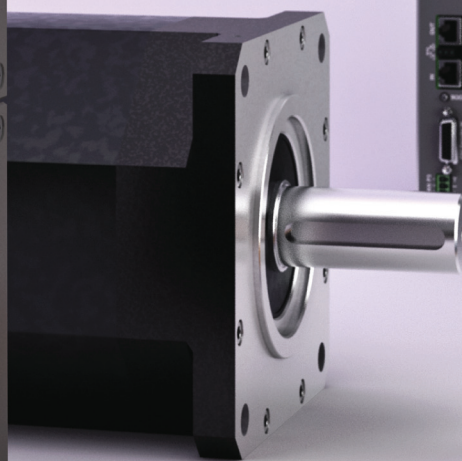


PRODUCT CATALOGUE

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 EtherCAT SLAVES
 EtherCAT IO MODULS
 SERVO DRIVES
 POWER SUPPLIES
 SYNCHRONOUS SERVOMOTORS
 ASYNCHRONOUS SERVOMOTORS
 ACCESSORIES
 OUTLINE DRAWINGS



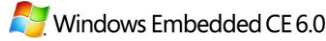
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NCT 201 CNC AND INDUSTRIAL CONTROL AND ITS PERIPHERIES

NCT 201 CNC AND INDUSTRIAL CONTROL IS BUILT ON 3 BASE COMPONENTS:

1. Windows Compact Embedded operation system (MICROSOFT)
2. EnDat22 (physical) absolute measurement system (HEIDENHAIN)
3. EtherCAT communication channel between the EHU (EtherCAT Host Unit) and its peripheries (SLAVES) (BECKHOFF)

Windows Compact Embedded (CE Professional)



The WINDOWS CE host unit (EHUxx) of the NCT 201 control is behind the monitor. The default pointing device is the touch screen, but there are 4 optionally used USB ports, where optional pointing devices (mouse, track ball, touchpad) can be connected if needed. The EHU has 2 Ethernet terminals. One of them can be connected to the peripheries (servo drives, input/output units) via EtherCAT protocol, while the another one can be connected to the computer network. The system program of NCT 201 control fits WINDOWS CE operation system perfectly, exploiting it to its full potential, like its professional file management, computer peripheries management (data storage devices, printers, data input peripheries, pointing devices, etc.), and other services (network, internet, remote machines, picture and video displaying, playing sound files, etc.)

EnDat 2.2

It is a physically absolute measuring system, which is also available with linear scale and rotary encoder. The rotary encoder is absolute in single or multi turn. In one rotation the rotary encoder distinguishes 33 554 432 positions, and it generates the absolute position for 4096 rotations. The NCT 200 control series can receive both the absolute linear encoders and single or multiturn absolute rotary encoders. Since the NCT servomotors are integrated with multiturn EnDat 2.2 absolute measuring system, therefore the reference point switch on the machine tool is not necessary anymore. After turning on the machine the machining can be started immediately, there is no uncertainty because of reference point pickup.

EtherCAT

EtherCAT (Ethernet for Control Automation Technology) is an open real-time Ethernet network, which uses standard Ethernet data frames. It consists of two main units, the EHU HOST central unit and the SLAVE peripheries (servo drives, EPU). The cable from the EHU has to be connected to the input terminal of the closest SLAVE periphery unit (EPU, servo drives, etc.), while the output of this periphery will be connected to the input of next periphery and so on. The system can be optionally chained over and over again, and extended with more SLAVE units.

EtherCAT hardware

The Ethercat network consists of one HOST unit and one or more (up to 65535) SLAVES.

The hardware of the HOST unit (**EHU**) is a universal Ethernet network adapter (most PCs have it), which is capable sending and receiving of 100 Mbit/s Ethernet data frames.

The SLAVE units have a special chip that enables them to select the data that refer to them, from the EtherCAT data stream that passes through them, and also to add their outgoing data **with minimal delay**.

