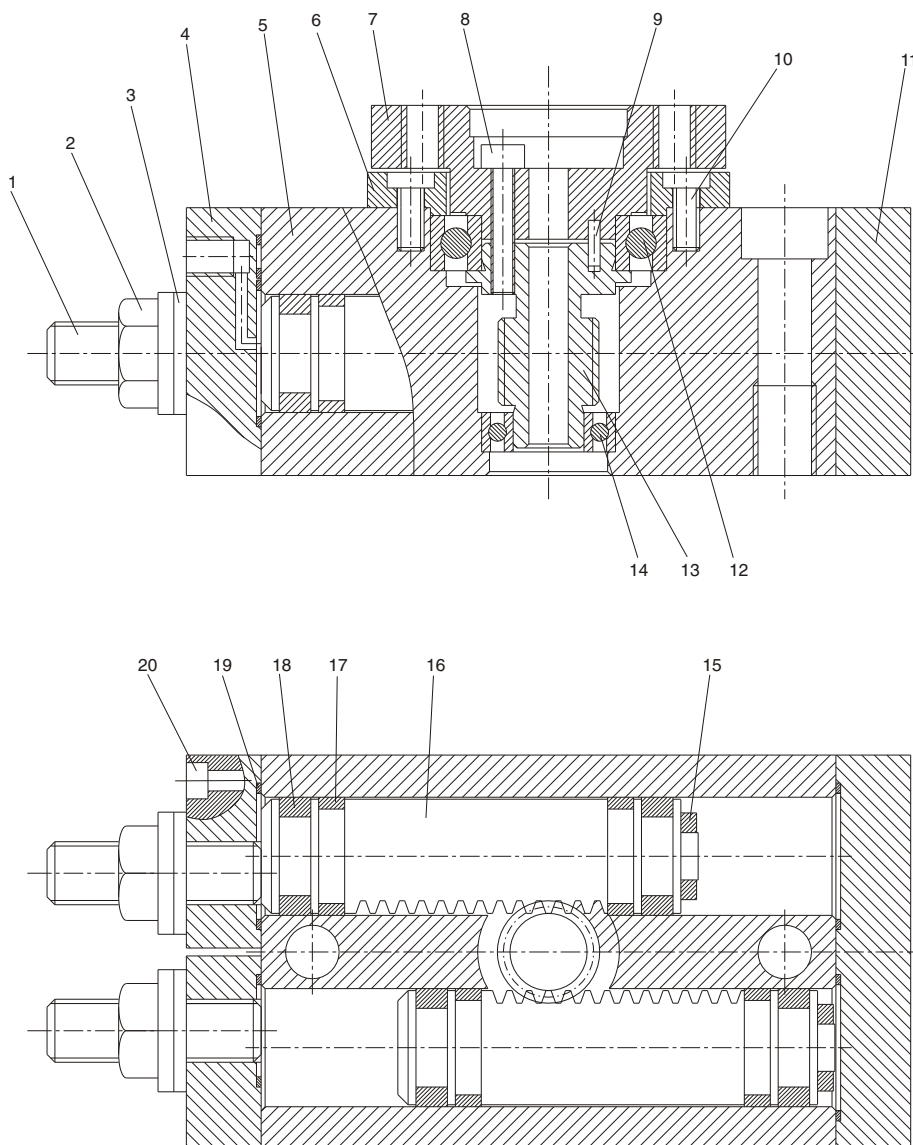


## General

These rotary actuators convert linear motion of a piston into a rotary motion via a rack and pinion device, using a single pinion-rack system for the 6410 version and a double system on 6400 versions. The 6410 series actuators have fixed stops at 90 and 180 degrees; while on the 6400 series, rotation can be adjusted between 0 and 190 degrees using variable stops that can also be substituted with hydraulic stoppers (shock absorbers). These devices are equipped with a rotating table upon which the load is fixed.

