## Motor modules

### Ordering overview

<table>
<thead>
<tr>
<th>LES 4/5/6 Direct drives</th>
<th>System / circular plug</th>
<th>Z-axis / circular plug with brake</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC servo motor DC 100</td>
<td>396 112 0060</td>
<td>-</td>
</tr>
<tr>
<td>Step motor MS 135 HT - 2</td>
<td>396 055 0060</td>
<td>396 055 0360</td>
</tr>
<tr>
<td>Step motor MS 200 HT - 2</td>
<td>396 058 0060</td>
<td>396 058 0360</td>
</tr>
<tr>
<td>EC servo motor EC 60S</td>
<td>396 415 0060</td>
<td>396 415 0260</td>
</tr>
<tr>
<td>EC servo motor EC 60L 48V</td>
<td>396 423 0060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 60L 310V</td>
<td>396 423 0070</td>
<td>-</td>
</tr>
<tr>
<td>DC servo motor DC 300</td>
<td>396 114 0060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 86L</td>
<td>396 466 0070</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 86S</td>
<td>396 444 0070</td>
<td>-</td>
</tr>
<tr>
<td>Step motor MS 600 HT</td>
<td>396 085 0060</td>
<td>-</td>
</tr>
<tr>
<td>Step motor MS 900 HT</td>
<td>396 088 0060</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LES 5 integrated</th>
<th>System / circular plug</th>
<th>Z-axis / circular plug with brake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step motor MS 135 HT - 2</td>
<td>396 055 1060</td>
<td>396 055 1360</td>
</tr>
<tr>
<td>Step motor MS 200 HT - 2</td>
<td>396 058 1060</td>
<td>396 058 1360</td>
</tr>
<tr>
<td>DC servo motor DC 100</td>
<td>396 112 1060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 60S</td>
<td>396 415 1060</td>
<td>396 415 1260</td>
</tr>
<tr>
<td>EC servo motor EC 60L 48V</td>
<td>396 423 1060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 60L 310V</td>
<td>396 423 1070</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LES 4 / LES 6 side mounting</th>
<th>System / circular plug</th>
<th>Z-axis / circular plug with brake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step motor MS 135 HT - 2</td>
<td>396 055 2060</td>
<td>396 055 2360</td>
</tr>
<tr>
<td>Step motor MS 200 HT - 2</td>
<td>396 058 2060</td>
<td>396 058 2360</td>
</tr>
<tr>
<td>DC servo motor DC 100</td>
<td>396 112 2060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 60S</td>
<td>396 415 2060</td>
<td>396 415 2260</td>
</tr>
<tr>
<td>EC servo motor EC 60L 48V</td>
<td>396 423 2060</td>
<td>-</td>
</tr>
<tr>
<td>EC servo motor EC 60L 310V</td>
<td>396 423 2070</td>
<td>-</td>
</tr>
</tbody>
</table>
Motor modules

Dimensioned drawing
Motor module 1

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Motor module</th>
<th>Length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>396112 0060</td>
<td>DC 100</td>
<td>185 mm</td>
</tr>
<tr>
<td>396055 0360</td>
<td>MS 135 HT 2 with brake</td>
<td>165 mm</td>
</tr>
<tr>
<td>396055 0660</td>
<td>MS 135 HT 2 w/o brake</td>
<td>105 mm</td>
</tr>
<tr>
<td>396058 0360</td>
<td>MS 200 HT 2 with brake</td>
<td>165 mm</td>
</tr>
<tr>
<td>396058 0660</td>
<td>MS 200 HT 2 w/o brake</td>
<td>105 mm</td>
</tr>
</tbody>
</table>

Dimensioned drawing
EC 60

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Motor module</th>
<th>Length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>396415 0260</td>
<td>EC 60S w/ brake</td>
<td>99 mm</td>
</tr>
<tr>
<td>396415 0560</td>
<td>EC 60S w/o brake</td>
<td>99 mm</td>
</tr>
<tr>
<td>396423 0060</td>
<td>EC 60L 48V</td>
<td>120 mm</td>
</tr>
<tr>
<td>396423 0070</td>
<td>EC 60L 310V</td>
<td>120 mm</td>
</tr>
</tbody>
</table>

Dimensioned drawing
DC 300

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Motor module</th>
<th>Length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>396114 0060</td>
<td>DC 300</td>
<td>210 mm</td>
</tr>
</tbody>
</table>

Dimensioned drawing
Motor module 2

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Motor module</th>
<th>Length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>396415 0270</td>
<td>EC 86L</td>
<td>115 mm</td>
</tr>
<tr>
<td>396444 0270</td>
<td>EC 86S</td>
<td>126 mm</td>
</tr>
<tr>
<td>396085 0060</td>
<td>MS 600HT</td>
<td>96 mm</td>
</tr>
<tr>
<td>396088 0060</td>
<td>MS 900 HT</td>
<td>126 mm</td>
</tr>
</tbody>
</table>
## Motor pin assignments

### Pin assignment for step motors

#### Motor connection

<table>
<thead>
<tr>
<th>M23 12-pin Pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Motor phase 1A</td>
<td></td>
</tr>
<tr>
<td>2 Motor phase 1B</td>
<td></td>
</tr>
<tr>
<td>3 Motor phase 2A</td>
<td></td>
</tr>
<tr>
<td>4 Motor phase 2B</td>
<td></td>
</tr>
<tr>
<td>5 +24V switch</td>
<td></td>
</tr>
<tr>
<td>6 +24V brake</td>
<td></td>
</tr>
<tr>
<td>7 GND switch</td>
<td></td>
</tr>
<tr>
<td>8 GND brake</td>
<td></td>
</tr>
<tr>
<td>9 Limit switch 1</td>
<td></td>
</tr>
<tr>
<td>10 Limit switch 2</td>
<td></td>
</tr>
<tr>
<td>11 ---</td>
<td></td>
</tr>
<tr>
<td>12 ---</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>

#### Encoder connection

<table>
<thead>
<tr>
<th>Sub-D 15-pin Pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ---</td>
<td></td>
</tr>
<tr>
<td>2 +5V encoder</td>
<td></td>
</tr>
<tr>
<td>3 Encoder track /Z</td>
<td></td>
</tr>
<tr>
<td>4 Encoder track /B</td>
<td></td>
</tr>
<tr>
<td>5 Encoder track /A</td>
<td></td>
</tr>
<tr>
<td>6 +24V switch</td>
<td></td>
</tr>
<tr>
<td>7 Limit switch 1</td>
<td></td>
</tr>
<tr>
<td>8 GND switch</td>
<td></td>
</tr>
<tr>
<td>9 ---</td>
<td></td>
</tr>
<tr>
<td>10 GND encoder</td>
<td></td>
</tr>
<tr>
<td>11 Encoder track Z</td>
<td></td>
</tr>
<tr>
<td>12 Encoder track B</td>
<td></td>
</tr>
<tr>
<td>13 Encoder track A</td>
<td></td>
</tr>
<tr>
<td>14 Reference switch</td>
<td></td>
</tr>
<tr>
<td>15 Limit switch 2</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>

*Motor phases are connected partially with two wires.*

### Pin assignment for DC servo motors with brushes (BCD)

#### Motor connection

<table>
<thead>
<tr>
<th>M23 9-pin (8+1) pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Motor phase 1 (U+)</td>
<td></td>
</tr>
<tr>
<td>2 Motor phase 1 (U-)</td>
<td></td>
</tr>
<tr>
<td>3 Motor phase 1 (U+)*</td>
<td></td>
</tr>
<tr>
<td>4 Motor phase 1 (U-)*</td>
<td></td>
</tr>
<tr>
<td>5 +24V brake</td>
<td></td>
</tr>
<tr>
<td>6 GND brake</td>
<td></td>
</tr>
<tr>
<td>7 ---</td>
<td></td>
</tr>
<tr>
<td>8 ---</td>
<td></td>
</tr>
<tr>
<td>9 Earthing lead</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>

#### Encoder connection

<table>
<thead>
<tr>
<th>Sub-D 15-pin Pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ---</td>
<td></td>
</tr>
<tr>
<td>2 +5V encoder</td>
<td></td>
</tr>
<tr>
<td>3 Encoder track /Z</td>
<td></td>
</tr>
<tr>
<td>4 Encoder track /B</td>
<td></td>
</tr>
<tr>
<td>5 Encoder track /A</td>
<td></td>
</tr>
<tr>
<td>6 +24V switch</td>
<td></td>
</tr>
<tr>
<td>7 Limit switch 1</td>
<td></td>
</tr>
<tr>
<td>8 GND switch</td>
<td></td>
</tr>
<tr>
<td>9 ---</td>
<td></td>
</tr>
<tr>
<td>10 GND encoder</td>
<td></td>
</tr>
<tr>
<td>11 Encoder track Z</td>
<td></td>
</tr>
<tr>
<td>12 Encoder track B</td>
<td></td>
</tr>
<tr>
<td>13 Encoder track A</td>
<td></td>
</tr>
<tr>
<td>14 Reference switch</td>
<td></td>
</tr>
<tr>
<td>15 Limit switch 2</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>

### Pin assignment for brushless EC servo motors (BLDC) 48V

#### Motor connection

<table>
<thead>
<tr>
<th>M23 9-pin (8+1) pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Motor phase U</td>
<td></td>
</tr>
<tr>
<td>2 Motor phase V</td>
<td></td>
</tr>
<tr>
<td>3 Motor phase W</td>
<td></td>
</tr>
<tr>
<td>4 ---</td>
<td></td>
</tr>
<tr>
<td>5 +24V brake</td>
<td></td>
</tr>
<tr>
<td>6 GND brake</td>
<td></td>
</tr>
<tr>
<td>7 ---</td>
<td></td>
</tr>
<tr>
<td>8 ---</td>
<td></td>
</tr>
<tr>
<td>9 Earthing lead</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>

