electron

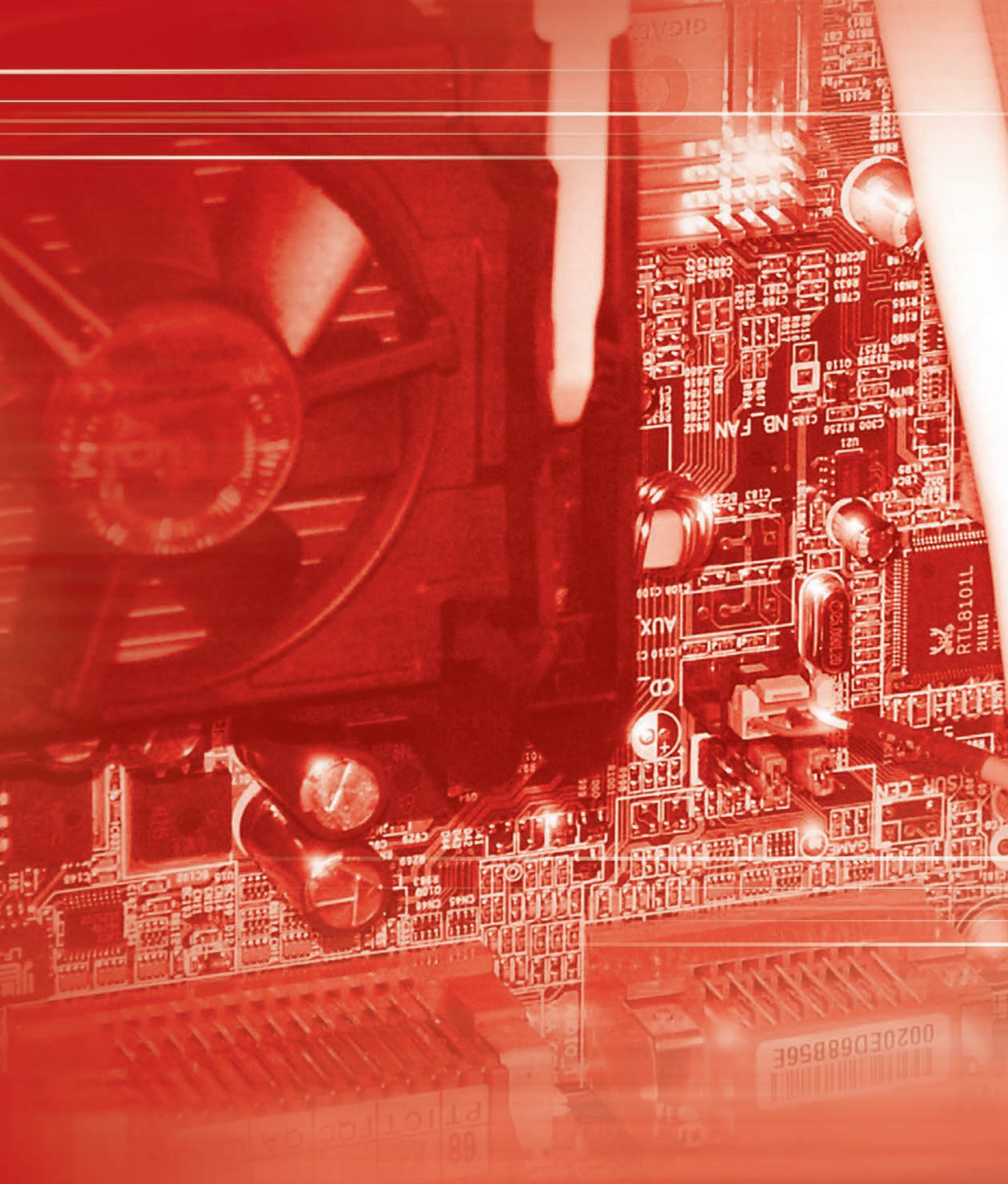**ELECTRONICS**

electronics

Overview

CNC control units

iOP 19-TFT
iOP 19-CPU

Step controller
Single axis controller

IT 116 Flash

Step controller
Multiple axis controller

iMC-S8

Servo controller
Single axis controller

MC 1-20
MC 1-40

Servo controller
Multiple axis controller

iPU-DC / iPU-EC

iCU-DC / iCU-EC

CAN-CNC controller
Overview

MADE IN GERMANY
MECHANICS – ELECTRONICS – SOFTWARE – SYSTEMS – DISPLAY – LIFESTYLE –

isel®

CNC control units   iOP-19-TFT / iOP-19-CPU

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General

The CNC control units iOP-19 are a revised version of the previous isel control panels iBP. All experiences have been incorporated into the new development of the iOP-19. They have an integrated 19" touch screen monitor, a silicone keyboard as well as a control panel with stainless steel buttons and emergency stop switch. A PC can be connected and operated via the lead-out standard connecting cables . The iOP-19-CPU has an isel CAN.

