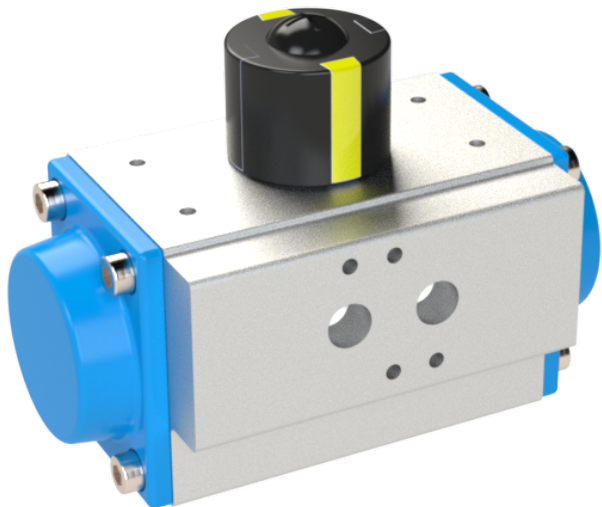


## Pneumatic swivel drive AN02



### Description:

Pneumatic drives for mounting on fittings with mounting flange according to ISO 5211. For controlling and regulating fittings.

### Features:

- suitable for fittings with mounting flange according to DIN 5211
  - Solenoid valve interface according to VDI/VDE 3845-NAMUR
  - Direct installation on fitting possible
  - preset swivel angle 90°
  - suitable for hazardous areas
- Any installation position

### execution:

Single acting normally closed,  
single acting normally open and  
double acting

### design:

Double piston swivel drive

### ambient temperature:

-20°C - +80°C

### material body:

hard-coated aluminum alloy

### material piston:

aluminum alloy

### material cover:

aluminum alloy powder coated

### material pinion:

anti-corrosion steel

### material sliding elements:

plastic

### material screws:

A2 stainless steel

### control pressure:

2 up to 8 bar

### control medium:

filtered air with regard to residual oil content, dust and water, at least according to DIN ISO 8573-1: 2010 [7:-:4]

### seal:

NBR

### nominal pivoting angle:

FKM for high-temperature version

double acting 90°, 120°\*, 180°\*

single acting 90°

nominal pivoting angle can be adjusted as standard from + 5° to -5°  
in both end positions

### temperature:

Standard: -20°C to +80°C or high temperature version: -20°C to +160°C

### flange image:

according to ISO 5211

### torque:

2 up to 13.040 Nm

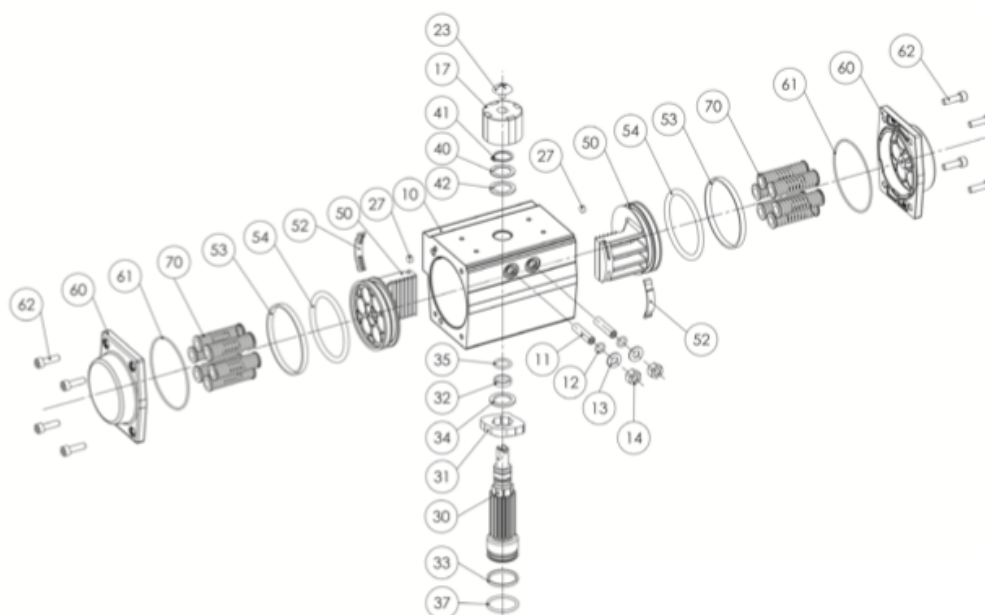
### SIL rating:

SIL3 according to IEC 61508 Part 1-2 and 4-7:2010

\*nominal pivoting angle double acting 120° and 180° on request

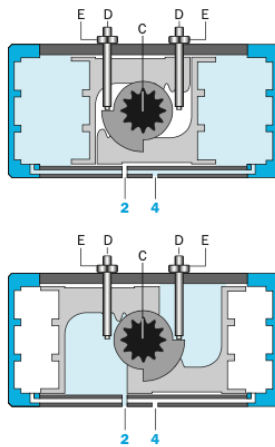
## Components:

|     |                                     |                                                               |
|-----|-------------------------------------|---------------------------------------------------------------|
| 10  | casing                              |                                                               |
| 11  | stop screw                          | Not applicable to size -032                                   |
| 12  | seal stop screw                     | Not applicable to size -032                                   |
| 13  | washer                              | Not applicable to size -032                                   |
| 14  | lock nut                            | Not applicable to size -032                                   |
| 17  | position indicator                  |                                                               |
| 23  | fixing screw for position indicator |                                                               |
| 25* | ring nut                            | Size -160 to -400                                             |
| 26* | plastic washer                      | Size -160 to -400                                             |
| 27  | sealing plug                        | Not applicable to size -032                                   |
| 30  | pinion                              |                                                               |
| 31  | stop pin                            | Not applicable to size -032                                   |
| 32  | pinion bearing upper                | Not applicable to size -032                                   |
| 33  | pinion bearing lower                | Not applicable to size -032                                   |
| 34  | inside thrust washer                |                                                               |
| 35  | seal pinion upper                   |                                                               |
| 37  | Seal pinion lower                   |                                                               |
| 40  | support washer                      |                                                               |
| 41  | lock washer                         |                                                               |
| 42  | outside thrust washer               |                                                               |
| 50  | piston                              |                                                               |
| 52  | guiding shoe                        | not applicable to size -032                                   |
| 53  | guiding ring                        | Not applicable to -032 and -040,<br>2 x to size -350 and -400 |
| 54  | piston sealing                      | 2x at size -400                                               |
| 60  | cap                                 |                                                               |
| 61  | cap seal                            |                                                               |
| 62  | cap screws                          |                                                               |
| 70  | springs                             | not applicable<br>to -032 and -040                            |

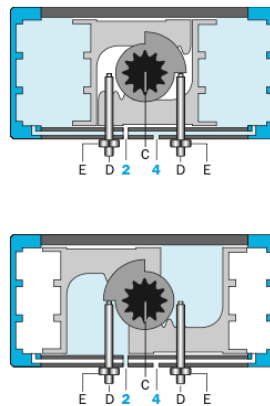


## Functional principle of double-acting drive

### GD-032 up to -210



### GD-240 up to -400



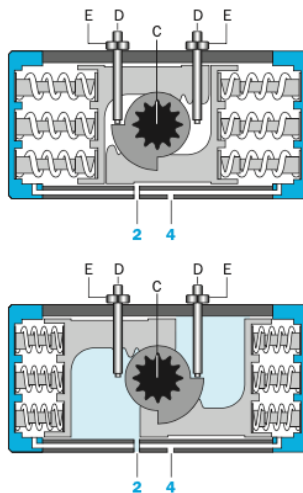
If the two outer chambers are pressurised via connection „4“, the pistons move towards each other into the basic position (0°).

The force of both pistons is transmitted to the pinion „C“ via the racks. If connection „2“ is pressurised and connection „4“ is vented, the pistons move apart into the 90° position

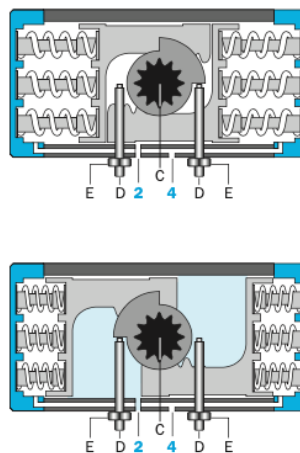
The pivoting angle can be adjusted between + 5° and - 5° in a pressureless state in both positions with the end position adjustment screws „D“ and secured with the lock nut „E“.

## Functional principle of a single-acting drive

### GS-052 up to -210



### GS-240 up to -400



In the single-acting model the springs push the pistons back into the basic position and air is exhausted from connection „2“.

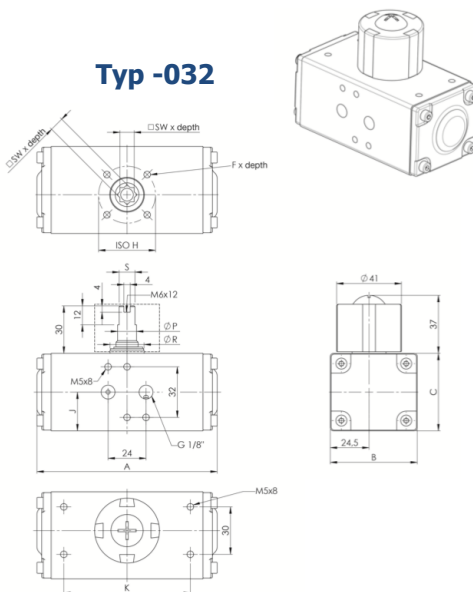
The number of springs can be adapted to the available control pressure. The setting of the end positions is carried out as described under „Function double-acting“.

