ELECTRONICS

Motors ......................... B4
Sensors ......................... B12
Controllers .................... B14
### Overview

#### Two-phase step motors

<table>
<thead>
<tr>
<th>Models</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 135HT-2</td>
<td>B 4</td>
</tr>
<tr>
<td>MS 200HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 300HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 600HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 900HT-2</td>
<td></td>
</tr>
</tbody>
</table>

#### DC servomotors

- with brushes
- DC 100
- DC 300

#### EC servomotors

- brushless
- EC 60
- EC 86

#### Linear motors

<table>
<thead>
<tr>
<th>Models</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 135HT-2</td>
<td>B 4</td>
</tr>
<tr>
<td>MS 200HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 300HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 600HT-2</td>
<td></td>
</tr>
<tr>
<td>MS 900HT-2</td>
<td></td>
</tr>
</tbody>
</table>

#### Magnetic length measuring system

<table>
<thead>
<tr>
<th>Models</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>iLM 25</td>
<td>B 10</td>
</tr>
<tr>
<td>iLM 50</td>
<td></td>
</tr>
</tbody>
</table>

#### CNC control panels

<table>
<thead>
<tr>
<th>Models</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>iMS 10</td>
<td>B 14</td>
</tr>
</tbody>
</table>

#### Drive modules

- for 2-phase step motors
- MD 24/28

#### Drive controllers

<table>
<thead>
<tr>
<th>Models</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>iMD 10/20</td>
<td>B 15</td>
</tr>
<tr>
<td>iMD 30/40</td>
<td></td>
</tr>
</tbody>
</table>
## Overview

### Motion kits
- PM 20 S/L
- PM 40 S

### PC controller
- CPC 12

### CAN PCI board
- iPC 15

### CAN controller components
- CAN I-O modules
- CPC 12

### Step controllers
- Single axis controller
  - IT 116 Flash

### Step controllers
- Multiple axis controller
  - IMC-P
  - IMC-SB

### Servo controller
- Single axis controller
  - MC 1-10
  - MC 1-20

### Servo controller
- Multiple axis controller
  - iMC-DC / iMC-EC
  - iPU-DC / iPU-EC

### CAN-CNC controller
- Overview
Two-phase step motors

Features
- Step angle 1.8°, higher resolution through microstep mode
- Very high torque through rare earth magnets
- Optimised for use with position controllers
- Optimum torque/size ratio
- Smaller step angle errors, non-cumulative
- IP43 protection class
- Optional:
  - MD 24 drive module
  - Brake (MS 200 HT)
  - Second shaft end (MS 200 HT)

General
Two-phase step motors behave similarly to synchronous motors. They are easy to control and are characterised by very long working life and reliability, at a favourable price. This results in a wide range of applications. Two-phase step motors in the MS range are of the high torque type. A particularly high torque is achieved by the use of rare earth magnets.

Technical specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Holding moment (Nm)</th>
<th>Winding current per phase (A)</th>
<th>Winding voltage per phase (V)</th>
<th>Winding inductance (mH)</th>
<th>Weight (kg)</th>
<th>Length (mm)</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 135 HT-2</td>
<td>1.1</td>
<td>3.0</td>
<td>2.4</td>
<td>2.4</td>
<td>0.7</td>
<td>56</td>
<td>470551</td>
</tr>
<tr>
<td>MS 200 HT-2</td>
<td>1.8</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>1.0</td>
<td>76</td>
<td>470581</td>
</tr>
<tr>
<td>MS 200 HT-2 (2nd shaft end)</td>
<td>1.8</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>1.1</td>
<td>76</td>
<td>470581 0100</td>
</tr>
<tr>
<td>MS 200 HT-2 (brake)</td>
<td>1.8</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>1.8</td>
<td>76</td>
<td>470581 0200</td>
</tr>
</tbody>
</table>

Wiring diagram

Torque curves

Subject to technical changes.
Two-phase step motors

### MS 300/600/900 HT-2

#### Features
- Step angle 1.8°, higher resolution through microstep mode
- Very high torque through rare earth magnets
- Optimised for use with position controllers
- Optimum torque/size ratio
- B-lead connection
- Smaller step angle errors, non-cumulative
- IP43 protection class
- Optional: MD 28 drive module

#### General

Two-phase step motors behave similarly to synchronous motors. They are easy to control and are characterised by very long working life and reliability, at a favourable price. This results in a wide range of applications. Two-phase step motors in the MS range are of the high torque type. A particularly high torque is achieved by the use of rare earth magnets.

#### Technical specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Holding torque Nm</th>
<th>Winding current per phase A</th>
<th>Winding voltage per phase V</th>
<th>Winding inductance mH</th>
<th>Weight kg</th>
<th>Length (without shaft) mm</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 300 HT - 2</td>
<td>3.11</td>
<td>5.6 / 2.8</td>
<td>1.68 / 3.38</td>
<td>1.6</td>
<td>2.0</td>
<td>66</td>
<td>470821</td>
</tr>
<tr>
<td>MS 600 HT - 2</td>
<td>6.80</td>
<td>7.0 / 3.5</td>
<td>2.28 / 4.55</td>
<td>2.4</td>
<td>3.0</td>
<td>98</td>
<td>470851</td>
</tr>
<tr>
<td>MS 900 HT - 2</td>
<td>9.00</td>
<td>6.3 / 3.1</td>
<td>2.84 / 5.67</td>
<td>4.2</td>
<td>4.5</td>
<td>126</td>
<td>470881</td>
</tr>
</tbody>
</table>

#### Wiring diagram

#### Dimensioned drawing

#### Torque curves

Subject to technical changes.
Servomotors

with brush drive

DC 100

Features

- Servomotor with brushes
- Low-resistance winding construction
- Good dynamic response
- Two-finger brush (long working life)
- Incremental encoder with 512 pulses/turn (optional for DC 300: 1,000 pulses/turn)
- IP43 protection class/IP50 encoder

General

DC servomotors with brushes are the entry into the controlled drive technology class. They have good dynamic response and have proved themselves in drive systems. The attached encoder enables precise positioning. This predestines their use in CNC machines and in automation systems.

Technical specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Voltage V</th>
<th>No-load speed rpm</th>
<th>No-load current A</th>
<th>Rated speed rpm</th>
<th>Rated torque Ncm</th>
<th>Rated current A</th>
<th>Rated output W</th>
<th>Peak current A</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 100</td>
<td>48</td>
<td>3,400</td>
<td>0.25</td>
<td>3,000</td>
<td>30</td>
<td>2.8</td>
<td>95</td>
<td>6.5</td>
<td>471022 0020</td>
</tr>
</tbody>
</table>

Dimensioned drawings

Pin assignments

<table>
<thead>
<tr>
<th>Cable coding</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire colour</td>
<td>Black</td>
<td>Red</td>
<td>Green</td>
<td>Brown</td>
<td>Grey</td>
<td>White</td>
<td>Yellow</td>
<td>Orange</td>
</tr>
<tr>
<td>Driver output</td>
<td>0V</td>
<td>Vcc</td>
<td>SIG A</td>
<td>SIG A</td>
<td>SIG B</td>
<td>SIG B</td>
<td>SIG Z</td>
<td>SIG Z</td>
</tr>
</tbody>
</table>
Servomotors with brush drive

DC 300

Features

- Servomotor with brushes
- Low-resistance winding construction
- Good dynamic response
- Two-finger brush (long working life)
- Incremental encoder with 512 pulses/turn (optional for DC 300: 1,000 pulses/turn)
- IP43 protection class/IP50 encoder

General

DC servomotors with brushes are the entry into the controlled drive technology class. They have a good dynamic response and have proved themselves in drive systems. The attached encoder enables precise positioning. This predestines their use in CNC machines and in automation systems.