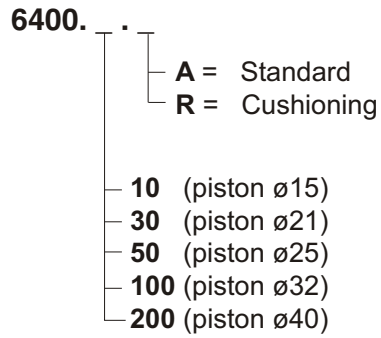


5

| Pos. | Item                           | Qty. | Pos. | Item                          | Qty. |
|------|--------------------------------|------|------|-------------------------------|------|
| 1    | Adjusting screw                | 2    | 11   | End cover                     | 1    |
| 2    | Lock nut                       | 2    | 12   | Upper bearing                 | 1    |
| 3    | Washer                         | 2    | 13   | Pinion                        | 1    |
| 4    | Front head cover               | 2    | 14   | Lower bearing                 | 1    |
| 5    | Body                           | 1    | 15   | Magnet                        | 2    |
| 6    | Closing flange                 | 1    | 16   | Rack                          | 2    |
| 7    | Turn table                     | 1    | 17   | Sliding shoe                  | 4    |
| 8    | Pinion-turn table fixing screw | 6    | 18   | Piston seal                   | 4    |
| 9    | Pin                            | 1    | 19   | Seal                          | 4    |
| 10   | Flange-Body fixing screw       | 6    | 20   | Front head cover fixing screw | 4    |



**Ordering code**



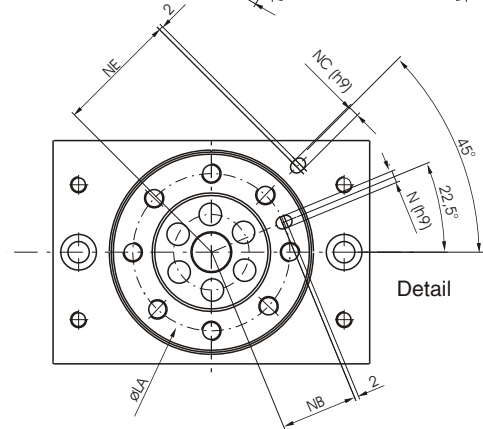
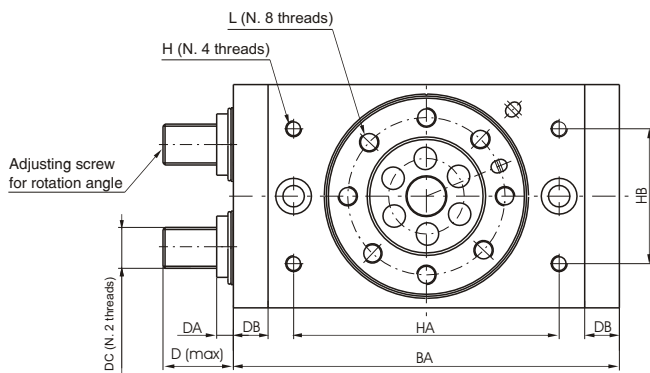
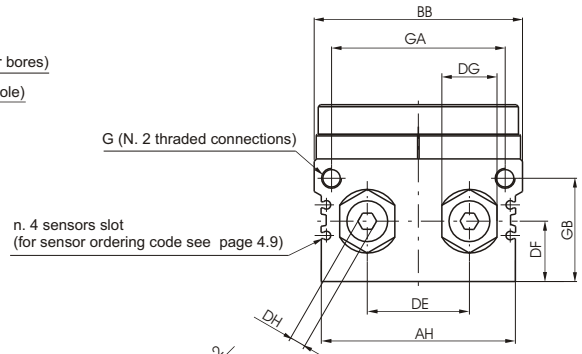
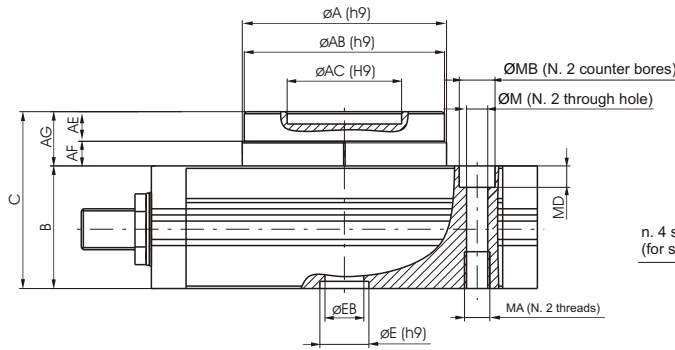
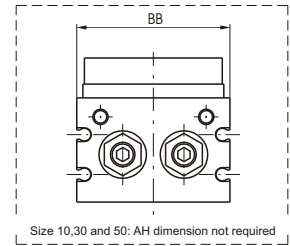
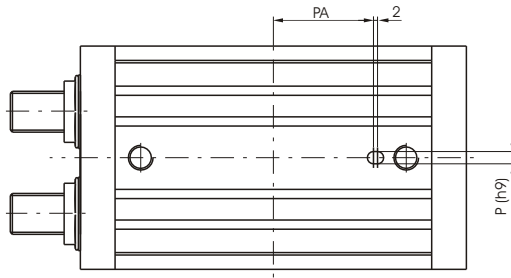
**NOTE :** Magnetic sensors see page 6.9