The SLAVES can be units for simple I/O functions (I16, O16) and intelligent units (TTLAI, DANI, SENS) containing micro controller, DSP as well. The SLAVE EtherCAT chip is actually a dual-port RAM (double sided read/write memory), from one side the EtherCAT network, on the other side the micro controller or the DSP writes and reads the RAM. In the case of a simple I/O unit the inputs are mirrored in the RAM (they are mapped here), and the outputs are updated from the RAM as well. Through the EtherCAT data frames the HOST actually sends reading and writing commands to the actual SLAVE RAM area.

Operation of EtherCAT

The EtherCAT is a network, in which both the end and the beginning are in the HOST unit, and in between the SLAVES are chained serial after each other.

The data frame, transmitted from the HOST, is like a train with several wagons, which travels on the rails (cabling), through the stations (SLAVE chips), during which the content of the appropriate wagons is exchanged. The train turns back after the last SLAVE and goes back to the HOST without stopping (receive).

The HOST processes the incoming data and prepares the new data frame (train) for sending.

Cabling, topology

There are two ways to connect the units:

1. Ethernet cable: it can be used for the distance of 100 m. Since it is to be used in an industrial environment, the cables are shielded STP cables.
2. LVDS bus: it is an easier hardware solution, for short distances, they are usually used to connect units that are only a few centimeters apart.

Since among the EtherCAT SLAVES there are units with more than two ports (ESIC card), the topology of the cabling can be various: linear, tree, star. Ethernet cable and the LVSD bus can be combined in the same topology.

Input (IN) and output (OUT) ports are indicated on the EtherCAT SLAVES For the cabling purpose. The interchange of these ports can cause serious operating problems.

EtherCAT HOST

The EtherCAT HOST software conducts the data exchange of the given application (CNC, Industrial controller) with its periphery (I/O modules, servo drives). This software connects the main application (e.g.: CNC controller) with the driver of the Ethernet controller.

The task of the EtherCAT HOST is the mapping of the network, identifying, configuring, parameter's setting of the SLAVE units, continuous monitoring of the proper operation of the EtherCAT network, correcting the error or sending error messages if needed. The EtherCAT HOST uses EtherCAT standard conformity XML files for identification and initialization of SLAVE units.

The XML file contains the manufacturer, identification number, input/output variables of the unit, dimensions, type, RAM addresses (the placement in the RAM) and other data of the variables.

After turning on the EtherCAT HOST reads the ID of the units from the EEPROM, and compares it to the data in the XML file, in order to identify the device, and based on the description in the XML it initializes the network, including its every unit. Furthermore it is the HOST's task to manage the status of the EtherCat network.

Operating status of SLAVE units, displaying operating statuses

Minden EtherCAT SLAVE egységen (hajtás, EPU), vagy modulon található egy Run LED, amely a 4 lehetséges státusz valamelyikét mutatja, továbbá annyi Link/Act LED ahány EtherCAT (RJ45 vagy LVDS) csatlakozó van az adott egységen.

There is a Run LED on every EtherCAT SLAVE unit (servo drive, EPU) or module, that shows one of the 4 possible statuses, furthermore there are as many Link/Act LEDs as EtherCAT (RJ45 or LVDS) connectors mounted in the unit.

Statuses of the RUN LED:

1. INIT status: Run LED does not light
2. PRE-OPERATIONAL status: Run LED blinks
3. SAFE-OPERATIONAL status: Run LED flashes
4. OPERATIONAL status: Run LED lights continuously

INIT (Run LED does not light): the initialization of EtherCAT slave chips, adjusting registers. The chips gets in this state after turning on.

PRE-OPERATIONAL (Run LED blinks): not real-time data exchange, mailbox communication. This state is suitable for parameterization of the units.

SAFE-OPERATIONAL (Run LED flashes): real-time data exchange, but the outputs are not set, they are in safe operation, the inputs are updated constantly.