Technical specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Voltage V</th>
<th>No-load speed rpm</th>
<th>No-load current A</th>
<th>Rated speed rpm</th>
<th>Rated torque Ncm</th>
<th>Rated current A</th>
<th>Rated output W</th>
<th>Peak current A</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 300</td>
<td>48</td>
<td>3,200</td>
<td>1</td>
<td>3,000</td>
<td>100</td>
<td>9</td>
<td>315</td>
<td>20</td>
<td>471024</td>
</tr>
</tbody>
</table>

Dimensioned drawings

Pin assignments

<table>
<thead>
<tr>
<th>Cable coding</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire colour</td>
<td>Black</td>
<td>Red</td>
<td>Green</td>
<td>Brown</td>
<td>Grey</td>
<td>White</td>
<td>Yellow</td>
<td>Orange</td>
</tr>
<tr>
<td>Driver output</td>
<td>0V</td>
<td>Vcc</td>
<td>SIG A</td>
<td>SIG Â</td>
<td>SIG B</td>
<td>SIG B</td>
<td>SIG Z</td>
<td>SIG Ž</td>
</tr>
</tbody>
</table>

Subject to technical changes.
**Motors**

### Servomotors with brushless drive

**EC 60**

#### Features
- Electronically commutated 3-phase servomotor
- Brushless drive
- High output performance concurrently with compact build
- Incremental measuring system
- Hall sensors
- IP44 protection class
- Uses: Positioning controllers, speed control
- Connection via circular plug
- Option: Brake

#### General
Brushless EC motors are designed as electronically switched 3-phase synchronous motors. Compared with brush drives, these motors have an even longer working life, because they are subjected to less wear. Moreover, in this case, high power density and dynamic response relative to size must be emphasized. These motors are used in many automation technology areas and in CNC machines.

#### Technical specification

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Description</th>
<th>Rated output W</th>
<th>Rated voltage V DC</th>
<th>Current A</th>
<th>Number of poles</th>
<th>Rated speed rpm</th>
<th>Torque at rated speed Nm</th>
<th>Peak torque Nm</th>
<th>Length L (mm)</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>474156 0048</td>
<td>EC 60S</td>
<td>156</td>
<td>48</td>
<td>6.9</td>
<td>8</td>
<td>3,000</td>
<td>0.5</td>
<td>1.75</td>
<td>73</td>
<td>1.25</td>
</tr>
<tr>
<td>474156 1048</td>
<td>EC 60S with brake</td>
<td>156</td>
<td>48</td>
<td>6.9</td>
<td>8</td>
<td>3,000</td>
<td>0.5</td>
<td>1.75</td>
<td>73</td>
<td>2.0</td>
</tr>
<tr>
<td>474235 0048</td>
<td>EC 60L</td>
<td>235</td>
<td>48</td>
<td>10.5</td>
<td>8</td>
<td>3,000</td>
<td>0.75</td>
<td>2.25</td>
<td>94</td>
<td>1.6</td>
</tr>
<tr>
<td>474235 0310</td>
<td>EC 60L</td>
<td>235</td>
<td>310</td>
<td>1.6</td>
<td>8</td>
<td>3,000</td>
<td>0.75</td>
<td>2.25</td>
<td>94</td>
<td>1.6</td>
</tr>
<tr>
<td>474235 1310</td>
<td>EC 60L with brake</td>
<td>235</td>
<td>310</td>
<td>1.6</td>
<td>8</td>
<td>3,000</td>
<td>0.75</td>
<td>2.25</td>
<td>94</td>
<td>2.35</td>
</tr>
</tbody>
</table>

#### Dimensioned drawings

- Motor cable 3x 0.5, L = 300 mm
- Encoder cable 4x 0.14, L = 300 mm

#### Pin assignments

<table>
<thead>
<tr>
<th>Pins</th>
<th>Colour</th>
<th>Signal</th>
<th>Pins</th>
<th>Colour</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yellow</td>
<td>HALU_A_IN</td>
<td>9</td>
<td>white</td>
<td>HALU_B_IN</td>
</tr>
<tr>
<td>2</td>
<td>red</td>
<td>VDC_Encoder</td>
<td>10</td>
<td>black</td>
<td>GND_Encoder</td>
</tr>
<tr>
<td>3</td>
<td>orange/black</td>
<td>ENC_Z</td>
<td>11</td>
<td>orange</td>
<td>ENC_Z</td>
</tr>
<tr>
<td>4</td>
<td>brown/black</td>
<td>ENC_B</td>
<td>12</td>
<td>brown</td>
<td>ENC_B</td>
</tr>
<tr>
<td>5</td>
<td>grey/black</td>
<td>ENC_A</td>
<td>13</td>
<td>grey</td>
<td>ENC_A</td>
</tr>
<tr>
<td>6</td>
<td>--</td>
<td>--</td>
<td>14</td>
<td>green</td>
<td>HALU_D_IN</td>
</tr>
<tr>
<td>7</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Motor cable**
- Colour: yellow, blue, green
- Signal: motor U, V, W

Subject to technical changes.
Servomotors with brushless drive

EC 86

Features
- Electronically commutated 3-phase servomotor
- Brushless drive
- High output performance concurrently with compact build
- Incremental measuring system
- Hall sensors
- IP44 protection class
- Uses: Positioning controllers, speed control
- Connection via circular plug
- Option: Brake

General
Brushless EC motors are constructed as electronically switched 3-phase synchronous motors. Compared with brush drives, these motors have an even longer working life, because they are subjected to less wear. Moreover, in this case, high power density and dynamic response relative to size must be emphasized. These motors are used in many automation technology areas and in CNC machines.

Technical specification

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Description</th>
<th>Rated output W</th>
<th>Rated voltage V DC</th>
<th>Current A</th>
<th>Number of poles</th>
<th>Rated speed rpm</th>
<th>Torque at rated speed Nm</th>
<th>Peak torque Nm</th>
<th>Length L mm</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>474440 0310</td>
<td>EC 86S</td>
<td>440</td>
<td>310</td>
<td>3.4</td>
<td>8</td>
<td>3,000</td>
<td>1.4</td>
<td>5.0</td>
<td>100</td>
<td>2.6</td>
</tr>
<tr>
<td>474660 0310</td>
<td>EC 86L</td>
<td>660</td>
<td>310</td>
<td>3.6</td>
<td>8</td>
<td>3,000</td>
<td>2.1</td>
<td>7.4</td>
<td>125</td>
<td>4</td>
</tr>
</tbody>
</table>

Dimensioned drawings

Encoder cable 14x 0.14, L = 300 mm
Motor cable 3x 0.5, L = 300 mm

Pin assignments

<table>
<thead>
<tr>
<th>Pins</th>
<th>Colour</th>
<th>Signal</th>
<th>Pins</th>
<th>Colour</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yellow</td>
<td>HALU_A_IN</td>
<td>9</td>
<td>white</td>
<td>HALU_B_IN</td>
</tr>
<tr>
<td>2</td>
<td>red</td>
<td>VDC_Encoder</td>
<td>10</td>
<td>black</td>
<td>GND_Encoder</td>
</tr>
<tr>
<td>3</td>
<td>orange/black</td>
<td>ENC_z</td>
<td>11</td>
<td>orange</td>
<td>ENC_z</td>
</tr>
<tr>
<td>4</td>
<td>brown/black</td>
<td>ENC_B</td>
<td>12</td>
<td>brown</td>
<td>ENC_B</td>
</tr>
<tr>
<td>5</td>
<td>grey/black</td>
<td>ENC_A</td>
<td>13</td>
<td>grey</td>
<td>ENC_A</td>
</tr>
<tr>
<td>6</td>
<td>--</td>
<td></td>
<td>14</td>
<td>green</td>
<td>HALU_C_IN</td>
</tr>
<tr>
<td>7</td>
<td>--</td>
<td></td>
<td>15</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>--</td>
<td></td>
<td></td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

Motor cable

<table>
<thead>
<tr>
<th>Pins</th>
<th>Colour</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>yellow</td>
<td>Motor U</td>
<td></td>
</tr>
<tr>
<td>blue</td>
<td>Motor V</td>
<td></td>
</tr>
<tr>
<td>green</td>
<td>Motor W</td>
<td></td>
</tr>
</tbody>
</table>

Subject to technical changes.
**Linear motors**

**LS coil package with MS magnetic rail**

Diagram: LS 25 winding package with MS 25 magnetic rail

Diagram: LS 50 winding package

Diagram: MS 25 magnetic rail with 8 magnets

---

**Features**

- Ready-for-installation systems comprising primary part (LS winding package) and secondary part (MS magnetic rail)
- Compact build
- High acceleration
- High speed and dynamic response
- High efficiency
- Free from wear
- Custom motor length
- Secondary part (MS magnetic rail): Elements of any length, depending on their carrier system, can be arranged in rows
- Controllable with standard servo converters

**Optional:**

- iMD 40 drive controller (only in conjunction with Hall board)
- Magnetic length measurement system
- Linear guides

---

**General**

Linear motors in the iLM series are linear 3-phase servomotors of various sizes and any length at a favourable price/performance ratio. The optionally integrated Hall sensors provide the positional information for switching the motor. There is a PTC temperature sensor in the primary component to protect the motor. The electrical connections (Hall, windings and temperature sensor) are made via permanently installed cable. Owing to the direct power transfer, there is no need for any mechanical transfer elements, such as spindles and toothed belts which completely eliminates friction and play. This means that higher speeds and dynamic responses can be achieved. The resultant lower clocking times reduce production costs and increase productivity. Because there are no mechanical elements in the drive itself, noise, wear and the resultant maintenance costs are minimised. In comparison with other linear drives, drives with linear motors are more accurate, faster, free from play (without return play) and more robust.