**Construction characteristics**

|             |  |
|-------------|--|
| Body        | aluminium alloy  |
| Cover plate | steel  |
| End plate   | steel  |
| Piston seal | NBR rubber   |
| Pinion      | steel  |
| Rack        | steel  |
| Turn table  | steel  |
| Cushioning  | elastic bumper (hydraulic damper available on request) |

**Technical characteristics**

|                      |                                      |
|----------------------|--------------------------------------|
| Fluid                | filtered and non lubricated air      |
| Max. pressure        | 10 bar (for type 100 and 200, 6 bar) |
| Working temperature  | -5°C ÷ +70°C                         |
| Rotation angle range | 0 ÷ 190°                             |
| Max. rotation        | 190°                                 |
| Rotation speed       | 0,2 ÷ 1 sec/90°                      |

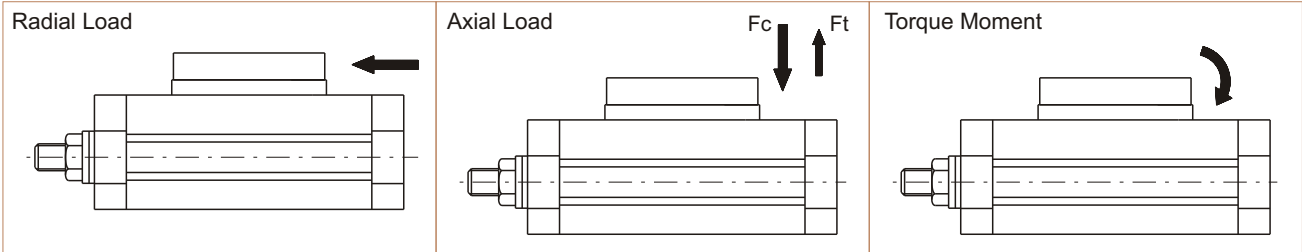


| Size                 | 10           | 30    | 50      | 100     | 200     |     |
|----------------------|--------------|-------|---------|---------|---------|-----|
| Ø piston             | Ø15          | Ø21   | Ø25     | Ø32     | Ø40     |     |
| ØA <sup>h9</sup>     | 46           | 67    | 77      | 100     | 118     |     |
| ØAB <sup>h9</sup>    | 45           | 65    | 75      | 98      | 116     |     |
| ØAC <sup>h9</sup>    | Useful depth | 20    | 32      | 35      | 56      | 64  |
|                      |              | 4     | 4,5     | 5       | 6       | 9   |
| AE                   | 8            | 10    | 12      | 14,5    | 16,5    |     |
| AF                   | 5            | 7     | 8       | 12,5    | 15,5    |     |
| AG                   | 13           | 17    | 20      | 27      | 32      |     |
| AH                   | /            | /     | /       | 95      | 115     |     |
| B <sup>+0,5/0</sup>  | 34           | 40    | 46      | 59      | 74      |     |
| BA                   | 92           | 127   | 152     | 189     | 240     |     |
| BB <sup>+0,5/0</sup> | 50           | 70    | 80      | 102     | 120     |     |
| C <sup>+0,5/0</sup>  | 47           | 57    | 66      | 86      | 106     |     |
| D                    | 17,7         | 25    | 31,4    | 34,3    | 40,2    |     |
| DA                   | 8,6          | 10,6  | 14      | 8       | 8       |     |
| DB                   | 9,5          | 12    | 15,5    | 17      | 24      |     |
| DC                   | M8x1         | M10x1 | M14x1,5 | M20x1,5 | M27x1,5 |     |
| DE                   | 20           | 29    | 38      | 50      | 60      |     |
| DF                   | 15,5         | 18,5  | 22      | 29,5    | 36,5    |     |
| DG                   | 12           | 14    | 19      | 27      | 36      |     |
| DH                   | 4            | 5     | 6       | 8       | 10      |     |
| ØE <sup>h9</sup>     | Useful depth | 15    | 22      | 26      | 24      | 32  |
|                      |              | 3     | 3       | 3       | 3,5     | 5,5 |
| ØEB                  | 5            | 9     | 10      | 19      | 24      |     |
| G                    | M5x0,8       | G1/8  | G1/8    | G1/8    | G1/8    |     |