Dimensioned drawings

	Depth T1	Depth T2
iOP-19-TFT	57	123
iOP-19-CPU	130	196
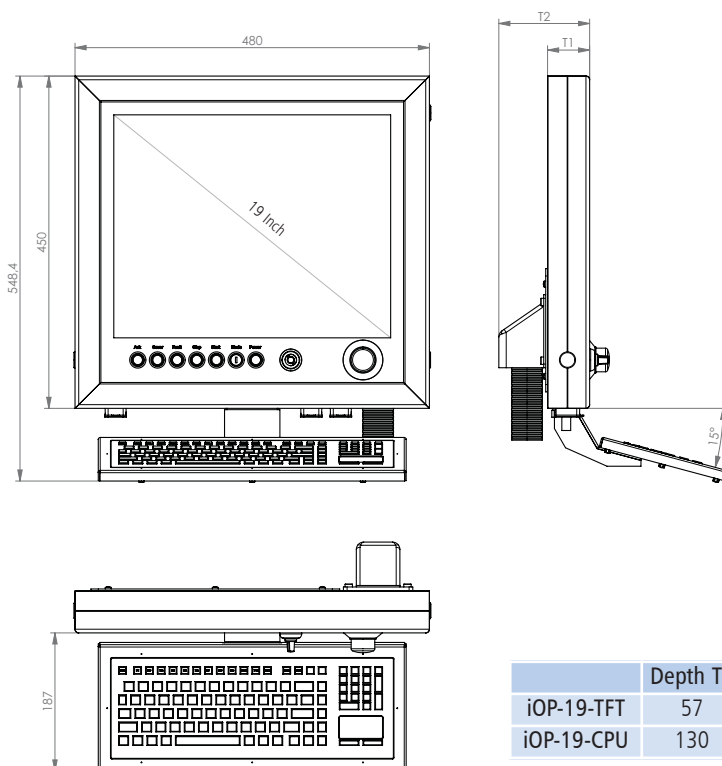
Technical specifications subject to change.

Common features

- robust aluminium housing (standard color: RAL 3011 / red)
- 19" touch screen display
- high-quality silicon keyboard (protection class: IP68) - in German and English - 105 keys, with touchpad
- easy mounting option for keyboard
- user-friendly approach via high-adjustable arm
- easy mounting via VESA mounting 100/100
- 3 USB ports

Features iOP-19-TFT
- protection class IP 50
- dimensions (without keyboard): W 480 x D 123 x H 450 mm
- weight: approx. 15kg

Features iOP-19-CPU
- protection class IP 40 and IP 50
- motherboard 64 bit / CPU IntelCore I3
- additional a network connection (LAN)
- dimensions (without keyboard): W 480 x D 196 x H 450 mm
- weight: approx. 16kg

Options
- foot
- simple keyboard and mouse tray
- Two-hand operation
- RAL 9005 (black) or graphite hammer

Ordering Data

Control panel **iOP-19-TFT**, RAL 3011 (red)
Part-no.: **371100 1000**

Control panel **iOP-19-CPU**, RAL 3011 (red)
Part-no.: **371101 1000**

German keyboard, RAL 3011 (red)
Part-no.: **371200 0001**

English keyboard, RAL 3011 (red)
Part-no.: **371200 0002**

Swivel arm for profile PS 50
Part-no.: **371050 2020**

Swivel arm for profile PS 80
Part-no.: **371050 2040**

Swivel arm for profile 100
Part-no.: **371050 2050**

Swivel arm for profile 125
Part-no.: **371050 2060**

Swivel arm for profile PS 140
Part-no.: **371050 2070**

Swivel arm for profile PV 150
Part-no.: **371050 2080**

electronics

Step controller IT116 Flash
Single axis controller

Figure:
IT 116 Flash front

Figure:
IT 116 Flash back side

General

The **IT 116 Flash step controller** is a freely programmable compact controller for a linear or circular axis with 2-phase stepper motor. The step controller comprises an intelligent step motor stage, a processor core with Flash memory for downloading/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

- DNC controller mode: PC/laptop connected permanently with the step controller via the serial interface

and the

- CNC controller mode: the step controller works independently, without PC coupling of the stored user program (standalone).

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 0500** (5m)

Other lengths on request.

