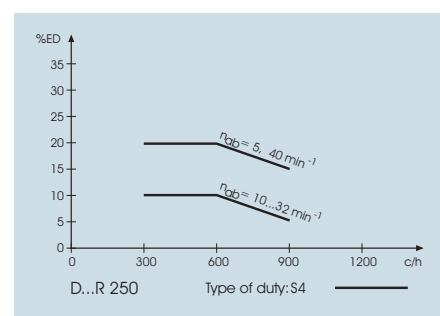
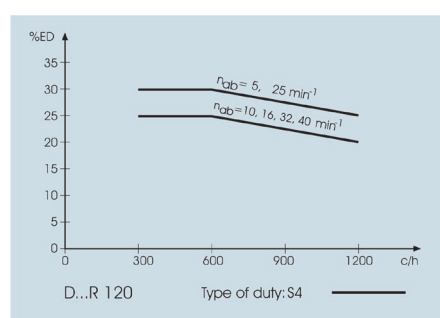
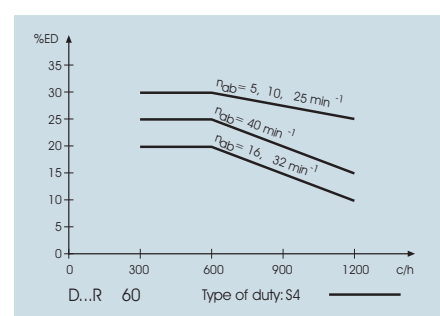
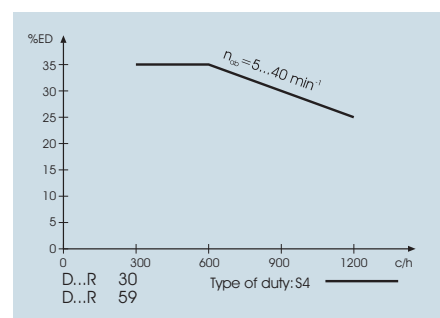
## MULTI-TURN ACTUATOR FOR MODULATING DUTY DR



| Actuator Model        | Actuator Speed (rpm) | Required Min. Length of Signal for Operating into Same Direction (ms) <sup>1)</sup> | Hysteresis (ms) | Torque Adjustment Range (Nm) | Max. Modulating Torque (N-m) | Connection Flange to DIN EN ISO 5210 (Standard) | Connection Flange to DIN EN ISO 5210 (Special Request) | Connection Flange to DIN 3210 (Special Request) | Max. Allowable Stem Diameter Output Drive A <sup>1)</sup> (mm) | Max. Allowable Axial Force Output Drive "A" (kN) |
|-----------------------|----------------------|-------------------------------------------------------------------------------------|-----------------|------------------------------|------------------------------|-------------------------------------------------|--------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------|
| DR 30                 | 5                    | 40                                                                                  | 290             | 15-30                        | 15                           | F07<br>-<br>-                                   | -                                                      | -                                               | 24<br>-                                                        | 30<br>-                                          |
|                       | 10                   | 40                                                                                  | 84              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 53              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 34              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 26              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 40                                                                                  | 22              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 59                 | 5                    | 40                                                                                  | 290             | 30-60                        | 30                           | F10<br>-                                        | -                                                      | G0                                              | 28<br>-                                                        | 40<br>-                                          |
|                       | 10                   | 40                                                                                  | 84              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 53              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 34              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 26              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 40                                                                                  | 22              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 60                 | 5                    | 40                                                                                  | 400             | 30-60                        | 30                           | F10                                             | F07<br>-                                               | -                                               | 32<br>40<br>40                                                 | 60<br>60<br>40                                   |
|                       | 10                   | 40                                                                                  | 200             |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 122             |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 48              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 39              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 40                                                                                  | 31              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 120                | 5                    | 40                                                                                  | 400             | 60-120                       | 60                           | F10<br>-                                        | -                                                      | G0                                              | 40<br>-                                                        | 60<br>-                                          |
|                       | 10                   | 40                                                                                  | 200             |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 122             |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 48              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 39              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 65                                                                                  | 31              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 250                | 5                    | 40                                                                                  | 127             | 120-250                      | 120                          | F14                                             | F16                                                    | G1/2                                            | 52                                                             | 120                                              |
|                       | 10                   | 40                                                                                  | 64              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 39              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 25              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 21              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 40                                                                                  | 16              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 500                | 5                    | 40                                                                                  | 127             | 200-500                      | 200                          | F14                                             | F16                                                    | G1/2                                            | 52                                                             | 160                                              |
|                       | 10                   | 40                                                                                  | 64              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 39              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 25              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 32                   | 40                                                                                  | 21              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 40                   | 40                                                                                  | 16              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
| DR 1000 <sup>2)</sup> | 5                    | 40                                                                                  | 117             | 500-1000                     | 500                          | F16                                             | -                                                      | G3                                              | 65                                                             | 190                                              |
|                       | 10                   | 40                                                                                  | 66              |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 16                   | 40                                                                                  | 4 <sup>4)</sup> |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |
|                       | 25                   | 40                                                                                  | 4 <sup>4)</sup> |                              |                              |                                                 |                                                        |                                                 |                                                                |                                                  |

- 1) For model B, B1, B2, C please consider dimension d5
- 2) Max. duty cycle 10 % max. operations per hour 300 (c/h)
- 3) Without consideration of signal running times caused by control processes
- 4) On request

Percentage of operation (% ED) within one hour in relation to number of duty cycles (c/h) per hour for different actuator output speeds ( $n_{ab}$ )



# Motor data

## MULTI-TURN ACTUATOR D



| Actuator Model     |           | Motor (400 V / 3ph / 50 Hz, 480 V / 3ph / 60 Hz) |                     |            |                                                    |                |                                                     |                                                    |                                                      |                                        |         |
|--------------------|-----------|--------------------------------------------------|---------------------|------------|----------------------------------------------------|----------------|-----------------------------------------------------|----------------------------------------------------|------------------------------------------------------|----------------------------------------|---------|
|                    |           | Output speed <sup>1)</sup><br>[rpm]              | Max. torque<br>[Nm] | Motor type | Nominal Power <sup>2)</sup><br>P <sub>N</sub> [kW] | Speed<br>[rpm] | Nominal Current <sup>3)</sup><br>I <sub>N</sub> [A] | load data                                          |                                                      | Starting Current<br>I <sub>N</sub> [A] | cos phi |
|                    |           |                                                  |                     |            |                                                    |                |                                                     | 50 % Current <sup>4)</sup><br>I <sub>50%</sub> [A] | 100 % Current <sup>5)</sup><br>I <sub>100%</sub> [A] |                                        |         |
| D 30               | S2-15 min | 5                                                | 30                  | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.4                                                | 0.4                                                  | 1.5                                    | 0.66    |
|                    |           | 10                                               |                     | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.4                                                | 0.4                                                  | 1.5                                    | 0.66    |
|                    |           | 16                                               |                     | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.4                                                | 0.5                                                  | 1.5                                    | 0.66    |
|                    |           | 25                                               |                     | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.5                                                | 0.7                                                  | 1.5                                    | 0.66    |
|                    |           | 32                                               |                     | TM4.01013  | 0.34                                               | 2.840          | 1.10                                                | 1.1                                                | 1.1                                                  | 4.8                                    | 0.62    |
|                    |           | 40                                               |                     | TM4.0106   | 0.25                                               | 1.360          | 1.10                                                | 1.0                                                | 1.1                                                  | 2.7                                    | 0.65    |
|                    |           | 50                                               |                     | TM4.01013  | 0.34                                               | 2.840          | 1.10                                                | 1.0                                                | 1.2                                                  | 4.8                                    | 0.62    |
|                    | S2-10 min | 80                                               |                     | TM4.01013  | 0.34                                               | 2.840          | 1.10                                                | 1.4                                                | 1.8                                                  | 4.8                                    | 0.62    |
|                    |           | 120                                              |                     | TM4.01013  | 0.34                                               | 2.840          | 1.10                                                | 1.4                                                | 2.0                                                  | 4.8                                    | 0.62    |
|                    |           | 160                                              |                     | TM4.01014  | 0.75                                               | 2.800          | 2.00                                                | 2.0                                                | 2.5                                                  | 10.0                                   | 0.70    |
| D 59               | S2-15 min | 5                                                | 60                  | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.4                                                | 0.5                                                  | 1.5                                    | 0.66    |
|                    |           | 10                                               |                     | TM4.0105   | 0.12                                               | 1.360          | 0.53                                                | 0.4                                                | 0.6                                                  | 1.5                                    | 0.66    |
|                    |           | 16                                               |                     | TM4.0106   | 0.25                                               | 1.360          | 1.10                                                | 0.9                                                | 1.0                                                  | 2.7                                    | 0.65    |
|                    |           | 25                                               |                     | TM4.0106   | 0.25                                               | 1.390          | 1.10                                                | 0.9                                                | 1.2                                                  | 2.7                                    | 0.65    |
|                    |           | 32                                               |                     | TM4.01013  | 0.34                                               | 2.840          | 1.10                                                | 1.1                                                | 1.4                                                  | 4.8                                    | 0.62    |
|                    |           | 40                                               |                     | TM4.0107   | 0.40                                               | 1.390          | 1.50                                                | 1.4                                                | 1.8                                                  | 5.1                                    | 0.63    |
|                    | S2-10 min | 50                                               |                     | TM4.01014  | 0.75                                               | 2.800          | 2.00                                                | 1.8                                                | 2.2                                                  | 10.0                                   | 0.70    |
|                    |           | 80                                               |                     | TM4.01014  | 0.75                                               | 2.800          | 2.00                                                | 2.1                                                | 2.9                                                  | 10.0                                   | 0.70    |
|                    |           | 120                                              |                     | TM4.01014  | 0.75                                               | 2.800          | 2.00                                                | 2.1                                                | 3.2                                                  | 10.0                                   | 0.70    |
|                    |           | 160                                              |                     | TM4.01014  | 0.75                                               | 2.800          | 2.00                                                | 2.5                                                | 4.1                                                  | 10.0                                   | 0.70    |
| D 60<br>S2-15 min  | S2-15 min | 5                                                | 60                  | TM1.01005  | 0.12                                               | 1.360          | 0.57                                                | 0.6                                                | 0.7                                                  | 1.5                                    | 0.62    |
|                    |           | 10                                               |                     | TM1.01000  | 0.21                                               | 2.670          | 0.65                                                | 0.7                                                | 0.9                                                  | 2.3                                    | 0.76    |
|                    |           | 16                                               |                     | TM1.01001  | 0.42                                               | 2.700          | 1.15                                                | 1.0                                                | 1.3                                                  | 4.6                                    | 0.81    |
|                    |           | 25                                               |                     | TM1.01006  | 0.18                                               | 1.320          | 0.76                                                | 0.8                                                | 1.2                                                  | 2.0                                    | 0.64    |
|                    |           | 32                                               |                     | TM1.01001  | 0.42                                               | 2.700          | 1.15                                                | 1.0                                                | 1.3                                                  | 4.6                                    | 0.81    |
|                    |           | 40                                               |                     | TM1.01007  | 0.34                                               | 1.310          | 1.30                                                | 1.2                                                | 1.8                                                  | 3.5                                    | 0.63    |
|                    |           | 50                                               |                     | TM1.01001  | 0.42                                               | 2.700          | 1.15                                                | 1.4                                                | 1.9                                                  | 4.6                                    | 0.81    |
|                    |           | 80                                               |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 2.0                                                | 2.7                                                  | 9.0                                    | 0.80    |
|                    |           | 120                                              |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 2.7                                                | 4.2                                                  | 9.0                                    | 0.80    |
|                    |           | 160                                              |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 2.8                                                | 4.6                                                  | 9.0                                    | 0.80    |
| D 120<br>S2-15 min | S2-15 min | 5                                                | 120                 | TM1.01007  | 0.34                                               | 1.310          | 1.30                                                | 1.0                                                | 1.2                                                  | 3.5                                    | 0.63    |
|                    |           | 10                                               |                     | TM1.01001  | 0.42                                               | 2.700          | 1.15                                                | 1.0                                                | 1.4                                                  | 4.6                                    | 0.81    |
|                    |           | 16                                               |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 1.7                                                | 2.1                                                  | 9.0                                    | 0.80    |
|                    |           | 25                                               |                     | TM1.01008  | 0.56                                               | 1.325          | 1.70                                                | 1.5                                                | 2.1                                                  | 5.7                                    | 0.72    |
|                    |           | 32                                               |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 1.8                                                | 2.3                                                  | 9.0                                    | 0.80    |
|                    |           | 40                                               |                     | TM1.01009  | 0.75                                               | 1.345          | 2.50                                                | 2.3                                                | 3.1                                                  | 8.6                                    | 0.62    |
|                    |           | 50                                               |                     | TM1.01002  | 0.90                                               | 2.670          | 2.30                                                | 2.2                                                | 3.4                                                  | 9.0                                    | 0.80    |
|                    |           | 80                                               |                     | TM1.01003  | 1.50                                               | 2.710          | 3.10                                                | 2.9                                                | 4.4                                                  | 14.6                                   | 0.89    |
|                    |           | 120                                              |                     | TM1.01004P | 1.60                                               | 2.820          | 3.70                                                | 4.4                                                | 6.6                                                  | 20.5                                   | 0.80    |
|                    |           | 160                                              |                     | TM1.01004P | 1.60                                               | 2.820          | 3.70                                                | 5.0                                                | 8.0                                                  | 20.5                                   | 0.80    |