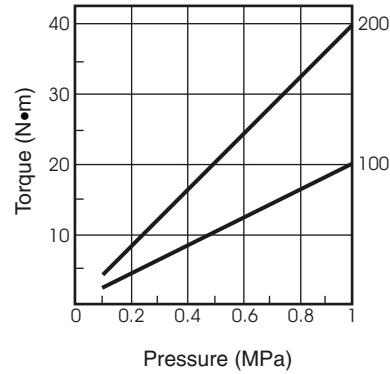
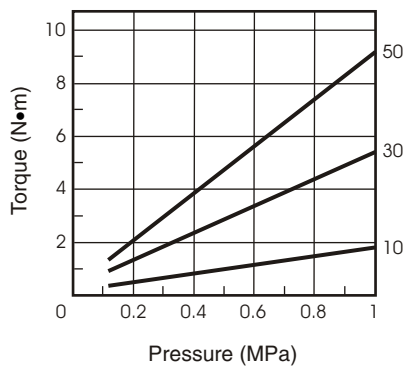
| Size             | 10           | 30      | 50      | 100      | 200      |          |
|------------------|--------------|---------|---------|----------|----------|----------|
| Ø piston         | Ø15          | Ø21     | Ø25     | Ø32      | Ø40      |          |
| GA               | 34,5         | 50      | 63      | 85       | 103      |          |
| GB               | 27,8         | 32      | 37,5    | 50,5     | 65,5     |          |
| H                | Useful depth | M5x0,8  | M6x1    | M8x1,25  | M10x1,75 | M12x1,75 |
|                  |              | 8       | 8       | 8        | 10       | 13       |
| HA               | 60           | 84      | 100     | 130      | 150      |          |
| HB               | 27           | 37      | 50      | 66       | 80       |          |
| L                | Useful depth | M5x0,8  | M6x1    | M8x1,25  | M10x1,5  | M12x1,75 |
|                  |              | 8       | 10      | 12       | 14,5     | 16,5     |
| LA               | 32           | 48      | 55      | 77       | 90       |          |
| M                | 6,8          | 8,6     | 10,5    | 10,4     | 14,2     |          |
| MA               | Useful depth | M8x1,25 | M10x1,5 | M12x1,75 | M12x1,75 | M16x2    |
|                  |              | 12      | 15      | 18       | 18       | 25       |
| MB               | 11           | 14      | 18      | 17,5     | 20       |          |
| MD               | 6,5          | 8,5     | 10,5    | 10,5     | 12,5     |          |
| N <sup>h9</sup>  | Useful depth | 3       | 4       | 5        | 6        | 8        |
|                  |              | 3,5     | 4,5     | 5,5      | 6,5      | 8,5      |
| NB               | 15           | 23      | 26,5    | 37,5     | 44       |          |
| NC <sup>h9</sup> | Useful depth | /       | /       | /        | 6        | 8        |
|                  |              | /       | /       | /        | 4,5      | 4,5      |
| NE               | /            | /       | /       | 59       | 69       |          |
| P <sup>h9</sup>  | Useful depth | /       | /       | /        | 6        | 8        |
|                  |              | /       | /       | /        | 4,5      | 6,5      |
| PA               | /            | /       | /       | 49       | 54       |          |
| Weight (gr)      | 530          | 1230    | 2080    | 4100     | 7650     |          |

**Permissible Loads**

|                           |    | Size |     |     |     |      |
|---------------------------|----|------|-----|-----|-----|------|
|                           |    | 10   | 30  | 50  | 100 | 200  |
| <b>Radial Load (N)</b>    |    | 80   | 200 | 320 | 400 | 550  |
| <b>Axial Load (N)</b>     | Fc | 80   | 370 | 450 | 710 | 1000 |
|                           | Ft | 75   | 200 | 300 | 500 | 750  |
| <b>Torque Moment (Nm)</b> |    | 2,5  | 5,5 | 9,5 | 18  | 25   |