OPERATIONAL (Run LED lights continuously): working condition, complete real-time operation, the outputs and the inputs are continuously updated.

Statuses of the Link/Act LED:

1. Link/Act LED does not light: the connector of unit does not connected
2. Link/Act LED lights continuously: that connector of unit has been connected
3. Link/Act LED blinks: data transfer through that connector

EtherCAT SLAVE

The EtherCAT SLAVES can be simple or complex units as well.

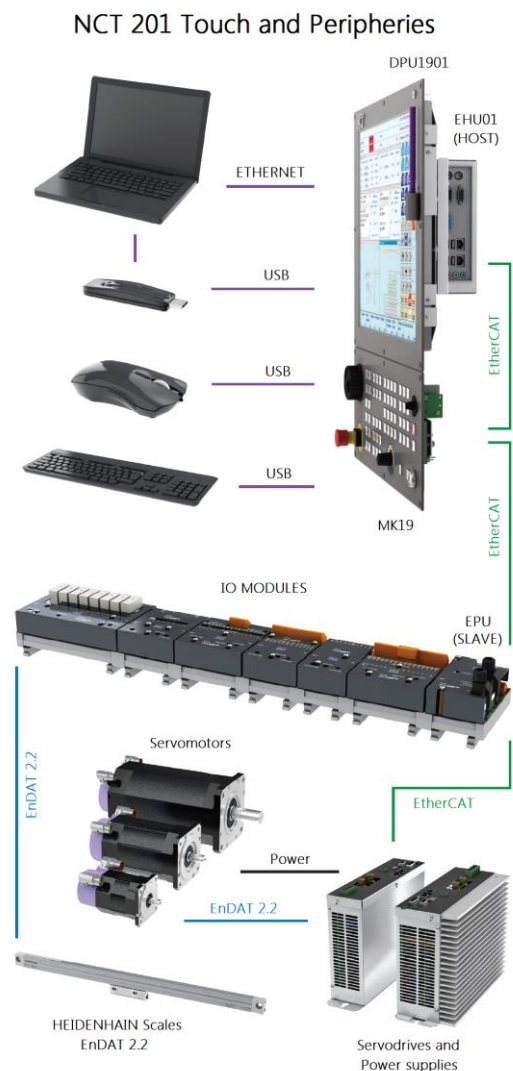
The simple SLAVE (e.g.: I16, O16) does not contain any intelligent part besides of the EtherCAT chip; the interface of the chip directly functions as a data I/O port.

The complex SLAVE (e.g.: TTLAI, SENS DANI) contains other intelligent parts, micro controller (e.g. DSP), which connects to the EtherCAT chip via a parallel or a SPI bus. With these kind of units higher-level protocols can be achieved on the EtherCAT bus (e.g: CoE: CANopen over EtherCAT, SoE: SERCOS over EtherCAT, EoE: Ethernet over EtherCAT, etc.).