---

**Ordering information**

**Winding package**

486 0XX 000X

- **Coil package**
  - 0 = LS 25
  - 1 = LS 50
- **Hall boards**
  - 0 = without Hall board
  - 1 = with Hall board
- **Number of coils**
  - 1 = 3 coils
  - 2 = 6 coils
  - 3 = 9 coils
  - 4 = 12 coils

**Magnetic rails**

- MS 25 magnetic rail with 8 magnets (L×W×H approx. 124/45/11 mm)
  - Part no.: 486100 01241
- MS 25 magnetic rail with 32 magnets (L×W×H approx. 496/45/11 mm)
  - Part no.: 486100 04961
- MS 50 magnetic rail with 8 magnets (L×W×H approx. 200/80/11 mm)
  - Part no.: 486110 0200
- MS 50 magnetic rail with 16 magnets (L×W×H approx. 400/80/11 mm)
  - Part no.: 486110 0400
- MS 50 magnetic rail with 32 magnets (L×W×H approx. 800/80/11 mm)
  - Part no.: 486110 0800

**Note:**

For the iMD 40 drive controller use coil packages with Hall boards only.

Any number of magnetic rails can be arranged with each other.

**Ordering example**

LS 25 coil package with 6 coils and Hall boards

+ 2 × MS 25 magnetic rails with 32 magnets
+ iMD 40 drive controller
+ iMS-I magnetic length measuring system (5 μm resolution)

Part no.: 486001 0002
Part no.: 486100 0496
Part no.: 314040
Part no.: 390255 4412

---

Subject to technical changes.
Linear motors
LS coil package with MS magnetic rail

Technical specification

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 25/6 coils</td>
<td>330</td>
<td>6</td>
<td>2.6</td>
<td>6.5</td>
<td>70</td>
<td>170</td>
<td>500</td>
<td>6.6</td>
</tr>
<tr>
<td>LS 25/12 coils</td>
<td>330</td>
<td>12</td>
<td>2.6</td>
<td>6.5</td>
<td>140</td>
<td>340</td>
<td>1,000</td>
<td>4.0</td>
</tr>
<tr>
<td>LS 50/6 coils</td>
<td>330</td>
<td>6</td>
<td>6.0</td>
<td>15.0</td>
<td>285</td>
<td>675</td>
<td>1,995</td>
<td>5.1</td>
</tr>
<tr>
<td>LS 50/12 coils</td>
<td>330</td>
<td>12</td>
<td>6.0</td>
<td>15.0</td>
<td>570</td>
<td>1,350</td>
<td>3,990</td>
<td>3.5</td>
</tr>
</tbody>
</table>

* Higher intermediate circuit voltage to order.
** Applicable for a working air gap of 0.8 mm.

Dimensioned drawings

iLM 25 linear motor

<table>
<thead>
<tr>
<th></th>
<th>Length Lm [mm]</th>
<th>Length Ls [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 25 coil package; 6 coils</td>
<td>190</td>
<td>MS 25 stator (8 ×)</td>
</tr>
<tr>
<td>LS 25 coil package; 6 coils, with Hall</td>
<td>230</td>
<td>MS 25 stator (32 ×)</td>
</tr>
<tr>
<td>LS 25 coil package; 12 coils</td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>LS 25 coil package; 12 coils, with Hall</td>
<td>405</td>
<td></td>
</tr>
</tbody>
</table>

iLM 50 linear motor

<table>
<thead>
<tr>
<th></th>
<th>Length Lm [mm]</th>
<th>Length Ls [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 50 coil package; 6 coils</td>
<td>295</td>
<td>MS 50 stator (8 ×)</td>
</tr>
<tr>
<td>LS 50 coil package; 6 coils, with Hall</td>
<td>358</td>
<td>MS 50 stator (32 ×)</td>
</tr>
<tr>
<td>LS 50 coil package; 12 coils</td>
<td>547</td>
<td></td>
</tr>
<tr>
<td>LS 50 coil package; 12 coils, with Hall</td>
<td>610</td>
<td></td>
</tr>
</tbody>
</table>

Subject to technical changes.
iMS magnetic length measuring system

Features

- Measuring head with sensor in stable casing
- Reliable, robust, good value
- 2 channels, A and B,
  - Difference mode incremental RS 422 or
  - Difference mode analogue 1Vss
- Incremental/digital resolution (see table)
- Repeatability = ±1 increment
- Magnetic tape on self-adhesive, stainless steel bearer tape

optional:

- Reference pulse

General

The iMS contactless magnetic measuring system relies on scanning a magnetically coded measuring tape by means of a magnetically sensitive sensor and is suitable for detection of both linear and radial positions. A decisive advantage compared with significantly more expensive optical systems is provided by its insensitivity to contamination caused by liquids, greases and dust. Our length measuring system is therefore a cost-effective alternative to other systems on the market.

Available sensor interfaces for further processing in the peripherals are, optionally, a pulse sensor with incremental RS422 AB output (Z optional) and a SIN/COS(Z optional) sensor with voltage amplitude 1Vss.

Ordering information

iMS-I magnetic length measuring system
in casing
Resolution 5μm, edge interval 0.55 μs,
Processing speed 5.25 m/s
Part no.: 390255 4412

Magnetic tape on self-adhesive stainless steel bearer tape (2 mm pole pitch, 10 mm wide, 1.3 mm thick)
Part no.: 563150

Detailed information under www.isel-germany.de

Dimensioned drawing

Subject to technical changes.
# iMS magnetic length measuring system

## Technical specification

### Sensor

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical specification</strong></td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Weight</td>
<td>appr. 70 g</td>
</tr>
<tr>
<td>Sensor cable</td>
<td>PUR</td>
</tr>
<tr>
<td>Cable bending radius</td>
<td>&gt; 10 mm, first bend &gt; 10 mm from sensor casing</td>
</tr>
<tr>
<td><strong>Electronic data</strong></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>4.9V - 5.1V (optional: 7V - 15V)</td>
</tr>
<tr>
<td>Current drain</td>
<td>&lt; 100 mA on no load</td>
</tr>
<tr>
<td>Output signals</td>
<td>Standard RS422 A, /A, B, /B optional reference Z, /Z Option: SIN/ COS 1Vss +20%, -40%, Z and /Z right sign</td>
</tr>
<tr>
<td>Termination</td>
<td>Terminating resistor = 120 Ohm between corresponding output signals, e.g. A - /A, at receiver</td>
</tr>
<tr>
<td>Sensor distance - magnetic tape</td>
<td>0.4 - 0.7 mm</td>
</tr>
<tr>
<td>Sensor resolution incremental</td>
<td>1 μm, 2.5 μm, 5 μm, 10 μm, 20 μm</td>
</tr>
<tr>
<td>Pulse interval</td>
<td>0.25 μs, 0.55 ns, 1 μs, 2 μs, 4 μs, 8 μs</td>
</tr>
<tr>
<td>Analogue sensor resolution</td>
<td>Sinusoidal period length = 2 mm</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>&lt; 10 m/s, higher on request</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Incremental resolution ± 1 increment, plus errors due to angular tilting in the 3 sensor axes</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Measurement error 20 μm, plus errors due to angular tilting in the 3 sensor axes</td>
</tr>
<tr>
<td>Reference sequence</td>
<td>optional: NSN (special order)</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-5°C to 80°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to 100°C</td>
</tr>
<tr>
<td>Air humidity (only sensor)</td>
<td>100%, dewing allowed</td>
</tr>
</tbody>
</table>