**Torque Diagrams**

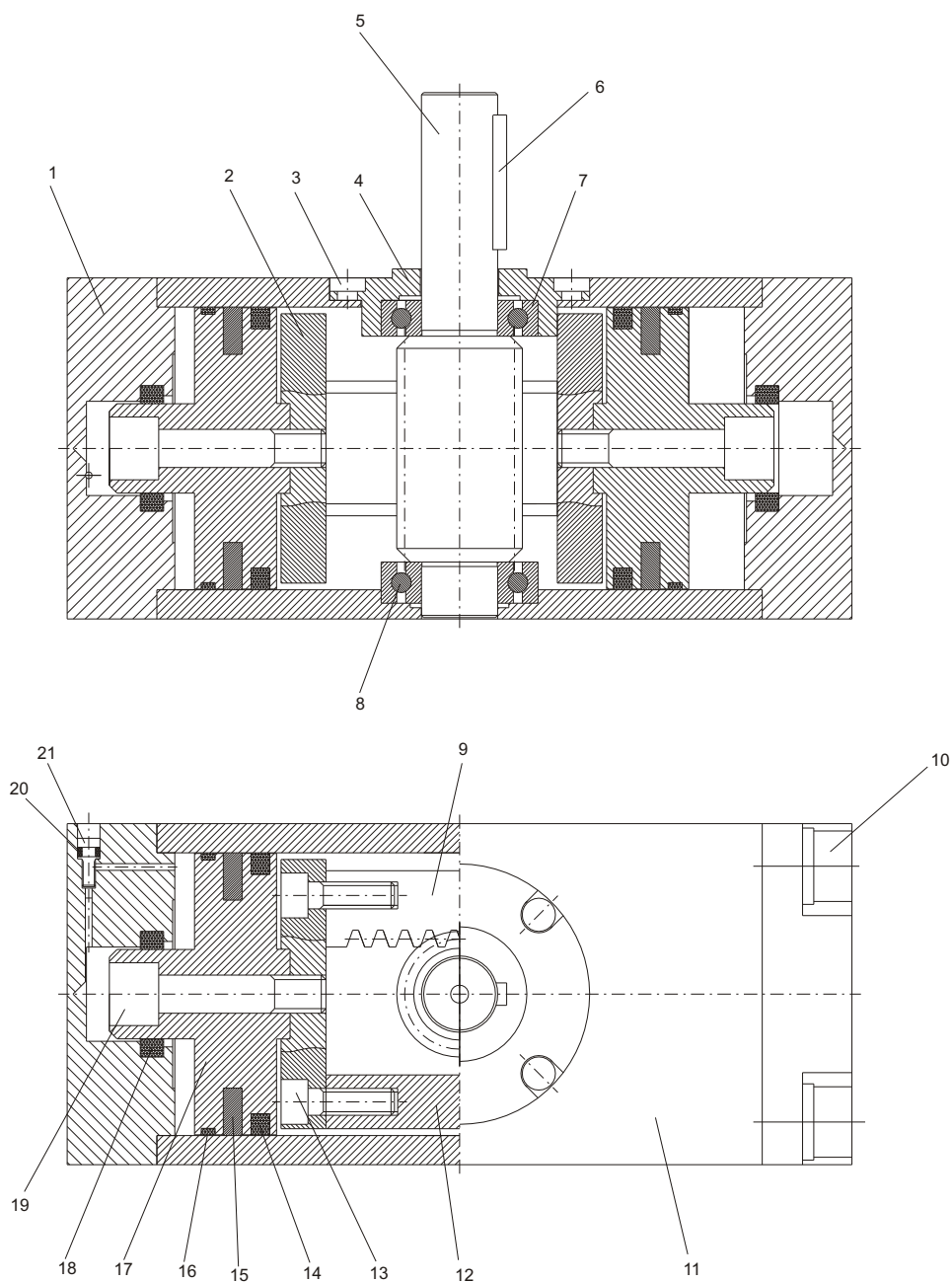


**Rotation time (sec./90°)**

| Dimension    | With adjusting screw | With hydraulic decelerator |
|--------------|----------------------|----------------------------|
| 10 - 30 - 50 | 0,2 ÷ 1              | 0,2 ÷ 0,7                  |
| 100          | 0,2 ÷ 2              | 0,2 ÷ 1                    |
| 200          | 0,2 ÷ 2,5            | 0,2 ÷ 1                    |