Motor lead
SubD 9-pin socket - plug 1:1
Part no.: **392781 0500**

Features

- final output stage
  48 V DC / 4.2 A peak
  for 2-phase stepper 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 (front) for
  coupling with PC/notebook
  (program download)
- control signals:
  program start/stop, reset on
  controller back side
- 4 optically isolated signal inputs
  (Signal voltage: 24 V DC)
- 4 relay outputs (24 V DC, 300 mA)
- motor brake controller (24 V DC)
- remote plug on rear of controller
  for external EMERGENCY SHUT-
  DOWN (2-channel), ext. power on
- euro cooling rib casing
- programming with PAL-PC 2.1
  for Win2000, XP, Vista, 7
- dimensions
  W 105 $\times$ H 111 $\times$ D 320 mm

Scope of delivery

- 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

Technical specifications subject to change.

electronics

Step controller
Multiple axis controller

iMC-S8

Figure:
iMC-S8 step controller as
bench version and with 19" housing

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

3 8 3 3 2 0 X X 1 X

Variant
1 = 19"-housing
2 = bench housing

Drive module
0 = MD 28
1 = MD 24

Numbers of axis
2 = 2 axis
**3** = 3 axis
4 = 4 axis

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

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, STOP, 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 scope of delivery)
  - 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 48 VDC
  - peak current: 1,0 - 4,2 A (MD 24)
    2,8 - 7,8 A (MD 28)
  - step resolution: 400-51200 steps
- Inputs/outputs
  - 16 inputs (24V DC)
  - 16 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**

Technical specifications subject to change.

electronics

Single axis controller MC1-10/20/40
iMD single axis controller for isel linear units
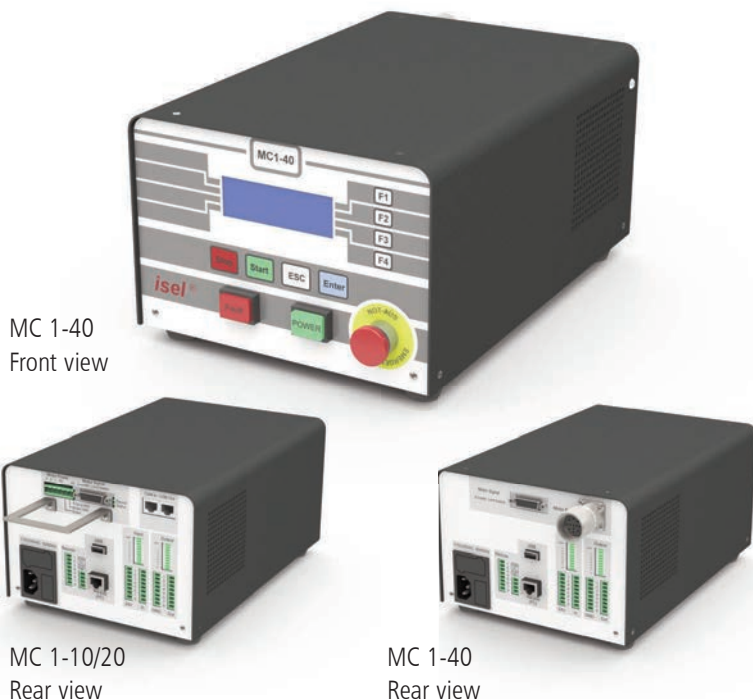
MC 1-40
Front view

MC 1-10/20
Rear view

MC 1-40
Rear view

General

MC 1 series servo-controllers are freely-programmable compact controllers for linear or rotating units with servomotors. The single axis controllers integrate all the components (interfaces, motion controller, power supply, drive controller, safety circuit, control elements) needed for axis control in compact bench housings. The supplied PAL-PC software can be used for programming.

There are three MC1 variants available:

- MC1-20: for controlling brushless EC servomotors (48 V)
- MC1-40: for controlling brushless EC servomotors (310 V)

Ordering information

MC 1-20 (including PAL-PC)	Part no.: **381518 0020**
MC 1-40 (including PAL-PC)	Part no.: **381518 0040**
Motor leads MC 1-20	Part no.: **392760 xxxx***
Motor leads MC 1-40	Part no.: **392307 xxxx***
Encoder lead	Part no.: **392740 xxxx***

* Leads available in different lengths,
  e.g.: 0100 = 1 m / 0150 = 1.5 m / 0200 = 2 m ... / 1000 = 10 m

Features

MC1-20
- for controlling brushless servomotors with an intermediate circuit voltage of 48 V DC
- analysis of Hall signals
- setup program "AcSetup"

MC1-40
- for controlling brushless servomotors with an intermediate circuit voltage of 310V DC
- analysis of Hall signals
- setup program "AcSetup"