### Normal measurement - magnetic strip

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>-5°C to 80°C</td>
</tr>
<tr>
<td>Material</td>
<td>High quality stainless steel, coding bearer elastomer, self-adhesive</td>
</tr>
<tr>
<td>Thickness</td>
<td>1.3 mm ± 0.15 mm + bonding layer 0.13 mm, optional: 0.1 mm stainless steel tape + bonding view 0.2 mm</td>
</tr>
<tr>
<td>Width</td>
<td>10 mm</td>
</tr>
<tr>
<td>Length</td>
<td>up to 50 m on roll</td>
</tr>
<tr>
<td>Pole pitch/PITCH</td>
<td>2 mm, i.e. north pole = 2 mm, south pole = 2 mm magnetic period = 4 mm</td>
</tr>
<tr>
<td>Number of tracks</td>
<td>Single track, 10 mm wide     Option: signal track 5 mm, reference track periodically 5 mm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.04 mm/m up to 50 m length, at 20°C</td>
</tr>
<tr>
<td>Coefficient of expansion</td>
<td>17E-6 m/Kelvin</td>
</tr>
<tr>
<td><strong>Ambient conditions</strong></td>
<td></td>
</tr>
<tr>
<td>with no or minimum effect on the measurement norm</td>
<td>Chemical resistance to contamination with motor oil, gearbox oil, ATF, hydraulic oil, kerosene, antifreeze, Clorox disinfectant, turpentine, water, brine. The materials listed have no or little effect on the long term stability of the measurement standard; among others, it depends on the concentration, the temperature and the time of the contamination. Please check your own case.</td>
</tr>
<tr>
<td>little/average effect on the measurement standard</td>
<td>Jet petrol, carburettor fuels, heptanes, alcohols</td>
</tr>
<tr>
<td>serious effect on the measurement standard</td>
<td>Aromatic hydrocarbons, ketones, inorganic acids</td>
</tr>
</tbody>
</table>

Subject to technical changes.
CNC control panels

General
CNC control panels are robust and powerful control units for an extensive range of applications in industrial automation and much more. A conventional external PC can be connected and operated with the standard connections provided. All CNC control panels come with an integrated touch screen monitor, a keyboard and a control panel with stainless steel keys and 2-channel emergency shutdown switch for operating CNC machines. The extensive range of installation options cater to both wall and bench mounting. Three different versions are available.

Ordering information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>19&quot; CNC control panel iBP 19-1, German silicon keyboard</td>
<td>Part no.: 371076 0102</td>
<td></td>
</tr>
<tr>
<td>19&quot; CNC control panel iBP 19-1, English silicon keyboard</td>
<td>Part no.: 371076 0112</td>
<td></td>
</tr>
<tr>
<td>19&quot; CNC control panel iBP 19-2, German steel keyboard</td>
<td>Part no.: 371077 0102</td>
<td></td>
</tr>
<tr>
<td>19&quot; CNC control panel iBP 19-2, English steel keyboard</td>
<td>Part no.: 371077 0112</td>
<td></td>
</tr>
<tr>
<td>Mounting arm for wall mounting iBP 19</td>
<td>Part no.: 371050 0003</td>
<td></td>
</tr>
<tr>
<td>Mounting arm for bench mounting</td>
<td>Part no.: 371050 0004</td>
<td></td>
</tr>
<tr>
<td>Stand iBP 19</td>
<td>Part no.: 371050 0005</td>
<td></td>
</tr>
<tr>
<td>Mounting arm for rack assembly iBP 19 on PS 80</td>
<td>Part no.: 371050 0009</td>
<td></td>
</tr>
<tr>
<td>Mounting arm for rack assembly iBP 19 on PS 100</td>
<td>Part no.: 371050 0010</td>
<td></td>
</tr>
<tr>
<td>Mounting arm for rack assembly iBP 19 on PS 140</td>
<td>Part no.: 371050 0008</td>
<td></td>
</tr>
</tbody>
</table>

Features

iBP 19-1
- 19" TFT touch screen display
- 102 keys, silicon keyboard (IP65) with integrated 2-key mouse pointer or mouse carrier plate fixed to the side
- Dimensions: 475 x D 501 x H 354 mm
- Weight: appr. 17.4 kg

iBP 19-2
- 19" TFT touch screen display
- 102 keys, stainless steel keyboard (IP65) with integrated 2-key trackball
- Dimensions: W 475 x T 501 x H 354 mm
- Weight: appr. 18.4 kg

Common features
- stable metal casing with aluminium front plate
- pivoted with wall and bench mounting
- simple connection of external PC systems
- Touch screen monitor
- robust and tamper-proof casing
- Control panel with stainless steel keys
- 2-channel emergency shutdown switch

Option:
- English keyboard

Subject to technical changes.
Drive modules
for 2-phase step motors

MD 24/28

Features
• High performance, low noise
• Power supply up to 50 V DC (80V DC)*
• Output current up to 4.2 A (7.8 A)*
• Automatic current reduction
• Suitable for 2-phase and 4-phase step motors
• Clocking/direction interface
• Input frequency for clocking input up to 300 KHz
• 15 (14)* selectable resolutions up to 25,600 steps/rev (51,200 steps/rev)*
• Opto-isolated, TTL-compatible inputs
• Protection against short-circuit, overvoltage and overcurrent

* MD 28

General
The step motor drive modules MD24/MD28 are powerful final stages for 2-phase and 4-phase step motors. The modules are micro-step capable and thus allow very quiet running of the connected motors. Due to its particular chopper technology for the motor current, identical motors can deliver higher speeds and torques than conventional comparable drive modules. The clocking/direction interface also allows simple connection to various motion controllers or a PLC.

Technical specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current</td>
<td>A</td>
<td>1.0</td>
<td></td>
<td>4.2 (3.0 A RMS)</td>
<td>2.8</td>
<td></td>
<td>7.8</td>
</tr>
<tr>
<td>Mains voltage</td>
<td>VDC</td>
<td>20</td>
<td>36</td>
<td>50</td>
<td>24</td>
<td>68</td>
<td>80</td>
</tr>
<tr>
<td>Current logic signals</td>
<td>mA</td>
<td>7</td>
<td>10</td>
<td>16</td>
<td>7</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Clocking input frequency</td>
<td>kHz</td>
<td>0</td>
<td></td>
<td>300</td>
<td>0</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>MQ</td>
<td>500</td>
<td></td>
<td></td>
<td>500</td>
<td></td>
<td>500</td>
</tr>
</tbody>
</table>

Part no. 316303 316304

Dimensioned drawings
General

The iMD10/20/30 series of drive controllers are economical final stages for DC motors (iMD10) and EC servomotors (iMD20) as well as for two-phase step motors (iMD30). The fully digital iMD40 drive controller is an economical final stage, powered directly from the mains, for EC servomotors (synchronous motors, such as linear or torque motors) up to 2 kW.

Typical applications are CNC machines and automation systems. The final stage casings are optimised for cabinet installation. The extensive configuration options allow flexible adaptation to a wide range of applications and all required settings can be made with a user-friendly commissioning software package.

There are various user interfaces available for integration with proprietary applications. Here, the CAN open interface must be emphasized. In addition to synchronous point-to-point positioning (S-PTP) and speed control, track control (CP - Continuous Path) and synchronised multiple axis applications are feasible using the implemented CANopen protocol DS402. Additional interfaces include a ±10V interface (nominal speed) and a RS232 interface. The iMD30 also has a clocking/direction interface.

Short controller cycle times (current, speed, position controller) ensure optimum performance for highly dynamic drives. The drive controllers are suitable both for rotary drives and for the corresponding linear direct drives and torque motors (iMD20 and iMD40). A redundant rest monitoring system has been integrated in the drive controller. It reduces work by the controller in external assemblies to a minimum and allows for convenient operation or use of the machine.