# Motor data

## MULTI-TURN ACTUATOR D



| Actuator Model      |           | Motor (400 V / 3ph / 50 Hz, 480 V / 3ph / 60 Hz) |                     |              |                                                    |                |                                                     |                                                    |                                                      |                                        |         |
|---------------------|-----------|--------------------------------------------------|---------------------|--------------|----------------------------------------------------|----------------|-----------------------------------------------------|----------------------------------------------------|------------------------------------------------------|----------------------------------------|---------|
|                     |           | Output speed <sup>1)</sup><br>[rpm]              | Max. torque<br>[Nm] | Motor type   | Nominal Power <sup>2)</sup><br>P <sub>N</sub> [kW] | Speed<br>[rpm] | Nominal Current <sup>3)</sup><br>I <sub>N</sub> [A] | load data                                          |                                                      | Starting Current<br>I <sub>N</sub> [A] | cos phi |
|                     |           |                                                  |                     |              |                                                    |                |                                                     | 50 % Current <sup>4)</sup><br>I <sub>50%</sub> [A] | 100 % Current <sup>5)</sup><br>I <sub>100%</sub> [A] |                                        |         |
| D 249               | S2-15 min | 5                                                | 250                 | TM1.01007    | 0.34                                               | 1.310          | 1.30                                                | 1.1                                                | 1.8                                                  | 3.5                                    | 0.63    |
|                     |           | 10                                               |                     | TM1.01008    | 0.56                                               | 1.325          | 1.70                                                | 1.4                                                | 1.9                                                  | 5.7                                    | 0.72    |
|                     |           | 16                                               |                     | TM1.01008    | 0.56                                               | 1.325          | 1.70                                                | 1.7                                                | 2.5                                                  | 5.7                                    | 0.72    |
|                     |           | 25                                               |                     | TM1.01009    | 0.75                                               | 1.345          | 2.50                                                | 2.5                                                | 4.1                                                  | 8.6                                    | 0.62    |
|                     |           | 32                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 2.4                                                | 4.0                                                  | 14.6                                   | 0.89    |
|                     |           | 40                                               |                     | TM1.01010    | 0.80                                               | 1.390          | 3.60                                                | 3.6                                                | 6.0                                                  | 11.2                                   | 0.50    |
|                     |           | 50                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 3.5                                                | 6.6                                                  | 14.6                                   | 0.89    |
|                     | S2-10 min | 80                                               | 200                 | TM1.01004    | 1.60                                               | 2.820          | 3.70                                                | 5.3                                                | 9.6                                                  | 20.5                                   | 0.80    |
|                     |           | 120                                              |                     | TM1.01004P   | 1.60                                               | 2.820          | 3.70                                                | Ⓔ                                                  | Ⓔ                                                    | 20.5                                   | 0.80    |
| D 250               | S2-15 min | 5                                                | 250                 | TM1.01008    | 0.56                                               | 1.325          | 1.70                                                | 1.2                                                | 1.6                                                  | 5.7                                    | 0.72    |
|                     |           | 10                                               |                     | TM1.01002    | 0.90                                               | 2.670          | 2.30                                                | 1.6                                                | 2.5                                                  | 9.0                                    | 0.80    |
|                     |           | 16                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 1.8                                                | 3.0                                                  | 14.6                                   | 0.89    |
|                     |           | 25                                               |                     | TM1.01009    | 0.75                                               | 1.345          | 2.50                                                | 2.2                                                | 3.5                                                  | 8.6                                    | 0.62    |
|                     | S2-10 min | 32                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 2.2                                                | 4.3                                                  | 14.6                                   | 0.89    |
|                     | S2-15 min | 40                                               |                     | TM2.01079    | 2.00                                               | 1.440          | 4.80                                                | 4.0                                                | 6.3                                                  | 25.0                                   | 0.77    |
|                     |           | 50                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 2.7                                                | 6.1                                                  | 14.6                                   | 0.89    |
|                     |           | 80                                               |                     | TM1.01004    | 1.60                                               | 2.820          | 3.70                                                | 4.4                                                | 10.1                                                 | 20.5                                   | 0.80    |
|                     |           | 120                                              |                     | TM2.01075    | 4.00                                               | 2.900          | 9.00                                                | 7.8                                                | 17.6                                                 | 57.0                                   | 0.80    |
|                     |           | 160                                              |                     | TM2.01076    | 6.00                                               | 2.870          | 13.90                                               | 9.9                                                | 19.9                                                 | 76.0                                   | 0.78    |
| D 500<br>S2-10 min  |           | 5                                                | 500                 | TM1.01009    | 0.75                                               | 1.345          | 2.50                                                | 2.1                                                | 2.7                                                  | 8.6                                    | 0.62    |
|                     |           | 10                                               |                     | TM1.01003    | 1.50                                               | 2.710          | 3.10                                                | 2.0                                                | 3.9                                                  | 14.6                                   | 0.89    |
|                     |           | 16                                               |                     | TM1.01004    | 1.60                                               | 2.820          | 3.70                                                | 3.2                                                | 5.8                                                  | 20.5                                   | 0.80    |
|                     |           | 25                                               |                     | TM2.01079    | 2.00                                               | 1.440          | 4.80                                                | 4.4                                                | 8.3                                                  | 25.0                                   | 0.77    |
|                     |           | 32                                               |                     | TM2.01075    | 4.00                                               | 2.900          | 9.00                                                | 5.0                                                | 9.6                                                  | 57.0                                   | 0.80    |
|                     |           | 40                                               |                     | TM2.01081    | 4.50                                               | 1.435          | 11.10                                               | 7.4                                                | 11.7                                                 | 57.0                                   | 0.77    |
|                     |           | 50                                               |                     | TM2.01075    | 4.00                                               | 2.900          | 9.00                                                | 6.2                                                | 14.5                                                 | 57.0                                   | 0.80    |
|                     |           | 80                                               |                     | TM2.01076    | 6.00                                               | 2.870          | 13.90                                               | 10.6                                               | 22.7                                                 | 76.0                                   | 0.78    |
|                     |           | 120                                              |                     | TM2.01078    | 8.50                                               | 2.875          | 18.70                                               | 14.4                                               | 31.6                                                 | 112.0                                  | 0.82    |
|                     |           | 160                                              |                     | TM2.01078    | 8.50                                               | 2.875          | 18.70                                               | 16.3                                               | 37.7                                                 | 112.0                                  | 0.82    |
|                     |           | 200                                              |                     | TB2.01076    | 6.00                                               | 2.870          | 13.90                                               | Ⓔ                                                  | Ⓔ                                                    | 76.0                                   | 0.78    |
| D 1000<br>S2-10 min |           | 5                                                | 1000                | TM1.01010    | 0.80                                               | 1.390          | 3.60                                                | Ⓔ                                                  | Ⓔ                                                    | 11.2                                   | 0.50    |
|                     |           | 10                                               |                     | TM1.01004    | 1.60                                               | 2.820          | 3.70                                                | 3.6                                                | 7.2                                                  | 20.5                                   | 0.80    |
|                     |           | 16                                               |                     | TM2.01075    | 4.00                                               | 2.900          | 9.00                                                | 6.5                                                | 14.3                                                 | 57.0                                   | 0.80    |
|                     |           | 25                                               |                     | TM2.01081    | 4.50                                               | 1.435          | 11.10                                               | 8.6                                                | 16.9                                                 | 57.0                                   | 0.77    |
|                     |           | 32                                               |                     | TM2.01075    | 4.00                                               | 2.900          | 9.00                                                | 8.1                                                | 21.8                                                 | 57.0                                   | 0.80    |
|                     |           | 40                                               |                     | TM2.01082    | 6.00                                               | 1.420          | 15.10                                               | 12.4                                               | 24.9                                                 | 64.0                                   | 0.73    |
|                     |           | 50                                               |                     | TM2.01076    | 6.00                                               | 2.870          | 13.90                                               | 11.8                                               | 30.2                                                 | 76.0                                   | 0.78    |
|                     |           | 80                                               |                     | TM2.01078    | 8.50                                               | 2.875          | 18.70                                               | 18.4                                               | 46.1                                                 | 112.0                                  | 0.82    |
|                     |           | 120                                              |                     | TB2.01082    | 6.00                                               | 1.420          | 15.10                                               | 13.3                                               | 27.3                                                 | 64.0                                   | 0.73    |
|                     |           | 160                                              |                     | TB2.01078    | 8.50                                               | 2.875          | 18.70                                               | 17.7                                               | 40.9                                                 | 112.0                                  | 0.82    |
|                     |           | 200                                              | 800                 | TB2.01078    | 8.50                                               | 2.875          | 18.70                                               | 22.0                                               | 36.0                                                 | 112.0                                  | 0.82    |
| D 2000<br>S2-15 min |           | 20                                               | 2000                | RUF100L/40K  | 2.50                                               | 1.460          | 6.50                                                | Ⓔ                                                  | Ⓔ                                                    | 35.0                                   | 0.77    |
|                     |           | 40                                               |                     | RUF112/4K    | 5.00                                               | 1.420          | 11.50                                               | Ⓔ                                                  | Ⓔ                                                    | 52.0                                   | 0.81    |
|                     |           | 80                                               |                     | RUF112M/20KS | 7.50                                               | 2.900          | 16.50                                               | Ⓔ                                                  | Ⓔ                                                    | 75.0                                   | 0.85    |
|                     |           | 120                                              |                     | RUF132M/20KS | 14.00                                              | 2.900          | 26.50                                               | Ⓔ                                                  | Ⓔ                                                    | 170.0                                  | 0.87    |
|                     |           | 160                                              |                     | RUF132M/20KS | 14.00                                              | 2.900          | 26.50                                               | Ⓔ                                                  | Ⓔ                                                    | 170.0                                  | 0.87    |
|                     |           | 200                                              |                     | RUF160L/2K   | 22.00                                              | 2.900          | 41.00                                               | Ⓔ                                                  | Ⓔ                                                    | 312.0                                  | 0.90    |