Table of dimensions

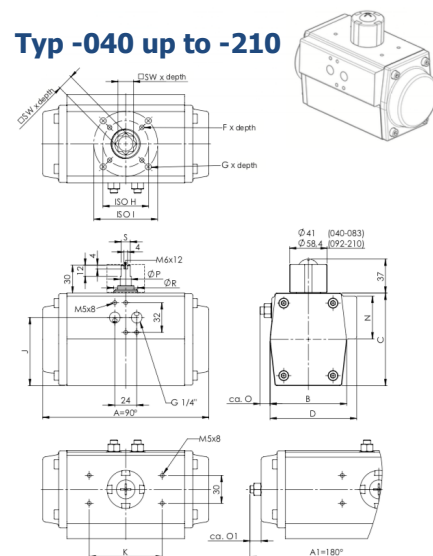
| Typ<br>GD / GS | A   | A1  | B    | C     | D     | E    | F x<br>depth | G x depth | ISO H    | ISO I    |
|----------------|-----|-----|------|-------|-------|------|--------------|-----------|----------|----------|
| 032            | 114 |     | 55   | 49    |       | 1/8" | M5x8         |           | ø36/F03  |          |
| 040            | 120 |     | 60,5 | 60    |       | 1/4" | M5x8         | M6x9      | ø36/F03  | ø50/F05  |
| 052            | 147 | 210 | 60   | 72    | 74,5  | 1/4" | M5x8         | M6x9      | ø36/F03  | ø50/F05  |
| 063            | 165 | 241 | 72   | 88    | 83    | 1/4" | M6x10        | M8x13     | ø50/F05  | ø70/F07  |
| 075            | 182 | 258 | 84   | 99,5  | 95    | 1/4" | M6x10        | M8x13     | ø50/F05  | ø70/F07  |
| 083            | 208 | 302 | 92   | 109   | 103   | 1/4" | M6x10        | M8x13     | ø50/F05  | ø70/F07  |
| 092            | 262 | 375 | 102  | 116,5 | 109,5 | 1/4" | M6x10        | M8x13     | ø50/F05  | ø70/F07  |
| 105            | 270 | 397 | 115  | 133   | 124,5 | 1/4" | M8x13        | M10x16    | ø70/F07  | ø102/F10 |
| 125            | 301 | 443 | 135  | 155   | 142   | 1/4" | M8x13        | M10x16    | ø70/F07  | ø102/F10 |
| 140            | 395 | 585 | 152  | 172   |       | 1/4" | M10x16       | M12x19    | ø102/F10 | ø125/F12 |
| 160            | 454 | 675 | 174  | 197   |       | 1/4" | M10x16       | M12x19    | ø102/F10 | ø125/F12 |
| 190            | 528 | 781 | 206  | 230   |       | 1/4" | M16x24       |           | ø140/F14 |          |
| 210            | 536 | 789 | 226  | 255   |       | 1/4" | M16x24       |           | ø140/F14 |          |
| 240            | 608 |     | 160  | 289   | 260   | 1/4" | M20x25       |           | ø165/F16 |          |
| 270            | 721 |     | 160  | 328   | 294   | 1/2" | M20x25       |           | ø165/F16 |          |
| 300            | 769 |     | 210  | 348   | 406   | 1/2" | M20x25       |           | ø165/F16 |          |
| 350            | 909 |     | 280  | 408   | 460   | 1/2" | M20x25       | M16x25    | ø165/F16 | ø254/F25 |
| 400            | 925 |     | 300  | 480   | 516   | 1/2" | M20x25       | M16x25    | ø165/F16 | ø254/F25 |

| Typ<br>GD / GS | J     | K   | N   | O    | O1 | P   | R     | S  | SW x<br>depth | weight<br>GD | volume<br>(l) | weight<br>GS | volume<br>(l) |
|----------------|-------|-----|-----|------|----|-----|-------|----|---------------|--------------|---------------|--------------|---------------|
| 032            | 24,5  | 80  |     |      |    | ø12 | ø21,5 | 10 | 9x11          | 0,73         | 0,09          |              |               |
| 040            | 24    | 80  |     | 15   |    | ø12 | ø21,5 | 10 | 11x14         | 0,9          | 0,19          |              |               |
| 052            | 48    | 80  | 46  | 9    | 16 | ø12 | ø21,5 | 10 | 11x14         | 1,3          | 0,28          | 1,43         | 0,12          |
| 063            | 61    | 80  | 46  | 12   | 14 | ø12 | ø26,5 | 10 | 14x18         | 2,0          | 0,44          | 2,17         | 0,21          |
| 075            | 73,3  | 80  | 46  | 11   | 14 | ø12 | ø26,5 | 10 | 17x19         | 2,55         | 0,64          | 2,81         | 0,30          |
| 083            | 80    | 80  | 46  | 12   | 16 | ø12 | ø26,5 | 10 | 17x21         | 3,25         | 0,9           | 3,67         | 0,43          |
| 092            | 91    | 80  | 46  | 9    | 22 | ø18 | ø35   | 14 | 17x21         | 5,24         | 1,37          | 6,01         | 0,64          |
| 105            | 99,5  | 80  | 46  | 7,5  | 16 | ø18 | ø35   | 14 | 22x26         | 6,06         | 1,83          | 6,9          | 0,95          |
| 125            | 127   | 80  | 46  | 8,5  | 23 | ø28 | ø46   | 20 | 22x26         | 10,00        | 3,0           | 11,38        | 1,6           |
| 140            | 138   | 80  | 75  | 7    | 16 | ø28 | ø51   | 20 | 27x31         | 14,02        | 4,7           | 16,42        | 2,5           |
| 160            | 159,5 | 130 | 84  | 6    | 15 | ø28 | ø51   | 20 | 27x31         | 24,52        | 6,9           | 28,32        | 3,7           |
| 190            | 188   | 130 | 100 | 8,5  | 38 | ø44 | ø61   | 32 | 36x40         | 32,4         | 11,3          | 39,4         | 5,9           |
| 210            | 205,5 | 130 | 115 | 10,5 | 35 | ø44 | ø73   | 32 | 36x40         | 39,8         | 15,0          | 49,3         | 7,5           |
| 240            | 67,5  | 130 |     | 10,5 |    | ø44 | ø73   | 32 | 46x50         | 57,0         | 20,0          | 70,0         | 11,0          |
| 270            | 79    | 130 |     | 13,5 |    | ø44 | ø73   | 32 | 46x50         | 78,7         | 31,0          | 100,3        | 17,0          |
| 300            | 174   | 130 |     |      |    | ø44 | ø73   | 32 | 46x50         | 121,7        | 53,5          | 149,12       | 23,8          |
| 350            | 204   | 130 |     |      |    | ø44 | ø73   | 32 | 55x60         | 210,2        | 81,4          | 259,3        | 35,1          |
| 400            | 240   | 130 |     |      |    | ø44 | ø73   | 32 | 55x60         | 280,0        | 108,6         | 325,0        | 52,6          |

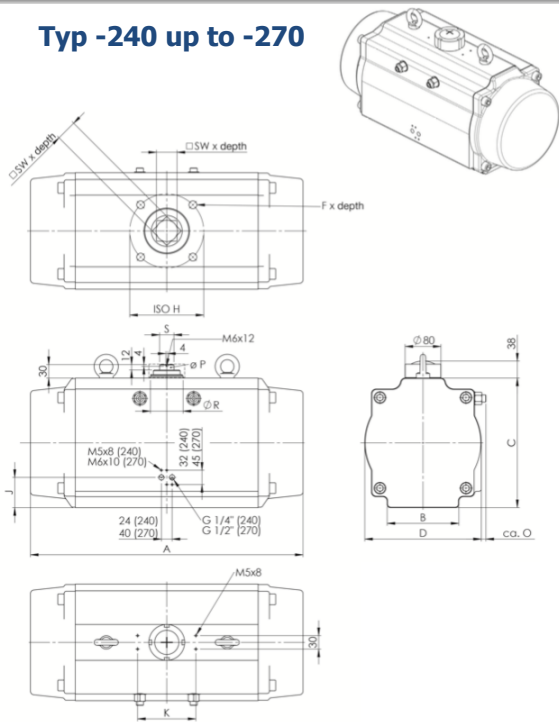
Typ -032



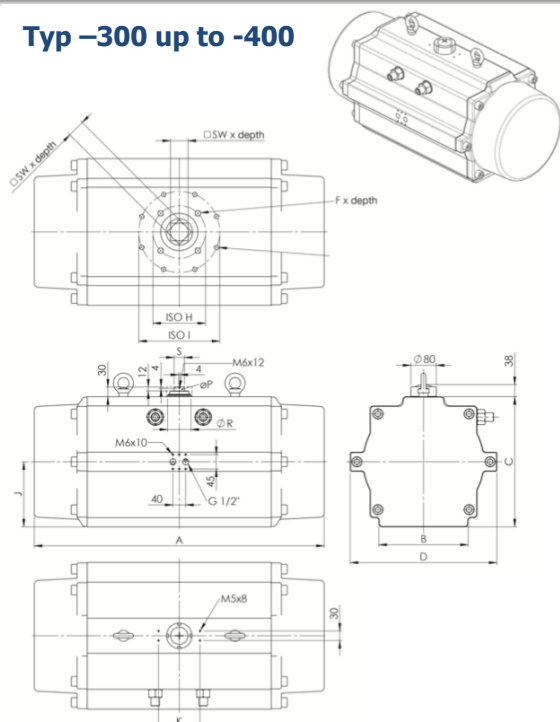
Typ -040 up to -210



Typ -240 up to -270



Typ -300 up to -400



item number:

| type             | temperature                                                                      | option                                                                                           | type*                                                                                                                                                                                                                                                                                                                     | springs**                                                                                      |
|------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| AN02 - pneumatic | 0 – Standard (-20°C to +80°C)<br>1 – High temperature version (-20°C bis +160°C) | 00 – double acting<br>01 – single acting (normally closed)<br>02 – single acting (normally open) | 00 – GD032*<br>01 – GD040*<br>02 – GD/GS052<br>03 – GD/GS 063<br>04 – GD/GS 075<br>05 – GD/GS 083<br>06 – GD/GS 092<br>07 – GD/GS 105<br>08 – GD/GS 125<br>09 – GD/GS 140<br>10 – GD/GS 160<br>11 – GD/GS 190<br>12 – GD/GS 210<br>13 – GD/GS 240<br>14 – GD/GS 270<br>15 – GD/GS 300<br>16 – GD/GS 350<br>17 – GD/GS 400 | 00**<br>04<br>05<br>06<br>07<br>08<br>09<br>10<br>11<br>12<br>13***<br>14***<br>15***<br>16*** |

Beispiel Nr.  
AN02000200:

AN02

0

0

02

00

Pneumatic actuator, Standard-Version  
Double acting  
Type GD052

\*Drives 032 and 040 only possible with double-acting drives

\*\*Springs only available for the 'single-acting' version, for double-acting always '-00'. Different number of springs available upon request.

\*\*\*GS400 single-acting drive has up to 16 springs, all other drives have a maximum of 12 springs.

## interpretation:

A safety factor for the valve must always be considered when determining actuator sizes. The recommended safety factor is at least 30%. Because this safety factor is subject to operating conditions, the safety factor required may be significantly higher.