Subject to technical changes.
# Drive controllers
for multi-phase and servomotors

## iMD 10/20/30/40

### Technical specification

<table>
<thead>
<tr>
<th>Features</th>
<th>iMD 10</th>
<th>iMD 20</th>
<th>iMD 30</th>
<th>iMD 40</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor type</strong></td>
<td>Brush servomotors (DC)</td>
<td>Brushless servomotors (EC, BLDC)</td>
<td>Two-phase step motors (ST)</td>
<td>Brushless servomotors (DC, BLDC)</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>40-95 V DC</td>
<td>230V AC, mains, single phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motor current</strong></td>
<td>Constant current 12 A, peak current 25 A</td>
<td>Constant current 12 A</td>
<td>Constant current 6.5 A</td>
<td>Peak current 8 A</td>
</tr>
<tr>
<td><strong>CAN bus interface</strong></td>
<td>CANopen DS301 V4.0 and DS402 V1.0 der CiA (CAN in automation)</td>
<td>CANopen DS301 V4.0 and DS402 V1.0 of CiA (CAN in automation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RS-232 interface</strong></td>
<td>For commissioning (DcSetup.exe) or e.g. PLC connection; effective data transfer protocol</td>
<td>For commissioning (AcSetup.exe) or e.g. PLC connection; effective data transfer protocol</td>
<td>For commissioning (StepSetup.exe) or e.g. PLC connection; effective data transfer protocol</td>
<td>For commissioning (AcSetup.exe) or, e.g. PLC connection; effective data transfer protocol</td>
</tr>
<tr>
<td><strong>Measuring system</strong></td>
<td>Incremental encoder (RS422); max. input frequency: 1.25 MHz</td>
<td>--</td>
<td>--</td>
<td>Incremental encoder (RS422); max. input frequency: 1.25 MHz</td>
</tr>
<tr>
<td><strong>Commutation</strong></td>
<td>--</td>
<td>Hall sensor signals</td>
<td>--</td>
<td>Hall sensor signals</td>
</tr>
<tr>
<td><strong>Analogue input (+/-10V)</strong></td>
<td>11 bit resolution</td>
<td>11 bit resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PWM switching frequency</strong></td>
<td>max. 12.5 kHz</td>
<td>max. 16.4 kHz</td>
<td>max. 10.0 kHz</td>
<td>max. 16.4 kHz</td>
</tr>
<tr>
<td><strong>Inputs for limit and reference switches</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Digital current, speed and position control</strong></td>
<td>Scanning times: min. 80 μs/244 μs/ 488 μs for current/speed/position controllers</td>
<td>Scanning times: min. 61 μs/244 μs/ 488 μs for current/speed/position controllers</td>
<td>Scanning times: min. 100 μs for current controllers</td>
<td>Scanning times: min. 61μs/ 244 μs/488 μs for current/ speed/position controllers</td>
</tr>
<tr>
<td><strong>Brake controller</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Gantry mode or synchronous control</strong></td>
<td>of 2 modules, Master-Slave via CAN bus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring of the motor current</strong></td>
<td>Short circuit, I²t</td>
<td>Short circuit, I²t, Pulse-by-pulse</td>
<td>Short circuit</td>
<td>Short circuit, I²t, Pulse-by-pulse</td>
</tr>
<tr>
<td><strong>Monitoring of the encoder signals</strong></td>
<td>✓</td>
<td>✓</td>
<td>--</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Monitoring of the software by internal Watchdog timer</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Simple update of the firmware over RS-232</strong></td>
<td>Possible locally by customer or service engineer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rest state monitoring</strong></td>
<td>Redundancy to ISO standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>180 x 35 x 110 mm</td>
<td>180 x 35 x 120 mm</td>
<td>180 x 35 x 110 mm</td>
<td>180 x 50 x 150 mm</td>
</tr>
<tr>
<td><strong>Part no.</strong> Drive controllers</td>
<td>314 020</td>
<td>314 030</td>
<td>314 070</td>
<td>314 040</td>
</tr>
</tbody>
</table>

Subject to technical changes.
### Motion Kits

Motion kits comprise brushless servomotors including matching drive controller. Motion kits are suitable for use in the range of small to medium outputs up to 2 kW.

These servomotors are electronically switched 3-phase motors with incremental sensor and Hall sensors. They are available in 4 sizes (for details, see catalogue pages for EC 60S/L and EC 80S/L).

Both iMD20/40 controllers are designed for power supplies of 40-90V DC (iMD20) or 230V AC (iMD40).

As the interface for higher-level controllers, both the CANopen interface and an analogue ±10V interface can be used (for details, see catalogue pages for iMD20 and iMD40).

### Technical specification

<table>
<thead>
<tr>
<th>Motor Type</th>
<th>iMK 20S</th>
<th>iMK 20L</th>
<th>iMK 40S</th>
<th>iMK 40L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor type</td>
<td>EC 60 S</td>
<td>EC 60 L</td>
<td>EC 86 S</td>
<td>EC 86 L</td>
</tr>
<tr>
<td>Motor output [W]</td>
<td>157</td>
<td>235</td>
<td>440</td>
<td>660</td>
</tr>
<tr>
<td>Rated torque [Nm]</td>
<td>0.5</td>
<td>0.75</td>
<td>1.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Peak torque [Nm]</td>
<td>1.75</td>
<td>2.25</td>
<td>5.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Rated speed [rpm]</td>
<td>3,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder resolution [incr]</td>
<td>1,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>40-95 V DC</td>
<td>230 V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN bus interface</td>
<td>CANopen DS301, DS402 of CiA (CAN in automation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analogue input (±10V)</td>
<td>11 bit resolution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PWM switching frequency</td>
<td>8.2 kHz or 16.4 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current/speed/position controllers</td>
<td>Scanning times min 61 μs, 344μs, 488 μs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs for reference &amp; limit switches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gantry or synchronous operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor current monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring of encoder signals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watchdog</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td></td>
<td></td>
<td>Processor Power section, I/Os</td>
<td></td>
</tr>
<tr>
<td>Rest state monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive controller dimensions</td>
<td>180 x 35 x 120 mm</td>
<td>180 x 50 x 150 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part no. Drive controller and motor</td>
<td>317000 0002</td>
<td>317000 0003</td>
<td>317000 0004</td>
<td>317000 0005</td>
</tr>
<tr>
<td>Part no. Motor cable</td>
<td>392760 xxxx *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part no. Encoder cable</td>
<td>392740 xxxx *</td>
<td>392305 xxxx *</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Cable length in mm available in different lengths.
  e.g.: 0150 = 1.50 m  0200 = 2.00 m  0300 = 3.00 m  0500 = 5.00 m ... 1000 = 10.00 m

Subject to technical changes.
**PC controller**

**iPC 15**

### General

The iPC15 universal PC controller is a Windows- or Linux-compatible controller at a favourable price/performance ratio. Its versatile applications may be found throughout the entire industry sector and in various consumer sectors.

All connections are made on the front. A multifunctional panel provides many potential variations in the connection area.

Inter alia, a CAN interface with optionally 1 or 2 channels is available.

A remote interface is available for covered installation (e.g. in a cabinet or in the interior of a motor vehicle).

Installation is possible both in the “standing” and “lying” positions.

### Technical specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>iPC15 PC controller</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Intel® Atom N270</td>
</tr>
<tr>
<td><strong>Form factor mainboard</strong></td>
<td>Mini-ITX (half height)</td>
</tr>
<tr>
<td><strong>RAM</strong></td>
<td>DDR2 SO DIMM 1GB (up to 2GB)</td>
</tr>
<tr>
<td><strong>Hard disks (S-ATA)</strong></td>
<td>2.5” ≥ 160 GB</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>Intel GMA 950</td>
</tr>
<tr>
<td><strong>Monitor</strong></td>
<td>VGA/DVI-D</td>
</tr>
<tr>
<td><strong>Audio</strong></td>
<td>Realtek® ALC662 Audio Codec</td>
</tr>
<tr>
<td><strong>LAN</strong></td>
<td>10/100/1,000 Mbit LAN</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>12 V DC</td>
</tr>
<tr>
<td><strong>External connections</strong></td>
<td>3 × USB 2.0, LAN VGA, DVI-D Audio multifunction connection 12V DC power supply</td>
</tr>
<tr>
<td><strong>Internal interfaces</strong></td>
<td>1 × PCI (without CAN interface) 1 × mini PCI Express, 1 x IDE 2 × SATA (1 x with HDD) 4 × USB 2.0 (3 × with SSD), 1 × parallel interface, 2 × serial interface, 1 × PS/2, 1 × SPDIF</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>Max. 90% (not condensing)</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>0°C to 35°C</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP 20</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.1 kg</td>
</tr>
<tr>
<td><strong>Dimensions (W×H×D)</strong></td>
<td>200 x 50 x 190 mm</td>
</tr>
</tbody>
</table>

Subject to technical changes.