#### Encoder connection

<table>
<thead>
<tr>
<th>Sub-D 15-pin Pin</th>
<th>Motor connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hall signal A</td>
<td></td>
</tr>
<tr>
<td>2 +5V encoder / Hall</td>
<td></td>
</tr>
<tr>
<td>3 Encoder track /Z</td>
<td></td>
</tr>
<tr>
<td>4 Encoder track /B</td>
<td></td>
</tr>
<tr>
<td>5 Encoder track /A</td>
<td></td>
</tr>
<tr>
<td>6 +24V switch</td>
<td></td>
</tr>
<tr>
<td>7 Limit switch 1</td>
<td></td>
</tr>
<tr>
<td>8 GND switch</td>
<td></td>
</tr>
<tr>
<td>9 Hall signal B</td>
<td></td>
</tr>
<tr>
<td>10 GND encoder</td>
<td></td>
</tr>
<tr>
<td>11 Encoder track Z</td>
<td></td>
</tr>
<tr>
<td>12 Encoder track B</td>
<td></td>
</tr>
<tr>
<td>13 Encoder track A</td>
<td></td>
</tr>
<tr>
<td>14 Hall signal C</td>
<td></td>
</tr>
<tr>
<td>15 Limit switch 2</td>
<td></td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td></td>
</tr>
</tbody>
</table>
## Motor leads

### Pin assignment for brushless EC servo motors (BLDC) 310V

<table>
<thead>
<tr>
<th>Motor connection</th>
<th>Encoder connection</th>
<th>M23 9-pin (4+3+1) pin</th>
<th>Sub-D 15-pin pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor phase U</td>
<td>Hall signal A</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PE</td>
<td>+5V encoder / Hall</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Motor phase W</td>
<td>Encoder track Z</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Motor phase V</td>
<td>Encoder track /A</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>Encoder track /B</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>+24V brake</td>
<td>Encoder track /A</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>+24V switch</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>GND brake</td>
<td>Limit switch 2</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>GND encoder</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Temp +</td>
<td>Encoder track Z</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>D</td>
<td>Encoder track B</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Temp -</td>
<td>Encoder track A</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Housing – cable shield</td>
<td>Hall signal B</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Limit switch 2</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

### Overview of motor leads for step-, DC servo and EC motors

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>392305 0300</td>
<td>3-metre EC/AC servomotor lead M23 310V (4+3+PE) socket - wire end sockets</td>
</tr>
<tr>
<td>392305 0500</td>
<td>5-metre EC/AC servomotor lead M23 310V (4+3+PE) socket - wire end sockets</td>
</tr>
<tr>
<td>392325 0300</td>
<td>3-metre encoder lead M23 17-pin socket – D-sub 15-pin plug</td>
</tr>
<tr>
<td>392325 0500</td>
<td>5-metre encoder lead M23 17-pin socket – D-sub 15-pin plug</td>
</tr>
<tr>
<td>392740 0300</td>
<td>3-metre encoder lead D-sub 15-pin plug – socket 1:1</td>
</tr>
<tr>
<td>392740 0500</td>
<td>5-metre encoder lead D-sub 15-pin plug – socket 1:1</td>
</tr>
<tr>
<td>392750 0300</td>
<td>3-metre step motor lead M23 12-pin plug – socket 1:1</td>
</tr>
<tr>
<td>392750 0500</td>
<td>5-metre step motor lead M23 12-pin plug – socket 1:1</td>
</tr>
<tr>
<td>392755 0300</td>
<td>3-metre step motor lead D-sub 9-pin plug – M23 12-pin socket</td>
</tr>
<tr>
<td>392755 0500</td>
<td>5-metre step motor lead D-sub 9-pin plug – M23 12-pin socket</td>
</tr>
<tr>
<td>392759 0300</td>
<td>3-metre DC/EC servomotor lead M23 9-pin (8+PE) plug - socket 1:1</td>
</tr>
<tr>
<td>392759 0500</td>
<td>5-metre DC/EC servomotor lead M23 9-pin (8+PE) plug - socket 1:1</td>
</tr>
<tr>
<td>392760 0300</td>
<td>3-metre DC/EC servomotor lead M23 9-pin (8+PE) plug – wire end bushings</td>
</tr>
<tr>
<td>392760 0500</td>
<td>5-metre DC/EC servomotor lead M23 9-pin 8+PE) plug – wire end bushings</td>
</tr>
<tr>
<td>392781 0300</td>
<td>3-metre step motor lead D-sub 9-pin plug – socket 1:1</td>
</tr>
<tr>
<td>392781 0500</td>
<td>5-metre step motor lead D-sub 9-pin plug – socket 1:1</td>
</tr>
</tbody>
</table>

*All listed motor and encoder leads are fit for use with tow chains.*

* Different lengths to order.
Installation kit with angular transmission  Drive element accessories

Installation alternatives

1. Clutch housing kit 90°
2. Clutch housing kit 0°

Angular transmission

Ordering overview

<table>
<thead>
<tr>
<th>Installation kit with angular transmission</th>
<th>Transmission shaft</th>
<th>Coupling / stationary bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>for H-design on LES 4/LES 6/LES 5, securing 90°</td>
<td>Hollow shaft Ø 25 mm x 4 mm, blank 1000 mm</td>
<td>Coupling for transmission shaft 12 to 25 mm adaptor, VE 2 pcs.</td>
</tr>
<tr>
<td>Deliverables: 2 × 1, 2 × 2, 2 × 4</td>
<td>Part no.: 219001 0125</td>
<td>Part no.: 218050 0002</td>
</tr>
<tr>
<td>Part no.: 216150 0002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for H-design on LES 4/LES 6/LES 5, securing 0°</td>
<td>Hollow shaft Ø 25 mm x 4 mm, blank 2000 mm</td>
<td>Stationary bearing for transmission shaft</td>
</tr>
<tr>
<td>Deliverables: 2 × 1, 2 × 2, 2 × 4</td>
<td>Part no.: 219001 0225</td>
<td>VE 1 pcs.</td>
</tr>
<tr>
<td>Part no.: 216150 0001</td>
<td></td>
<td>Part no.: 896202 5562</td>
</tr>
</tbody>
</table>

For matching direct drive modules LES 4/5/6 see table on page "C72".
Installation kit with angular transmission  Drive element accessories

Dimensioned drawing and technical specification

<table>
<thead>
<tr>
<th>Pedestal bearing: to avoid vibrations/to support the transmission shaft (recommended from a transmission shaft length of 1,500 mm up)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmissible torque</td>
<td>18 Nm</td>
</tr>
<tr>
<td>Weight of coupling</td>
<td>0.3 kg</td>
</tr>
<tr>
<td>Weight of shaft</td>
<td>0.540 kg/m</td>
</tr>
<tr>
<td>Moment of inertia of both couplings</td>
<td>2.68 * 10^-4 kgm²</td>
</tr>
<tr>
<td>Moment of inertia of shaft</td>
<td>8.171 * 10^-4 kgm² / 100 mm</td>
</tr>
</tbody>
</table>

Dimensioned drawing - coupling

Part-no. 218050 0002
**Slide/crossbench plates**

**Hole diagram, slide plate PS 1**
L 125 x W 70 x H 7.7 mm
Mounting on: LES 4 with 1 x WS 5/70
Part no.: 277001

**Hole diagram, slide plate PS 2**
L 255 x W 70 x H 7.7 mm
Mounting on: LES 4 with 2 x WS 5/70
Fixing option for: Angle bracket WV 2 / WV 5
Part no.: 277002

**Hole diagram, slide plate PS 3**
L 220 x W 125 x H 7.5 mm
Mounting on: LES 5 with 2 x WS 5/70
Part no.: 277003

**Hole diagram, slide plate PS 4**
L 225 x W 220 x H 7.5 mm
Mounting on: LES 5 with 4 x WS 5/70
Mounting on crossbench: LES 5 with LES 5 (in conjunction with VP 2) Fixing option for: Angle bracket WV 3 / WV 6
Part no.: 277004

**Hole diagram, slide plate PS 6**
L 220 × W 125 × H 7.5 mm
Mounting on: LES 4 with 2 × WS 5/70
Part no.: 277011

**Hole diagram, slide plate PS 7**
L 255 × W 220 × H 7.5 mm
Mounting on: LES 6 with 4 × WS 5/70
Mounting on crossbench: LES 6 with LES 5 (in conjunction with PS 4)
Part no.: 277016

**Connectors**

**Connecting cross**
2 x LES 4
Part no.: 277007
Slide/crossbench plates

Hole diagram, slide plate PS 8
L 125 × W 145 × H 7.7 mm
Mounting on: LES 6 with 2 × WS 5/70
Part no.: 277017

Hole diagram, slide plate PS 9
L 250 × W 145 × H 7.5 mm
Mounting on: LES 6 with 4 × WS 5/70
Fixing option for: Angle bracket WV 7
Part no.: 277018

Hole diagram, slide plate PS 10
L 210 × W 215 × H 7.5 mm
Mounting on: LES 6 with 4 × WS 5/70
Mounting on crossbench: LES 6 with LES 6 (in conjunction with PS 11)
Part no.: 277019

Hole diagram, slide plate PS 11
L 210 × W 215 × H 7.5 mm
Mounting on: LES 6 with 4 × WS 5/70
Mounting on crossbench: LES6 with LES4 (in conjunction with PS10) Fixing option for: LES 6
Part no.: 277020

Hole diagram, slide plate PS 12
L 220 × W 180 × H 7.5 mm
Mounting on: LES 6 with 4 × WS 5/70
Fixing option for: LES 5
Part no.: 277021

Hole diagram, connection plate VP 2
L 255 × W 220 × H 7.5 mm
Mounting on: LES 5 with 4 × WS 5/70
Fixing option for: LES 5
Part no.: 277006
**Slide/crossbench plates**

**Hole diagram, slot plate set for crossbench LES 4**
L 100 × W 100 × H 8 mm

Mounting on: LES 4
Fixing option for: LES 4

Part no.: 277008

---

**Crossbench connection plates 1**

2 × L 255 × W 220 × H 8 mm

one set from PS 4 and VP 2,
for right-angled connection
two linear guides LES 5

Part no.: 277010

---

**Crossbench connection plates 2**

2 × L 220 × W 125 × H 8 mm

one set from PS 3 and PS 6,
for right-angled connection
one linear guide LES 5 with one
linear guide LES 4