## net torques in Nm (DOUBLE ACTING):

| Typ | 2,0 bar | 2,5 bar | 3,0 bar | 3,5 bar | 4,0 bar | 4,5 bar | 5,0 bar | 5,5 bar | 6,0 bar | 7,0 bar | 8,0 bar |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 032 | 3       | 4       | 5       | 5       | 6       | 7       | 8       | 8       | 9       | 11      | 12      |
| 040 | 5       | 6       | 7       | 8       | 10      | 11      | 12      | 13      | 14      | 17      | 19      |
| 052 | 8       | 10      | 12      | 14      | 16      | 18      | 20      | 22      | 24      | 28      | 32      |
| 063 | 14      | 18      | 21      | 25      | 28      | 32      | 35      | 39      | 42      | 49      | 56      |
| 075 | 20      | 25      | 30      | 35      | 40      | 45      | 50      | 55      | 60      | 70      | 79      |
| 083 | 31      | 38      | 46      | 53      | 61      | 69      | 76      | 84      | 92      | 107     | 122     |
| 092 | 45      | 56      | 67      | 79      | 90      | 101     | 112     | 124     | 135     | 157     | 180     |
| 105 | 65      | 81      | 98      | 114     | 130     | 146     | 163     | 179     | 195     | 228     | 260     |
| 125 | 101     | 127     | 152     | 178     | 203     | 228     | 254     | 279     | 304     | 355     | 406     |
| 140 | 174     | 217     | 260     | 304     | 347     | 390     | 434     | 477     | 521     | 607     | 694     |
| 160 | 264     | 331     | 397     | 463     | 529     | 595     | 661     | 727     | 731     | 925     | 1058    |
| 190 | 426     | 533     | 639     | 746     | 852     | 959     | 1066    | 1172    | 1279    | 1492    | 1705    |
| 210 | 521     | 651     | 781     | 911     | 1041    | 1171    | 1302    | 1432    | 1562    | 1822    | 2082    |
| 240 | 765     | 956     | 1148    | 1339    | 1530    | 1721    | 1913    | 2104    | 2295    | 2678    | 3060    |
| 270 | 1162    | 1453    | 1743    | 2034    | 2324    | 2615    | 2905    | 3196    | 3486    | 4067    | 4648    |
| 300 | 1594    | 1993    | 2391    | 2790    | 3188    | 3587    | 3985    | 4384    | 4782    | 5579    | 6376    |
| 350 | 2387    | 2983    | 3580    | 4177    | 4773    | 5370    | 5967    | 6563    | 7160    | 8353    | 9546    |
| 400 | 3256    | 4070    | 4884    | 5698    | 6512    | 7326    | 8140    | 8954    | 9768    | 11396   | 13024   |

## net torques in Nm (SINGLE ACTING):

|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|----------------|-----------------|-----------|--------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|        |                | Md F[Nm]        |           | 2,0                                                                      |     | 2,5 |     | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
| type   | spring<br>code | Md<br>min       | Md<br>max | min                                                                      | max | min | max | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| GS-052 | 1              | 0,8             | 1,2       | 6,8                                                                      | 7,2 | 8,8 | 9,2 | 10,8 | 11,2 | 12,8 | 13,2 | 14,8 | 15,2 | 16,8 | 17,2 | 18,8 | 19,2 | 20,8 | 21,2 | 22,8 | 23,2 | 26,8 | 27,1 | 30,8 | 31,1 |
|        | 2              | 1,6             | 2,4       | 5,6                                                                      | 6,4 | 7,6 | 8,4 | 9,6  | 10,4 | 11,6 | 12,3 | 13,6 | 14,3 | 15,6 | 16,3 | 17,6 | 18,3 | 19,6 | 20,3 | 21,6 | 22,3 | 25,6 | 26,3 | 29,6 | 30,3 |
|        | 3              | 2,5             | 3,6       | 4,4                                                                      | 5,5 | 6,4 | 7,5 | 8,4  | 9,5  | 10,4 | 11,5 | 12,4 | 13,5 | 14,4 | 15,5 | 16,4 | 17,5 | 18,4 | 19,5 | 20,4 | 21,5 | 24,4 | 25,5 | 28,4 | 29,5 |
|        | 4              | 3,3             | 4,7       | 3,2                                                                      | 4,7 | 5,2 | 6,7 | 7,2  | 8,7  | 9,2  | 10,7 | 11,2 | 12,7 | 13,2 | 14,7 | 15,2 | 16,7 | 17,2 | 18,7 | 19,2 | 20,7 | 23,2 | 24,7 | 27,2 | 28,7 |
|        | 5              | 4,1             | 5,9       | 2,1                                                                      | 3,9 | 4,1 | 5,9 | 6,1  | 7,9  | 8,0  | 9,9  | 10,0 | 11,9 | 12,0 | 13,9 | 14,0 | 15,9 | 16,0 | 17,9 | 18,0 | 19,9 | 22,0 | 23,9 | 26,0 | 27,9 |
|        | 6              | 4,9             | 7,1       | 0,91                                                                     | 3,1 | 2,9 | 5,1 | 4,9  | 7,1  | 6,9  | 9,1  | 8,9  | 11,1 | 10,9 | 13,1 | 12,9 | 15,1 | 14,9 | 17,1 | 16,8 | 19,1 | 20,8 | 23,1 | 24,8 | 27,1 |
|        | 7              | 5,7             | 8,3       |                                                                          |     | 1,7 | 4,3 | 3,7  | 6,3  | 5,7  | 8,33 | 7,7  | 10,3 | 9,7  | 12,3 | 11,7 | 14,3 | 13,7 | 16,3 | 15,7 | 18,3 | 19,7 | 22,2 | 23,7 | 26,2 |
|        | 8              | 6,5             | 9,5       |                                                                          |     |     |     | 2,5  | 5,4  | 4,5  | 7,4  | 6,5  | 9,4  | 8,5  | 11,4 | 10,6 | 13,4 | 12,5 | 15,4 | 14,5 | 17,4 | 18,5 | 21,4 | 22,5 | 25,4 |
|        | 9              | 7,4             | 10,7      |                                                                          |     |     |     | 1,3  | 4,6  | 3,3  | 6,6  | 5,3  | 8,6  | 7,3  | 10,6 | 9,3  | 12,6 | 11,3 | 14,6 | 13,3 | 16,6 | 17,3 | 20,6 | 21,3 | 24,6 |
|        | 10             | 8,2             | 11,9      |                                                                          |     |     |     |      | 2,1  | 5,8  | 4,1  | 7,8  | 6,1  | 9,8  | 8,1  | 11,8 | 10,1 | 13,8 | 12,1 | 15,8 | 16,1 | 19,8 | 20,1 | 23,8 |      |
|        | 11             | 9,0             | 13,1      |                                                                          |     |     |     |      |      |      | 2,9  | 7,0  | 4,9  | 9,0  | 6,9  | 11,0 | 8,9  | 13,0 | 10,9 | 15,0 | 14,9 | 19,0 | 18,2 | 22,2 |      |
|        | 12             | 9,8             | 14,2      |                                                                          |     |     |     |      |      |      |      | 1,7  | 6,2  | 3,7  | 8,2  | 5,7  | 10,2 | 7,7  | 12,2 | 9,7  | 14,2 | 13,7 | 18,2 | 17,7 | 22,2 |

|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|----------------|-----------------|-----------|--------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| type   | spring<br>code | Md F[Nm]        |           | 2,0                                                                      |     | 2,5 |     | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
|        |                | Md<br>min       | Md<br>max | min                                                                      | max | min | max | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| GS-063 | 1              | 1,4             | 2,1       | 6,8                                                                      | 7,2 | 8,8 | 9,2 | 10,8 | 11,2 | 12,8 | 13,2 | 14,3 | 15,2 | 16,8 | 17,2 | 18,8 | 19,2 | 20,8 | 21,2 | 22,8 | 23,2 | 26,8 | 27,1 | 30,8 | 31,1 |
|        | 2              | 2,9             | 4,2       | 5,6                                                                      | 6,4 | 7,6 | 8,4 | 9,6  | 10,4 | 11,6 | 12,3 | 13,6 | 14,3 | 15,6 | 16,3 | 17,6 | 18,3 | 19,5 | 20,3 | 21,6 | 22,3 | 25,6 | 26,3 | 29,6 | 30,3 |
|        | 3              | 4,3             | 6,3       | 4,4                                                                      | 5,5 | 6,4 | 7,5 | 8,4  | 9,5  | 10,4 | 11,5 | 12,4 | 13,5 | 14,4 | 15,5 | 16,4 | 17,5 | 18,4 | 19,5 | 20,4 | 21,5 | 24,4 | 25,5 | 28,4 | 29,5 |
|        | 4              | 5,8             | 8,4       | 3,2                                                                      | 4,7 | 5,2 | 6,7 | 7,2  | 8,7  | 9,2  | 10,7 | 11,2 | 12,7 | 13,2 | 14,7 | 15,2 | 16,7 | 17,2 | 18,7 | 19,2 | 20,7 | 23,2 | 24,7 | 27,2 | 28,7 |
|        | 5              | 7,2             | 10,5      | 2,1                                                                      | 3,9 | 4,1 | 5,9 | 6,1  | 7,9  | 8,0  | 9,9  | 10,0 | 11,9 | 12,0 | 13,9 | 14,0 | 15,9 | 16,0 | 17,9 | 18,0 | 19,9 | 22,0 | 23,9 | 26,0 | 27,9 |
|        | 6              | 8,6             | 12,5      | 0,9                                                                      | 3,1 | 2,9 | 5,1 | 4,9  | 7,1  | 6,9  | 9,1  | 8,9  | 11,1 | 10,9 | 13,1 | 12,9 | 15,1 | 14,9 | 17,1 | 16,8 | 19,1 | 20,8 | 23,1 | 24,8 | 27,1 |
|        | 7              | 10,1            | 14,6      |                                                                          |     | 1,7 | 4,3 | 3,7  | 6,3  | 5,7  | 8,3  | 7,7  | 10,3 | 9,7  | 12,3 | 11,7 | 14,3 | 13,7 | 16,3 | 15,7 | 18,3 | 19,7 | 22,2 | 23,7 | 26,2 |
|        | 8              | 11,5            | 16,7      |                                                                          |     |     |     | 2,5  | 5,4  | 4,5  | 7,4  | 6,5  | 9,4  | 8,5  | 11,4 | 10,5 | 13,4 | 12,5 | 15,4 | 14,5 | 17,4 | 18,5 | 21,4 | 22,5 | 25,4 |
|        | 9              | 13,0            | 18,8      |                                                                          |     |     |     | 1,3  | 4,6  | 3,3  | 6,6  | 5,3  | 8,6  | 7,3  | 10,6 | 9,3  | 12,6 | 11,3 | 14,6 | 13,3 | 16,3 | 17,3 | 20,6 | 21,3 | 24,6 |
|        | 10             | 14,4            | 20,9      |                                                                          |     |     |     |      |      | 2,1  | 5,8  | 4,1  | 7,8  | 6,1  | 9,8  | 8,1  | 11,8 | 10,1 | 13,8 | 12,1 | 15,8 | 16,1 | 19,8 | 20,1 | 23,8 |
|        | 11             | 15,8            | 23,0      |                                                                          |     |     |     |      |      |      |      | 2,9  | 7,0  | 4,9  | 9,0  | 6,9  | 11,0 | 8,9  | 13,0 | 10,9 | 15,0 | 14,9 | 19,0 | 18,9 | 23,0 |
|        | 12             | 17,3            | 25,1      |                                                                          |     |     |     |      |      |      |      | 17   | 6,2  | 3,7  | 8,2  | 5,7  | 10,2 | 7,7  | 12,2 | 9,7  | 14,2 | 13,7 | 18,2 | 17,7 | 22,2 |
|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|        | spring<br>code | Md F[Nm]        |           | 2,0                                                                      |     | 2,5 |     | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
|        |                | Md<br>min       | Md<br>max | min                                                                      | max | min | max | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| 73     | 1              | 2               | 3         | 17                                                                       | 18  | 22  | 23  | 27   | 28   | 32   | 33   | 37   | 38   | 42   | 43   | 47   | 48   | 52   | 53   | 57   | 58   | 67   | 68   | 77   | 78   |
|        | 2              | 4               | 6         | 14                                                                       | 16  | 19  | 21  | 24   | 26   | 29   | 31   | 34   | 36   | 39   | 41   | 44   | 46   | 49   | 51   | 54   | 56   | 64   | 66   | 74   | 76   |
|        | 3              | 6               | 9         | 11                                                                       | 14  | 16  | 19  | 21   | 24   | 26   | 29   | 31   | 34   | 36   | 39   | 41   | 44   | 46   | 49   | 51   | 54   | 61   | 64   | 71   | 73   |
|        | 4              | 8               | 12        | 8                                                                        | 12  | 13  | 17  | 18   | 22   | 23   | 27   | 28   | 32   | 33   | 37   | 38   | 42   | 43   | 47   | 48   | 52   | 58   | 61   | 68   | 71   |
|        | 5              | 10              | 15        | 5                                                                        | 10  | 10  | 15  | 15   | 20   | 20   | 25   | 25   | 30   | 30   | 35   | 35   | 40   | 40   | 45   | 45   | 49   | 55   | 59   | 65   | 69   |
| GS-075 | 6              | 12              | 18        | 2                                                                        | 8   | 7   | 13  | 12   | 18   | 17   | 23   | 22   | 28   | 27   | 33   | 32   | 37   | 37   | 42   | 42   | 47   | 52   | 57   | 62   | 67   |
|        | 7              | 14              | 21        |                                                                          |     | 4   | 11  | 9    | 16   | 14   | 21   | 19   | 25   | 24   | 30   | 29   | 35   | 34   | 40   | 39   | 45   | 49   | 55   | 59   | 65   |
|        | 8              | 16              | 24        |                                                                          |     |     |     | 6    | 14   | 11   | 18   | 16   | 23   | 21   | 28   | 26   | 33   | 31   | 38   | 36   | 43   | 46   | 53   | 56   | 63   |
|        | 9              | 18              | 27        |                                                                          |     |     |     | 3    | 11   | 8    | 16   | 13   | 21   | 18   | 26   | 23   | 31   | 28   | 36   | 33   | 41   | 43   | 51   | 53   | 61   |
|        | 10             | 20              | 30        |                                                                          |     |     |     |      |      | 5    | 14   | 10   | 19   | 15   | 24   | 20   | 29   | 25   | 34   | 30   | 39   | 40   | 49   | 50   | 59   |
|        | 11             | 22              | 33        |                                                                          |     |     |     |      |      |      |      | 7    | 17   | 12   | 22   | 17   | 27   | 22   | 32   | 27   | 37   | 37   | 47   | 47   | 57   |
|        | 12             | 25              | 35        |                                                                          |     |     |     |      |      |      |      | 4    | 15   | 9    | 20   | 14   | 25   | 19   | 30   | 24   | 35   | 34   | 45   | 44   | 55   |
|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