### Features

- Universal PC controller
- Robust, impact-proof aluminium casing
- Compact configuration
- Various installation options
- Energy-efficient and low noise
- Supply voltage 12V DC
- Front multifunctional panel for versatile connection options
- Design with hard disk or solid state disk (optional)
- Windows- and Linux-compatible

### Ordering information

**iPC15 PC controller**, CAN-PCI-1-channel, PCI riser board, serial, remote, including Windows, power supply unit and lead
Part no.: 371064 0005

**iPC15 PC controller**, CAN-PCI-2-channel, PCI riser board, serial, remote, including Windows, power supply unit and lead
Part no.: 371064 0006
CAN PCI board

### Technical specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>ICC 10/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>PCI V2.2 / 32 bit</td>
</tr>
<tr>
<td>CAN channels</td>
<td>1/2</td>
</tr>
<tr>
<td>galvanic isolation</td>
<td>✓</td>
</tr>
<tr>
<td>Data transfer rate</td>
<td>up to 1 Mbits/s</td>
</tr>
<tr>
<td>Plug</td>
<td>RJ45</td>
</tr>
</tbody>
</table>

**Block diagram CAN bus with iPC 15**

### Features

- Mechanical dimensions: 119.5 × 47.3 mm
- PCI-V2.2-compliant
- 32-bit, 33 MHz target interface chip
- 1 or 2 CAN channel RJ45 connector, screened
- CAN bus galvanically isolated
- Data transfer rate up to 1 Mbits/s
- Drivers for NT/2000/XP/Vista
- Driver for isel-CAN-CNC controller
- Driver for CoDeSys available
- PDO and SDO communication via supplied DLL
- can be used as CANopen master for a wide range of applications

### Ordering information

**CAN PCI board ICC 10**
Part no.: 320310 (Single channel)

**CAN PCI board ICC 20**
Part no.: 320311 (2 channels)
CAN controller components

**General**

Both isel CANopen I/O modules provide an entry level into the world of modern industrial automation. They enable installation on site or in a cabinet.

A 24V DC power supply, galvanic isolation of the inputs and outputs and the terminals available directly on the module provide a great range of operating possibilities.

Connection via plug-in terminals and the status display assigned directly to the connection make for very user-friendly installation and servicing.

**Technical specification**

<table>
<thead>
<tr>
<th>CAN I/O module 16/16</th>
<th>CAN I/O module 8/12 - 4/1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital inputs</strong></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>via optical coupler</td>
<td>via optical coupler</td>
</tr>
<tr>
<td>(Input current approx. 8 mA)</td>
<td>(Input current approx. 8 mA)</td>
</tr>
<tr>
<td><strong>Digital outputs</strong></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>8 × relays, Imax &lt; 5A</td>
<td>4 × relays, Imax &lt; 5A</td>
</tr>
<tr>
<td>8 × electronically, Imax &lt; 350 mA</td>
<td>8 × electronically, Imax &lt; 350 mA</td>
</tr>
<tr>
<td><strong>Analogue output</strong></td>
<td></td>
</tr>
<tr>
<td>1 0V - 10V via 8-bit D/A converter</td>
<td>1 0V - 10V via 8-bit D/A converter</td>
</tr>
<tr>
<td><strong>Analogue input</strong></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td>4</td>
</tr>
<tr>
<td>0V - 10V, 10-bit resolution</td>
<td>0V - 10V, 10-bit resolution</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP20</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>24V DC (logic voltage),</td>
</tr>
<tr>
<td></td>
<td>24V DC (process voltage),</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>160 mA (logic and relays)</td>
</tr>
<tr>
<td></td>
<td>Is load dependent on the external wiring</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-5°C to +40 °C</td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-25°C to +70 °C</td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
<td>max 95 %</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP20</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>260 g</td>
</tr>
<tr>
<td><strong>Casing size</strong></td>
<td>85 × 180 × 28 mm (W × H × D)</td>
</tr>
</tbody>
</table>

Subject to technical changes.

**Features**

**CAN I/O module 16/16**

- 16 digital inputs via optical couplers (input current approx. 8 mA)
- 16 digital outputs, 8 × relays, Imax < 5A, 8 × electronically, Imax < 350 mA (thermal protection, short circuit protection)
- One analogue output, 0V - 10V via 8-bit D/A converter (users of an analogue output can no longer use the electronic outputs)

**CAN I/O module 8/12 - 4/1**

- 8 digital inputs via optical couplers (input current approx. 8 mA)
- 12 digital outputs, 4 × relays, Imax < 5A, 8 × electronically, Imax < 350 mA (thermal protection, short circuit protection)
- One analogue output, 0V - 10V via 8-bit D/A converter
- 4 analogue outputs, 0V - 10V 10-bit resolution
The CAN CPC12 positioning module serves adaptation of drive controllers from various other manufacturers with ±10V interface to the CAN CNC controller.

This enables - in addition to CAN drive controllers offered by isel - operation of not CAN-enabled modules or modules that are not directly compatible with this controller.

The necessary control inputs and outputs for this purpose are provided by the CPC12 module.

### Features

**CAN CPC 12 positioning module**

- Controlling any number of drive controllers and frequency converters with ±10V input
- Digital position control with cycle time 488 μs
- Power supply +24V DC
- CANopen DS 301, DS 402, data transfer rate up to 1 Mbd
- RS232 for commissioning or PLC coupling
- Outputs for releasing external servo controllers and brake controllers
- Inputs for reference & limit switches
- Incremental encoder (RS422)
- Monitoring of limit switches for the positioning axes with emergency shutdown message
- Optionally as multi-axis solution in control cabinet
- Gantry mode or synchronous control of 2 modules, Master-Slave via CAN bus

Part no.: 320 210
Step controller
Single axis controller

Features
• Final output stage
  48V DC/4.2A peak
  for 2-phase step motors
• max. 25,600 microsteps/turn
• Mains voltage:
  115V AC/230V AC, 50…60 Hz
• Automatic current sink at
  50% phase current at
  motor speed < 1 rpm
• Motor current/microstep resolution
  variable with DIP switch
• Integrated 32-bit RISC processor
  (Embedded controller) with Flash
  memory for firmware and PAL PC
  user program
• RS-232 interface (frontal) for
  coupling with PC/notebook
  (program download)
• optional: USB interface (frontal)
  for loading user programs from an
  USB memory stick (USB on the go)
• Control signals Program
  start/stop, reset to controller
  back side
• 4 optically isolated signal inputs
  (Signal voltage : 24V DC)
• 4 relay outputs (24V DC, 300 mA)
• Motor brake controller (24V DC)
• Remote plug on rear of controller
  for external EMERGENCY
  SHUTDOWN (2-channel),
  external power on
• Euro cooling rib casing
• Programming with PAL-PC 2.1
  for Win2000, XP, Vista, 7
• Dimensions
  W 105 × H 111 × D 320 mm

General
The IT 116 Flash step controller is a freely programmable compact controller
for a linear or circular axis with 2-phase step motor. The step controller comprises
an intelligent step motor stage, a processor core with Flash memory for downloa-
ding/storing the PAL-PC user program and the clocking/direction signal generation
for the final stage of the motor, the necessary power supply units, a safety circuit
(Stop category 0 to EN 60204) and a casing with mains input filter and control
elements.

The integrated operating system in the Flash memory of the processor core
supports both
• the DNC mode of the controller: PC/laptop connected permanently with the
  step controller via the serial interface
and
• the CNC mode of the controller: The step controller works independently,
  without PC coupling of the stored user
  program (stand alone).