<sup>1)</sup> Output speed: increased by factor 1.2 at 60 Hz

<sup>2)</sup> Nominal power P<sub>N</sub>: Mechanical power at motor shaft (data on nameplate); increased by factor 1.2 at 60 Hz

<sup>3)</sup> Nominal current I<sub>N</sub>: Rated current of the motor (data on nameplate)

<sup>4)</sup> 50 % current I<sub>50%</sub>: Current at 50 % of maximum adjustable torque

<sup>5)</sup> 100 % current I<sub>100%</sub>: Current at 100 % of maximum adjustable torque

<sup>Ⓔ</sup> on request

# Motor data

MULTI-TURN ACTUATOR FOR MODULATING DUTY DR



| Actuator Model | Motor (400 V / 3ph / 50 Hz, 480 V / 3ph / 60 Hz) |             |            |                             |       |                               |                                                    |                                                      |                    |         |
|----------------|--------------------------------------------------|-------------|------------|-----------------------------|-------|-------------------------------|----------------------------------------------------|------------------------------------------------------|--------------------|---------|
|                | Output speed <sup>1)</sup>                       | Max. torque | Motor type | Nominal Power <sup>2)</sup> | Speed | Nominal Current <sup>3)</sup> | load data                                          |                                                      | Starting Current   | cos phi |
|                | [rpm]                                            | [Nm]        |            | P <sub>N</sub> [kW]         | [rpm] | I <sub>N</sub> [A]            | 50 % Current <sup>4)</sup><br>I <sub>50%</sub> [A] | 100 % Current <sup>5)</sup><br>I <sub>100%</sub> [A] | I <sub>N</sub> [A] |         |
| DR 30          | 5                                                | 30          | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.4                                                | 0.4                                                  | 1.5                | 0.66    |
|                | 10                                               |             | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.4                                                | 0.4                                                  | 1.5                | 0.66    |
|                | 16                                               |             | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.4                                                | 0.5                                                  | 1.5                | 0.66    |
|                | 25                                               |             | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.5                                                | 0.7                                                  | 1.5                | 0.66    |
|                | 32                                               |             | TM4.01013  | 0.34                        | 2.840 | 1.10                          | 1.1                                                | 1.1                                                  | 4.8                | 0.62    |
|                | 40                                               |             | TM4.0106   | 0.25                        | 1.360 | 1.10                          | 1.0                                                | 1.1                                                  | 2.7                | 0.65    |
| DR 59          | 5                                                | 60          | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.4                                                | 0.5                                                  | 1.5                | 0.66    |
|                | 10                                               |             | TM4.0105   | 0.12                        | 1.360 | 0.53                          | 0.4                                                | 0.6                                                  | 1.5                | 0.66    |
|                | 16                                               |             | TM4.0106   | 0.25                        | 1.360 | 1.10                          | 0.9                                                | 1.0                                                  | 2.7                | 0.65    |
|                | 25                                               |             | TM4.0106   | 0.25                        | 1.390 | 1.10                          | 0.9                                                | 1.2                                                  | 2.7                | 0.65    |
|                | 32                                               |             | TM4.01013  | 0.34                        | 2.840 | 1.10                          | 1.1                                                | 1.1                                                  | 4.8                | 0.62    |
|                | 40                                               |             | TM4.0107   | 0.40                        | 1.390 | 1.50                          | 1.4                                                | 1.8                                                  | 5.1                | 0.63    |
| DR 60          | 5                                                | 60          | TM1.01005  | 0.12                        | 1.360 | 0.57                          | 0.6                                                | 0.7                                                  | 1.5                | 0.62    |
|                | 10                                               |             | TM1.01000  | 0.21                        | 2.670 | 0.65                          | 0.7                                                | 0.9                                                  | 2.3                | 0.76    |
|                | 16                                               |             | TM1.01001  | 0.42                        | 2.700 | 1.15                          | 1.0                                                | 1.3                                                  | 4.6                | 0.81    |
|                | 25                                               |             | TM1.01006  | 0.18                        | 1.320 | 0.76                          | 0.8                                                | 1.2                                                  | 2.0                | 0.64    |
|                | 32                                               |             | TM1.01001  | 0.42                        | 2.700 | 1.15                          | 1.0                                                | 1.3                                                  | 4.6                | 0.81    |
|                | 40                                               |             | TM1.01007  | 0.34                        | 1.310 | 1.30                          | 1.2                                                | 1.8                                                  | 3.5                | 0.63    |
| DR 120         | 5                                                | 120         | TM1.01007  | 0.34                        | 1.310 | 1.30                          | 1.0                                                | 1.2                                                  | 3.5                | 0.63    |
|                | 10                                               |             | TM1.01001  | 0.42                        | 2.700 | 1.15                          | 1.0                                                | 1.4                                                  | 4.6                | 0.81    |
|                | 16                                               |             | TM1.01002  | 0.90                        | 2.670 | 2.30                          | 1.7                                                | 2.1                                                  | 9.0                | 0.80    |
|                | 25                                               |             | TM1.01008  | 0.56                        | 1.325 | 1.70                          | 1.5                                                | 2.1                                                  | 5.7                | 0.72    |
|                | 32                                               |             | TM1.01002  | 0.90                        | 2.670 | 2.30                          | 1.8                                                | 2.3                                                  | 9.0                | 0.80    |
|                | 40                                               |             | TM1.01009  | 0.75                        | 1.345 | 2.50                          | 2.3                                                | 3.1                                                  | 8.6                | 0.62    |
| DIM R 250      | 5                                                | 250         | TM1.01008  | 0.56                        | 1.325 | 1.70                          | 1.2                                                | 1.6                                                  | 5.7                | 0.72    |
|                | 10                                               |             | TM1.01002  | 0.90                        | 2.670 | 2.30                          | 1.6                                                | 2.5                                                  | 9.0                | 0.80    |
|                | 16                                               |             | TM1.01003  | 1.50                        | 2.710 | 3.10                          | 1.8                                                | 3.0                                                  | 14.6               | 0.89    |
|                | 25                                               |             | TM1.01009  | 0.75                        | 1.345 | 2.50                          | 2.2                                                | 3.5                                                  | 8.6                | 0.62    |
|                | 32                                               |             | TM1.01003  | 1.50                        | 2.710 | 3.10                          | 2.2                                                | 4.3                                                  | 14.6               | 0.89    |
|                | 40                                               |             | TMR2.01079 | 2.00                        | 1.440 | 4.80                          | 4.0                                                | 6.3                                                  | 25.0               | 0.77    |
| DR 500         | 5                                                | 500         | TM1.01009  | 0.75                        | 1.345 | 2.50                          | 2.1                                                | 2.7                                                  | 8.6                | 0.62    |
|                | 10                                               |             | TM1.01003  | 1.50                        | 2.710 | 3.10                          | 2.0                                                | 3.9                                                  | 14.6               | 0.89    |
|                | 16                                               |             | TM1.01004  | 1.60                        | 2.820 | 3.70                          | 3.2                                                | 5.8                                                  | 20.5               | 0.80    |
|                | 25                                               |             | TMR2.01079 | 2.00                        | 1.440 | 4.80                          | 4.4                                                | 8.3                                                  | 25.0               | 0.77    |
|                | 32                                               |             | TMR2.01075 | 4.00                        | 2.900 | 9.00                          | 5.0                                                | 9.6                                                  | 57.0               | 0.80    |
|                | 40                                               |             | TMR2.01081 | 4.50                        | 1.435 | 11.10                         | 7.4                                                | 11.7                                                 | 57.0               | 0.77    |
| DR 1000        | 5                                                | 1000        | TMR2.01079 | 2.00                        | 1.440 | 4.80                          | 3.1                                                | 7.2                                                  | 25.0               | 0.77    |
|                | 10                                               |             | TMR2.01080 | 3.00                        | 1.420 | 8.10                          | 6.0                                                | 7.9                                                  | 40.0               | 0.71    |
|                | 16                                               |             | TMR2.01082 | 6.00                        | 1.420 | 15.10                         | 7.6                                                | 13.7                                                 | 100.0              | 0.73    |
|                | 25                                               |             | TMR2.01082 | 6.00                        | 1.420 | 15.10                         | 10.4                                               | 15.8                                                 | 100.0              | 0.73    |

<sup>1)</sup> Output speed: increased by factor 1.2 at 60 Hz

<sup>2)</sup> Nominal power P<sub>N</sub>: Mechanical power at motor shaft (data on nameplate); increased by factor 1.2 at 60 Hz

<sup>3)</sup> Nominal current I<sub>N</sub>: Rated current of the motor (data on nameplate)

<sup>4)</sup> 50 % current I<sub>50%</sub>: Current at 50 % of maximum adjustable torque

<sup>5)</sup> 100 % current I<sub>100%</sub>: Current at 100 % of maximum adjustable torque

# Technical data

## PART-TURN ACTUATOR DP

## PART-TURN ACTUATOR FOR MODULATING DUTY DPR



| Actuator Model | Operating Time for 90°<br>↗ [sec] 50 Hz | Operating Time for 90°<br>↘ [sec] 60 Hz | Torque adjustment range [Nm] | Torque adjustment range modulating actuator [Nm] | Max. modulating torque [Nm] | Connection Flange According to DIN EN ISO 5211 | max. bore diameter of output drive V [mm] | max width of square bore output drive L/D [mm] | Type of Duty S 2-... [min] | Type of Duty S 4-... [%ED] |
|----------------|-----------------------------------------|-----------------------------------------|------------------------------|--------------------------------------------------|-----------------------------|------------------------------------------------|-------------------------------------------|------------------------------------------------|----------------------------|----------------------------|
| DP(R) 75       | 8, 16, 24, 34                           | 7, 13, 20, 28                           | 25-75                        | 37.5-75                                          | 37,5                        | F05<br>F07<br>F10*                             | 28                                        | 22                                             | 15                         | 25                         |
| DP(R) 150      |                                         |                                         | 50-150                       | 75-150                                           | 75                          | F05<br>F07<br>F10*                             | 28                                        | 22                                             | 15                         | 25                         |
| DP(R) 299      |                                         |                                         | 125-300                      | 150-300                                          | 150                         | F07<br>F10*                                    | 28                                        | 22                                             | 15                         | 25                         |
| DP(R) 300      |                                         |                                         | 125-300                      | 150-300                                          | 150                         | F10<br>F12*                                    | 38                                        | 30                                             | 15                         | 25                         |
| DP(R) 450      |                                         |                                         | 250-450                      | 225-450                                          | 225                         | F10<br>F12*                                    | 38                                        | 30                                             | 15                         | 25                         |
| DP(R) 600      | 8, 16, 32, 48, 67                       | 7, 13, 26, 40, 56                       | 200-600                      | 300-600                                          | 300                         | F12<br>F14*                                    | 50                                        | 36                                             | 15                         | 25                         |
| DP(R) 900      |                                         |                                         | 500-900                      | 450-900                                          | 450                         | F12<br>F14*                                    | 50                                        | 36                                             | 15                         | 25                         |
| DP(R) 1200     | 7'', 18, 36, 55, 75                     | 6, 15, 30, 46, 63                       | 500-1200                     | 600-1200                                         | 600                         | F14<br>F16*                                    | 60                                        | 46                                             | 15                         | 25                         |
| DP(R) 1800     |                                         |                                         | 1000-1800                    | 900-1800                                         | 900                         | F14<br>F16*                                    | 60                                        | 46                                             | 15                         | 25                         |

\* On special request.

\*\*) not available as modulating actuator

The max. torques given by DIN EN ISO 5211 to each flange size must not be exceeded.

For higher torques please request more information.