|        |             | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |         |         |         |         |
|--------|-------------|--------------------------------------------------------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|        |             | Md F[Nm]                                                                 |          | 2,0    |        | 2,5    |        | 3,0    |        | 3,5    |        | 4,0    |        | 4,5    |        | 5,0    |        | 5,5    |        | 6,0    |        | 7,0     |         | 8,0     |         |
| type   | spring code | Md min 3                                                                 | Md max 5 | min 26 | max 27 | min 34 | max 35 | min 41 | max 43 | min 49 | max 50 | min 56 | max 58 | min 64 | max 55 | min 72 | max 73 | min 79 | max 81 | min 87 | max 88 | Min 102 | Max 104 | Min 117 | max 119 |
| GS-083 | 1           |                                                                          |          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |         |         |         |         |
|        | 2           | 6                                                                        | 6        | 21     | 24     | 29     | 32     | 37     | 39     | 44     | 47     | 52     | 55     | 60     | 62     | 67     | 70     | 75     | 78     | 82     | 75     | 76      | 100     | 113     | 116     |
|        | 3           | 9                                                                        | 9        | 17     | 21     | 25     | 29     | 32     | 35     | 40     | 44     | 47     | 52     | 55     | 59     | 63     | 67     | 70     | 74     | 78     | 82     | 93      | 97      | 108     | 113     |
|        | 4           | 13                                                                       | 13       | 12     | 18     | 20     | 26     | 28     | 33     | 35     | 41     | 43     | 48     | 50     | 56     | 58     | 64     | 66     | 71     | 73     | 79     | 89      | 94      | 104     | 109     |
|        | 5           | 16                                                                       | 16       | 8      | 15     | 15     | 22     | 23     | 30     | 31     | 38     | 38     | 45     | 46     | 53     | 54     | 61     | 61     | 68     | 69     | 76     | 84      | 91      | 99      | 106     |
|        | 6           | 19                                                                       | 19       | 3      | 12     | 11     | 19     | 19     | 27     | 26     | 35     | 34     | 42     | 41     | 50     | 49     | 57     | 57     | 66     | 64     | 73     | 80      | 88      | 95      | 103     |
|        | 7           | 22                                                                       | 22       |        |        | 6      | 16     | 14     | 24     | 22     | 31     | 29     | 39     | 37     | 47     | 45     | 54     | 52     | 62     | 60     | 70     | 75      | 85      | 90      | 100     |
|        | 8           | 25                                                                       | 25       |        |        |        |        | 9      | 21     | 17     | 28     | 25     | 36     | 32     | 44     | 40     | 51     | 48     | 59     | 66     | 66     | 70      | 82      | 86      | 97      |
|        | 9           | 28                                                                       | 28       |        |        |        |        | 5      | 18     | 13     | 225    | 20     | 33     | 28     | 40     | 35     | 48     | 43     | 56     | 51     | 63     | 66      | 79      | 81      | 94      |
|        | 10          | 33                                                                       | 31       |        |        |        |        |        | 8      | 22     | 16     | 30     | 23     | 37     | 31     | 45     | 39     | 53     | 46     | 60     | 61     | 75      | 77      | 91      |         |
|        | 11          | 41                                                                       | 34       |        |        |        |        |        |        |        |        | 11     | 27     | 19     | 34     | 26     | 42     | 34     | 49     | 42     | 57     | 57      | 72      | 72      | 88      |
|        | 12          | 38                                                                       | 38       |        |        |        |        |        |        |        |        | 7      | 23     | 14     | 31     | 22     | 39     | 29     | 46     | 37     | 54     | 52      | 69      | 68      | 84      |

|        |                | spring<br>force |                | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |     |  |
|--------|----------------|-----------------|----------------|--------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|--|
|        |                | Md F[Nm]        |                | 2,0                                                                      |           | 2,5       |           | 3,0       |           | 3,5       |           | 4,0       |           | 4,5       |           | 5,0        |            | 5,5        |            | 6,0        |            | 7,0        |            | 8,0        |            |     |  |
| type   | spring<br>code | Md<br>min<br>5  | Md<br>max<br>7 | min<br>38                                                                | max<br>40 | min<br>49 | max<br>52 | min<br>61 | max<br>63 | min<br>72 | max<br>74 | min<br>83 | max<br>85 | min<br>94 | max<br>97 | min<br>106 | max<br>106 | min<br>117 | max<br>119 | min<br>128 | max<br>130 | Min<br>151 | Max<br>153 | Min<br>173 | max<br>175 |     |  |
| GS-092 | 1              |                 |                |                                                                          |           |           |           |           |           |           |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |     |  |
|        | 2              | 9               | 13             | 32                                                                       | 36        | 43        | 47        | 54        | 58        | 65        | 69        | 77        | 81        | 88        | 92        | 99         | 103        | 110        | 114        | 121        | 126        | 144        | 148        | 166        | 171        |     |  |
|        | 3              | 14              | 20             | 25                                                                       | 31        | 36        | 42        | 47        | 54        | 59        | 65        | 70        | 76        | 81        | 87        | 92         | 99         | 104        | 110        | 115        | 121        | 137        | 143        | 160        | 166        |     |  |
|        | 4              | 18              | 27             | 18                                                                       | 27        | 29        | 38        | 41        | 49        | 52        | 60        | 63        | 71        | 74        | 82        | 86         | 94         | 97         | 105        | 106        | 116        | 131        | 139        | 153        | 161        |     |  |
|        | 5              | 23              | 33             | 11                                                                       | 22        | 23        | 33        | 34        | 44        | 45        | 56        | 56        | 67        | 68        | 78        | 79         | 89         | 90         | 101        | 101        | 112        | 124        | 134        | 146        | 157        |     |  |
|        | 6              | 28              | 40             | 5                                                                        | 17        | 16        | 29        | 27        | 40        | 39        | 51        | 50        | 62        | 61        | 73        | 72         | 85         | 83         | 96         | 95         | 107        | 117        | 130        | 140        | 152        |     |  |
|        | 7              | 32              | 47             |                                                                          |           | 9         | 24        | 21        | 35        | 32        | 46        | 43        | 58        | 54        | 69        | 66         | 80         | 77         | 91         | 88         | 103        | 110        | 125        | 133        | 147        |     |  |
|        | 8              | 37              | 54             |                                                                          |           | 3         | 19        | 14        | 31        | 25        | 42        | 36        | 53        | 48        | 64        | 59         | 75         | 70         | 87         | 81         | 98         | 104        | 120        | 126        | 143        |     |  |
|        | 9              | 41              | 60             |                                                                          |           |           |           | 7         | 26        | 18        | 37        | 30        | 48        | 41        | 60        | 52         | 71         | 63         | 82         | 75         | 93         | 97         | 116        | 120        | 138        |     |  |
|        | 10             | 46              | 67             |                                                                          |           |           |           |           |           | 12        | 33        | 23        | 44        | 34        | 55        | 45         | 66         | 57         | 77         | 68         | 89         | 90         | 111        | 113        | 134        |     |  |
|        | 11             | 51              | 74             |                                                                          |           |           |           |           |           |           |           |           | 16        | 39        | 28        | 50         | 39         | 62         | 50         | 73         | 61         | 84         | 84         | 107        | 106        | 129 |  |
|        | 12             | 55              | 80             |                                                                          |           |           |           |           |           |           |           |           | 10        | 35        | 21        | 46         | 32         | 57         | 43         | 68         | 56         | 80         | 77         | 102        | 99         | 124 |  |