Ordering information
IT 116 Flash step controller (115V AC, 60 Hz)  Part no.: 381016 0115 *
IT 116 Flash step controller (230V AC, 50 Hz)  Part no.: 381016 *
* including PAL-PC

Accessories
Motor lead
M23 12-pin socket - SubD 9-pin Pin
Part no.: 392755 0200 (2m)
Part no.: 392755 0300 (3m)
Part no.: 392755 0500 (5m)

Motor lead
SubD 9-pin socket - plug 1:1
Part no.: 392780 0081 (0.8m)
Part no.: 392780 0151 (1.5m)
Part no.: 392780 0201 (2.0m)
Part no.: 392780 0301 (3.0m)

Scope of supply
• Controller in cassette casing
• Mating plug (I/O, pulse, remote)
• serial interface lead
  (SubD9 - RJ 45)
• 230V AC mains lead
• PAL-PC software CD
• Operating instructions
• Programming instructions

Subject to technical changes.

made by isel®
Step controllers
Multiple axis controller

General
iMC-P step controllers iMC-P are freely programmable compact controllers with max. 4 final stages for 2-phase step motors. The controllers integrate all necessary components (interfaces, motion controllers, power supply, final stages, safety circuit incl. door controller, control elements), which are needed to control a machine, in a compact bench housing. The iMC-P1 controller with core module with at least one integrated final stage enables the control of up to 3 additional final stages with clocking/direction module. The signals needed for this are provided through the appropriate external interfaces.

• iMC-P1n: with intelligent core module for control via RS232
  The controller also works either in DNC mode (permanently connected with the computer) or in CNC mode (after transfer of the user program as a standalone controller), e. g. via the accompanying PAL-PC software

Features
• 8 signal inputs (24V DC)
• 8 relay outputs (24V DC, 300 mA)
  max. 2A total current
• 1 relay output (230V AC/6A)
• 1 analogue output (0 - 10V)
• RS232 programming interface (rear)
• 32-bit RISC processor and memory for user program
• Programming with PAL-PC (DNC and CNC modes), @-format (DNC and CNC modes), ProNC, Remote, Galaad, Labview (DNC mode), various high level languages
• max. 4 final stages (48V/4.2A) for 2-phase step motors (power supply unit 500 W)
• from a step angle of 1.8° up to 25,600 microsteps/turn (1/128 microstep)
• automatic current sink
• motor current adjustable via DIP switch
• additional control signals (start, stop, reset) adaptable
• Safety circuits (emergency shutdown, door circuit controller) via external plugs in higher level safety circuits integrable
• Broadband mains supply: 110 - 250V AC, 50..60 Hz
• Clocking/direction module to order
• Bench casing
  W 379 × H 137 × D260

Deliverables
• Controller
• Mating plug (I/O, pulse, remote)
• serial interface lead (null modem)
• 230V AC mains lead
• PAL-PC software CD
• Operating and programming instructions

Ordering information
2-axis controller iMC-P1-2 Part no.: 381403 0002*
3-axis controller iMC-P1-3 Part no.: 381403 0003*
4-axis controller iMC-P1-4 Part no.: 381403 0004*
USB - RS232 converter Part no.: 372000 0001

Accessories
Motor lead SubD9 plug - SubD9 socket Part no.: 392780 0151 (1.50 m) Part no.: 392780 0201 (2.00 m) Part no.: 392780 0301 (3.00 m)
Motor lead SubD9 plug - M23 socket Part no.: 392755 0200 (2.00 m) Part no.: 392755 0300 (3.00 m) Part no.: 392755 0400 (4.00 m)
Motor lead SubD9 plug - M23 socket Part no.: 392755 0500 (5.00 m) Part no.: 392755 0600 (6.00 m) Part no.: 392755 0800 (8.00 m)
…other lengths to order.

* including PAL-PC

Subject to technical changes.
Step controllers
Multiple axis controller

iMC-S8

Features
- 32-bit RISC processor with Flash memory for user program
- Final output stages
  - Step resolution and motor current adjustable via variable DIP switch
  - Automatic current sink
- Acceleration, start-stop frequency and step output frequency variable
- Both hardware limit switches configurable
- Door controller/hood controller
- Control elements in the front of the casing
- External EMERGENCY SHUTDOWN and POWER connection for integration in higher level safety circuits
- Connection for external control signals, such as START, STOR, RESET (only CNC mode)
- 230V connection for milling spindle (100-230V AC)
- 0..10V analogue output for external frequency converter for speed-controlled main spindle
- Programming/Operation
  - PAL-PC in CNC mode (in the deliverables)
  - Remote (optional: ProNC) in DNC mode
  - isel @ - format in CNC/DNC modes

Technical specification
- Broadband mains supply 100 - 250V AC, 50..60Hz
- Processor
  - Flash memory 128 kB
  - Capacity to store 350 commands
  - Max. step output frequency 40 kHz
- Final stages
  - Power supply 48V DC
  - Peak current: 2.8 - 7.8A
  - Step resolution: 400-51200 steps
- Inputs/outputs
  - 8 inputs (24V DC)
  - 8 outputs (24V DC/300mA, Itot 2A)
  - 1 relay output (230V AC, max. 6A)
  - 1 analogue output (0 - 10V)
- RS232 operating/programming interface
- Stop category 1, safety category 2
- Versions:
  - Bench casing
    W 475 × H 410 × D 187.5 mm
  - 19" housing
    W 482.5 × H 410 × D 175.5 mm

Accessories
- Motor lead M23 plug - M23 socket
  Part no.: 392750 0300 (3m)
  Part no.: 392750 0500 (5m)
- Motor lead M23 plug - SubD9 socket
  Part no.: 392752 0300 (3m)
  Part no.: 392752 0500 (5m)
- Controller software - Remote
  Part no.: Z12-334500
- Controller and programming software ProNC
  Part no.: Z11-333500

Subject to technical changes.

General
The iMC-S8 step controller is a freely programmable compact controller for linear or circular axes with 2-phase step motors. The controller integrates all the necessary components (power supply, safety circuit, power electronics, core processor, interfaces, operating elements) that are needed to control individual spindles all the way to entire machines. It has an intelligent core module that is controlled and programmed via a RS232 interface. The core module also converts the commands programmed in the user program into clocking/direction signals for the connected final stages. Depending on the purpose, the iMC-S8 controller can be used either in CNC or in DNC mode.

In CNC mode, the processor processes the CNC program which was previously produced with PAL-PC and stored in the controller’s Flash memory.

In DNC mode, the iMC-S8 controller is connected permanently with a control computer (PC, laptop) via a serial interface (RS232). Processing is carried out via the isel control software Remote.

Ordering information

<table>
<thead>
<tr>
<th>Model</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-axis iMC-S8 step controller, bench housing</td>
<td>383320 2002 *</td>
</tr>
<tr>
<td>2-axis iMC-S8 step controller, 19“ housing</td>
<td>383320 1002 *</td>
</tr>
<tr>
<td>3-axis iMC-S8 step controller, bench housing</td>
<td>383320 2003 *</td>
</tr>
<tr>
<td>3-axis iMC-S8 step controller, 19“ housing</td>
<td>383320 1003 *</td>
</tr>
<tr>
<td>4-axis iMC-S8 step controller, bench housing</td>
<td>383320 2004 *</td>
</tr>
<tr>
<td>4-axis iMC-S8 step controller, 19“ housing</td>
<td>383320 1004 *</td>
</tr>
</tbody>
</table>

* including PAL-PC

Deliverables
Controller, mating plug (I/O, pulse, Remote), serial interface lead (null modem), 230V AC mains lead, PAL-PC software CD, operating instructions, programming instructions

Figure: iMC-S8 step controller as bench version and with 19“ housing
Servo controller
Single axis controller

General
Servo controllers in the MC1 series are freely programmable compact controllers for a linear or rotary unit with servomotor.

The single axis controllers integrate all necessary components (interfaces, motion controller, power supply, drive controller, safety circuit, control elements), which are needed to control a machine, in a compact bench housing. The supplied PAL-PC software can be used for programming.