Part no.: 277012

---

**Additional combination examples**

Crossbench LES 5 and LES 6
PS 4 and PS 7

Crossbench 2 x LES 6
PS 10 and PS 11

Crossbench LES 4 and LES 6
PS 11 and PS 10
T-slot slide plates

Hole pattern T-slot plate PT 25 × 250 for LES 4
L 100 × W 75 × H 20 mm
Mounting on: LES 4 with 1 × WS 5/70
Part no.: 277030 0001

Hole pattern T-slot plate PT 25 × 250 for LES 6
L 100 × W 125 × H 20 mm
Mounting on: LES 6 with 2 × WS 5/70
Part no.: 277030 0003

Hole pattern T-slot plate PT 25 × 250 for LES 5
L 100 × W 250 × H 20 mm
Mounting on: LES 5 with 2 × WS 5/70
Part no.: 277030 0005

Connectors

L 200 × W 75 × H 20 mm
Mounting on: LES 4 with 2 × WS 5/70
Part no.: 277030 0002

L 200 × W 125 × H 20 mm
Mounting on: LES 6 with 4 × WS 5/70
Part no.: 277030 0004

L 200 × W 250 × H 20 mm
Mounting on: LES 5 with 4 × WS 5/70
Part no.: 277030 0006
### Angle brackets

**Angle bracket with clamping surface milled flat**

- **WV 1**
  - Blank
  - Aluminium casting (0.2 kg)
  - L71 × W75 × H71
  - Part no.: 209110 0010

- **WV 2**
  - Blank
  - Aluminium casting (2.6 kg)
  - L221 × W75 × H446
  - Part no.: 209110 0022

- **WV 3**
  - Blank
  - Aluminium casting (1.1 kg)
  - L221 × W221 × H446
  - Part no.: 209110 0032

- **WV 5**
  - Blank
  - Aluminium, welded (5.3 kg)
  - L220 × W75 × H670
  - Part no.: 209110 0050

- **WV 6**
  - Blank
  - Aluminium, welded (13.3 kg)
  - L220 × W220 × H670
  - Part no.: 209110 0060

- **WV 7**
  - Blank
  - Aluminium, welded (10.8 kg)
  - L220 × W220 × H670
  - Part no.: 209110 0070

- **WV 8**
  - Blank
  - Aluminium, welded (7.4 kg)
  - L222 × W145 × H446
  - Part no.: 209110 0080

- **WV 19**
  - Blank
  - Aluminium, welded (2.5 kg)
  - L150 × W221 × H300
  - Part no.: 209110 0190

### Matching cover plates

- **Cover plate for WV 2**
  - Naturally anodised
  - Aluminium sheet, weight 0.8 kg
  - Part no.: 209110 0021

- **Cover plate for WV 3**
  - Naturally anodised
  - Aluminium sheet, weight 1.15 kg
  - Part no.: 209110 0031

- **Cover plate for WV 5**
  - Naturally anodised
  - Aluminium sheet, weight 1.2 kg
  - Part no.: 209110 0051

- **Cover plate for WV 6**
  - Naturally anodised
  - Aluminium sheet, weight 1.8 kg
  - Part no.: 209110 0061

- **Cover plate for WV 7**
  - Naturally anodised
  - Aluminium sheet, weight 1.5 kg
  - Part no.: 209110 0071

- **Cover plate for WV 8**
  - Naturally anodised
  - Aluminium sheet, weight 1 kg
  - Part no.: 209110 0081
Angle brackets

Hole diagram
Angle bracket WV 1
L 71 × W 75 × H 71 mm

Hole diagram
Angle bracket WV 2
L 221 × W 75 × H 446 mm

Hole diagram
Angle bracket WV 3
L 221 × W 221 × H 446 mm

Hole diagram
Angle bracket WV 5
L 220 × W 75 × H 670 mm

Connectors
**Angle bracket**

**Hole diagram**
Angle bracket WV 6
L 220 × W 220 × H 670 mm

**Hole pattern FRONT**

**Hole pattern BOTTOM**

**Hole diagram**
Angle bracket WV 7
L 220 × W 145 × H 670 mm

**Hole pattern FRONT**

**Hole pattern BOTTOM**

**Hole diagram**
Angle bracket WV 8
L 222 × W 145 × H 446 mm

**Hole pattern FRONT**

**Hole pattern BOTTOM**

**Hole diagram**
Angle bracket WV 19
L 150 × W 221 × H 300 mm

**Hole pattern FRONT**

**Hole pattern BOTTOM**
## Accessories

### Energy guidance chain

- **Energy guide chain 3**
  - VE 1 pc. at 1 m
  - Part no.: 219204 1000

- **Connectors for energy chain 3**
  - with strain relief
  - VE 1 kit
  - Part no.: 219205 0002

### Dimensioned drawing

#### Energy guide chain

- Dimensioned drawing
- Energy guide chain

### Tapped strips / sliding nuts

- **Tapped strips**
  - M6 (no figure)
  - galvanised
  - Ra 50 mm
  - VE 3 pcs. at 1 m
  - Part no.: 209011

- **Sliding nut**
  - M6 (Figure 1)
  - galvanised
  - VE 100 pcs.
  - Part no.: 209001 0005

- **Angle sliding nut**
  - M6 (Figure 4)
  - galvanised
  - VE 25 pcs.
  - Part no.: 209021 0003

- **Special angle sliding nut**
  - 3 × M6 (Figure 3)
  - galvanised
  - VE 25 pcs.
  - Part no.: 209022 0003

### Attachment kits

- **Gas strut attachment kit**
  - Stroke 220 mm
  - Nominal length 490 mm
  - Part no.: 216450 0001

- **Limit switch attachment kit for LES 4**
  - for external limit switches
  - Process path reduction by appr. 40 mm
  - Part no.: 216460 0001

- **Limit switch attachment kit LES 5**
  - for external limit switches
  - Process path reduction by appr. 40 mm
  - Part no.: 216460 0002

- **Limit switch attachment kit LES 6**
  - for external limit switches
  - Process path reduction by appr. 40 mm
  - Part no.: 216460 0003

- **Mounting set for sealing air**
  - for LF4 - LF6
  - Part no.: 216460 0006
The crossbenches 10/20 consist of two linear units LES 5, which are interconnected at right angles. The individual axes are driven by servo motor with a recirculating ball drive of 10 mm pitch.

To achieve very high load-bearing capabilities, each axis is fitted with four linear slots.

In addition to this standard design, it is possible to combine all LES 5 linear units with each other by means of the crossbench connection plates.

Features
- Two isel linear units LES 5 adjustable for no play with integrated servomotor
- Recirculating ball drive, pitch 10 mm
- Travel:
  - X-axis: 210/310 mm
  - Y-axis: 210/310 mm
- Options:
  - 5 mm spindle pitch
  - Milled T-slot plate
  - Step motor
  - Servo controller
  - Other travel

Ordering data
- Crossbench 10-V
  - Part no.: 272200 0001
- Crossbench 20-V
  - Part no.: 272200 0002

Dimensioned drawings

Crossbench 20
With milled T-key plate and drainage channel (option)
Space for your notes
**Functional overview** Linear unit LEZ 9

- **End position buffering both sides with parabolic springs**
- **Simple clamping of the belt with clamping bolts under the slot**
- **Rigid aluminium profile in lengths up to 6m**
- **2 steel shafts Ø 8 mm, pressed into the profile and calibrated**
- **Drive motor can be flanged on both sides**
**Functional overview** Linear unit LEZ 9

- Tothed belt HDT 3 M, 15 mm wide
- Central lubrication system option
- Patented isel shaft slots with T-key inserts, milled flat
- Bevel gear in bearings both sides
- Variable fixing options
Linear units
with toothed belt drive

Features
- Aluminium profile, miniature linear guide LFS-8-2
- No-play feed with toothed belt drive
  - Toothed belt with 3 mm interval
  - Width 9 mm
- Feed per turn: 60 mm
- Repeatability less than or equal to ± 0.2 mm
- Max. feed: 1.5 m/s
- Limit or reference switch accuracy < 0.1 mm (with drive modules)

Accessories are on page C98.

Options:
- Special lengths in 100 mm raster to order, max. 6000 mm
- Also available as direct drive with
  - Step motor
  - DC servo motor
- Overrun limit switches with connecting cable (only in combination with integrated drive module)

Ordering key
232 005 XXXX

Drives/Slides
Roller carriages
8 = without motor, with shaft slides
9 = without motor, with roller carriages

Profile lengths LFS-8-2 (mm)
298, 398, 498, 598, 675, 698, 798, 998, 1498, 1798, 1998, 2498, 2998
(e.g. 398 mm = 040, 675 mm = 068)
Option: up to 6000 mm

Technical specification
Belt type...............................................HTD 3M, width 9 mm
Slide weight...........................................0.430 kg
Weight without drive module................1000 mm = 3 kg
Specific weight of the toothed belt......0.0225 kg/m
Roller carriage weight............................1.03 kg
Specific guide weight............................0.200 kg/100 mm
Effective diameter of the synchronous disks.................................Ø 19.10 mm
Moment of inertia of the synchronous disks.................................5.585*10^-7 kgm²
Feed per turn.........................................60 mm

Load diagram
Permitted accelerated weights relative to the belt strength.*

* with vertical construction, the acceleration due to gravity (g = 9.81 m/s²) must be taken into account

Bending data is on page C23.
Linear units

with toothed belt drive

Dimensioned drawings

without motor, with shaft slides

without motor, with roller carriages

Motor modules (Motor pin assignments are on page C74.)

Drive module with step motor
MS-045 HT (direct drive)
Feed: 60 mm/turn

Part no.: 396048 3015

Drive module with step motor
MS-045 HT (reduction 2:1)
Feed: 30 mm/turn

Part no.: 396049 3015

Drive module with step motor
MS-135 HT (reduction 2:1)
Feed: 30 mm/turn

Part no.: 396056 3015
Linear units

with toothed belt drive

Features

- Aluminium profile, with miniature linear guide LFS-8-5
- no-play feed with toothed belt drive - toothed belt with 5 mm interval, Width 25 mm
- Max. feed: 5 m/s
- Shaft slides WS 3, L 176 × W 130 mm
- Feed per turn: 70 mm
- Repeatability less than or equal to ± 0.2 mm
- Limit or reference switch accuracy < 0.1 mm
- available in lengths up to 6,000 mm

Accessories are on page C98.