|        |                | spring<br>force |                 | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |           |           |           |           |           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--------|----------------|-----------------|-----------------|--------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|        |                | Md<br>F[Nm]     |                 | 2,0                                                                      |           | 2,5       |           | 3,0       |           | 3,5        |            | 4,0        |            | 4,5        |            | 5,0        |            | 5,5        |            | 6,0        |            | 7,0        |            | 8,0        |            |
| type   | spring<br>code | Md<br>min<br>7  | Md<br>max<br>10 | min<br>55                                                                | max<br>58 | min<br>72 | max<br>75 | min<br>88 | max<br>91 | min<br>104 | min<br>107 | max<br>120 | min<br>123 | min<br>137 | max<br>140 | min<br>153 | max<br>156 | min<br>169 | max<br>172 | min<br>185 | max<br>188 | Min<br>218 | Max<br>221 | Min<br>250 | max<br>253 |
| GS-105 | 2              | 13              | 19              | 46                                                                       | 52        | 62        | 68        | 78        | 84        | 94         | 100        | 111        | 117        | 127        | 133        | 143        | 149        | 159        | 165        | 176        | 182        | 208        | 214        | 241        | 247        |
|        | 3              | 20              | 29              | 36                                                                       | 45        | 52        | 61        | 68        | 77        | 85         | 94         | 101        | 110        | 117        | 126        | 133        | 142        | 150        | 159        | 166        | 175        | 198        | 207        | 231        | 240        |
|        | 4              | 27              | 39              | 26                                                                       | 38        | 43        | 55        | 59        | 71        | 75         | 87         | 91         | 103        | 108        | 120        | 124        | 136        | 140        | 152        | 156        | 168        | 189        | 201        | 221        | 223        |
|        | 5              | 33              | 48              | 17                                                                       | 31        | 33        | 48        | 49        | 64        | 65         | 80         | 82         | 97         | 98         | 113        | 114        | 129        | 130        | 145        | 147        | 162        | 179        | 194        | 212        | 227        |
|        | 6              | 40              | 58              | 7                                                                        | 25        | 23        | 41        | 39        | 57        | 56         | 74         | 72         | 90         | 88         | 99         | 95         | 116        | 111        | 132        | 127        | 148        | 160        | 181        | 192        | 213        |
|        | 7              | 47              | 68              |                                                                          |           | 13        | 34        | 30        | 51        | 46         | 67         | 62         | 83         | 87         | 99         | 95         | 116        | 111        | 132        | 127        | 148        | 160        | 181        | 192        | 213        |
|        | 8              | 53              | 77              |                                                                          |           |           |           | 20        | 44        | 36         | 60         | 53         | 77         | 69         | 93         | 85         | 109        | 101        | 125        | 118        | 142        | 150        | 174        | 183        | 207        |
|        | 9              | 6,              | 87              |                                                                          |           |           |           |           |           | 27         | 54         | 43         | 70         | 59         | 86         | 75         | 102        | 92         | 119        | 108        | 35         | 140        | 167        | 173        | 200        |
|        | 10             | 67              | 97              |                                                                          |           |           |           |           |           | 17         | 47         | 33         | 63         | 49         | 79         | 66         | 96         | 82         | 112        | 96         | 728        | 131        | 161        | 163        | 193        |
|        | 11             | 73              | 106             |                                                                          |           |           |           |           |           |            |            | 24         | 57         | 40         | 73         | 56         | 89         | 72         | 105        | 89         | 122        | 121        | 154        | 154        | 187        |
|        | 12             | 80              | 116             |                                                                          |           |           |           |           |           |            |            | 14         | 50         | 30         | 66         | 46         | 82         | 63         | 99         | 79         | 115        | 111        | 147        | 144        | 180        |

|        |                | spring<br>force |           | pneumatic net torque Md N [Nm] at minimum control pressure PSt [bar] |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|----------------|-----------------|-----------|----------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|        |                | Md F[Nm]        |           | 2,0                                                                  |     | 2,5 |     | 3,0 |     | 3,5 |     | 4,0 |     | 4,5 |     | 5,0 |     | 5,5 |     | 6,0 |     | 7,0 |     | 8,0 |     |
| type   | spring<br>code | Md<br>min       | Md<br>max | min                                                                  | max | min | max | min | max | min | min | max | min | min | max | min | max | min | max | min | max | Min | Max | Min | max |
| GS-125 | 1              | 10              | 15        | 86                                                                   | 91  | 112 | 116 | 137 | 142 | 162 | 167 | 188 | 192 | 213 | 218 | 239 | 243 | 264 | 269 | 289 | 294 | 340 | 345 | 391 | 395 |
|        | 2              | 21              | 30        | 71                                                                   | 81  | 97  | 106 | 122 | 131 | 147 | 157 | 173 | 182 | 198 | 207 | 23  | 233 | 249 | 258 | 274 | 284 | 325 | 334 | 376 | 385 |
|        | 3              | 31              | 45        | 56                                                                   | 70  | 80  | 96  | 107 | 121 | 132 | 146 | 158 | 172 | 183 | 197 | 208 | 222 | 234 | 246 | 259 | 273 | 310 | 324 | 360 | 375 |
|        | 4              | 42              | 6         | 41                                                                   | 60  | 66  | 85  | 92  | 111 | 117 | 136 | 143 | 161 | 168 | 187 | 193 | 212 | 219 | 237 | 244 | 263 | 295 | 313 | 345 | 364 |
|        | 5              | 52              | 75        | 26                                                                   | 49  | 51  | 75  | 77  | 100 | 102 | 126 | 127 | 151 | 153 | 176 | 178 | 202 | 204 | 227 | 229 | 252 | 280 | 303 | 330 | 354 |
|        | 6              | 62              | 91        | 11                                                                   | 39  | 36  | 64  | 62  | 90  | 87  | 115 | 112 | 140 | 138 | 166 | 163 | 191 | 188 | 217 | 214 | 242 | 265 | 293 | 315 | 343 |
|        | 7              | 73              | 106       |                                                                      |     | 21  | 54  | 47  | 79  | 72  | 105 | 97  | 130 | 123 | 155 | 148 | 181 | 173 | 206 | 199 | 232 | 249 | 262 | 300 | 333 |
|        | 8              | 83              | 121       |                                                                      |     |     |     | 31  | 69  | 57  | 94  | 82  | 120 | 108 | 145 | 133 | 170 | 158 | 196 | 184 | 221 | 234 | 272 | 285 | 323 |
|        | 9              | 74              | 136       |                                                                      |     |     |     |     |     | 42  | 84  | 67  | 109 | 92  | 135 | 118 | 160 | 143 | 185 | 169 | 211 | 219 | 261 | 270 | 312 |
|        | 10             | 104             | 151       |                                                                      |     |     |     |     |     | 27  | 74  | 52  | 99  | 77  | 124 | 103 | 150 | 128 | 175 | 153 | 200 | 204 | 251 | 255 | 302 |
|        | 11             | 114             | 166       |                                                                      |     |     |     |     |     |     |     | 37  | 88  | 62  | 114 | 88  | 139 | 113 | 165 | 138 | 190 | 189 | 241 | 240 | 291 |
|        | 12             | 125             | 181       |                                                                      |     |     |     |     |     |     |     | 22  | 78  | 47  | 103 | 73  | 129 | 98  | 154 | 123 | 180 | 174 | 230 | 225 | 281 |

|  |  | spring |  | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--------|--|--------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|--|--|--------|--|--------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