Common features
- max. output power 500 W (MC1-20)
- 32-bit high performance RISC processor with 256 kB 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 and 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
- 6(8) signal inputs (24 V DC)
- 8 relay outputs (24 V DC/700 mA)
- stop category 0 in accordance with EN60204
- emergency shutdown circuit via plug in higher level safety circuit integrable
- broadband mains supply: 110...250 V AC, 50..60 Hz (MC1-20)
- 250 V AC, 50Hz (MC1-40)
- bench casing W 204 × H 149 × D286

Scope of delivery
- 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

Technical specifications subject to change.

made by isel®

Power unit
Multiple axis controller

iPU-DC/iPU-EC

Figure:
Power unit iPU as
bench version and with 19" housing

General

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.

Ordering information

3 5 3 0 0 0 X 0 X X

Number of axes
2 = 2 axes
3 = 3 axes
4 = 4 axes

Versions
1 = 19" housing
2 = Bench housing

Drive controller
1 = iMD 10 (brush DC servomotors)
2 = iMD 20 (brushless EC servomotors)

Accessories

Motor lead M23 plug - M23 socket	Part no.: **392759 0300** (3m)
	Part no.: **392759 0500** (5m)
Encoder lead SubD15 plug - SubD15 socket	Part no.: **392740 0300** (3m)
	Part no.: **392740 0500** (5m)
CAN PCI board iCC 10 (single channel)	Part no.: **320310**
CAN PCI board iCC 20 (2 channels)	Part no.: **320311**
Controller software - Remote	Part no.: **Z12-334500**
ProNC control software	Part no.: **Z11-333500**

Technical specifications subject to change.

Features

- drive controller for up to four brush or brushless DC servo motors
- 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, (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 speed-controlled main spindle
- front-sided control elements (optionally, installed in the rear)
- two alternative casings
- programming/operation
  - Remote (optional: ProNC)

Technical specification

- broadband mains supply
  - 115 V AC / 230 V AC, 50..60 Hz
- switching power supply 1000 W / 48 V
- final output stages iMD10 / iMD20
  - Power supply: 24 - 80 V DC
  - Peak / nominal current: 25 A / 12 A
- inputs/outputs
  - 4 digital inputs (24 V DC / 8 mA)
  - 8 digital outputs (24 V DC / 350 mA)
  - 1 relay output (230 V AC, max. 6 A)
  - 1 analog output (0 - 10 V)
- safety controller
  - up to safety category 3
  - door circuit and spindle control
- RJ 45 CANopen interface
- versions:
- bench housing
  - W 475 x H 410 x D 187.5 mm
- 19" housing
  - W 482.5 x H 410 x T 175.5 mm

Scope of delivery

- controller
- mating plug (I/O, pulse, remote)
- CAN bus lead (RJ45, patch lead)
- 230 V AC mains lead
- operating instructions

electronics

Multiple axis controller
iMD multiple axis controller for isel linear units

iCU-DC / iCU-EC

ICU-DC
Front view

ICU-DC
Rear view

General

The **CAN controllers** of the **iCU-DC** and **iCU-EC** series are compact, high-performance drive controllers for 2 - 6 DC servomotors and are offered at an optimal price / performance ratio.

The bench housing integrates all control components needed to solve a wide variety of automation tasks, ranging from the final stage via the I/O assembly to the safety controller.

The control computer has an integrated CANopen PCI card interface serving as CAN Master for the drive controller and I/O components. External upgrades are also possible, up to 128 CAN nodes. The connecting points at the rear of the control computer facilitate easy connection to (for example) a monitor. Peripherals such as a mouse and keyboard can be connected at the USB interfaces provided. LAN connection allows integration into an existing network and can be used for remote servicing.

The NC control core facilitates the interpolation of up to 6 axes (linear, circular, helical) as well as Online and Look Ahead machining. 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).

Features
- drive controller for up to 6 brush or brushless DC servo motors
- 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 control / hood control
- external emergency cut-out for integration into higher level safety circuits
- connection for external control signals (START, STOP, RESET) via signal inputs
- control computer connections: VGA, 4 x USB (2 x front, 2 x rear), RJ45 Ethernet (100 Mbit/s)
- connection for milling spindle (100 -230V AC)
- 0 ...10 V output for external frequency converter for speed-controlled main spindle
- front-sided control elements
- industrial control computer based on Windows® with
  - CANopen PCI board
  - driver software for CNC control
- programming/Operation
  - Remote (optional: ProNC)