Options:

- Special lengths in 100 mm raster to order, max. 6,000 mm
- also as direct drive with
  - Multi-phase motor
  - DC servomotor
- Overrun limit switches with connecting cable (only in combination with integrated drive module)

Technical specification

Belt type............................................ HTD 5M, width 25 mm
Slide weight........................................ 0,940 kg
Weight without drive module............. 1000 mm = 7.9 kg
specific weight of the toothed belt...... 0.09 kg/m
Roller carriage weight.......................... 2.03 kg
specific guide weight......................... 0.472 kg/100 mm
Effective diameter of the synchronous disks.............. Ø 22.28 mm
Moment of inertia of the synchronous disks.............. 5.58×10⁻⁶ kgm²
Feed per turn....................................... 70 mm

Linear guide rail LFS-8-5

Moment of inertia Ix............................ 137,48 cm³
Moment of inertia Iy............................ 27,98 cm³
Resistance torque Wx........................... 23,91 cm³
Resistance torque Wy........................... 13,09 cm³

Load diagram

Permitted accelerated weights relative to the belt strength.*

* with vertical construction, the acceleration due to gravity (g = 9.81 m/s²) must be taken into account
Linear units

with toothed belt drive

Dimensioned drawings

without motor, with shaft slides

without motor, with roller carriages

Motor modules

Drive module with step motor
MS-600 HT (reduction 2:1)
Feed: 35 mm/turn

Part no.: 396086 3060

Drive module with EC servomotors
(Reduction 2:1)
Feed: 35 mm/turn

Part number | Motor module | Length L
--- | --- | ---
396 415 3260 | EC 60S with brake | 151.5 mm
396 415 3060 | EC 60S without brake | 198.5 mm
396 423 3060 | EC 6L | 198.5 mm
396 444 3070 | EC 86S | 177.5 mm
396 466 3070 | EC 86L | 202.5 mm
**Linear units**

with toothed belt drive

---

**Technical specification**

- Belt type: HTD 5M, width 25 mm
- Slide weight: 0.940 kg
- Weight without drive module: 1000 mm = 10.5 kg
- Specific weight of the toothed belt: 0.09 kg/m
- Roller carriage weight: 2.03 kg
- Specific guide weight: 0.648 kg/100 mm
- Feed per turn: 70 mm or 150 mm
- Effective diameter of the synchronous disks:
  - Feed 70 mm/turn: 22.28 mm
  - Feed 150 mm/turn: 47.75 mm
- Moment of inertia of the synchronous disks:
  - Feed 70 mm/turn: 5.58E-6 kgm²
  - Feed 150 mm/turn: 1.796.10⁻⁴ kgm²

---

**LEZ 3**

**Features**

- Aluminium profile, miniature linear guide LFS-8-4
- No-play feed with toothed belt drive, toothed belt with 5 mm interval, width 25 mm
- Max. feed: 5 m/s
- Shaft slides WS3, L176 × W130 mm
- Feed per turn:
  - 70 mm or 150 mm
- Repeatability less than or equal to ± 0.2 mm
- Limit or reference switch accuracy < 0.1 mm
- Available in lengths up to 6,000 mm
- Motor modules right and left can be flanged

---

**Load diagram**

Permitted accelerated weights relative to the belt strength.*

---

* with vertical construction, the acceleration due to gravity (g = 9.81 m/s²) must be considered

Bending data is on page C27.
Linear units
with toothed belt drive

Dimensioned drawings
with shaft slides

Profile length $L$

Travel = Profile length $L$ minus 235 mm

Feed: 70 mm/turn

Motor modules (Motor pin assignments are on page C74.)

<table>
<thead>
<tr>
<th>Drive module with stepper motor (direct drive)</th>
<th>Drive module with EC servomotor EC 86 (direct drive)</th>
<th>Drive module with DC servomotor DC 300 (direct drive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>Motor module</td>
<td>Length $L$</td>
</tr>
<tr>
<td>396 085 0060</td>
<td>MS 600 HT right</td>
<td></td>
</tr>
<tr>
<td>396 085 0061</td>
<td>MS 600 HT left</td>
<td></td>
</tr>
<tr>
<td>396 088 0060</td>
<td>MS 900 HT right</td>
<td></td>
</tr>
<tr>
<td>396 088 0061</td>
<td>MS 900 HT left</td>
<td></td>
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<tr>
<td>Part number</td>
<td>Motor module</td>
<td>Length $L$</td>
</tr>
<tr>
<td>396 444 0070</td>
<td>EC 86S</td>
<td>177.5 mm</td>
</tr>
<tr>
<td>396 446 0070</td>
<td>EC 86L</td>
<td>202.5 mm</td>
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<td>Part number</td>
<td>Motor module</td>
<td>Length $L$</td>
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<td>MS 600 HT right</td>
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<td>MS 900 HT right</td>
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<td>MS 900 HT left</td>
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<td>Motor module</td>
<td>Length $L$</td>
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<tr>
<td>396 444 0070</td>
<td>EC 86S</td>
<td>177.5 mm</td>
</tr>
<tr>
<td>396 446 0070</td>
<td>EC 86L</td>
<td>202.5 mm</td>
</tr>
</tbody>
</table>
Linear units

with toothed belt drive

Features

- Aluminium profile
- Linear guide LFS-8-7
- no-play feed with toothed belt drive
- toothed belt with 3 mm interval
  Width 15 mm
- Max. feed. 2 m/s
- Shaft slides WS 11
  L 96 × W 95 mm
- Feed per turn: 60 mm
- Repeatability less than or equal to ± 0.2 mm
- Limit or reference switch accuracy < 0.1 mm
- Servomotor

Accessories are on page C98.

Options:

- Special lengths in 100 mm raster to order
- Stepper motor

Ordering key

2 3 2 0 1 0 X XXX *

Profile lengths (mm)
496, 996, 1496, 1996, 2496, 2996
(e. g. 496 mm = 0050
1496 mm = 0150)

Technical specification

Belt type................................. HTD 3M, width 15 mm
Slide weight............................0.4 kg
Weight without drive module...........1000 mm = 4.4 kg
  specific weight of the toothed belt.....0.04 kg/m
  specific guide weight..................0.29 kg/100 mm
Effective diameter of the synchronous disks........... Ø 19.1 mm
Moment of inertia of the synchronous disks.......... 5.58E-6 kgm²
Feed per turn................................60 mm

Linear guide rail LFS-8-7
Moment of inertia Ix.......................... 29.34 cm²
Moment of inertia Iy.......................... 10.86 cm²
Resistance torque Wx.......................... 7.52 cm²
Resistance torque Wy.......................... 5.68 cm²

Load diagram

Permitted accelerated weights relative to the belt strength.*

Note:
Please order drive modules separately on the listed part numbers and specify here, whether the delivery should take place with or without attachment.

* Only for model with shaft slide (model with carriage on request)

* with vertical construction, the acceleration due to gravity (g=9.81 m/s²) must be considered
Linear units

with toothed belt drive

Dimensioned drawings

with shaft slides

with roller carriages

Motor modules

Drive module with stepper motor MS 200 HT
(Reduction 2:1)
Feed: 30mm / turn

Drive module with DC servomotor DC 100
(Reduction 2:1)
Feed: 30mm / turn

Part no.: 396112 3063

Figure:
LEZ 9 with roller carriage and
MS 200 HAT stepper motor
Mounted on left

Figure:
LEZ 9 with shaft slide and
DC 100 servomotor
mounted on right
## Accessories

### LEZ 1

**Angle bracket**
- for LEZ 1
- Part no.: 209110 0010

**20/30 coupling**
- for LEZ 1
- Part no.: 218001 5080

**Shaft slide 1/70**
- L 96 × W 72 × H 28.5 mm
- Clamping surface plane milled, T-slot insert, M6
- Central lubrication system option, adjustable for no play
- Weight: 0.35 kg
- Option: stainless steel version
- Part no.: 223 100 0070
  Stainless steel: 223 101 0070

**Limit switch set**
- Option: 2. Limit switches
- for LEZ 1
- Part no.: 632 125 0002

### LEZ 2

**Motor fixing plate**
- for LEZ 2
- incl. fixing material
- for direct drive see page C78 et seq.
- Part no.: 232199 0004

**Angle bracket**
- for LEZ 2
- incl. fixing material
- Part no.: 232199 0005

**Coupling for Transmission shaft**
- for LEZ 2
- 1 VE = 1 coupling
- Part no.: 218003 0120

**Shaft slide WS 11/70**
- L 96 × W 96 × H 32 mm
- Clamping surface plane milled, T-slot insert, M6
- Central lubrication system option, adjustable for no play
- Weight: 0.4 kg
- Option: stainless steel version
- Part no.: 223111 0070
  Stainless steel: 223111 1070

**Limit switch set**
- Motor side
- Part no.: 397201 0000
- Deviation
- Part no.: 397201 XXXX

### LEZ 3

**Angle bracket**
- for LEZ 3
- incl. fixing material
- Part no.: 232199 0005

**Coupling for Transmission shaft**
- for LEZ 3
- 1 VE = 2 couplings
- Part no.: 218050 0002

**Transmission shaft ø 25 mm**
- Length 1m
- Part no.: 219001 0125
- Length 2m
- Part no.: 219001 0225

**Limit switch set**
- Motor side
- Part no.: 397201 0000
- Deviation
- Part no.: 397201 XXXX

### LEZ 9

**30/40 coupling**
- for LEZ 9
- 1 VE = 1 coupling
- Part no.: 218002 8080

**Shaft slide WS 11/70**
- L 96 × W 96 × H 32 mm
- Clamping surface plane milled, T-slot insert, M6
- Central lubrication system option, adjustable for no play
- Weight: 0.4 kg
- Option: stainless steel version
- Part no.: 223111 0070
  Stainless steel: 223111 1070
Examples in use

2-axis H-design
- 2 × LEZ 3
- 1 × LEZ 2
- Transmission shaft

2-axis boom
- 1 × LEZ 2
- 1 × LEZ 9

Crossbench LEZ 1
- 2 × LEZ 1

LEZ 1
- 2-axis flatbed configuration

made by isel
Linear units

with direct drive

Features

- Aluminium linear guide with magnet rail
- Internal magnetic tape
- Drive slots with spool package and magnetic length measurement system
- Low noise running
- Adjustable for no play
- High accelerations and speeds
- No backlash
- No need for mechanical transfer devices
- No servicing and greasing tasks
- With 2 limit or reference switches
- Repeatability ± 0.01 mm
- Standard lengths to 3 m
  (in 100 mm raster)

Options:

- Drive controller
- Folding cover
- Parking brake
- Various winding packages
- Segmentable guide

General

Where the earlier conventional linear units with spindle drives were reaching their development limits, linear units with linear motors are coming to the fore: They are achieving enormous accelerations, move into positions with pinpoint accuracy and work with virtually no wear because of the absence of mechanical connectors.