# Motor data

PART-TURN ACTUATOR DP

PART-TURN ACTUATOR FOR MODULATING DUTY DPR



| Actuator Model | Operating Time<br>for 90° $\pm$ [sec]<br>50 Hz | Operating Time<br>for 90° $\pm$ [sec]<br>60 Hz | Rated Power<br>50 Hz <sup>1)</sup> [kW] | Rated Power<br>60 Hz <sup>1)</sup> [kW] | Rated<br>Current <sup>2)</sup> [A] | Starting Current<br>[A] | cos phi | Eta [%] |
|----------------|------------------------------------------------|------------------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------|-------------------------|---------|---------|
| DP (R) 75      | 8                                              | 7                                              | 0.04                                    | 0.05                                    | 0.18                               | 0.51                    | 0.81    | 39      |
|                | 16                                             | 13                                             | 0.04                                    | 0.05                                    | 0.18                               | 0.51                    | 0.81    | 39      |
|                | 24                                             | 20                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 34                                             | 28                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 150     | 8                                              | 7                                              | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 16                                             | 13                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 24                                             | 20                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 34                                             | 28                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 299     | 8                                              | 7                                              | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 16                                             | 13                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 24                                             | 20                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 34                                             | 28                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 300     | 8                                              | 7                                              | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 16                                             | 13                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 24                                             | 20                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 34                                             | 28                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 450     | 8                                              | 7                                              | 0.25                                    | 0.30                                    | 1.10                               | 2.70                    | 0.65    | 50      |
|                | 16                                             | 13                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 24                                             | 20                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 34                                             | 28                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 600     | 8                                              | 7                                              | 0.34                                    | 0.41                                    | 1.10                               | 4.80                    | 0.62    | 59      |
|                | 16                                             | 13                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 32                                             | 26                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 48                                             | 40                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 67                                             | 56                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 900     | 8                                              | 7                                              | 0.34                                    | 0.41                                    | 1.10                               | 4.80                    | 0.62    | 59      |
|                | 16                                             | 13                                             | 0.25                                    | 0.3                                     | 1.10                               | 2.70                    | 0.65    | 50      |
|                | 32                                             | 26                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 48                                             | 40                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 67                                             | 56                                             | 0.08                                    | 0.10                                    | 0.61                               | 0.98                    | 0.55    | 43      |
| DP (R) 1200    | 7 <sup>3)</sup>                                | 6 <sup>3)</sup>                                | 0.34                                    | 0.41                                    | 1.10                               | 4.80                    | 0.62    | 59      |
|                | 18                                             | 15                                             | 0.34                                    | 0.41                                    | 1.10                               | 4.80                    | 0.62    | 59      |
|                | 36                                             | 30                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 55                                             | 46                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 75                                             | 63                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
| DP (R) 1800    | 7 <sup>3)</sup>                                | 6 <sup>3)</sup>                                | 0.75                                    | 0.90                                    | 2.00                               | 10.00                   | 0.70    | 59      |
|                | 18                                             | 15                                             | 0.34                                    | 0.41                                    | 1.10                               | 4.80                    | 0.62    | 59      |
|                | 36                                             | 30                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |
|                | 55                                             | 46                                             | 0.10                                    | 0.12                                    | 0.49                               | 1.24                    | 0.57    | 56      |
|                | 75                                             | 63                                             | 0.12                                    | 0.14                                    | 0.53                               | 1.50                    | 0.66    | 50      |

All shown figures are based on 400 V/3 ph/50 Hz and 480 V/3 ph/60 Hz.

<sup>1)</sup> Nominal power  $P_N$ : Mechanical power at motor shaft (data on nameplate)

<sup>2)</sup> Nominal current  $I_N$ : Rated current of the motor (data on nameplate)

<sup>3)</sup> Operating time for 90°; no modulating duty available

# Actuator dimensions

PART-TURN ACTUATOR DP

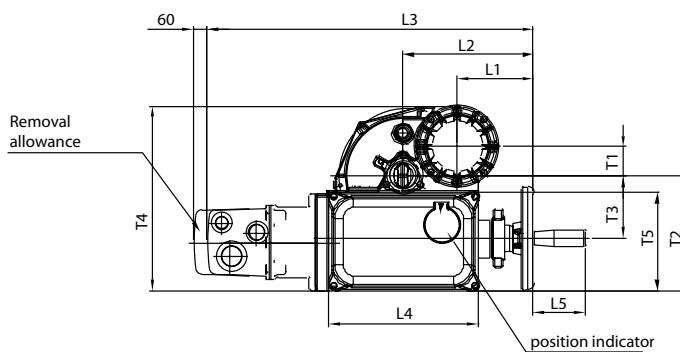
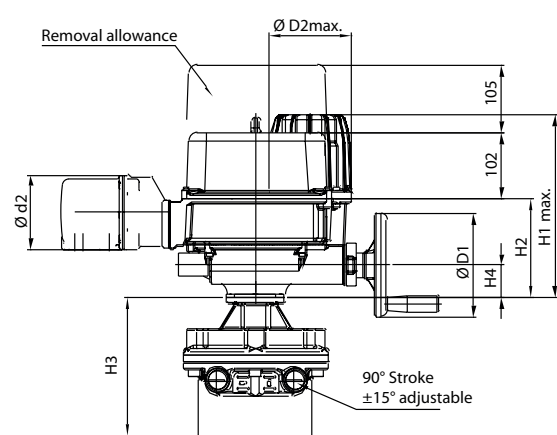
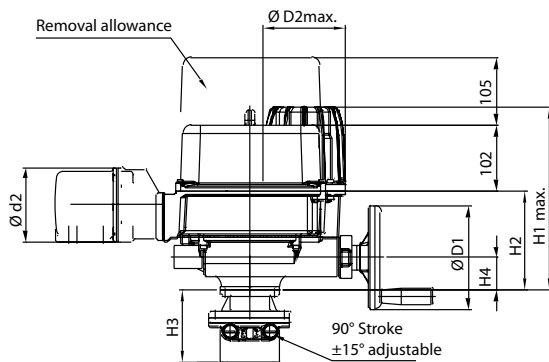
PART-TURN ACTUATOR FOR MODULATING DUTY DPR



| Actuator DP, DP R Models | 75/150/299 | 300/450 | 600/900 | 1200/1800 |
|--------------------------|------------|---------|---------|-----------|
| Weight (kg)              | 27         | 29      | 35      | 40        |
| Dimensions (mm)          |            |         |         |           |
| d2                       | Ø 170      | Ø 170   | Ø 170   | Ø 170     |
| D1                       | 160        | 160     | 250     | 250       |
| D2 Max.                  | 125        | 125     | 125     | 125       |
| H1 Max.                  | 280        | 280     | 280     | 280       |
| H2                       | 150        | 150     | 150     | 150       |
| H3                       | 113.5      | 131     | 175     | 215       |
| H4                       | 49         | 49      | 49      | 49        |
| L1                       | 117        | 117     | 117     | 117       |
| L2                       | 201        | 201     | 201     | 201       |
| L3 max                   | 503        | 503     | 503     | 503       |
| L4                       | 233        | 233     | 233     | 233       |
| L5                       | 80         | 80      | 80      | 80        |
| T1                       | 45         | 45      | 45      | 45        |
| T2                       | 179        | 179     | 179     | 179       |
| T3                       | 97.5       | 97.5    | 97.5    | 97.5      |
| T4                       | 305        | 305     | 305     | 305       |
| T5                       | 153        | 153     | 153     | 153       |

DP(R) 75/150/299

from DP(R) 300



# Actuator dimensions

PART-TURN ACTUATOR DP

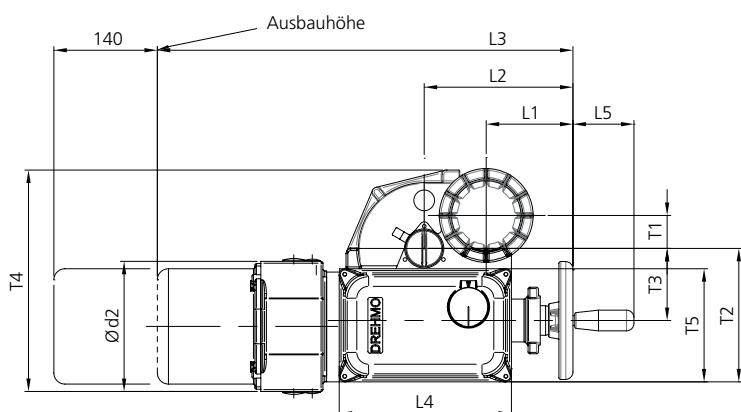
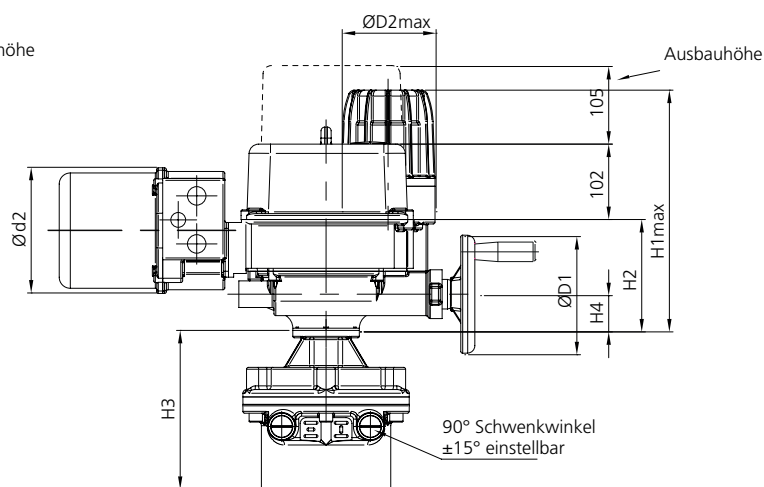
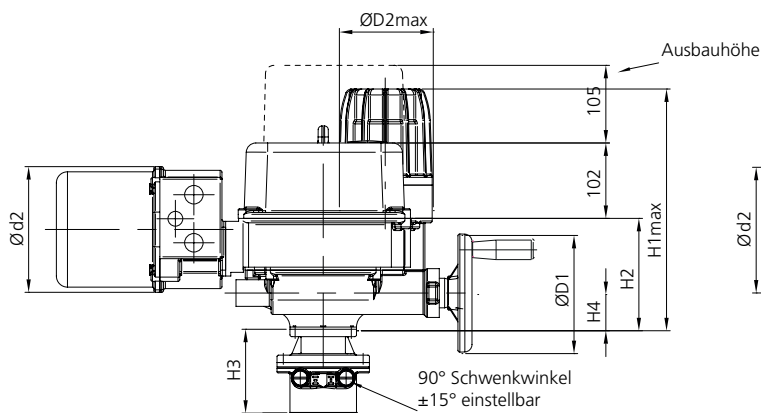
PART-TURN ACTUATOR FOR MODULATING DUTY DPR



| Actuator DP, DP R Models | 75/150/299 | 300/450 | 600/900 | 1200/1800 |
|--------------------------|------------|---------|---------|-----------|
| Weight (kg)              | 27         | 29      | 35      | 40        |
| Dimensions (mm)          |            |         |         |           |
| d2                       | Ø 170      | Ø 170   | Ø 170   | Ø 170     |
| D1                       | 160        | 160     | 250     | 250       |
| D2 Max.                  | 125        | 125     | 125     | 125       |
| H1 Max.                  | 280        | 280     | 280     | 280       |
| H2                       | 150        | 150     | 150     | 150       |
| H3                       | 113.5      | 131     | 175     | 215       |
| H4                       | 49         | 49      | 49      | 49        |
| L1                       | 117        | 117     | 117     | 117       |
| L2                       | 201        | 201     | 201     | 201       |
| L3 max                   | 503        | 503     | 503     | 503       |
| L4                       | 233        | 233     | 233     | 233       |
| L5                       | 80         | 80      | 80      | 80        |
| T1                       | 45         | 45      | 45      | 45        |
| T2                       | 179        | 179     | 179     | 179       |
| T3                       | 97.5       | 97.5    | 97.5    | 97.5      |
| T4                       | 305        | 305     | 305     | 305       |
| T5                       | 153        | 153     | 153     | 153       |