**Kinetic energy**

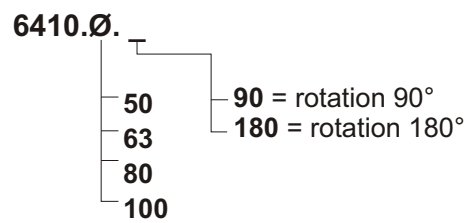
| Dimension | With adjusting screw | With hydraulic decelerator  |
|-----------|----------------------|---|
| 10        | 0,006                | Please apply to our tech-dpt for info (as general rule expressed valves can be multiplied by 3) |
| 30        | 0,045                |   |
| 50        | 0,08                 |   |
| 100       | 0,30                 |   |
| 200       | 0,52                 |   |



| Pos. | Item                              | Qty. | Pos. | Item                       | Qty. |
|------|-----------------------------------|------|------|----------------------------|------|
| 1    | End plate                         | 2    | 12   | Guiding rod                | 1    |
| 2    | Rack support                      | 2    | 13   | Rack fixing screw          | 4    |
| 3    | Upper bearing flange fixing screw | 4    | 14   | Piston seal                | 2    |
| 4    | Upper bearing flange              | 1    | 15   | Magnet                     | 2    |
| 5    | Pinion                            | 1    | 16   | Sliding shoe               | 2    |
| 6    | Key                               | 1    | 17   | Piston                     | 2    |
| 7    | Upper bearing                     | 1    | 18   | Cushioning washer          | 2    |
| 8    | Lower bearing                     | 1    | 19   | Piston fixing screw        | 2    |
| 9    | Rack                              | 1    | 20   | Cushioning screw seal      | 2    |
| 10   | End plate fixing screw            | 8    | 21   | Cushioning adjusting screw | 2    |
| 11   | Body                              | 1    |      |                            |      |



**Ordering code**



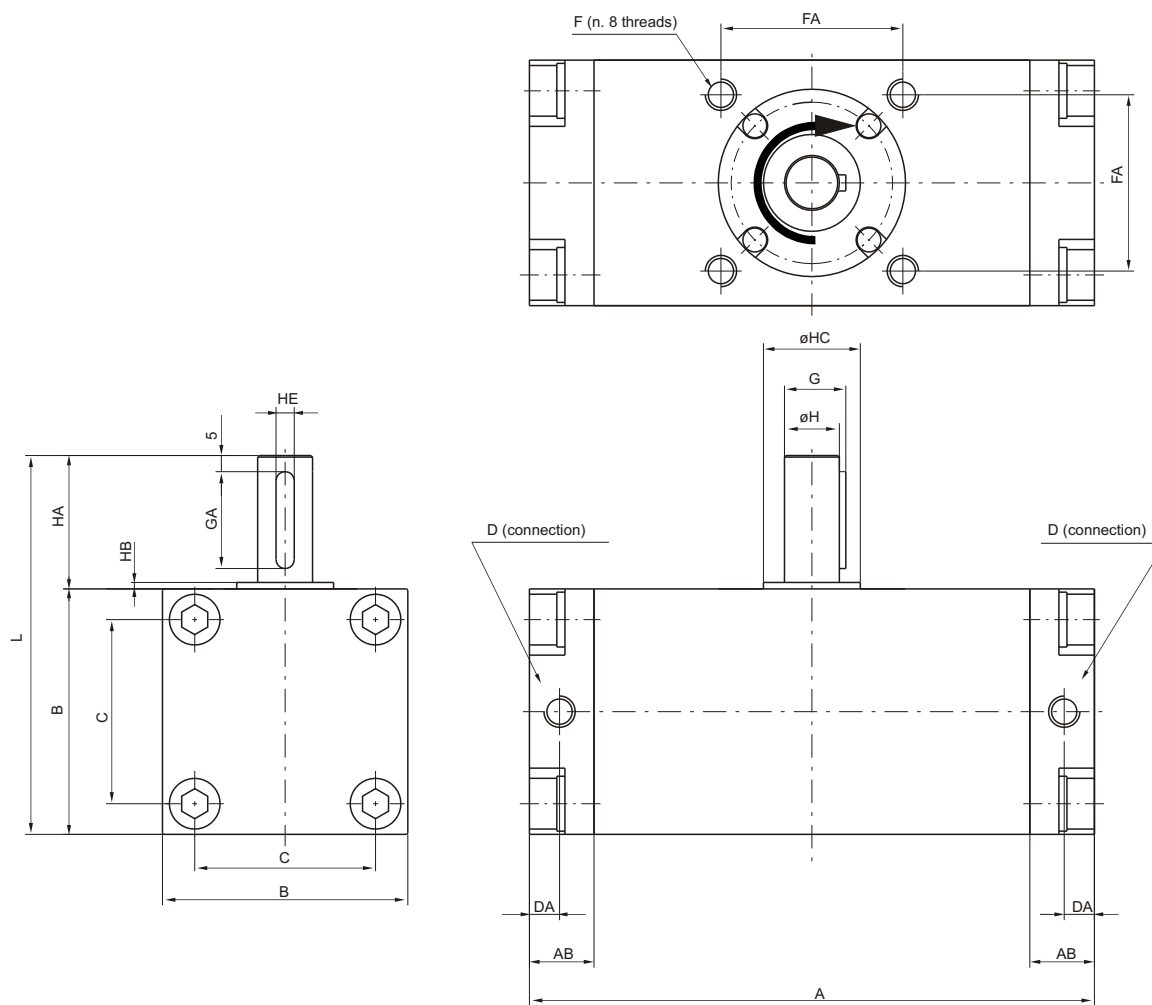
**NOTE :** Magnetic sensors see page 6.7