Linear motors are being used increasingly in machine tools, as well as for positioning systems and handling systems in linear technology. Linear units with steel shaft guides are particularly suited for the machine tools field and positioning systems.

Isel iLD series linear units are constructed from rigid aluminium profiles. The guides comprise Isel precision steel shafts and Isel aluminium shaft slots, proven in use for more than 20 years. The magnetic Isel length measurement system is also incorporated.

In this field, Isel linear motor units have the advantage of higher accelerations (up to 30 m/s²) and processing speeds of up to 4 m/s. Linear motors with iron core produce very high permanent forces, which reach more than 1000 N.

A matching integrated brake is also available as an option. Matching folding bellows covers are also available to protect from dirt. The “made by Isel” concept means that an optimum price/performance-ratio is offered, which in its turn means very short amortisation periods for customers.

Further information on request!
Linear units with direct drive

Dimensioned drawings

<table>
<thead>
<tr>
<th>LFS 12-150</th>
<th>LFS 16-250</th>
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<tbody>
<tr>
<td>L1 (mm)</td>
<td>L1 (mm)</td>
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</table>
## Rotation units

### Overview

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDH-M</td>
<td>Indexing table / Rotary unit</td>
<td>C 104</td>
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<tr>
<td>RDH-S</td>
<td>Indexing table / Rotary unit</td>
<td>C 106</td>
</tr>
<tr>
<td>RDH-XS</td>
<td>Indexing table / Rotary unit</td>
<td>C 108</td>
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<td>DSH-S</td>
<td>Rotary / swivel unit</td>
<td>C 110</td>
</tr>
<tr>
<td>RF 1</td>
<td>Indexing table</td>
<td>C 112</td>
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# Rotation units

## Overview

<table>
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<tr>
<th>Model</th>
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<tr>
<td>iZD 54</td>
<td>Rotary unit</td>
<td>C 114</td>
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<tr>
<td>MD 1</td>
<td>Miniature rotary unit</td>
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<tr>
<td>ZD 30</td>
<td>Rotary unit</td>
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</tr>
<tr>
<td>ZR 20</td>
<td>Indexing table</td>
<td>C 120</td>
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<tr>
<td>ZDS 2030</td>
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<td>C 121</td>
</tr>
</tbody>
</table>

- CAD data on our website [www.isel.com](http://www.isel.com)
- Made by isel®

**Transported loads**

**Machining forces**

**Feed**
Indexing table / Rotary unit

**Features**
- With precision transmission
- High load capacity, rigid drive bearing
- Absence of play and high torsional rigidity
- Reduction 1:51 or 1:101
- Stepper or servomotor
- Protection class IP 65
- Stainless design
- Transfer accuracy < 1 minute of arc
- Repeatability < ± 6 seconds of arc
- Available in solid or hollow shaft design
- No maintenance

For pin assignment see page C122
For transport loads see page C123

**Ordering key**

2 6 6 2 X X 0 X 0 0

- **Flanged shaft**
  - 0 = solid shaft
  - 1 = hollow shaft

- **Transmission reduction**
  - 0 = 101
  - 1 = 51

- **Motors**
  - 0 = Stepper motor MS 200 HAT with encoder (400 imp., 3-channel, RS422)
  - 3 = brushless EC servomotor EC 60S
  - 4 = brushed DC servomotor DC 100
  - 5 = Stepper motor without encoder

**Accessories**

- **Chuck assembly**
  - 3-jaw chuck Ø 125
  - Part no.: 269062 0125
  - 4-jaw chuck Ø 125
  - Part no.: 269061 0125*
- **Aluminium T-key plate**
  - Ø 240 mm/PT 25
  - Part no.: 269050 0240
  - Ø 365 mm/PT 25
  - Part no.: 269050 0365
- **Aluminium rotary plate**
  - Ø 490 mm, customised fixing borings available at extra cost
  - Part no.: 269051 0500
- **Tailstock unit RE M**
  - Part no.: 269100 2100 (1000 mm)
  - Part no.: 269100 2150 (1500 mm)
  - Part no.: 269100 2200 (2000 mm)

*including flange

---

**RDH-M**

RDH-M as rotary unit (hollow shaft design)

RDH-M as indexing table (solid shaft design)
Indexing table / Rotary unit  

RDH-M

Technical specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Stepper motor</th>
<th>EC servomotor</th>
<th>DC servomotor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:51</td>
<td>1:101</td>
<td>1:51</td>
</tr>
<tr>
<td>Nominal speed [1/min]</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Max. speed [1/min]</td>
<td>24</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Nominal torque [Nm]</td>
<td>24</td>
<td>46</td>
<td>9</td>
</tr>
<tr>
<td>Max. torque (short term) [Nm]</td>
<td>--</td>
<td>--</td>
<td>42</td>
</tr>
<tr>
<td>Nominal holding torque (static load) [Nm]</td>
<td>55</td>
<td>108</td>
<td>26</td>
</tr>
<tr>
<td>Max. Transmission load [Nm]</td>
<td>98</td>
<td>157</td>
<td>98</td>
</tr>
<tr>
<td>Dynamic load factor C [N]</td>
<td></td>
<td></td>
<td>21800</td>
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<tr>
<td>Static load factor C0 [N]</td>
<td></td>
<td></td>
<td>35800</td>
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</table>

* Values for half-step operation

Dimensioned drawings

<table>
<thead>
<tr>
<th>Version</th>
<th>Part no.</th>
<th>L</th>
<th>A</th>
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</thead>
<tbody>
<tr>
<td>Tailstock unit RE-M 1000 mm</td>
<td>269100 2100</td>
<td>1110</td>
<td>624,5</td>
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<tr>
<td>Tailstock unit RE-M 1500 mm</td>
<td>269100 2150</td>
<td>1610</td>
<td>1124,5</td>
</tr>
<tr>
<td>Tailstock unit RE-M 2000 mm</td>
<td>269100 2200</td>
<td>2110</td>
<td>1624,5</td>
</tr>
</tbody>
</table>
Indexing table / Rotary unit

RDH-S as rotary unit (hollow shaft design)

RDH-S as indexing table (solid shaft design)

Features
- With precision transmission
  - High load capacity, rigid drive bearing
  - Absence of play and high torsional rigidity
- Reduction 1:51 or 1:101
- Stepper or servomotor
- Protection class IP 65
- Stainless design
- Transfer accuracy <1.5 minute of arc
- Repeatability < ± 6 seconds of arc
- Available in solid or hollow shaft design
- No maintenance

For pin assignment see page C122
For transport loads, see page C123

Ordering key

2 6 6 1 X X 0 X 0 0

- **Flanged shaft**
  - 0 = solid shaft
  - 1 = hollow shaft

- **Transmission reduction**
  - 0 = 101
  - 1 = 51

- **Motors**
  - 0 = Stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
  - 2 = brushless DC servomotor RE 40
  - 3 = brushless EC servomotor EC 42
  - 5 = Stepper motor without encoder

Accessories

Chuck assembly
3-jaw chuck Ø 65
Part no.: 269060 3065*

3-jaw chuck Ø 80
Part no.: 269060 2080*

3-jaw chuck Ø 100
Part no.: 269060 2100*

Chuck jaws
4-jaw chuck Ø 100
Part no.: 269061 2100*

Tailstock unit RE S
for RDH-S
Part no.: 269100 1020 (200 mm)
Part no.: 269100 1030 (300 mm)
Part no.: 269100 1040 (400 mm)
Part no.: 269100 1050 (500 mm)

* including flange
# Indexing table / Rotary unit RDH-S

## Technical specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Stepper motor MS 045 HT*</th>
<th>EC servomotor EC 42 (brushless)</th>
<th>DC servomotor RE 40 (brushed)</th>
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</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:51</td>
<td>1:101</td>
<td>1:51</td>
</tr>
<tr>
<td>Nominal speed [1/min]</td>
<td>4</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz (225 l/min)</td>
<td>at 1100 l/min</td>
<td>at 1100 l/min</td>
</tr>
<tr>
<td>Max. speed [1/min]</td>
<td>24</td>
<td>12</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>at 800 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal torque [Nm]</td>
<td>7</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. torque (short term) [Nm]</td>
<td>--</td>
<td>--</td>
<td>7</td>
</tr>
<tr>
<td>Nominal holding torque (static load) [Nm]</td>
<td>7</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Max. Transmission load [Nm]</td>
<td>18</td>
<td>28</td>
<td>18</td>
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<tr>
<td>Dynamic load factor C [N]</td>
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<tr>
<td>Static load factor C[2] [N]</td>
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</table>

* Values at half-step operation

## Dimensioned drawings

![Dimensioned drawings](image_url)

<table>
<thead>
<tr>
<th>Versions</th>
<th>Part-no.</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailstock unit RE S 200 mm</td>
<td>269100 1020</td>
<td>370</td>
<td>128</td>
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<tr>
<td>Tailstock unit RE S 300 mm</td>
<td>269100 1030</td>
<td>470</td>
<td>228</td>
</tr>
<tr>
<td>Tailstock unit RE S 400 mm</td>
<td>269100 1040</td>
<td>570</td>
<td>328</td>
</tr>
<tr>
<td>Tailstock unit RE S 500 mm</td>
<td>269100 1050</td>
<td>670</td>
<td>428</td>
</tr>
</tbody>
</table>
Indexing table / Rotary unit