DP(R) 75/150/299 Ex

from DP(R) 300 Ex





## PART-TURN ACTUATOR FOR MODULATING DUTY DPR



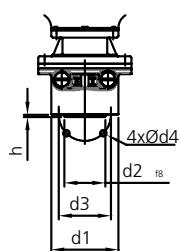
| Actuator DP(R)             | 75/150/299 |     |     | 300/450 |     | 600/900 |     | 1200/1800 |     |
|----------------------------|------------|-----|-----|---------|-----|---------|-----|-----------|-----|
| Size DIN<br>EN ISO<br>5211 | F05        | F07 | F10 | F10     | F12 | F12     | F14 | F14       | F16 |
| Dimensions (mm)            |            |     |     |         |     |         |     |           |     |
| d1                         | 90         | 90  | 125 | 125     | 150 | 150     | 175 | 175       | 210 |
| d2 <sup>18</sup>           | 35         | 55  | 70  | 70      | 85  | 85      | 100 | 100       | 130 |
| d3                         | 50         | 70  | 102 | 102     | 125 | 125     | 140 | 140       | 165 |
| d4                         | M6         | M8  | M10 | M10     | M12 | M12     | M16 | M16       | M20 |
| d5                         | 16         |     |     | 16      |     | 22      |     | 22        |     |
| d6                         | 11         |     |     | 11      |     | 14      |     | 18        |     |
| h*                         | 2.5        |     |     | 2.5     |     | 2.5     |     | 2.5       |     |
| h1                         | 12         |     |     | 12      |     | 16      |     | 16        |     |
| h2                         | 110        |     |     | 130     |     | 170     |     | 180       |     |
| threath depth d4           | 12         | 15  | 16  | 18      | 19  | 22      | 25  | 29        | 32  |
| Lmax                       | 40         |     | 66  | 50      | 82  | 61      | 102 | 75        | 127 |
| l6                         | 10         |     |     | 10      |     | 16      |     | 19        |     |
| l8                         | 20         |     |     | 20      |     | 26      |     | 26        |     |
| l9                         | 80         |     |     | 80      |     | 90      |     | 100       |     |
| l10                        | 40         |     |     | 40      |     | 45      |     | 50        |     |
| l11                        | 25         |     |     | 25      |     | 30      |     | 35        |     |
| l12                        | 120        |     |     | 120     |     | 135     |     | 150       |     |
| l13                        | 80         |     |     | 80      |     | 110     |     | 110       |     |
| l14                        | 150        |     |     | 150     |     | 190     |     | 225       |     |
| r1                         | 150        |     |     | 150     |     | 150     |     | 150       |     |
| r2                         | 200        |     |     | 200     |     | 200     |     | 200       |     |
| r3                         | -          |     |     | -       |     | 250     |     | 250       |     |

Length unit: mm

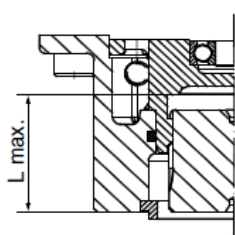
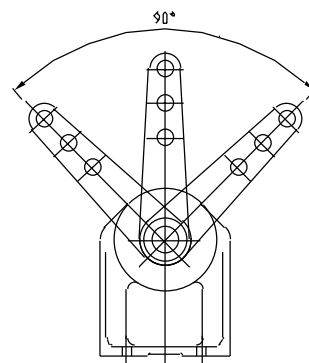
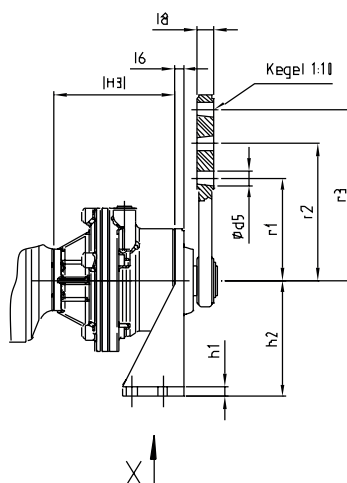
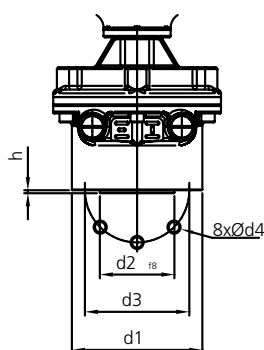
\* Allowance for spigot is not available as standard. The spigot ring is a separate component, available as option.

## DIRECT MOUNTING

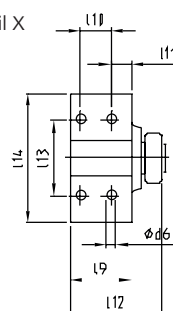
DP 75/150/299



from DP 300

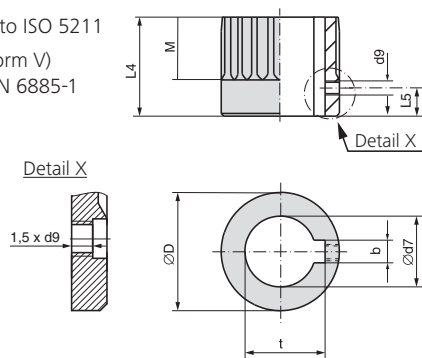


Detail X



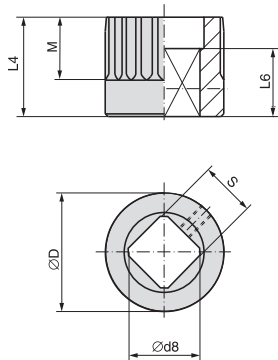
# Output drive forms

Bore according to ISO 5211  
With keyway (form V)  
according to DIN 6885-1



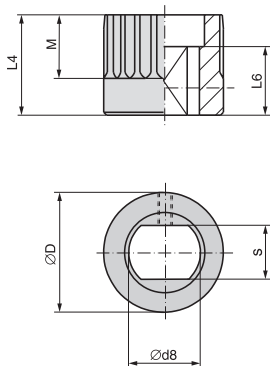
| Dimensions            | DP... 75/150 |     | DP... 299 |     | DP 300/450 |     | DP... 600/900 |     | DP... 1200/1800 |     |
|-----------------------|--------------|-----|-----------|-----|------------|-----|---------------|-----|-----------------|-----|
| ISO 5211              | F05          | F07 | F07       | F10 | F10        | F12 | F12           | F14 | F14             | F16 |
| Ø D                   | 41.75        |     | 41.75     |     | 51.75      |     | 67.6          |     | 81.6            |     |
| b JS9 <sup>1)</sup>   | 6            |     | 6         |     | 8          |     | 10            |     | 14              |     |
| Ø d7 H8 <sup>2)</sup> | 18           |     | 22        |     | 28         |     | 36            |     | 48              |     |
| Ø d7 max.             | 28           |     | 28        |     | 38         |     | 50            |     | 60              |     |
| d9 <sup>3)</sup>      | M5           |     | M5        |     | M6         |     | M6            |     | M6              |     |
| L4                    | 35           |     | 35        |     | 45         | 75  | 55            | 95  | 65              | 115 |
| L5 <sup>3)</sup>      | 8            |     | 8         |     | 10         |     | 10            |     | 10              |     |
| M                     | 20           |     | 20        |     | 30         |     | 40            |     | 47              | 40  |
| t <sup>1)</sup>       | 20.8         |     | 24.8      |     | 31.3       |     | 39.3          |     | 51.8            |     |

Square bore (form L/D)  
according to ISO 5211



| Dimensions              | DP... 75/150 |     | DP... 299 |     | DP 300/450         |     | DPIM 600/900 |     | DPIM 1200/1800 |     |
|-------------------------|--------------|-----|-----------|-----|--------------------|-----|--------------|-----|----------------|-----|
| ISO 5211                | F05          | F07 | F07       | F10 | F10                | F12 | F12          | F14 | F14            | F16 |
| Ø D                     | 41.75        |     | 41.75     |     | 51.75              |     | 67.6         |     | 81.6           |     |
| Ø d8 min. <sup>2)</sup> | 18.1         |     | 22.2      |     | 28.2               |     | 36.2         |     | 48.2           |     |
| Ø d8 max.               | 28.2         |     | 28.2      |     | 40.2 <sup>4)</sup> |     | 48.2         |     | 60.2           |     |
| L4                      | 35           |     | 35        | 60  | 45                 | 75  | 55           | 95  | 65             | 115 |
| L6 min.                 | 30           |     | 30        |     | 30                 |     | 30           |     | 40             |     |
| M                       | 20           |     | 20        |     | 30                 |     | 40           |     | 47             | 40  |
| s H11 <sup>2)</sup>     | 14           |     | 17        |     | 22                 |     | 27           |     | 36             |     |
| s H11 max.              | 22           |     | 22        |     | 30 <sup>4)</sup>   |     | 36           |     | 46             |     |

Bore with two-flats (form H)  
according to ISO 5211

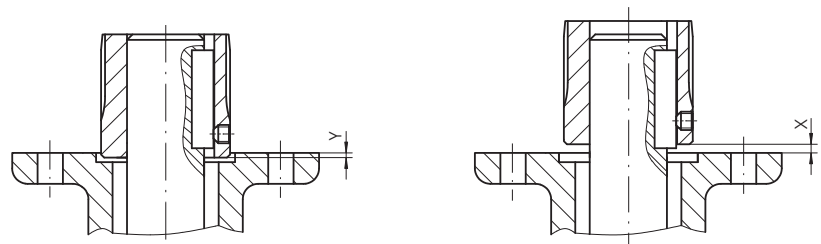


| Dimensions              | DP... 75/150 |     | DP... 299 |     | DP 300/450 |     | DPIM 600/900             |     | DPIM 1200/1800 |     |
|-------------------------|--------------|-----|-----------|-----|------------|-----|--------------------------|-----|----------------|-----|
| ISO 5211                | F05          | F07 | F07       | F10 | F10        | F12 | F12                      | F14 | F14            | F16 |
| Ø D                     | 41.75        |     | 41.75     |     | 51.75      |     | 67.6                     |     | 81.6           |     |
| Ø d8 min. <sup>2)</sup> | 18.1         |     | 22.2      |     | 28.2       |     | 36.2                     |     | 48.2           |     |
| Ø d8 max.               | 28.2         |     | 28.2      |     | 36.2       |     | 48.2 (48 <sup>5)</sup> ) |     | 60.2           |     |
| L4                      | 35           |     | 35        | 60  | 45         | 75  | 55                       | 95  | 65             | 115 |
| L6 min.                 | 25           |     | 25        |     | 25         |     | 30                       |     | 40             |     |
| M                       | 20           |     | 20        |     | 30         |     | 40                       |     | 47             | 40  |
| s H11 <sup>2)</sup>     | 14           |     | 17        |     | 22         |     | 27                       |     | 36             |     |
| s H11 max.              | 22           |     | 22        |     | 27         |     | 36 (41 <sup>5)</sup> )   |     | 46             |     |

Mounting position of coupling

|        |   |  |   |  |    |  |    |  |
|--------|---|--|---|--|----|--|----|--|
| X max. | 3 |  | 4 |  | 5  |  | 8  |  |
| Y max. | 2 |  | 5 |  | 10 |  | 10 |  |