Technical specification
- broadband mains supply
  - 115 V AC / 230 V AC, 50...60 Hz
- switching power supply 1000 W / 48 V
- iMD10/iMD20 final output stages
  - Power supply: 24...80 V DC
  - Peak / nominal current: 25 A / 12 A
- input/output of CAN E/A module
  - 4 digital inputs, 8 digital outputs
  - 1 relay output (230V AC, max. 6 A)
  - 1 analog output (not required with frequency convertor option)
- CAN safety circuit module
  - up to safety category 3
  - door circuit control
  - spindle control
- bench casing
  W 630 x H 230 x T 400 mm
- options:
  - frequency converter for iSA500 - iSA2200
  - additional CAN I/O module (16 x inputs, 16 x outputs)

Ordering information

Number of axes
2 = 2 axes
3 = 3 axes
4 = 4 axes
5 = 5 axes
6 = 6 axes

3 5 4 0 1 2   X 0 X 0

Versions
1 = iCU DC* (brush-type DC servomotors)
2 = iCU EC* (brushless EC servomotors)

Accessories

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

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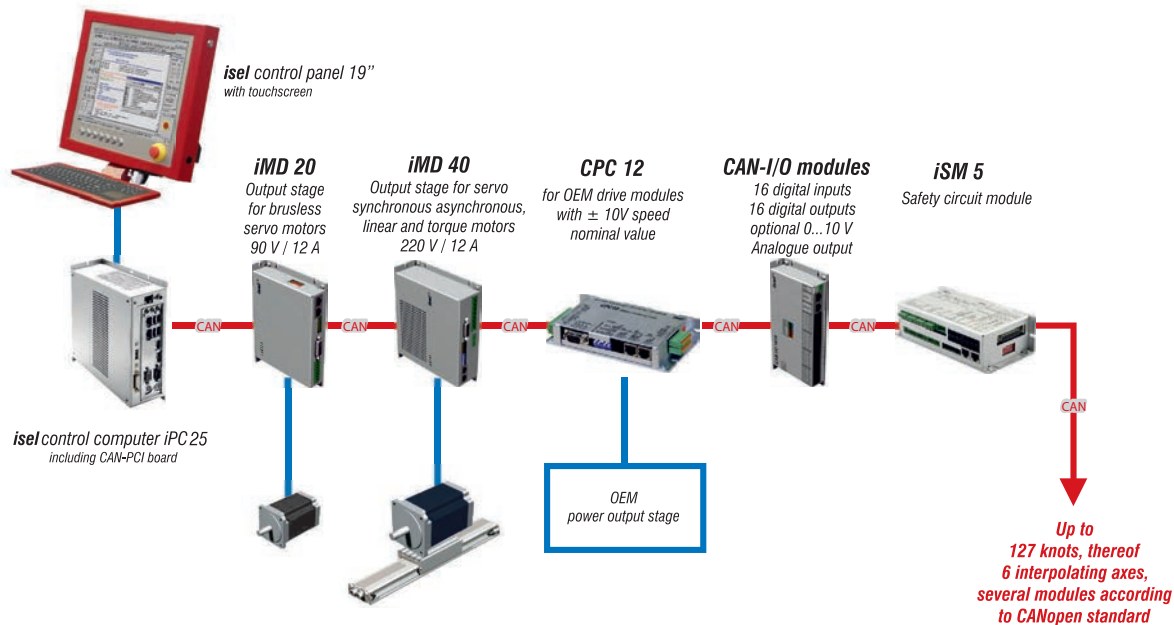Part no.: **392740 0300** (3m)
Part no.: **392740 0500** (5m)

Scope of delivery
- controller
- mating plug (I/O, pulse, remote)
- 230V AC mains lead
- operating and programming instructions

Technical specifications subject to change.

made by isel®

CAN-CNC controller
Example of a topology with the isel-CAN-CNC controller

isel control panel 19"
with touchscreen

iMD 20
Output stage
for brusless
servo motors
90 V / 12 A

iMD 40
Output stage for servo
synchronous asynchronous,
linear and torque motors
220 V / 12 A

CPC 12
for OEM drive modules
with ± 10V speed
nominal value

CAN-I/O modules
16 digital inputs
16 digital outputs
optional 0...10 V
Analogue output

iSM 5
Safety circuit module

CAN — CAN — CAN — CAN — CAN

CAN

isel control computer iPC 25
including CAN-PCI board

OEM
power output stage

**Up to
127 knots, thereof
6 interpolating axes,
several modules according
to CANopen standard**

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

The CAN controller is a pure software solution for PCs with Windows 2000/XP/VISTA/Win7 (32/64 bit). 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/Win7 (32/64 bit)
- 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 while looking ahead.
- 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

Technical specifications subject to change.