**Construction characteristics**

|             |                 |
|-------------|-----------------|
| Body        | aluminium alloy |
| Piston      | aluminium       |
| End plate   | aluminium       |
| Piston seal | NBR rubber      |
| Pinion      | steel           |
| Rack        | steel           |

**Technical characteristics**

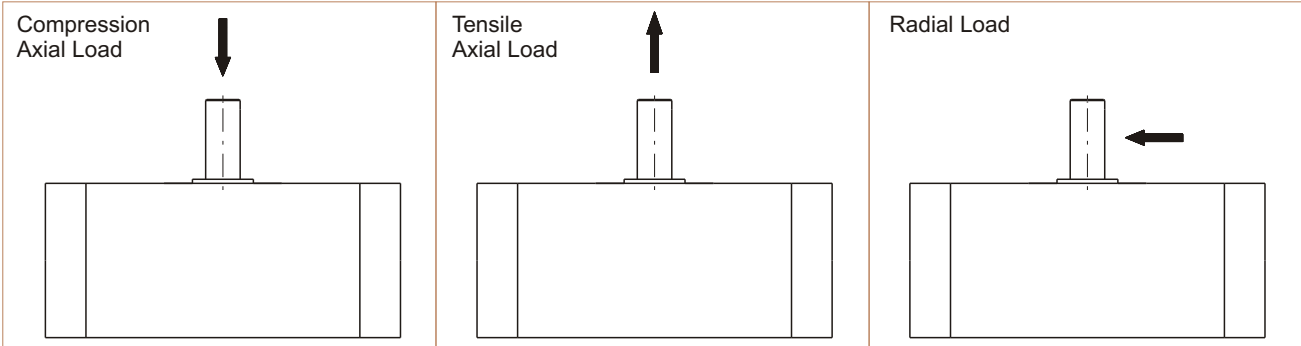
|                     |                                 |
|---------------------|---------------------------------|
| Fluid               | filtered and non lubricated air |
| Max. pressure       | 10 bar                          |
| Working temperature | -5°C ÷ +70°C                    |



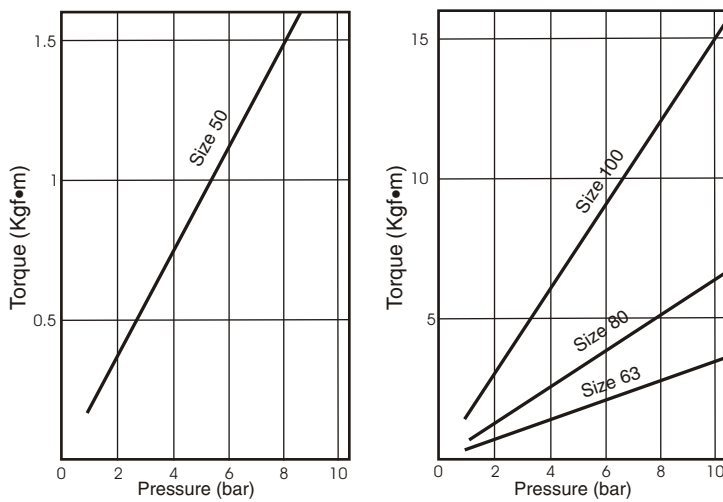
| Bore        |              | Ø50                  | Ø63                  | Ø80                  | Ø100                  |
|-------------|--------------|----------------------|----------------------|----------------------|-----------------------|
| A           | 90°          | 156                  | 175                  | 199                  | 259                   |
|             | 180°         | 189                  | 214                  | 243                  | 325                   |
| AB          |              | 17                   | 20                   | 23,5                 | 25                    |
| B           |              | 64                   | 77                   | 93                   | 113                   |
| C           |              | 46                   | 57                   | 70                   | 85                    |
| D           |              | G1/8                 | G1/8                 | G1/4                 | G3/8                  |
| DA          |              | 8,5                  | 10                   | 12                   | 12,5                  |
| F           |              | M8x1,25              | M10x1,5              | M12x1,75             | M12x1,75              |
|             | Useful depth | 8                    | 12                   | 13                   | 14                    |
| FA          |              | 48                   | 60                   | 72                   | 85                    |
| G           |              | 17                   | 19,5                 | 22,5                 | 28                    |
| GA          |              | 25                   | 30                   | 40                   | 45                    |
| H           |              | 15                   | 17                   | 20                   | 25                    |
| HA          |              | 36                   | 41                   | 50                   | 60                    |
| HB          |              | 2,5                  | 2,5                  | 3                    | 4                     |
| HC          |              | 25                   | 30                   | 35                   | 40                    |
| HE          |              | 5 <sup>0/-0,03</sup> | 6 <sup>0/-0,03</sup> | 6 <sup>0/-0,03</sup> | 8 <sup>0/-0,036</sup> |
| L           |              | 98                   | 117                  | 142                  | 172                   |
| Weight (gr) | 90°          | 1500                 | 2500                 | 4300                 | 8500                  |
|             | 180°         | 1700                 | 3000                 | 5000                 | 9500                  |