|        |             | force                                                                    |        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |
|--------|-------------|--------------------------------------------------------------------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| type   | spring code | Md F[Nm]                                                                 |        | 2,0 |     | 2,5 |     | 3,0 |     | 3,5 |     | 4,0 |     | 4,5 |     | 5,0 |     | 5,5 |     | 6,0 |     | 7,0 |     | 8,0  |      |
|        |             | Md min                                                                   | Md max | min | max | min | max | min | max | min | min | max | min | min | max | min | max | min | max | min | max | Min | Max | Min  | max  |
|        |             | 18                                                                       | 26     | 148 | 156 | 191 | 199 | 234 | 242 | 278 | 286 | 321 | 329 | 365 | 373 | 408 | 416 | 451 | 459 | 495 | 503 | 581 | 589 | 668  | 676  |
| GS-140 | 2           | 36                                                                       | 52     | 122 | 138 | 165 | 181 | 209 | 225 | 252 | 268 | 295 | 311 | 339 | 355 | 382 | 398 | 425 | 442 | 469 | 485 | 556 | 572 | 642  | 658  |
|        | 3           | 53                                                                       | 77     | 96  | 120 | 139 | 164 | 183 | 207 | 226 | 250 | 270 | 294 | 313 | 337 | 356 | 380 | 400 | 424 | 443 | 467 | 530 | 554 | 617  | 641  |
|        | 4           | 71                                                                       | 103    | 70  | 102 | 114 | 146 | 157 | 189 | 200 | 233 | 244 | 276 | 287 | 319 | 330 | 363 | 374 | 406 | 417 | 449 | 504 | 536 | 591  | 623  |
|        | 5           | 89                                                                       | 129    | 44  | 84  | 88  | 128 | 131 | 171 | 175 | 215 | 218 | 258 | 261 | 302 | 305 | 345 | 348 | 388 | 391 | 432 | 478 | 518 | 565  | 605  |
|        | 6           | 107                                                                      | 155    | 19  | 67  | 62  | 110 | 105 | 154 | 149 | 197 | 192 | 240 | 235 | 284 | 279 | 327 | 322 | 371 | 366 | 414 | 378 | 501 | 539  | 587  |
|        | 7           | 124                                                                      | 181    |     |     | 36  | 93  | 80  | 136 | 123 | 179 | 166 | 223 | 210 | 266 | 253 | 309 | 295 | 353 | 340 | 395 | 427 | 483 | 513  | 570  |
|        | 8           | 142                                                                      | 207    |     |     |     |     | 54  | 118 | 97  | 162 | 140 | 205 | 184 | 248 | 227 | 292 | 271 | 335 | 314 | 378 | 401 | 465 | 487  | 552  |
|        | 9           | 160                                                                      | 232    |     |     |     |     |     |     | 71  | 144 | 115 | 187 | 158 | 231 | 201 | 274 | 245 | 317 | 288 | 361 | 375 | 447 | 462  | 534  |
|        | 10          | 178                                                                      | 258    |     |     |     |     |     |     | 45  | 126 | 89  | 169 | 132 | 213 | 176 | 256 | 219 | 300 | 262 | 343 | 349 | 430 | 436  | 516  |
|        | 11          | 195                                                                      | 284    |     |     |     |     |     |     |     |     | 63  | 152 | 106 | 195 | 150 | 238 | 193 | 282 | 238 | 325 | 323 | 412 | 410  | 499  |
|        | 12          | 213                                                                      | 310    |     |     |     |     |     |     |     |     | 37  | 134 | 81  | 177 | 124 | 221 | 167 | 264 | 211 | 307 | 297 | 394 | 384  | 481  |
|        |             | spring force                                                             |        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |
|        |             | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |
| type   | spring code | Md F[Nm]                                                                 |        | 2,0 |     | 2,5 |     | 3,0 |     | 3,5 |     | 4,0 |     | 4,5 |     | 5,0 |     | 5,5 |     | 6,0 |     | 7,0 |     | 8,0  |      |
|        |             | Md min                                                                   | Md max | min | max | min | max | min | max | min | min | max | min | min | max | min | max | min | max | min | max | Min | Max | Min  | max  |
|        |             | 27                                                                       | 39     | 225 | 237 | 291 | 303 | 357 | 369 | 432 | 436 | 489 | 502 | 556 | 568 | 622 | 634 | 688 | 700 | 754 | 766 | 888 | 896 | 1018 | 1030 |
| GS-160 | 2           | 54                                                                       | 79     | 186 | 210 | 252 | 276 | 318 | 342 | 364 | 408 | 450 | 475 | 516 | 541 | 582 | 607 | 648 | 673 | 715 | 739 | 847 | 871 | 979  | 1003 |
|        | 3           | 81                                                                       | 118    | 146 | 183 | 212 | 249 | 279 | 315 | 345 | 381 | 411 | 447 | 477 | 514 | 543 | 580 | 609 | 646 | 675 | 712 | 807 | 844 | 940  | 976  |
|        | 4           | 108                                                                      | 157    | 107 | 156 | 173 | 222 | 239 | 288 | 305 | 354 | 371 | 420 | 438 | 486 | 504 | 553 | 670 | 619 | 636 | 685 | 768 | 817 | 900  | 949  |
|        | 5           | 136                                                                      | 197    | 68  | 129 | 134 | 195 | 200 | 261 | 266 | 327 | 332 | 393 | 398 | 459 | 464 | 525 | 530 | 592 | 597 | 658 | 729 | 790 | 861  | 922  |
|        | 6           | 163                                                                      | 236    | 28  | 102 | 94  | 168 | 161 | 234 | 227 | 300 | 293 | 366 | 359 | 432 | 425 | 498 | 491 | 564 | 557 | 631 | 689 | 763 | 822  | 895  |
|        | 7           | 190                                                                      | 275    |     |     | 55  | 141 | 121 | 207 | 187 | 273 | 253 | 339 | 320 | 405 | 386 | 371 | 452 | 537 | 518 | 603 | 550 | 736 | 780  | 868  |
|        | 8           | 217                                                                      | 315    |     |     |     |     | 82  | 180 | 148 | 246 | 214 | 312 | 280 | 378 | 346 | 444 | 412 | 510 | 478 | 576 | 611 | 709 | 743  | 841  |
|        | 9           | 244                                                                      | 354    |     |     |     |     |     |     | 109 | 219 | 175 | 285 | 241 | 351 | 307 | 417 | 373 | 483 | 439 | 549 | 571 | 681 | 704  | 814  |
|        | 10          | 271                                                                      | 393    |     |     |     |     |     |     | 69  | 192 | 135 | 258 | 202 | 324 | 268 | 390 | 334 | 456 | 400 | 500 | 532 | 654 | 664  | 787  |
|        | 11          | 296                                                                      | 433    |     |     |     |     |     |     |     |     | 96  | 231 | 162 | 297 | 228 | 363 | 294 | 429 | 360 | 495 | 493 | 627 | 625  | 759  |
|        | 12          | 325                                                                      | 472    |     |     |     |     |     |     |     |     | 57  | 203 | 123 | 270 | 189 | 336 | 255 | 402 | 321 | 468 | 453 | 600 | 586  | 732  |



|        |                | spring<br>force |                 | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |            |            |            |            |            |            |            |            |            |            |            |             |             |             |             |             |             |             |             |             |             |      |  |
|--------|----------------|-----------------|-----------------|--------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|--|
|        |                | Md F[Nm]        |                 | 2,0                                                                      |            | 2,5        |            | 3,0        |            | 3,5        |            | 4,0        |            | 4,5        |            | 5,0         |             | 5,5         |             | 6,0         |             | 7,0         |             | 8,0         |             |      |  |
| type   | spring<br>code | Md<br>min<br>44 | Md<br>max<br>63 | min<br>363                                                               | max<br>383 | min<br>469 | max<br>489 | min<br>576 | max<br>596 | min<br>683 | min<br>702 | max<br>789 | min<br>809 | min<br>896 | max<br>915 | min<br>1002 | max<br>1002 | min<br>1109 | max<br>1129 | min<br>1215 | max<br>1235 | Min<br>1429 | Max<br>1448 | Min<br>1642 | max<br>1661 |      |  |
| GS-190 | 1              |                 |                 |                                                                          |            |            |            |            |            |            |            |            |            |            |            |             |             |             |             |             |             |             |             |             |             |      |  |
|        | 2              | 87              | 127             | 299                                                                      | 339        | 406        | 445        | 513        | 552        | 619        | 659        | 726        | 765        | 832        | 872        | 939         | 978         | 1045        | 1085        | 1152        | 1191        | 1365        | 1406        | 1578        | 1618        |      |  |
|        | 3              | 131             | 190             | 236                                                                      | 295        | 343        | 402        | 449        | 506        | 556        | 615        | 662        | 721        | 769        | 828        | 876         | 935         | 962         | 1041        | 1089        | 1148        | 1302        | 1361        | 1515        | 1574        |      |  |
|        | 4              | 175             | 254             | 173                                                                      | 252        | 279        | 358        | 386        | 466        | 492        | 574        | 599        | 678        | 706        | 784        | 812         | 891         | 891         | 998         | 1025        | 1104        | 1238        | 1317        | 1452        | 1530        |      |  |
|        | 5              | 218             | 317             | 109                                                                      | 208        | 216        | 314        | 322        | 421        | 429        | 528        | 536        | 634        | 642        | 741        | 749         | 847         | 855         | 954         | 962         | 1060        | 1175        | 1274        | 1388        | 1487        |      |  |
|        | 6              | 262             | 390             | 46                                                                       | 164        | 152        | 271        | 259        | 377        | 366        | 484        | 472        | 590        | 579        | 697        | 686         | 804         | 792         | 910         | 896         | 1017        | 1112        | 1230        | 1325        | 1443        |      |  |
|        | 7              | 306             | 444             |                                                                          |            | 89         | 227        | 196        | 334        | 302        | 440        | 409        | 547        | 515        | 653        | 622         | 760         | 728         | 866         | 835         | 973         | 1048        | 1186        | 1261        | 1399        |      |  |
|        | 8              | 350             | 507             |                                                                          |            |            |            | 132        | 290        | 239        | 396        | 345        | 503        | 452        | 610        | 559         | 716         | 665         | 823         | 772         | 929         | 985         | 1142        | 1198        | 1356        |      |  |
|        | 9              | 393             | 571             |                                                                          |            |            |            |            |            |            | 175        | 353        | 282        | 459        | 389        | 566         | 495         | 672         | 602         | 779         | 706         | 886         | 921         | 1099        | 1135        | 1312 |  |
|        | 10             | 437             | 634             |                                                                          |            |            |            |            |            |            | 112        | 309        | 219        | 416        | 325        | 522         | 432         | 629         | 538         | 735         | 645         | 842         | 858         | 1055        | 1071        | 1268 |  |
|        | 11             | 481             | 697             |                                                                          |            |            |            |            |            |            |            |            | 155        | 372        | 262        | 479         | 358         | 585         | 475         | 692         | 581         | 796         | 795         | 1011        | 1008        | 1225 |  |
|        | 12             | 524             | 761             |                                                                          |            |            |            |            |            |            |            |            | 92         | 328        | 198        | 435         | 305         | 541         | 411         | 648         | 518         | 755         | 731         | 968         | 944         | 1181 |  |

|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|----------------|-----------------|-----------|--------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
|        |                | Md F[Nm]        |           | 2,0                                                                      |     | 2,5 |     | 3,0 |     | 3,5 |     | 4,0 |     | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |      |
| type   | spring<br>code | Md<br>min       | Md<br>max | min                                                                      | max | min | max | min | max | min | min | max | min | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |      |
| GS-210 | 1              | 53              | 77        | 443                                                                      | 467 | 573 | 597 | 703 | 728 | 834 | 858 | 964 | 966 | 1094 | 1118 | 1224 | 1248 | 1354 | 1378 | 1484 | 1506 | 1745 | 1769 | 2005 | 2029 |      |
|        | 2              |                 | 107       | 155                                                                      | 366 | 414 | 496 | 544 | 625 | 674 | 756 | 804 | 886 | 934  | 1016 | 1065 | 1147 | 1195 | 1277 | 1325 | 1407 | 1455 | 1667 | 1715 | 1928 | 1976 |
|        | 3              |                 | 160       | 232                                                                      | 288 | 361 | 418 | 491 | 549 | 621 | 679 | 751 | 809 | 881  | 939  | 1011 | 1069 | 1141 | 1199 | 1272 | 1329 | 1402 | 1590 | 1662 | 1850 | 1922 |
|        | 4              |                 | 213       | 310                                                                      | 211 | 307 | 341 | 437 | 471 | 567 | 601 | 698 | 731 | 828  | 862  | 958  | 992  | 1088 | 1122 | 1218 | 1252 | 1348 | 1512 | 1609 | 1773 | 1869 |
|        | 5              |                 | 267       | 387                                                                      | 133 | 254 | 264 | 384 | 394 | 514 | 524 | 644 | 664 | 774  | 784  | 905  | 914  | 1035 | 1044 | 1165 | 1175 | 1295 | 1435 | 1666 | 1695 | 1816 |
|        | 6              |                 | 320       | 465                                                                      | 56  | 200 | 186 | 331 | 316 | 461 | 446 | 591 | 577 | 721  | 707  | 851  | 837  | 961  | 967  | 1111 | 1097 | 1242 | 1357 | 1602 | 1618 | 1762 |
|        | 7              |                 | 374       | 542                                                                      |     |     | 109 | 277 | 239 | 407 | 369 | 537 | 499 | 668  | 629  | 796  | 759  | 928  | 890  | 1058 | 1020 | 1188 | 1280 | 1449 | 1540 | 1709 |
|        | 8              |                 | 427       | 620                                                                      |     |     |     |     | 161 | 354 | 291 | 484 | 422 | 614  | 552  | 744  | 682  | 875  | 812  | 1005 | 942  | 1135 | 1203 | 1395 | 1463 | 1655 |
|        | 9              |                 | 480       | 697                                                                      |     |     |     |     |     |     | 214 | 431 | 344 | 561  | 474  | 691  | 604  | 821  | 735  | 961  | 885  | 1032 | 1125 | 1342 | 1385 | 1602 |
|        | 10             |                 | 534       | 775                                                                      |     |     |     |     |     |     | 137 | 377 | 267 | 508  | 397  | 638  | 527  | 768  | 657  | 898  | 787  | 1028 | 1048 | 1288 | 1308 | 1549 |
|        | 11             |                 | 587       | 852                                                                      |     |     |     |     |     |     |     |     | 189 | 454  | 319  | 584  | 450  | 714  | 580  | 845  | 710  | 975  | 970  | 1235 | 1230 | 1495 |
| 12     |                | 640             | 929       |                                                                          |     |     |     |     |     |     |     | 112 | 401 | 242  | 531  | 372  | 661  | 502  | 791  | 632  | 921  | 893  | 1182 | 1153 | 1442 |      |