- 1) Dimensions depend on Ø d7, refer to DIN 6885-1
- 2) Recommended size according to ISO 5211
- 3) Thread with grub screw
- 4) According to DIN 79
- 5) According to DIN 475





# Electrical components

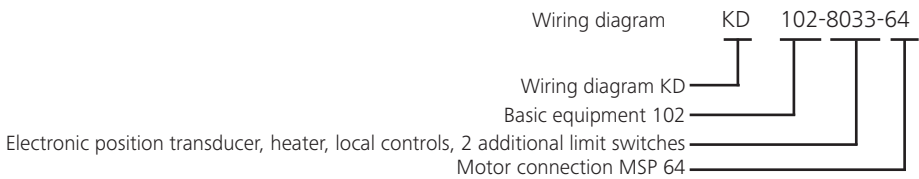
|                                              |                                                                       | 1NO 1NC<br> | Double <sup>1)</sup><br>1NO 1NC<br> | 1NO<br> | 1NC<br> |
|----------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Basic equipment                              | Torque switch for cw rotation<br>Torque switch for ccw rotation       | DR1<br>+<br>DL2                                                                              | DR11<br>+<br>DL21                                                                                                     |                                                                                            |                                                                                            |
|                                              | Limit switch for c. w. rotation<br>Limit switch for c. c. w. rotation | WR1<br>+<br>WL2                                                                              | WR11<br>+<br>WL21                                                                                                     |                                                                                            |                                                                                            |
|                                              | Flasher                                                               |                                                                                              |                                                                                                                       |                                                                                            | BL                                                                                         |
| Additional torque and limit switch equipment | Limited switches for intermediate positions                           | W5<br>+<br>W6                                                                                | W51<br>+<br>W61                                                                                                       |                                                                                            |                                                                                            |
|                                              |                                                                       |                                                                                              |                                                                                                                       |                                                                                            |                                                                                            |
| Local controls                               | Selector switch Local 0-Remote (lockable in each position)            |                                                                                              |                                                                                                                       | S1                                                                                         |                                                                                            |
|                                              | Control switch Open-Stop-Close                                        |                                                                                              |                                                                                                                       | S2                                                                                         |                                                                                            |

|            |                                                                           |  |  |  |  |  |
|------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Transducer | Single resistance transducer<br>R = 100 Ω, 220 Ω, 500 Ω, 1000 Ω           | B1                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|            | Electronic position transducer 4...20 mA<br>2-wire-system <sup>4)</sup>   |                                                                                   | B3                                                                                |                                                                                     |                                                                                     |                                                                                     |
|            | Electronic position transducer 0/4...20 mA<br>3-wire-system <sup>2)</sup> |                                                                                   |                                                                                   | B3                                                                                  |                                                                                     |                                                                                     |
|            | Electronic position transducer 0/4...20 mA<br>4-wire-system <sup>2)</sup> |                                                                                   |                                                                                   |                                                                                     | B3                                                                                  |                                                                                     |
| Heater     | Heater P = 10 W <sup>3)</sup>                                             |                                                                                   |                                                                                   |                                                                                     |                                                                                     | E1                                                                                  |

- 
- Options for KD 102
- 
- Basic equipment KD 102

- 1) Special versions requiring special wiring diagrams.  
2) Not possible in explosion-proof version.  
3) In explosion-proof P = 6 W.  
4) Ex version: rated voltage 12 .. 22,5 V intrinsically safe

## Key of wiring diagrams



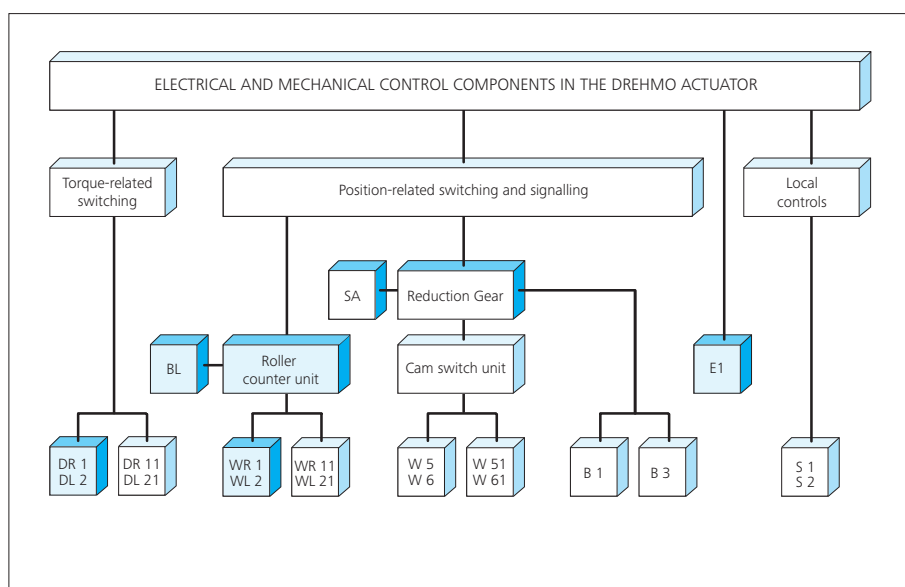


# Electrical and mechanical components



## Legend

|           |                                                      |
|-----------|------------------------------------------------------|
| DR1, DR11 | Torque switches for closing direction (cw rotation)  |
| DL2, DL21 | Torque switches for opening direction (ccw rotation) |
| WR1, WR11 | Limit switches for closing direction (cw rotation)   |
| WL2, WL21 | Limit switches for opening direction (ccw rotation)  |
| W5-W6     | Limit switches for intermediate positions            |
| W51, W61  | Flasher                                              |
| BL        | Single resistance transducer                         |
| B1        | Electronic position transducer                       |
| S1        | Selector switch Local-0-Remote                       |
| S2        | Control switch Open-Stop-Close                       |
| E1        | Heater                                               |
| SA        | Mechanical position indicator                        |

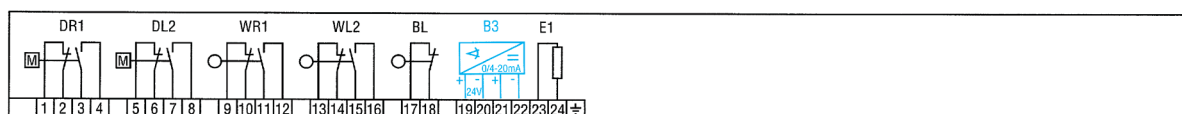


## Wiring diagrams

### WIRING DIAGRAM KD 102-...-... and variants

#### Basic equipment and variants

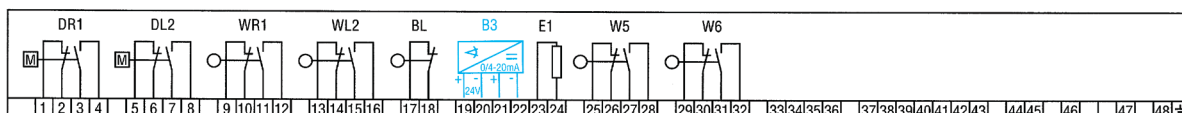
5000 / 8000



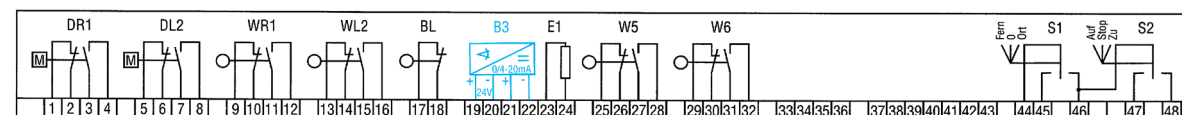
5004 / 8004



5030 / 8030



5033 / 8033



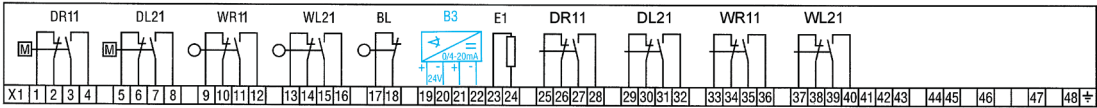
# Wiring diagrams

WIRING DIAGRAM KD 98-...-... and variants

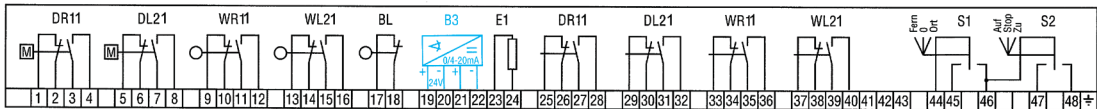


Basic equipment with tandem limit and tandem torque switches and variants

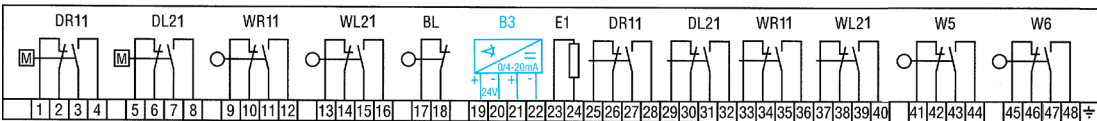
5000 / 8000



5004 / 8004



5030 / 8030



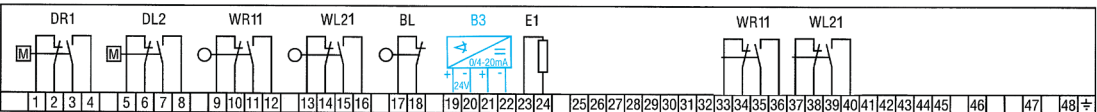
# Wiring diagrams

WIRING DIAGRAM KD 100-...-... and variants

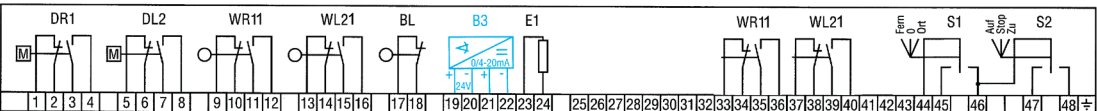


Basic equipment with tandem limit switches and variants

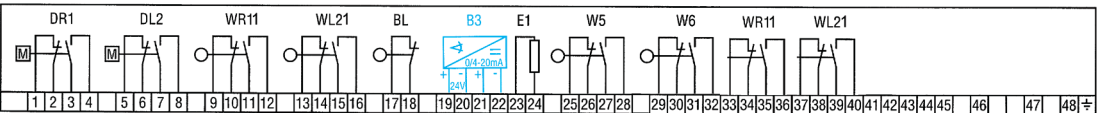
5000 / 8000



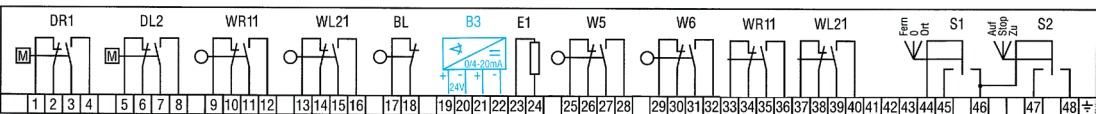
5004 / 8004



5030 / 8030



5033 / 8033



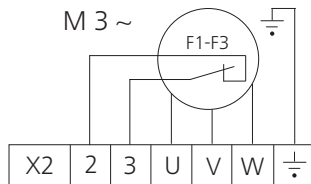
# Wiring diagrams

WIRING DIAGRAM KD 98-...-... and variant

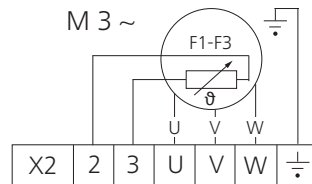


WITH THERMAL SWITCH

WITH PTC RESISTOR



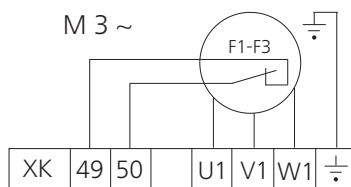
MSP 01



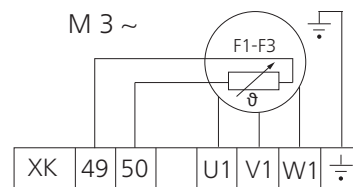
MSP 16

WIRING TO TERMINAL STRIP<sup>1)</sup>

- Screw connection max. 4.0 mm<sup>2</sup>: basic version
- 4.0 mm<sup>2</sup>: ex-proof version
- Voltage range X2: up to 690 V possible
- Cable glands<sup>2)</sup>
- 2 groups with 2 x Pg 29 and 1 x Pg 13.5 or
- 2 groups with 2 x M32 x 1.5 and 1 x M20 x 1.5
- Delivery with covered cable entry
- Options on request