Two versions are available:
- MC-10: For controlling brush DC servomotors
- MC-20: For controlling brushless EC servomotors

Features
MC-10
- for controlling brush servomotors
- Commissioning program "DcSetup"
- For technical specification for the drive controller see "iMD10 drive controller"

MC-20
- for controlling brushless servomotors
- Analysis of Hall signals
- Commissioning program "AcSetup"
- For technical specification for the drive controller see "iMD20 drive controller"

Common features
- Max. output power 500 W
- 32-bit high performance RISC processor with 256 kByte Flash memory
- User program in CNC mode for up to 650 commands
- Processing of the program in CNC or DNC mode
- Programming with PAL-PC (CNC mode), @-format (CNC mode), ProNC, Remote (DNC mode)
- LC display with 4 lines, each with 20 characters (freely programmable)
- additional control signals (Start, Stop) adaptable
- Connection for incremental encoder
- 68 bit signal inputs (24 V DC)
- 8 relay outputs (24 V DC/700 mA)
- Stop category 0 to EN60204
- Emergency shutdown circuit via plug in higher level safety circuit can be integrated
- Broadband mains supply: 110 - 250V AC, 50..60 Hz
- Bench casing
  W 204 × H 149 × D286

Deliverables
- Controller
- mating plug (I/O, pulse, Remote)
- serial interface lead
  (SubD9 - RJ 45)
- 230V AC mains lead
- PAL-PC software CD
- Operating instructions
- Programming instructions

Ordering information
MC1-10 (including PAL-PC) Part no.: 381518 0010
MC1-20 (including PAL-PC) Part no.: 381518 0020
Motor lead Part no.: 392760 xxxx *
Encoder lead Part no.: 392740 xxxx *

* Lead length [mm] available in different lengths.
e.g.: 0100 = 1.00 m/0150 = 1.50 m/0200 = 2.00 m ... 1000 = 10.00 m

Subject to technical changes.
**Servo controller**

**Multiple axis controller**

---

**iMC-DC/iMC-EC**

**Features**
- Drive controller for up to 6 brush or brushless DC servomotors
- NC control via CANopen field bus
- IMD10/iMD20 final output stages
  - 4-quadrant drive controller
  - Analysis for incremental encoder
  - Rest state monitoring
  - Over- and undervoltage protection,
    Overtemperature protection, short-circuit proof
- Door controller/hood controller
- external EMERGENCY SHUTDOWN and POWER connection for integration in higher level safety circuits
- Connection for external control signals, such as START, STOP, RESET via signal inputs
- Connection for milling spindle (100 - 230V AC)
- 0…10V output for external frequency converter for speed-controlled main spindle
- Control elements in the front of the casing
- Industrial control computer running under Windows® with
  - CANopen PCI board
  - Driver software for CNC controller
- Programming/Operation
  - Remote (optional: ProNC)

**Technical specification**
- Broadband mains supply
  - 115V AC/230V AC, 50..60 Hz
- Switching power supply 1000W/48V
- iMD10/iMD20 final output stages
  - Power supply 24 - 80V DC
  - Peak current/rated current: 25A/12 A
- Inputs/outputs
  - 16 digital inputs
  - 8 digital outputs
  - 1 analogue output
- Safety controller
  - up to safety category 3
- Door circuit controller
- Spindle controller

**Bench casing**
- W 630 × H 230 × D 400 mm

**Option:**
- without TFT display and keyboard

**Ordering information**

<table>
<thead>
<tr>
<th>Number of axes</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versions</td>
<td>2 = 2 axes</td>
<td>3 = 3 axes</td>
<td>4 = 4 axes</td>
<td>5 = 5 axes</td>
<td>6 = 6 axes</td>
</tr>
</tbody>
</table>

* including PAL-PC

**Accessories**

- Motor lead M23 pin - M23 socket
  - Part no.: 392759 0300 (3m)
  - Part no.: 392759 0500 (5m)

- Encoder lead SubD 15 plug - SubD15 socket
  - Part no.: 392740 0300 (3m)
  - Part no.: 392740 0500 (5m)

---

**General**

CAN controllers in the iMC-DC and iMC-EC series are compact, powerful drive controllers for 2 to 6 DC servomotors at an ideal price/performance ratio. The attractive bench housing integrates all control components which are needed to solve a wide variety of automation tasks. They range from the final stage via the I/O assembly to the safety controller. In addition, a 26 cm (10.2") touch screen TFT display and a keyboard are incorporated, which makes for convenient operation.

A CANopen PCI board is integrated in the control computer as an interface. This acts as the CAN master for the drive controller and the I/O module. In addition, external expansions up to 128 CAN nodes are possible with ease. The NC controller core allows interpolation of up to 6 axes (linear, circular and helical) and online and lock ahead track processing. When using the ProNC software, individual axes can be controlled as handling axes (in addition to the interpolating axes).

All final stages have automatic jerk limitation and rest state monitoring (up to safety category 3).

---

**Figure:**

Front and rear iMC-DC servo controller
The *iPU power units* are powerful drive controllers for up to four linear or circular axes with brush or brushless motors. The compact controller integrates all necessary controller components, which are needed to solve a wide range of automation tasks. These range from iMD10 or iMD20 final output stages through the I/O module to safety control and power electronics.

As its interface for NC control, the *iPU power unit* has a CANopen interface at the back of the housing, which works according to the DS301 bus protocol and DS402. By using the optional CAN PCI board iCC 10 or a iPC series control computer, the controller can control interpolation (linear, circular, helical) of all four axes as well as track processing.

The final output stages (iMD10 or iMD20) also have automatic jerk limitations and rest state monitoring.

The control elements integrated in the front of the housing, such as EMERGENCY SHUTDOWN, START or STOP enable convenient operation.

### Features
- Drive controller for up to four brush or brushless DC servomotors
- NC control via CANopen field bus
- iMD10/iMD20 final output stages
  - 4-quadrant drive controller
  - Analysis for incremental encoder
  - Rest state monitoring
  - Over- and undervoltage protection, Overtemperature protection, short-circuit proof
- Door controller/hood controller
- Connection for external control signals, such as EMERGENCY SHUTDOWN, START, STOP FOR Integration in higher level safety circuits
- Connection for milling spindle (100 - 230V AC)
- 0 .. 10V output for external frequency converter for governed main spindle
- Control elements in the front of the casing (optionally, installed in the rear)
- two alternative casings
- Programming/Operation
  - Remote (optional: ProNC)

### Technical specification
- Broadband mains supply
  - 115V AC/230V AC, 50..60 Hz
- Switching power supply unit
  - 1000 W/48 V
- iMD10/iMD20 final output stages
  - Power supply 24 - 80V DC
  - Peak current/rated current: 25A/12 A
- Inputs/outputs
  - 4 digital inputs (24V DC/8mA)
  - 8 digital outputs (24V DC/350mA)
  - 1 relay output (230V AC, max. 6A)
  - 1 analogue output (0 - 10V)
- Safety controller
  - up to safety category 3
  - Door circuit controller
  - Spindle controller
- RJ 45 CANopen interface
- Versions:
  - Bench housing
    - W 475 × H 410 × D 187.5 mm
  - 19” housing
    - W 482.5 × H 410 × D 175.5 mm

### Scope of supply
- Controller
- mating plug (I/O, pulse, Remote)
- CAN bus lead (RJ45, patch lead)
- 230V AC mains lead
- Operating instructions

Subject to technical changes.
CAN-CNC controller
Example of a topology with the isel-CAN-CNC controller

With consequent use of the CiA’s (CAN in automation) CANopen standards, isel Germany delivers a high quality PC-based CAN-CNC controller for intelligent positioning/drive units and I/O modules.

The CAN-CNC controller supports interpolation operation (linear, circular and helical) of up to six positioning drives per machine and up to 127 handling axes and CAN modules.

The high time demands of a CNC controller are guaranteed by a WDM driver developed by isel. An additional real time operating system for Windows will be unnecessary. This guarantees compatibility with future Windows versions (Win7 in preparation).

The CAN controller is a pure software solution for PCs with Windows 2000/XP/VISTA. The CANopen PCI boards iCC 10/20 also act as an interface.

Owing to the features provided, the CAN-CNC controller is equally suited for all machining tasks, such as milling, engraving, drilling, turning, water jet and laser cutting, as well as for applications in automation systems.

For this purpose, ProNC provides a universal programming environment.

Features

- Machine control to the CANopen standard as a pure software solution for PCs with Windows 2000/XP/VISTA
- CiA-Standard, DS 301, DSP 401, DSP 402
- Supports up to six positioning axes and 127 handling axes and CAN modules.
- Look ahead track processing with a freely definable number of movement elements, which the controller processes to a forecast.
- Jerk limitation for elimination of mechanical vibrations
- Upstream speed control for highly dynamic and lag error-free machining
- Software tools for setting and optimising motor final stages/positioning modules
- Interfaces for PC:
  - CANopen PCI board iCC 10 (single channel) CAN bus 1
  - CANopen PCI board iCC 20 (two channels CAN buses 1 and 2)

Subject to technical changes.