**RDH-XS**

### Features
- With precision transmission
- High load capacity, rigid drive bearing
- Absence of play and high torsional rigidity
- Reduction 1:50 or 1:100
- Stepper or servomotor
- Protection class IP 65
- Stainless design
- Transfer accuracy <2 minutes of arc
- Repeatability < ± 1 minute of arc
- No maintenance

For pin assignment see page C122
For transport loads, see page C123

### Ordering key

2 6 6 0 0 X 0 X 0 0

**Transmission reduction**
- 0 = 100
- 1 = 50

**Motors**
- 0 = Stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
- 2 = brushed DC servomotor RE 40
- 3 = brushless EC servomotor EC 42
- 5 = Stepper motor without encoder

### Accessories

**Chuck assembly**
- 3-jaw chuck Ø 65
- Part no.: 269060 4065*
- * including flange

**Tailstock unit RE XS**
- for RDH-XS
- Part no.: 269100 0020 (200 mm)
- Part no.: 269100 0030 (300 mm)
- Part no.: 269100 0040 (400 mm)
- Part no.: 269100 0050 (500 mm)
## Indexing table / Rotary unit RDH-XS

### Technical specification

<table>
<thead>
<tr>
<th></th>
<th>Stepper motor MS 045 HT *</th>
<th>EC servomotor EC 42</th>
<th>DC servomotor RE 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:50</td>
<td>1:100</td>
<td>1:50</td>
</tr>
<tr>
<td>Nominal speed [1/min]</td>
<td>5</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz (225 1/min)</td>
<td>at 1100 Hz</td>
<td>at 1100 Hz</td>
</tr>
<tr>
<td>Max. speed [1/min]</td>
<td>24</td>
<td>12</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>at 8000 Hz (2000 1/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal torque [Nm]</td>
<td>5</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz (225 1/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. torque (short term) [Nm]</td>
<td>--</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td>Nominal holding torque  [Nm]</td>
<td>5</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Max. Transmission load  [Nm]</td>
<td>9</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>

Limit for repeatable peak torque

| Dynamic load C [N]     | 392                       |
| Static load Cs [N]     | 392                       |

* Values for half-step operation

### Dimensioned drawings

[Images of dimensioned drawings]

<table>
<thead>
<tr>
<th>Versions</th>
<th>Part no.</th>
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<tbody>
<tr>
<td>Tailstock unit RE-XS 200 mm</td>
<td>269100 0020</td>
<td>325</td>
<td>117</td>
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<td>Tailstock unit RE-XS 300 mm</td>
<td>269100 0030</td>
<td>425</td>
<td>217</td>
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<td>Tailstock unit RE-XS 400 mm</td>
<td>269100 0040</td>
<td>525</td>
<td>317</td>
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<tr>
<td>Tailstock unit RE-XS 500 mm</td>
<td>269100 0050</td>
<td>625</td>
<td>417</td>
</tr>
</tbody>
</table>
**Rotary / swivel unit**

**DSH-S**

**Features**
- With precision transmission
  - High load capacity, rigid drive bearing
  - Absence of play and high torsional rigidity
- With rotary unit RDH-S
- Reduction 1:51 or 1:101
- Stepper or servomotor
- Protection class IP 65
- Stainless design
- Transfer accuracy < 1.5 minute of arc
- Repeatability < ± 6 seconds of arc
- No maintenance
- Swivel range continuously variable

For pin assignment see page C122
For transport loads, see page C123

**Ordering key**

2 6 5 4 1 X X 0 0 0

**Motors**
- 0 = Stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
- 2 = brushed DC servomotor RE 40
- 3 = brushless EC servomotor EC 42
- 5 = Stepper motor without encoder

**Transmission reduction**
- 0 = 1 : 101
- 1 = 1 : 51

**Accessories**

**Chuck assembly**
- 3-jaw chuck Ø 65
  - Part no.: 269060 3065*
- 3-jaw chuck Ø 80
  - Part no.: 269060 2080*
- 3-jaw chuck Ø 100
  - Part no.: 269060 2100*

**Chuck assembly**
- 4-jaw chuck Ø 100
  - Part no.: 269061 2100*

**Circular plate**
- Ø 150
  - Part no.: 269 050 0150

* including flange
# Rotary / swivel unit

## DSH-S

### Technical specification

<table>
<thead>
<tr>
<th></th>
<th>Stepper motor</th>
<th>EC servomotor</th>
<th>DC servomotor</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>MS 045 HT *</td>
<td>EC 42</td>
<td>RE 40</td>
</tr>
<tr>
<td>Reduction ratio</td>
<td>1:51</td>
<td>1:101</td>
<td>1:51</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>4 [1/min]</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>Max. speed</td>
<td>59 [1/min]</td>
<td>30</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>at 8000 Hz</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>7 [Nm]</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>at 1500 Hz</td>
<td>9.2</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Max. torque (short term)</td>
<td>--</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Nominal holding torque (static load)</td>
<td>7 [Nm]</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Max. transmission load</td>
<td>18 [Nm]</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>Dynamic load factor C</td>
<td>--</td>
<td>28</td>
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<tr>
<td>Static load factor C0</td>
<td>--</td>
<td>--</td>
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</tbody>
</table>

*Values for half-step operation

### Dimensioned drawings

- [Swivel range 190° / max. 230°](#)
- [Base plate](#)
- [RDH-S](#)
# Indexing table

---

## RF 1

### Features

- Low play toothed belt drive with stepper or DC servo motor
- Reduction 1: 24 (standard)
- Weight: 14.6 kg

For pin assignment see page C122
For transport loads, see page C123

### Options:

- Reduction installation set 1 : 52 or 1 : 100
- Electromagnetic brake [60 Nm]
- Step motor drive with encoder
- CNC controller

### Ordering key

2 6 0 2 4 X X X 0 0

**Motores**
- 1 = Stepper motor MS 200 HT without encoder
- 4 = brushed DC servomotor DC 100
- 5 = brushless EC servomotor EC 605

**Brake**
- 0 = without brake
- 1 = magnetic brake

**Plug**
- 1 = servomotor: M23 + SubD15
- 2 = Stepper motor: SubD9

### Accessories

#### Installation set
- for reduction 1:52
  - Part no.: 269077 0001
- for reduction 1:100
  - Part no.: 269077 0002

#### Aluminium T-key plate
- Ø 240 mm/PT 25
  - Part no.: 269050 0240
- Ø 365 mm/PT 25
  - Part no.: 269050 0365

#### Aluminium rotary plate
- Ø 490 mm, customised fixing borings available at extra cost
  - Part no.: 269051 0500

#### Chuck assembly
- 3-jaw chuck Ø 125
  - Part no.: 269062 0125
- 4-jaw chuck Ø 125
  - Part no.: 269061 0125
## Indexing table RF 1

### Technical specification

<table>
<thead>
<tr>
<th></th>
<th>Stepper motor MS 200 HT *</th>
<th>Servomotor DC 100 / EC 60S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduction ratio</strong></td>
<td>1:24</td>
<td>1:24</td>
</tr>
<tr>
<td></td>
<td>1:52</td>
<td>1:52</td>
</tr>
<tr>
<td></td>
<td>1:100</td>
<td>1:100</td>
</tr>
<tr>
<td><strong>Speed [1/min]</strong></td>
<td>0-50</td>
<td>0-12</td>
</tr>
<tr>
<td></td>
<td>0-23</td>
<td>0-12</td>
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<tr>
<td></td>
<td>0-125</td>
<td>0-58</td>
</tr>
<tr>
<td></td>
<td>0-125</td>
<td>0-30</td>
</tr>
<tr>
<td><strong>Operation torque (0 - 500 Hz) [Nm]</strong></td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>--</td>
</tr>
<tr>
<td><strong>Operation torque (500 - 1000 Hz) [Nm]</strong></td>
<td>18</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>--</td>
</tr>
<tr>
<td><strong>Nominal torque [Nm]</strong></td>
<td>--</td>
<td>6 / 10</td>
</tr>
<tr>
<td></td>
<td>13 / 22</td>
<td>25 / 42</td>
</tr>
<tr>
<td><strong>Nominal holding torque (static load) [Nm]</strong></td>
<td>37</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>13 / 22</td>
<td>16 / 26</td>
</tr>
<tr>
<td></td>
<td>30 / 50</td>
<td>--</td>
</tr>
<tr>
<td><strong>Min. Step [arcmin]</strong></td>
<td>2.5</td>
<td>2</td>
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<td>2</td>
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</tbody>
</table>

* Values for half-step operation

### Dimensioned drawings
### Rotary unit

**iZD 54**

#### Features
- Low play toothed belt drive with stepper motor
- Horizontal and vertical
- Reduction 1:54
- Good price/performance ratio
- High torque
- Dimensions (L×W×H): 220 × 185 × 95 mm
- Weight approx. 6.5 kg

For pin assignment see page C122
For transport loads, see page C123

#### Technical specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:54</td>
</tr>
<tr>
<td>Speed (1/min)</td>
<td>0-22</td>
</tr>
<tr>
<td>Operating torque (Nm)</td>
<td>30</td>
</tr>
<tr>
<td>Nominal holding torque</td>
<td>48</td>
</tr>
<tr>
<td>Min. step (arcmin)</td>
<td>2</td>
</tr>
</tbody>
</table>

Based max. 8 kHz, half-step operation

#### Accessories

**Chuck assembly**

- 3-jaw chuck Ø 100
  - Part no.: 269060 0100
- 4-jaw chuck Ø 100
  - Part no.: 269061 0100

**Aluminium T-key plate Ø 250 mm, PT 24**
- Part no.: 269050 0250
Rotary unit

iZD 54

Dimensioned drawing
**Mini rotary unit**

**Features**
- low play toothed belt drive with stepper or DC servo motor
- Reduction 1: 20
- Shaft with Ø 9 mm boring
- Housing flange with inner cone SK 20
- Weight: according to design, from 1.35 kg