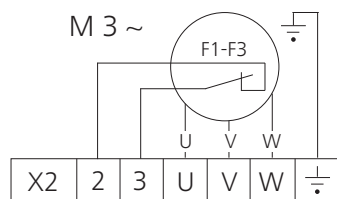
RT



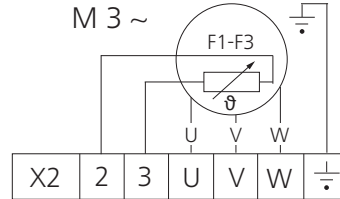
RK

WIRING TO COMPACT PLUG/SOCKET CONNECTOR

- XK: screw connections max. 6 mm<sup>2</sup> (power)
- XK: screw connections max. 2.5 mm<sup>2</sup> (controls)
- Voltage range XK: 690 V / 25 A
- Cable glands
- 1 x M32 x 1.5, 1 x M25 x 1.5 and 1 x M20 x 1.5
- Delivery with covered cable entry
- Options on request



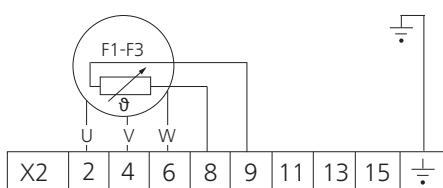
MSP 02 <sup>3)</sup>



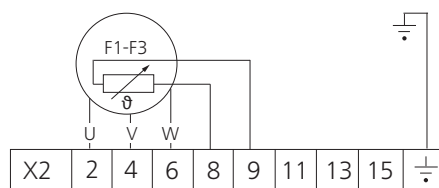
MSP 17 <sup>3)</sup>

WIRING TO COMPACT PLUG CONNECTOR

- X2: screw connection max. 6 mm<sup>2</sup>
- X1: screw connection max. 2.5 mm<sup>2</sup>
- Voltage range X2: 500 V / 35 A
- Cable glands
- 2 x Pg 29 and 1 x Pg 13.5 or
- 2 x M32 x 1.5 and 1 x M20 x 1.5
- Delivery with covered cable entry
- Options on request



MSP 03 <sup>3)</sup>



MSP 24 <sup>3)</sup>

WIRING TO COMPACT PLUG CONNECTOR

- X2: cage-clamp connection max. 2.5 mm<sup>2</sup>
- X1: screw connection max. 2.5 mm<sup>2</sup>
- Voltage range X2: 750 V / 16 A
- Cable glands
- 2 x Pg 29 and 1 x Pg 13.5 or
- 2 x M32 x 1.5 and 1 x M20 x 1.5
- Delivery with covered cable entry
- Options on request

## REMARKS

### MOTOR

The 3-phase AC enclosed motor is star-connected ex works. Different motor versions and connections (MSP) in special version are available.

### F1-F3

Motor protection by thermal switches: MSP01, RT, MSP02, MSP03

Option: thermistor: MSP 16, RK, MSP17, MSP24

### NOTE 1

To ensure "safe electrical isolation" in compliance with EN 50178, additional protective measures must be taken by the user.

### NOTE 2

For explosion-proof application

- A thermal overcurrent relay must be used on site for ex-proof motors with thermal switches.
- A certified control and according EN/IEC 60947-8 must be used on site if the motor is protected by thermistor elements.

### NOTE 3

Thermal motor protection with thermistors

- Thermistors according to DIN 44082
- Test voltage 2.5 V DC
- Application only with trip units made in accordance with accepted standards.

### NOTE 4

It is not allowed to unplug the electrical plug/socket connector under voltage.

<sup>1)</sup> Always for actuators in ex-proof version.  
For other actuators on special request.

<sup>2)</sup> Further applications on request.

<sup>3)</sup> Version delivered till end of 1994, still available on request.

# Electronic position transducer

## Transducer for DREHMO actuators



### APPLICATION

The EM 5.004 / EM 5.005 electronic measuring amplifier converts – with the aid of a precision potentiometer with protection IP 65 as pick-up – the mechanical dimension of distance or angle of rotation linearly into an impressed DC signal. Thus the distances travelled or positions reached by DREHMO-Actuators can be displayed directly, even over long lines, as an appropriate current value on an indicating instrument. Additionally, they can be evaluated by a computer.

When using the explosion-proof version (type EM 5.005) of the electronic position transducer, the current valid standards for the installation of intrinsically safe circuits must be followed without fail (DIN EN 60079-14 / VDE 0165 Part 1).

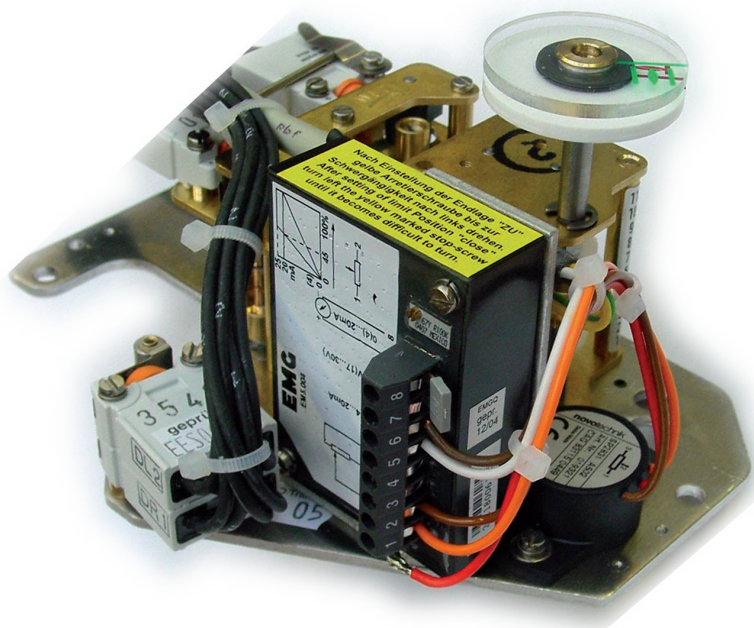
### VERSIONS

Two versions of the electronic position transducer are available:

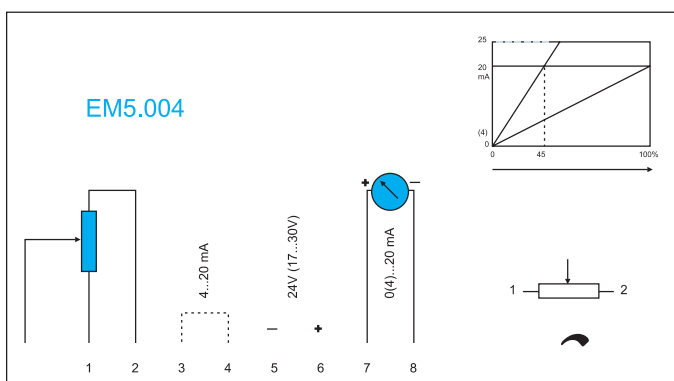
- Normal version type EM 5.004
- Explosion-proof version type EM 5.005

The amplifying potentiometer allows setting of the travel distance from 45 %...100 % corresponding to a current of 20 mA.

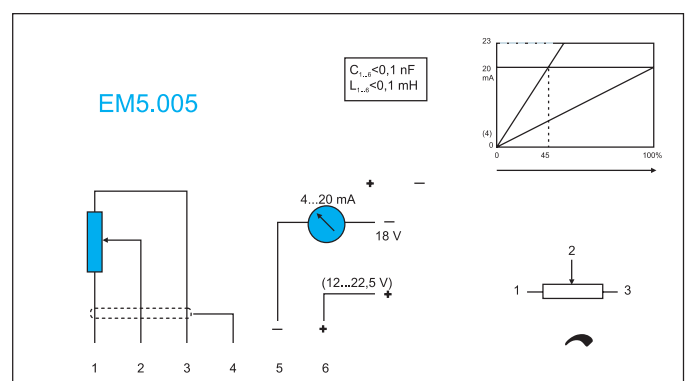
The current-distance characteristic can be reversed by changing connections 1 and 2 with type EM 5.004 and connections 1 and 3 with type EM 5.005.



### NORMAL VERSION TYPE EM 5.004



### EXPLOSION-PROOF VERSION TYPE EM 5.005





# Electronic position transducer

NOTES FOR APPLICATION

SET UP

## Technical data



|                         | Type EM 5.004<br>2-wire-system | 3-wire-system   | 4-wire-system   | Type EM 5.005 only<br>2-wire-system |
|-------------------------|--------------------------------|-----------------|-----------------|-------------------------------------|
| Ignition enclosure type |                                |                 |                 | Ex ib IIC T4 to T6                  |
| Temperature range       | -25 °C...+80 °C                | -25 °C...+80 °C | -25 °C...+80 °C | -25 °C...+60 °C                     |

| Transducer<br>Precision potentiometer |                                              |                                              |                                              |                                              |
|---------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|
| Slider                                | precious metal,<br>fully rotating            | precious metal,<br>fully rotating            | precious metal,<br>fully rotating            | precious metal,<br>fully rotating            |
| Mechanical life                       | app. 50 x 10 <sup>6</sup><br>shaft movements | app. 50 x 10 <sup>6</sup><br>shaft movements | app. 50 x 10 <sup>6</sup><br>shaft movements | app. 50 x 10 <sup>6</sup><br>shaft movements |
| Linearity                             | ± 0.3 %                                      | ± 0.3 %                                      | ± 0.3 %                                      | ± 0.3 %                                      |
| Resolution error                      | < 0.01°                                      | < 0.01°                                      | < 0.01°                                      | < 0.01°                                      |
| Measuring range                       | 293°                                         | 293°                                         | 293°                                         | 293°                                         |

| Electronic section<br>(pulse-proof to IEC 1.2 kV/50<br>µs)                                 |                                                           |                                              |                                              |                                                           |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------------------------------------|
| Output current                                                                             | 4...20 mA                                                 | 0,1...20 mA / 4...20 mA                      | 0,1...20 mA / 4...20 mA                      | 4...20 mA                                                 |
| Operating voltage <sup>1)</sup><br>(terminals 5 and 6)                                     | +17...+30 V                                               | +17...+30 V                                  | +17...+30 V                                  | +12...+22.5 V                                             |
| max. input current when<br>standard distance setting is<br>exceeded<br>(terminals 5 and 6) | 29 mA ± 2.5 mA                                            | 29 mA ± 2.5 mA                               | 29 mA ± 2.5 mA                               | 23 mA ± 1.5 mA                                            |
| Permissible load                                                                           | 17 V / 0 Ω<br>24 V / 350 Ω<br>30 V / 650 Ω                | 17 V / 400 Ω<br>24 V / 680 Ω<br>30 V / 920 Ω | 17 V / 400 Ω<br>24 V / 680 Ω<br>30 V / 920 Ω | 12 V / 0 Ω<br>17 V / 250 Ω<br>22.5 V / 525 Ω              |
| max. line resistance between<br>voltage source and terminal 5                              | $R_{load} = \frac{V_{op} - 17 \text{ V}}{0.02 \text{ A}}$ | 80 Ω                                         |                                              | $R_{load} = \frac{V_{op} - 12 \text{ V}}{0.02 \text{ A}}$ |
| External capacitance in-<br>ductance                                                       |                                                           |                                              |                                              | < 0.1 nF<br>< 0.1 nH                                      |
| Temperature drift <sup>2)</sup>                                                            | 0.2 % / 10 k                                              | 0.2 % / 10 k                                 | 0.2 % / 10 k                                 | 0.2 % / 10 k                                              |
| Linearity deviation                                                                        | 1 ‰                                                       | 1 ‰                                          | 1 ‰                                          | 1 ‰                                                       |
| Effect of altering operating<br>voltage <sup>2)</sup>                                      | 0.6 ‰ / V                                                 | 0.1 ‰ / V                                    | 0.1 ‰ / V                                    | 0.6 ‰ / V                                                 |
| Effect of altering load <sup>2)</sup>                                                      | typ. 0.1 % / 100 Ω                                        | typ. 0.1 % / 100 Ω                           | typ. 0.1 % / 100 Ω                           | typ. 0.1 % / 100 Ω                                        |