**Allowable Loads**

|                              | Bore |     |     |      |
|------------------------------|------|-----|-----|------|
|                              | Ø50  | Ø63 | Ø80 | Ø100 |
| Radial Load (N)              | 200  | 300 | 400 | 600  |
| Axial Load in compression(N) | 500  | 600 | 900 | 1000 |
| Tensile Axial Load (N)       | 200  |     |     |      |



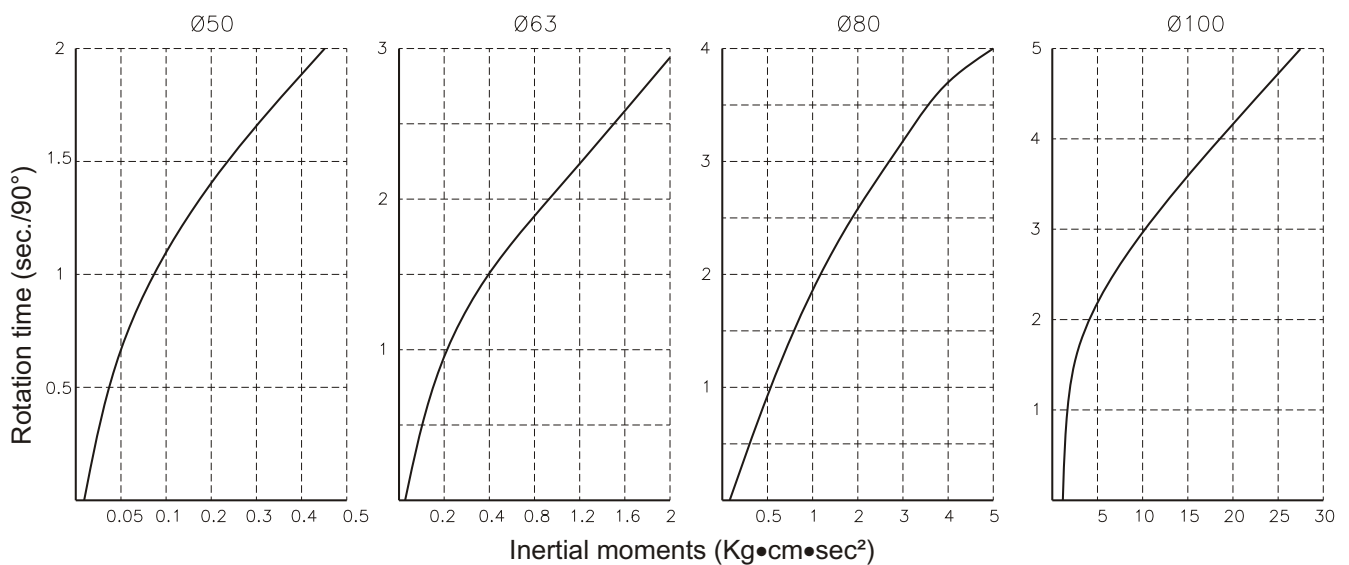
**Torque Diagrams**



**Max Kinetic energy (Kg•cm)**  
Kinetic energy (cushioning angle 35°)

| Bore |     |     |      |
|------|-----|-----|------|
| Ø50  | Ø63 | Ø80 | Ø100 |
| 10   | 15  | 20  | 30   |

**Rotation time according to inertial moments**



5