For pin assignment see page C122
For transport loads, see page C123

**Optionen:**
- additional installation plate (vertical installation possible)
- CNC controller

**Ordering key**

261010 0X10

**Motors**
0 = Stepper motor MS 045 HT
2 = brushed DC servomotor RE 40
3 = brushless EC servomotor EC 42

**Accessories**

**Chuck assembly**
3-jaw chuck Ø 65
Part no.: 269060 2065*

* including flange

**Collet holder**
Collet holder SK 20 for tools Ø 3 - 10 mm, with installation ring
Part no.: 239172 0001

Collets are on page E 29.
Mini rotary unit MD 1

Technical specification

<table>
<thead>
<tr>
<th></th>
<th>Stepper motor MS 045 HT *</th>
<th>DC servomotor RE 40</th>
<th>EC servomotor EC 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:20</td>
<td>1:20</td>
<td>1:20</td>
</tr>
<tr>
<td>Speed [1/min]</td>
<td>0 - 60</td>
<td>0 - 175</td>
<td>0 - 150</td>
</tr>
<tr>
<td>Operating torque (0 - 1600 Hz) [Nm]</td>
<td>8</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Nominal torque [Nm]</td>
<td>--</td>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>Nominal holding torque (static load) [Nm]</td>
<td>14</td>
<td>3.9</td>
<td>4</td>
</tr>
<tr>
<td>Min. step (positional accuracy) [arcmin]</td>
<td>3.5</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

* Values for half-step operation

Dimensioned drawings

<table>
<thead>
<tr>
<th></th>
<th>Length L for step</th>
<th>Length L for DC servo</th>
</tr>
</thead>
<tbody>
<tr>
<td>closed design</td>
<td>129 mm</td>
<td>180 mm</td>
</tr>
<tr>
<td>closed with installation plate</td>
<td>133 mm</td>
<td>184 mm</td>
</tr>
</tbody>
</table>

made by isel
Rotary unit

**Features**
- Low play toothed belt drive with Stepper motor
- Reduction 1 : 30
- Shaft with Ø 15 mm boring
- Housing flange with inner cone SK 20
- Weight: 2,9 kg

For pin assignment see page C122
For transport loads, see page C123

**Options:**
- CNC controller via Sub D

**Technical specification**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stepper motor MS 045 HT</td>
<td></td>
</tr>
<tr>
<td>Reduction ratio</td>
<td>1:30</td>
</tr>
<tr>
<td>Speed [1/min]</td>
<td>0 - 40</td>
</tr>
<tr>
<td>Operating torque [0 - 1600 Hz] [Nm]</td>
<td>12</td>
</tr>
<tr>
<td>Nominal holding torque [static load] [Nm]</td>
<td>20</td>
</tr>
<tr>
<td>Min. step [positional accuracy] [arcmin]</td>
<td>2.5</td>
</tr>
</tbody>
</table>

* Values for half-step operation

**Accessories**

- **Chuck assembly**
  - 3-jaw chuck Ø 65
  - Part no.: 269060 2065*
  - Including flange

- **Chuck assembly**
  - 3-jaw chuck Ø 80
  - Part no.: 269060 3080*

- **Collet holder**
  - Collet holder SK 20 for tools Ø 5 - 13 mm, with installation ring
  - Part no.: 239172 0001
  - Collets are on page E 27.

- **Tailstock unit RE-ZD30**
  - 200 mm Part no.: 269 100 1060 L 331
  - 300 mm Part no.: 269 100 1070 L 431
  - 400 mm Part no.: 269 100 1080 L 531
  - 500 mm Part no.: 269 100 1090 L 631
Rotary unit

Dimensioned drawing

Tailstock unit RE-ZD30

ZD 30

made by isel®

Rotation units | MECHANICS C119
**Indexing table**

**Features**
- Low play toothed belt drive with stepper motor
- Reduction 1 : 20
- Shaft with Ø 15 mm boring
- Housing flange with inner cone SK 20
- Weight: 2,1 kg

For pin assignment see page C122
For transport loads, see page C123

**Options:**
- CNC controller via Sub D

**Collet holder SK 20**
(Options)

---

**Ordering data**

Indexing table ZR 20
Part no.: **260300 0000**

---

**Technical specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction ratio</td>
<td>1:20</td>
</tr>
<tr>
<td>Speed [1/min]</td>
<td>0 - 60</td>
</tr>
<tr>
<td>Operating torque (0 - 1600 Hz) [Nm]</td>
<td>8</td>
</tr>
<tr>
<td>Nominal holding torque (static load) [Nm]</td>
<td>14</td>
</tr>
<tr>
<td>Min. step (positional accuracy) [arcmin]</td>
<td>3.5</td>
</tr>
</tbody>
</table>

* Values for half-step operation

---

**Accessories**

see rotary / swivel unit

---

**Dimensioned drawing**

---

*Made by isel*
Rotary / swivel unit

**ZDS 2030**

**General**

The **rotary tilting unit ZDS 2030** can be used as a 4th/5th axis in CNC machines for fine workshops or in the handling area.

It is a combination of ZD 30 and the modified version of ZR 20.

ZDS 2030 enables 5-side machining or free-form surface machining on a conventional 3-axis system of easily machinable materials (e.g. plastic).

The tilting angle is **139°** in both directions.

---

**Ordering data**

Rotary / swivel unit ZDS 2030  
Part no.: **265000 0000**

**Accessories**

- **Chuck assembly**
  - 3-jaw chuck Ø 65  
  - Part no.: **269060 2065***
  - * including flange

- **Collet holder**
  - SK 20 collet holder for tools Ø 3 - 13 mm, with installation ring  
  - Part no.: **239172 0001**
  - Collets are on page E 29.

---

**Dimensioned drawing**

[Diagram of the rotary swivel unit ZDS 2030]
### Motor pin assignments

#### Pin assignment for 12-pin stepper motors (for RDH, DSH-S)

**Motor connection**

- **M23 12-pin Pin**
  1. Motor phase 1A
  2. Motor phase 1B
  3. Motor phase 2A
  4. Motor phase 2B
  5. +24V switch
  6. +24V brake
  7. GND switch
  8. GND brake
  9. Limit switch 1
 10. Limit switch 2
 11. ---
 12. ---
Housing – cable shield

**View of pin insert at the insertion side**

#### Pin assignment for 9-pin stepper motors (for RF1, iZD 54, MD 1, ZD 30, ZR 20, ZDS 2030)

**Motor connection**

- **M23 9-pin (8+1) Pin**
  1. Motor phase 1 (U+)
  2. Motor phase 1 (U-)
  3. Motor phase 1 (U+) *
  4. Motor phase 1 (U-) *
  5. +24V brake
  6. GND brake
  7. ---
  8. ---
  9. Earthing lead
Housing – cable shield

**View of pin insert at the insertion side**

#### Pin assignment for stepper motors with encoder (for RDH)

**Motor connection**

- **M23 12-pin Pin**
  1. Motor phase 1A
  2. Motor phase 1B
  3. Motor phase 2A
  4. Motor phase 2B
  5. +24V switch
  6. +24V brake
  7. GND switch
  8. GND brake
  9. Limit switch 1
 10. Limit switch 2
 11. ---
 12. ---
Housing – cable shield

**Encoder connection**

- **Sub-D 9-pin Pin**
  1. +5V encoder
  2. Encoder track A
  3. Encoder track Z
  4. Encoder track B
  5. ---
  6. GND encoder
  7. Encoder track A
  8. Encoder track B
  9. Encoder track Z
Housing – cable shield

**View of pin insert at the insertion side**

#### Pin assignment for brushed DC servo motors (BDC)

**Motor connection**

- **M23 9-pin (8+1) Pin**
  1. Motor phase 1 (U+)
  2. Motor phase 1 (U-)
  3. Motor phase 1 (U+)*
  4. Motor phase 1 (U-) *
  5. +24V brake
  6. GND brake
  7. ---
  8. ---
  9. Earthing lead
Housing – cable shield

**Encoder connection**

- **Sub-D 15-pin Pin**
  1. ---
  2. +5V encoder / Hall
  3. Encoder track Z
  4. Encoder track B
  5. Encoder track A
  6. +24V switch
  7. Limit switch 1
  8. GND switch
  9. ---
 10. GND encoder
 11. Encoder track Z
 12. Encoder track B
 13. Encoder track A
 14. Reference switch
 15. Limit switch 2
Housing – cable shield

**View of pin insert at the insertion side**

#### Pin assignment for brushless EC servo motors (BLDC)

**Motor connection**

- **Sub-D 9-pin Pin**
  1. Motor phase U
  2. Motor phase V
  3. Motor phase W
  4. ---
  5. +24V brake
  6. GND brake
  7. ---
  8. ---
  9. Earthing lead
Housing – cable shield

**Encoder connection**

- **Sub-D 15-pin Pin**
  1. Hall signal A
  2. +5V encoder / Hall
  3. Encoder track Z
  4. Encoder track B
  5. Encoder track A
  6. +24V switch
  7. Limit switch 1
  8. GND switch
  9. Hall signal B
 10. GND encoder
 11. Encoder track Z
 12. Encoder track B
 13. Encoder track A
 14. Hall signal C
 15. Limit switch 2
Housing – cable shield

**View of pin insert at the insertion side**

---

*Motor phases are connected partially over 2 wires.*
### Rotary- / swivel- / Rotation units