<sup>1)</sup> It is recommended, for 2-wire-systems, that the smoothing be better than 1.5 Vpp

<sup>2)</sup> referred to I<sub>max</sub> = 20 mA

# Electronic position transducer

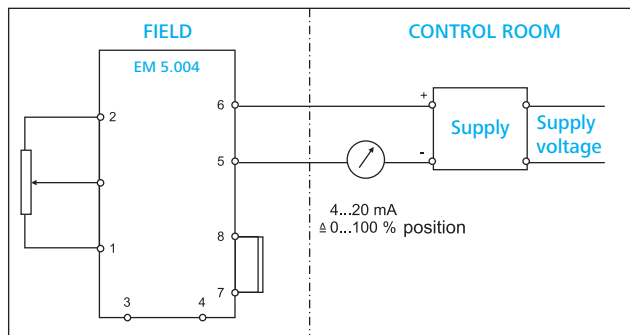
## Connection details



NORMAL VERSION TYPE EM 5.004

SET UP

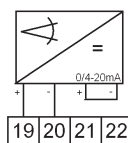
### 2-WIRE-SYSTEM



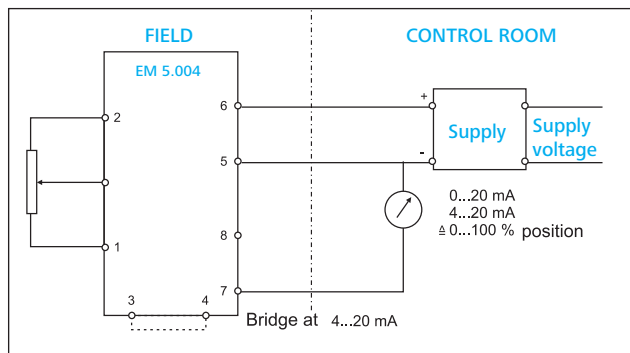
For actuators wired according to DREHMO wiring diagram KD 102-... following connections for a EM5.004 with 24 V supply are possible:

### ELECTRICAL CONNECTION

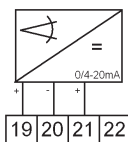
#### 2-wire-system



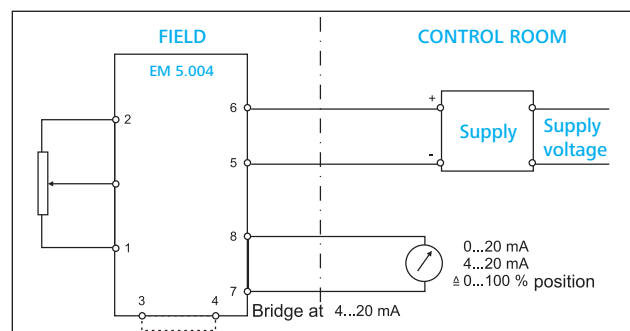
### 3-WIRE-SYSTEM



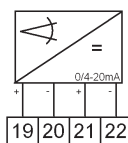
#### 3-wire-system



### 4-WIRE-SYSTEM

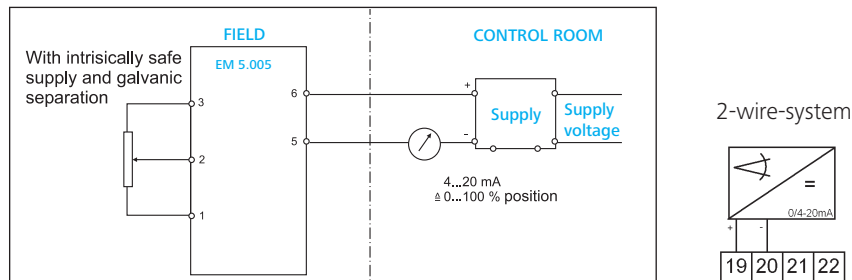


#### 4-wire-system

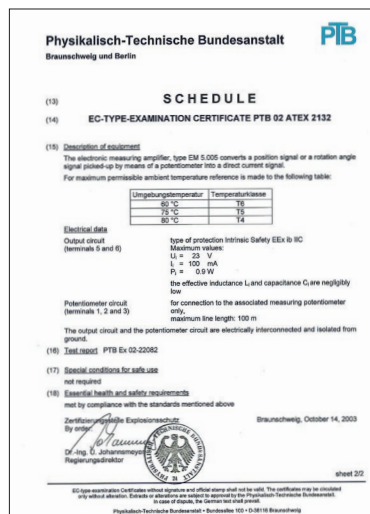
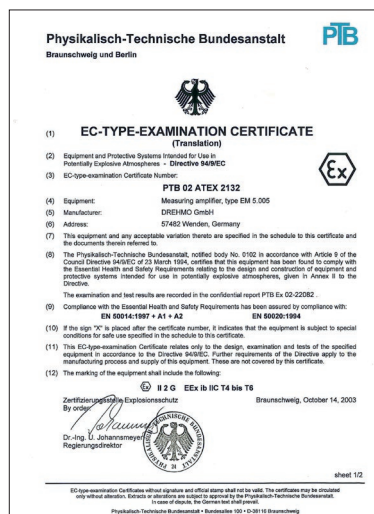


## EXPLOSION-PROOF TYPE EM 5.005

For actuators wired according to DREHMO wiring diagram KD 102-... following connection for a EM5.005 with 22,5 V supply is possible:



## PTB certificates



# General specification, information and product features



The s-range actuator provides a highly reliable, proven mechanical design and is easy to build up and set up. Because of the high processing quality these actuators are suitable in the best way for usage under roughest industrial conditions.

|                                                                                          |                                                                                                                                           |  |  |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Actuator type and application                                                            | for butterfly and ball valves, for gate, globe an plug valves, for sluize gate and damper etc.                                            |  |  |
| Product range                                                                            | DREHMO s-range                                                                                                                            |  |  |
| Permissible ambient temperature                                                          | -25 °C up to +80 °C ON/OFF INCHING duty    -25 °C up to +60 °C MODULATING duty<br>(for low and high temperatures also available)          |  |  |
| Enclosure class                                                                          | IP 68 (5m/24h)                                                                                                                            |  |  |
| Applicable standards for manufacturing, testing, product quality and safety              | · DIN EN ISO 9001, CE conformity acc. EC 2006/95/EC<br>· DIN EN 60529, DIN EN 60034<br>· EC directives 2006/95/EC, 2004/108/EC            |  |  |
| Actuator gear design<br>Mounting position, lubrication                                   | Double input excentric planetary gear, selflocking<br>any mounting position, oil lubricated for lifetime                                  |  |  |
| Housing material<br>Final paint                                                          | High strength, light weight, corrosion resistant cast aluminium<br>Colour: RAL 5015 (skyblue)                                             |  |  |
| Corrosion protection class                                                               | K3 for indoor and outdoor istallation (C3 EN ISO 12944-2)<br>K4 / K5 for higher requirements available (on request) (C4/C5)               |  |  |
| Humidity protection                                                                      | With siligagel for storage and internal heating during operation                                                                          |  |  |
| Manual operation                                                                         | With handwheel, Clockwise closing at the handwheel VALVE CLOSE<br>Maximum permissible force at the handwheel acc. to EN 12570             |  |  |
| Mechanical valve adaption:<br>MULTITURN actuator<br>PARTTURN actuator<br>LINEAR actuator | Form and sizes according standard like:<br>· DIN EN ISO 5210 / DIN 3210<br>· DIN EN ISO 5211<br>· DIN 3358                                |  |  |
| Motor type                                                                               | 3 -phase TENV totally enclosed squirrel cage induction motor, class F insulation,<br>(class H available ) (1-ph and DC motors available)  |  |  |
| Motor protection                                                                         | 3 PTC thermistors embedded in motor windings                                                                                              |  |  |
| Nominal voltage                                                                          | 220 V ...690 V ± 10 %, 3-ph                                                                                                               |  |  |
| Frequency                                                                                | 50 Hz or 60 Hz ± 3 %                                                                                                                      |  |  |
| Binary feedback indications                                                              | Torque switches, Limit switches,<br>Flasher<br><br>Contact capacity with fine silver contacts<br>acc. to DIN EN 60947-5-1<br><br>400 V AC |  |  |



|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wiring diagram KD 102-5000                    | For ON/OFF duty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Wiring diagram KD 102-8000                    | INCHING or MODULATING duty with 4...20 mA, analogue position feedback signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Electrical connection,                        | Via plug and socket connector with screw terminals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Cable diameter and                            | Power cable 2,5 ... 6 mm <sup>2</sup> , control cable 0,75 ... 2,5 mm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Cable entries                                 | 1 x M20 x 1,5, 1 x M25 x 1,5, 1 x M32 x 1,5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>OTHER OPTIONS</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Handwheel with square nut                     | Adapter for pneumatic or electric tools for quick operation under emergency conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Plug, maintenance department                  | Bypack supply for wall attachment to carry the actuator plug during maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Mechanical position indicator                 | With pick off gear for valve stroke adaption                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4...20 mA position indicator                  | In 2-, 3- or 4-wire version for position indicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Potentiometer                                 | In single- or tandem-version for position indicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Torque switches                               | In tandem (DPDT) version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Limit switches                                | In tandem (DPDT) version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Intermediate position switches                | For indication of one or more intermediate positions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Cover for electrical connection               | Different sized covers with various cable entry configuration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Industrial type electrical connection         | Industrial type crimp or screw plug connectors in various versions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>RODUCT CERTIFICATION AND FACTORY TESTS</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| TÜV certification                             | <ul style="list-style-type: none"> <li>· General functionality within the permissible ambient temperature range</li> <li>· Motor operation in various ambient temperatures and type of duty</li> <li>· Reproducibility of the torque and position settings</li> <li>· Handwheel force according to EN 12570</li> <li>· Enclosure class IP 67 according to EN 60529 or respectively IP 68</li> <li>· Required and approved lifetime</li> <li>· Corrosion resistance against aggressive ambient respectively salty or sulphurous atmospheres</li> </ul> |
| QA certification                              | ISO 9001:2008, ISO 14001, OHSAS 18001,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CE certification                              | EC Declaration of CE Conformity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Factory test certificate                      | Yes, every single actuator, on request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |





# **DREHMO**

VALVE ACTUATORS

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