|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|----------------|-----------------|-----------|--------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|        |                | Md F[Nm]        |           | 2,0                                                                      |     | 2,5 |     | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
| type   | spring<br>code | Md<br>min       | Md<br>max | min                                                                      | max | min | max | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | min  | max  | min  | max  |
| GS-240 | 1              | 78              | 114       | 651                                                                      | 687 | 843 | 878 | 1034 | 1069 | 1225 | 1260 | 1416 | 1452 | 1608 | 1643 | 1799 | 1834 | 1990 | 226  | 2181 | 2217 | 2564 | 2599 | 2947 | 2982 |
|        | 2              | 157             | 228       | 537                                                                      | 608 | 729 | 800 | 920  | 991  | 111  | 1182 | 1303 | 1373 | 1494 | 1565 | 1685 | 1756 | 1876 | 1947 | 2068 | 2138 | 2450 | 2521 | 2833 | 2903 |
|        | 3              | 235             | 341       | 424                                                                      | 530 | 615 | 721 | 806  | 912  | 997  | 1104 | 1189 | 1295 | 1380 | 1486 | 1571 | 1677 | 1763 | 1869 | 1954 | 2060 | 2336 | 2443 | 2719 | 2825 |
|        | 4              | 314             | 455       | 310                                                                      | 451 | 501 | 643 | 692  | 834  | 884  | 1025 | 1075 | 1217 | 1266 | 1408 | 1458 | 1599 | 1649 | 1790 | 1840 | 1962 | 2223 | 2364 | 2605 | 2747 |
|        | 5              | 392             | 569       | 196                                                                      | 373 | 387 | 564 | 579  | 756  | 770  | 947  | 961  | 1138 | 1152 | 1329 | 1344 | 1521 | 1535 | 1712 | 1726 | 1903 | 2109 | 2286 | 8491 | 2668 |
|        | 6              | 470             | 683       | 82                                                                       | 295 | 274 | 486 | 465  | 677  | 656  | 868  | 847  | 1060 | 1039 | 1251 | 1230 | 1442 | 1421 | 1633 | 1612 | 1825 | 1995 | 2207 | 2378 | 2590 |
|        | 7              | 549             | 797       |                                                                          |     | 160 | 407 | 351  | 599  | 542  | 790  | 734  | 731  | 925  | 1173 | 1116 | 1364 | 1307 | 1555 | 1499 | 1746 | 1881 | 2129 | 2264 | 2511 |
|        | 8              | 627             | 910       |                                                                          |     |     |     | 237  | 520  | 428  | 712  | 620  | 903  | 811  | 1094 | 1002 | 1285 | 1194 | 1477 | 1385 | 1668 | 1767 | 2060 | 2150 | 2433 |
|        | 9              | 706             | 1024      |                                                                          |     |     |     |      |      | 315  | 633  | 506  | 824  | 397  | 1016 | 889  | 1207 | 1080 | 1398 | 1271 | 1590 | 1654 | 1972 | 2036 | 2355 |
|        | 10             | 784             | 1138      |                                                                          |     |     |     |      |      | 201  | 555  | 392  | 746  | 583  | 937  | 775  | 1129 | 966  | 1320 | 1157 | 1511 | 1540 | 1894 | 1922 | 2276 |
|        | 11             | 863             | 1252      |                                                                          |     |     |     |      |      |      |      | 278  | 668  | 470  | 859  | 661  | 1050 | 852  | 1241 | 1043 | 1433 | 1426 | 1815 | 1809 | 2198 |
|        | 12             |                 |           |                                                                          |     |     |     |      |      |      |      | 165  | 589  | 356  | 780  | 547  | 972  | 738  | 1163 | 930  | 1354 | 1312 | 1737 | 1695 | 2119 |

|        |                | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |      |      |      |      |      |      |      |      |      |      |      |      |       |      |      |      |      |      |      |      |      |
|--------|----------------|-----------------|-----------|--------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|
|        |                | Md F[Nm]        |           | 2,0                                                                      |      | 2,5  |      | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |       | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
| type   | spring<br>code | Md<br>min       | Md<br>max | min                                                                      | max  | min  | max  | min  | max  | min  | min  | max  | min  | min  | max  | min  | max   | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| GS-270 | 1              | 119             | 173       | 969                                                                      | 1043 | 1280 | 1333 | 1570 | 162  | 1860 | 1914 | 2151 | 2205 | 2441 | 2495 | 2732 | 2786  | 3022 | 3076 | 3313 | 3367 | 3894 | 3948 | 4475 | 4529 |
|        | 2              | 238             | 346       | 816                                                                      | 924  | 1107 | 1214 | 1397 | 1505 | 1688 | 1795 | 1978 | 2086 | 2269 | 2376 | 2559 | 2667  | 2850 | 2957 | 3140 | 3248 | 3721 | 3828 | 4302 | 4409 |
|        | 3              | 357             | 518       | 643                                                                      | 805  | 934  | 1095 | 1224 | 1386 | 1515 | 1676 | 1805 | 1967 | 2096 | 2257 | 2386 | 2547  | 2677 | 2838 | 2967 | 3128 | 3548 | 3709 | 4129 | 4290 |
|        | 4              | 476             | 691       | 471                                                                      | 686  | 761  | 976  | 1052 | 1266 | 1342 | 1557 | 1632 | 1847 | 1923 | 2138 | 2213 | 2428  | 2504 | 2719 | 2794 | 3009 | 3375 | 3690 | 3956 | 4171 |
|        | 5              | 596             | 864       | 298                                                                      | 566  | 588  | 857  | 879  | 1147 | 1169 | 1439 | 1460 | 1728 | 1750 | 2019 | 2041 | 2309  | 2331 | 2600 | 2622 | 2890 | 3203 | 3471 | 3783 | 4052 |
|        | 6              | 715             | 1037      | 125                                                                      | 447  | 415  | 738  | 706  | 1028 | 996  | 1319 | 1287 | 1609 | 1577 | 1900 | 1868 | 21909 | 2158 | 2481 | 2449 | 2771 | 3030 | 3352 | 3611 | 3933 |
|        | 7              | 834             | 1210      |                                                                          |      | 243  | 619  | 533  | 909  | 824  | 1200 | 1114 | 1490 | 1404 | 1781 | 1695 | 2071  | 1985 | 2362 | 2276 | 2652 | 2857 | 3233 | 3438 | 3814 |
|        | 8              | 963             | 1383      |                                                                          |      |      |      | 360  | 790  | 661  | 1081 | 941  | 1371 | 1232 | 1661 | 1522 | 1952  | 1813 | 2242 | 2103 | 2533 | 2684 | 3114 | 3265 | 3695 |
|        | 9              | 1072            | 1555      |                                                                          |      |      |      |      |      | 478  | 961  | 768  | 1252 | 1059 | 1542 | 1349 | 1833  | 1640 | 2123 | 1930 | 2414 | 2511 | 2995 | 3092 | 3576 |
|        | 10             | 1191            | 1728      |                                                                          |      |      |      |      |      | 305  | 842  | 596  | 1133 | 886  | 1423 | 1176 | 1714  | 1467 | 2004 | 1757 | 2295 | 2338 | 2876 | 2919 | 3457 |
|        | 11             | 1310            | 1901      |                                                                          |      |      |      |      |      |      |      | 423  | 1014 | 713  | 1304 | 1004 | 1595  | 1294 | 1885 | 1585 | 2176 | 2166 | 2757 | 2746 | 3338 |
|        | 12             | 1429            | 2074      |                                                                          |      |      |      |      |      |      |      | 250  | 895  | 540  | 1185 | 931  | 1476  | 1121 | 1766 | 1412 | 2057 | 1993 | 2637 | 2574 | 3218 |



|        |             | spring force |        | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|-------------|--------------|--------|--------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| type   | spring code | Md F[Nm]     |        | 2,0                                                                      |      | 2,5  |      | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
|        |             | Md min       | Md max | min                                                                      | max  | min  | max  | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| GS-300 | 1           | 163          | 237    | 1357                                                                     | 1431 | 1755 | 1829 | 2154 | 2227 | 2552 | 2626 | 2951 | 3024 | 3349 | 3423 | 3748 | 3821 | 4146 | 4220 | 4545 | 4618 | 3542 | 5415 | 6139 | 6212 |
|        | 2           | 327          | 474    | 1120                                                                     | 1267 | 1518 | 1666 | 1917 | 2064 | 2315 | 2163 | 2714 | 2861 | 3112 | 3260 | 3511 | 3658 | 3909 | 4056 | 4308 | 4455 | 5104 | 5252 | 5901 | 6049 |
|        | 3           | 490          | 711    | 883                                                                      | 1104 | 1281 | 1502 | 1680 | 1901 | 2078 | 2299 | 2477 | 2698 | 2875 | 3096 | 3273 | 3495 | 3672 | 3893 | 4070 | 4292 | 4867 | 5089 | 5664 | 5885 |
|        | 4           | 653          | 948    | 646                                                                      | 940  | 1044 | 1339 | 1443 | 1737 | 1841 | 2136 | 2239 | 2534 | 2638 | 2933 | 3036 | 3331 | 3435 | 3730 | 3833 | 4126 | 4630 | 4925 | 5427 | 5722 |
|        | 5           | 817          | 1185   | 406                                                                      | 777  | 807  | 1176 | 1205 | 1574 | 1604 | 1972 | 2002 | 271  | 2401 | 2769 | 2799 | 3168 | 3196 | 3566 | 3596 | 3965 | 4393 | 4762 | 5190 | 5559 |
|        | 6           | 960          | 1423   | 171                                                                      | 614  | 570  | 1012 | 968  | 1411 | 1367 | 1809 | 1765 | 2208 | 2164 | 2606 | 2562 | 3005 | 2931 | 3403 | 3359 | 3801 | 4156 | 598  | 4953 | 5395 |
|        | 7           | 1144         | 1660   |                                                                          |      | 33   | 849  | 731  | 1247 | 1130 | 1646 | 1528 | 2044 | 1927 | 2443 | 2325 | 2841 | 2724 | 3240 | 3122 | 3638 | 3919 | 4435 | 4716 | 5232 |
|        | 8           | 1307         | 1897   |                                                                          |      |      |      | 494  | 1084 | 893  | 1482 | 1291 | 1881 | 1690 | 2279 | 2088 | 2678 | 2487 | 3076 | 2885 | 3475 | 3671 | 4272 | 4479 | 5069 |
|        | 9           | 1470         | 2134   |                                                                          |      |      |      |      |      | 666  | 1319 | 1054 | 1717 | 1452 | 2116 | 1851 | 2514 | 2249 | 2913 | 2648 | 3311 | 3445 | 4106 | 4242 | 1905 |
|        | 10          | 1634         | 2371   |                                                                          |      |      |      |      |      | 418  | 1156 | 817  | 1554 | 1215 | 1953 | 1614 | 2351 | 2012 | 2750 | 2411 | 3148 | 3206 | 3945 | 4005 | 4742 |
|        | 11          | 1797         | 2606   |                                                                          |      |      |      |      |      |      |      | 580  | 1391 | 978  | 1789 | 1377 | 2188 | 1775 | 1586 | 2174 | 2935 | 2971 | 3782 | 3768 | 4579 |
|        | 12          | 1960         | 2845   |                                                                          |      |      |      |      |      |      |      | 343  | 1227 | 741  | 1626 | 1140 | 2024 | 1538 | 2423 | 1937 | 2821 | 2734 | 3618 | 3531 | 4415 |