#### Transport loads, machining forces, feed

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDH-M (step)</td>
<td>100 kg</td>
<td>45 kg</td>
<td>55 Nm</td>
<td>24 Nm</td>
<td>24 Nm</td>
<td>4 l/min.</td>
<td>1:51</td>
</tr>
<tr>
<td>RDH-M (step)</td>
<td>160 kg</td>
<td>70 kg</td>
<td>108 Nm</td>
<td>45 Nm</td>
<td>45 Nm</td>
<td>2 l/min.</td>
<td>1:101</td>
</tr>
<tr>
<td>RDH-M (brushless EC-servo)</td>
<td>110 kg</td>
<td>50 kg</td>
<td>26 Nm</td>
<td>9 Nm</td>
<td>9 Nm</td>
<td>22 l/min.</td>
<td>1:51</td>
</tr>
<tr>
<td>RDH-M (brushless EC-servo)</td>
<td>180 kg</td>
<td>80 kg</td>
<td>51 Nm</td>
<td>17 Nm</td>
<td>17 Nm</td>
<td>11 l/min.</td>
<td>1:101</td>
</tr>
<tr>
<td>RDH-S (Step)</td>
<td>30 kg</td>
<td>15 kg</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>4 l/min.</td>
<td>1:51</td>
</tr>
<tr>
<td>RDH-S (Step)</td>
<td>48 kg</td>
<td>24 kg</td>
<td>11 Nm</td>
<td>11 Nm</td>
<td>11 Nm</td>
<td>2 l/min.</td>
<td>1:101</td>
</tr>
<tr>
<td>RDH-S (brushless EC-servo)</td>
<td>30 kg</td>
<td>15 kg</td>
<td>7 Nm</td>
<td>4.6 Nm</td>
<td>4.6 Nm</td>
<td>22 l/min.</td>
<td>1:51</td>
</tr>
<tr>
<td>RDH-S (brushless EC-servo)</td>
<td>48 kg</td>
<td>24 kg</td>
<td>11 Nm</td>
<td>4.6 Nm</td>
<td>9.2 Nm</td>
<td>11 l/min.</td>
<td>1:101</td>
</tr>
<tr>
<td>RDH-S (DC-Servo)</td>
<td>25 kg</td>
<td>13 kg</td>
<td>7 Nm</td>
<td>4.6 Nm</td>
<td>4.6 Nm</td>
<td>22 l/min.</td>
<td>1:51</td>
</tr>
<tr>
<td>RDH-S (DC-Servo)</td>
<td>40 kg</td>
<td>20 kg</td>
<td>11 Nm</td>
<td>8.7 Nm</td>
<td>8.7 Nm</td>
<td>11 l/min.</td>
<td>1:101</td>
</tr>
<tr>
<td>RDH-XS (Step)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>24 l/min.</td>
<td>1:50</td>
</tr>
<tr>
<td>RDH-XS (Step)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>12 l/min.</td>
<td>1:100</td>
</tr>
<tr>
<td>RDH-XS (brushless EC-Servo)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>59 l/min.</td>
<td>1:50</td>
</tr>
<tr>
<td>RDH-XS (brushless EC-Servo)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>30 l/min.</td>
<td>1:100</td>
</tr>
<tr>
<td>RDH-XS (DC-Servo)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>5 Nm</td>
<td>70 l/min.</td>
<td>1:50</td>
</tr>
<tr>
<td>RDH-XS (DC-Servo)</td>
<td>30 kg</td>
<td>10 kg</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>7 Nm</td>
<td>35 l/min.</td>
<td>1:100</td>
</tr>
<tr>
<td>RF 1 (Step)</td>
<td>60 kg</td>
<td>30 kg</td>
<td>37 Nm</td>
<td>17.5 Nm</td>
<td>17.5 Nm</td>
<td>50 l/min.</td>
<td>1:24</td>
</tr>
<tr>
<td>RF 1 (Step)</td>
<td>100 kg</td>
<td>50 kg</td>
<td>75 Nm</td>
<td>38 Nm</td>
<td>38 Nm</td>
<td>23 l/min.</td>
<td>1:52</td>
</tr>
<tr>
<td>RF 1 (Step)</td>
<td>150 kg</td>
<td>75 kg</td>
<td>75 Nm</td>
<td>75 Nm</td>
<td>75 Nm</td>
<td>12 l/min.</td>
<td>1:100</td>
</tr>
<tr>
<td>RF 1 (DC-Servo / EC Servo)</td>
<td>70 kg</td>
<td>35 kg</td>
<td>7 / 12 Nm</td>
<td>6 / 10 Nm</td>
<td>6 / 10 Nm</td>
<td>125 U/min.</td>
<td>1:24</td>
</tr>
<tr>
<td>RF 1 (DC-Servo / EC Servo)</td>
<td>110 kg</td>
<td>55 kg</td>
<td>16 / 26 Nm</td>
<td>13 / 22 Nm</td>
<td>13 / 22 Nm</td>
<td>58 U/min.</td>
<td>1:52</td>
</tr>
<tr>
<td>RF 1 (DC-servo / EC servo)</td>
<td>160 kg</td>
<td>80 kg</td>
<td>30 / 50 Nm</td>
<td>25 / 42 Nm</td>
<td>25 / 42 Nm</td>
<td>30 U/min.</td>
<td>1:100</td>
</tr>
<tr>
<td>MD 1 (Step)</td>
<td>5 kg</td>
<td>2.5 kg</td>
<td>14 Nm</td>
<td>8 Nm</td>
<td>8 Nm</td>
<td>60 U/min.</td>
<td>1:20</td>
</tr>
<tr>
<td>MD 1 (DC servo)</td>
<td>6 kg</td>
<td>3 kg</td>
<td>3.9 Nm</td>
<td>3 Nm</td>
<td>3 Nm</td>
<td>175 U/min.</td>
<td>1:20</td>
</tr>
<tr>
<td>MD 1 (brushless EC-servo)</td>
<td>6 kg</td>
<td>3 kg</td>
<td>4 Nm</td>
<td>3.2 Nm</td>
<td>3.2 Nm</td>
<td>150 U/min.</td>
<td>1:20</td>
</tr>
<tr>
<td>ZR 20 (step)</td>
<td>10 kg</td>
<td>5 kg</td>
<td>14 Nm</td>
<td>8 Nm</td>
<td>8 Nm</td>
<td>60 U/min.</td>
<td>1:20</td>
</tr>
<tr>
<td>ZD 30 (Step)</td>
<td>14 kg</td>
<td>8 kg</td>
<td>20 Nm</td>
<td>12 Nm</td>
<td>12 Nm</td>
<td>40 U/min.</td>
<td>1:30</td>
</tr>
<tr>
<td>IZD 54</td>
<td>30 kg</td>
<td>15 kg</td>
<td>48 Nm</td>
<td>30 Nm</td>
<td>30 Nm</td>
<td>22 U/min.</td>
<td>1:54</td>
</tr>
</tbody>
</table>

*) Guideline values, which will vary according to the use.
SOFTWARE

Software and
control organization.......................... D2

CAD/CAM software
isy-CAM 2.5 PLUS ................................ D4

Interpreter software
Remote ............................................. D5

Programming software
ProNC ............................................. D6
PAL-PC 2.1 ........................................ D7
Software and controller organisation

Multiple axis step motor controllers:
- IMC 4
- iMC-P
- iMC-S8

Single axis controllers:
- MC 1-10 (DC servo)
- MC 1-20 (EC servo)
- IT 116 Flash (Step)

isy-CAM 2.5 PLUS / 3.2 incl. Remote with Import-Filter

PAL-PC 2.1
@ format download for CNC mode

ProNC
Automation technology
PAL-/DIN-/NCP data

CAD/CAM Software
Operating and programming software (text format)
Operating and programming software (graphics format)
Interpreter software
DLL concept
Hardware

NCP format
Software and controller organisation

- CAD-CAM system with ISO post processor
  - ISO format (G-code)
- Remote
  - Output program for:
    - NCP data
    - ISO data
- LabVIEW®
  - VI library...for custom Labview projects

Motion Control / IO / Spindle / Tool Change DLL for

Windows

2000 / XP / VISTA / Win 7

- CAN-PCI board
- 1 or 2 channels
- CAN modules
  - iMD 10/20/30/40, CAN-I/O, iSM 5
- CAN controllers
  - iMC-DC / EC
  - iPU-DC / EC
General
With isy-CAM 2.5 PLUS the customer is provided with a Windows®-based CAD/CAM package. It provides a comprehensive solution from design to production with CNC machines.

The software package provided is ideal for entry into the CAD/CAM world. Operation is "windows-like", via graphic menus and dialogue boxes.

The CAD component includes all necessary features for design in the 2D area. With the CAM component, processing data for the machine controller can be generated simply and quickly - directly from the design data. This processing data can then be output directly with the integrated operating and output software Remote to the CNC machine or controller.

Post-processor features
- Tool list with selection and instructions for the tool geometry
- Immersion versions/start-up strategy
- automatic residual material treatment
- clockwise/reverse running
- Measurement/undersize machining
- Calculation tolerances
- Tool track separation
- Any setting of the processing sequence for technology blocks
- Post-processor run to generate NCP data for 3 axes (X/Y/Z) or cylindrical jacket area with a 4th axis (spindle)

Features
- freely definable line types and colours
- integrated online help, configurable interface
- parallel and independent working on several drawings
- Geometric element such as points, lines, ellipses, circles, curves (polygons, splines, Bezier curves, NURBS), polygons and many more.
- direct use of Windows scripts
- professional counting and text preparation features
- Hatching, freely definable hatching types
- automatic arrangement and alignment features
- Sketching outlines and changing them interactively
- numeric input options for absolute, relative and polar coordinates
- Import: DXF, HPGL, AI, EPS, TIFF, BMP, NC, NCP
- Export: DXF, HPGL, AI, WMF, EMF, TIFF, JPG, BMP
- extensive DIN/ISO-compliant measuring and dimensioning features
- Trim, separate and drag curves, Conversions of various geometry types
- Geometry manipulation by moving and copying as translation, rotation, scaling, mirror imaging
- intelligent object snapping
- optimum checking of the computed NCP data through integrated online simulation of the tool tracks
- Generation of processing data for all typical 2D and 2.5D production tasks
- Option: 3D version to order

Ordering information
Part no.: Z13-337030
isy-CAM 2.5 PLUS

Part no.: Z13-337030-0001
Update isy-CAM 2.5 light to isy-CAM 2.5 PLUS

Part no.: Z13-337030-1000
Second licence on isy-CAM 2.5 PLUS

isy-CAM 2.5 PLUS

a complete package with:
• 2D-CAD/Design
• 2.5D-CAM up to 3+1 axes
• integrated machine controller
• Service