|        |             | spring force |        | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|-------------|--------------|--------|--------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| type   | spring code | Md F[Nm]     |        | 2,0                                                                      |      | 2,5  |      | 3,0  |      | 3,5  |      | 4,0  |      | 4,5  |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0  |      | 8,0  |      |
|        |             | Md min       | Md max | min                                                                      | max  | min  | max  | min  | max  | min  | min  | max  | min  | min  | max  | min  | max  | min  | max  | min  | max  | Min  | Max  | Min  | max  |
| GS-300 | 1           | 245          | 355    | 2031                                                                     | 2142 | 2628 | 2738 | 3225 | 3335 | 3821 | 3932 | 4418 | 4528 | 5014 | 5125 | 5611 | 5721 | 6206 | 6318 | 6804 | 6915 | 7997 | 8108 | 9191 | 9300 |
|        | 2           | 489          | 710    | 1676                                                                     | 1897 | 2273 | 2494 | 2870 | 3090 | 3466 | 3667 | 4063 | 4284 | 4659 | 4880 | 5256 | 5477 | 5853 | 6073 | 5449 | 6670 | 7642 | 7863 | 8836 | 9050 |
|        | 3           | 734          | 1065   | 1321                                                                     | 1653 | 1918 | 2249 | 2515 | 2846 | 3111 | 3442 | 3708 | 4039 | 4304 | 4636 | 4901 | 5232 | 5496 | 5829 | 6094 | 6425 | 7287 | 7619 | 8481 | 8810 |
|        | 4           | 978          | 1420   | 967                                                                      | 1408 | 1563 | 2005 | 2160 | 2601 | 2756 | 3198 | 3353 | 3794 | 3960 | 4391 | 4546 | 4988 | 5143 | 5584 | 5739 | 6181 | 6933 | 7374 | 8126 | 8560 |
|        | 5           | 1223         | 1775   | 612                                                                      | 1163 | 1206 | 1760 | 1805 | 2357 | 2401 | 2953 | 2998 | 3550 | 3595 | 4246 | 4191 | 4743 | 4788 | 5340 | 5384 | 5936 | 6578 | 7129 | 7771 | 8320 |
|        | 6           | 1466         | 2130   | 257                                                                      | 919  | 853  | 1515 | 1450 | 2112 | 2046 | 2709 | 2643 | 3305 | 3240 | 3902 | 3836 | 4498 | 4433 | 5095 | 5029 | 5692 | 6223 | 6885 | 7416 | 8070 |
|        | 7           | 1712         | 2485   |                                                                          |      | 496  | 1271 | 1095 | 1867 | 1691 | 2464 | 2288 | 3061 | 2885 | 3657 | 3481 | 4254 | 4078 | 4850 | 4674 | 5447 | 5868 | 6640 | 7061 | 7860 |
|        | 8           | 1967         | 2840   |                                                                          |      |      |      | 740  | 1623 | 1336 | 2219 | 1933 | 2816 | 2530 | 3413 | 3126 | 4009 | 3723 | 4606 | 4319 | 5202 | 5513 | 6396 | 6706 | 7580 |
|        | 9           | 2201         | 3195   |                                                                          |      |      |      |      |      | 961  | 7975 | 1578 | 2571 | 2175 | 3168 | 2771 | 3765 | 3368 | 4361 | 3964 | 4958 | 5158 | 6151 | 6351 | 7340 |
|        | 10          | 2446         | 34550  |                                                                          |      |      |      |      |      | 627  | 1730 | 1223 | 2327 | 1820 | 2923 | 2416 | 3520 | 3013 | 4117 | 3610 | 4713 | 4803 | 5906 | 5996 | 7100 |
|        | 11          | 2691         | 3905   |                                                                          |      |      |      |      |      |      |      | 868  | 2082 | 1466 | 2679 | 2061 | 3275 | 2668 | 3872 | 3255 | 4469 | 4448 | 5662 | 5641 | 6850 |
|        | 12          | 2935         | 4260   |                                                                          |      |      |      |      |      |      |      | 513  | 1838 | 1110 | 2434 | 1706 | 3031 | 2303 | 3627 | 2900 | 4224 | 4093 | 5417 | 5286 | 6610 |

| spring<br>code | spring<br>force |           | pneumatic applied torque Md N [Nm] at minimum control pressure Pst [bar] |      |      |      |      |      |      |      |      |      |       |      |      |      |      |      |      |      |       |       |       |       |
|----------------|-----------------|-----------|--------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|-------|-------|-------|-------|
|                | Md F[Nm]        |           | 2,0                                                                      |      | 2,5  |      | 3,0  |      | 3,5  |      | 4,0  |      | 4,5   |      | 5,0  |      | 5,5  |      | 6,0  |      | 7,0   |       | 8,0   |       |
|                | Md<br>min       | Md<br>max | min                                                                      | max  | min  | max  | min  | max  | min  | max  | min  | max  | min   | max  | min  | max  | min  | max  | min  | max  | Min   | Max   | Min   | Max   |
| 1              | 262             | 411       | 2845                                                                     | 2994 | 3659 | 3808 | 4473 | 4622 | 5287 | 5436 | 6101 | 6250 | 69145 | 7064 | 7729 | 7878 | 8543 | 8692 | 9357 | 9506 | 10985 | 11134 | 12613 | 12762 |
| 2              | 525             | 823       | 2433                                                                     | 2731 | 3247 | 3545 | 4061 | 4359 | 4875 | 5173 | 5689 | 5967 | 6603  | 6901 | 319  | 7615 | 8131 | 8429 | 8945 | 9243 | 10573 | 10671 | 12201 | 12300 |
| 3              | 787             | 1234      | 2022                                                                     | 2469 | 2836 | 3283 | 3650 | 4097 | 4464 | 4911 | 5278 | 5725 | 6092  | 6539 | 6906 | 7353 | 7720 | 8167 | 8534 | 8961 | 10162 | 10609 | 11790 | 11889 |
| 4              | 1050            | 1646      | 1610                                                                     | 2206 | 2424 | 3020 | 3238 | 3834 | 4052 | 4648 | 4866 | 5462 | 5680  | 6276 | 6494 | 7090 | 7308 | 7904 | 8122 | 8718 | 9750  | 10346 | 11378 | 11477 |
| 5              | 1312            | 2057      | 1199                                                                     | 1944 | 2013 | 2758 | 2827 | 3572 | 3641 | 4386 | 4455 | 5200 | 5269  | 6014 | 6082 | 6828 | 6697 | 7642 | 7711 | 8456 | 9339  | 10064 | 10967 | 11066 |
| 6              | 1575            | 2469      | 787                                                                      | 1681 | 1601 | 2495 | 2415 | 3309 | 3229 | 4123 | 4043 | 4937 | 4857  | 5751 | 5671 | 6565 | 6485 | 7379 | 7299 | 8193 | 8927  | 9621  | 10555 | 10654 |
| 7              | 2100            | 3292      |                                                                          |      | 778  | 7970 | 1592 | 2784 | 2406 | 3598 | 3220 | 4412 | 4034  | 5226 | 4848 | 6040 | 5662 | 6854 | 6476 | 7668 | 8104  | 9296  | 9732  | 10821 |
| 8              | 2362            | 3703      |                                                                          |      |      |      | 1181 | 2522 | 1995 | 3336 | 2809 | 4150 | 3623  | 4964 | 4437 | 5778 | 5251 | 6592 | 6065 | 7405 | 7693  | 9034  | 9321  | 10410 |
| 9              | 2625            | 4115      |                                                                          |      |      |      | 769  | 2260 | 1583 | 3074 | 2397 | 3888 | 3211  | 4702 | 4025 | 5516 | 4839 | 6330 | 5653 | 7144 | 7281  | 8772  | 8909  | 10000 |
| 10             | 2887            | 4526      |                                                                          |      |      |      |      |      |      | 1172 | 2811 | 1986 | 3625  | 2800 | 4439 | 3614 | 5253 | 4428 | 6067 | 5242 | 6881  | 6870  | 8509  | 8498  |
| 11             | 3149            | 4938      |                                                                          |      |      |      |      |      |      | 760  | 5249 | 1574 | 3363  | 2388 | 4177 | 3202 | 4991 | 4016 | 5806 | 4830 | 6619  | 6458  | 8247  | 8086  |
| 12             | 3412            | 5349      |                                                                          |      |      |      |      |      |      |      |      | 1163 | 3100  | 1977 | 3914 | 2791 | 4728 | 3605 | 5542 | 4419 | 6356  | 6047  | 7984  | 7675  |
| 13             | 3412            | 5349      |                                                                          |      |      |      |      |      |      |      |      | 1163 | 3100  | 1977 | 3914 | 2791 | 4728 | 3605 | 5542 | 4419 | 6356  | 6047  | 7984  | 7675  |
| 14             | 3674            | 5761      |                                                                          |      |      |      |      |      |      |      |      | 751  | 2838  | 1565 | 3652 | 2379 | 4466 | 3193 | 5280 | 4007 | 6094  | 5635  | 77722 | 7263  |
| 15             | 3937            | 6172      |                                                                          |      |      |      |      |      |      |      |      |      |       | 1154 | 3389 | 1966 | 4203 | 2780 | 5017 | 3596 | 5831  | 5224  | 7459  | 6852  |
| 16             | 4199            | 6584      |                                                                          |      |      |      |      |      |      |      |      |      |       | 742  | 3127 | 1556 | 3941 | 2370 | 4756 | 3184 | 5569  | 4812  | 7197  | 6440  |