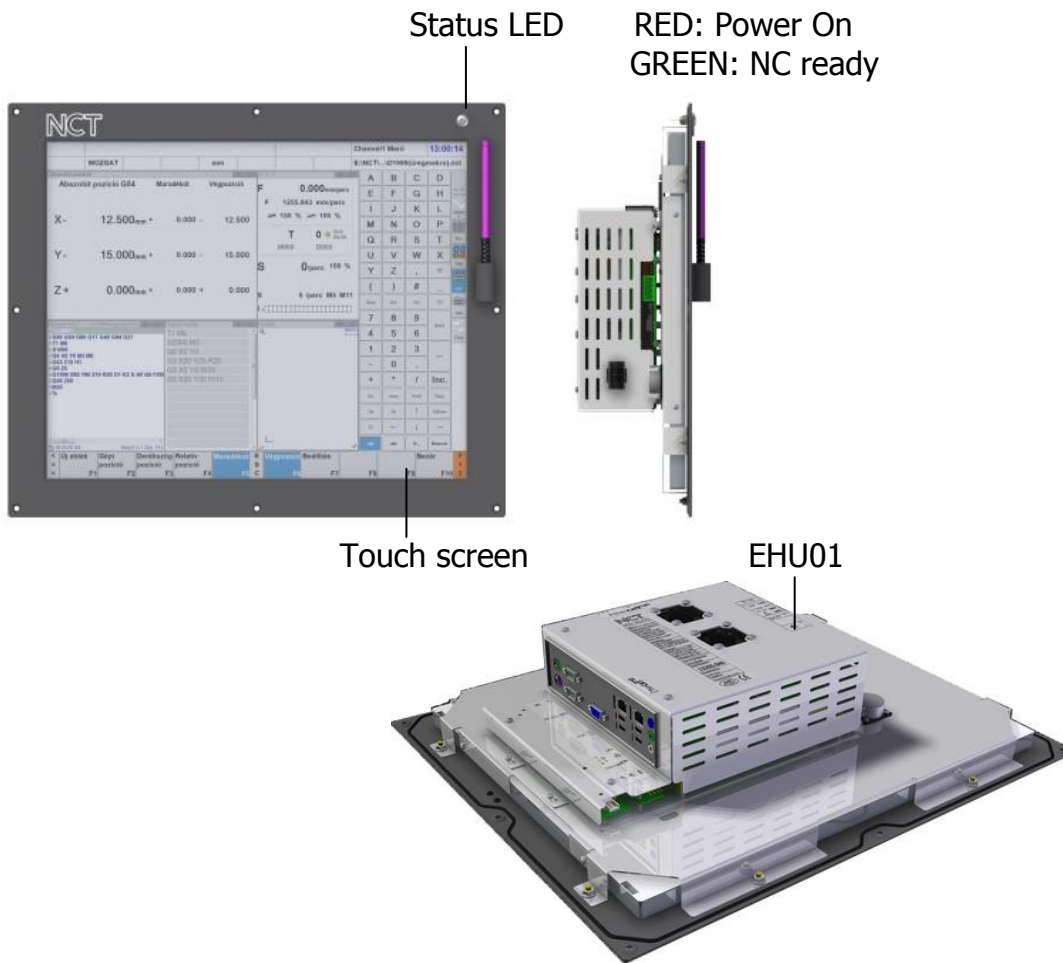
The registers of the SLAVES (the RAM space) can be addressed from the HOST by the following 3 ways:

1. By the position of the device: the address consists of 2 parts, the first gives the address according to the stringing order, and the second addresses the RAM on the given device.
2. By the address of the device: the address consists of 2 parts, the first is its own address that is stored in the EEPROM, and the other addresses the RAM on the given device.
3. By global addressing: from a 32 bit logical address, the memory manager (FMMU) in the SLAVE recognizes, that the given logical address belongs to it, and which local address should be assigned to it. In this case the FMMU unit should be initializing in HOST INIT state. This addressing mode makes the process (real-time) data management manageable in the case of several SLAVE units.

The clock on the units with nanosecond precision can synchronize several SLAVE units. By synchronizing the clocks in the SLAVE units, it can be ensured, that a given event occurs on different SLAVES at the same time (e.g.: the outputs update at the same time on every unit). Time stamp can also be assigned to an event, which makes the data processing accurate



DPU1901 / 19" Display and Processor Unit



Status LED

RED: Power On
GREEN: NC ready

Touch screen

EHU01

The DPU1901 is a TOUCH SCREEN control panel, display and central electronic in one unit. The electronic is an EHU01 unit located behind the display and connected to it via LVDS. There are 2 fans built into the standard version of the EHU01 to ensure smooth temperature distribution. If the unit is mounted into the closed metal box, it does not require further active cooling, or additional fans.

A separate optional panel with 3 pieces of USB ports can be applied to the DPU1901 unit.

There is a touch pen located on the right side of the DPU1901 unit.

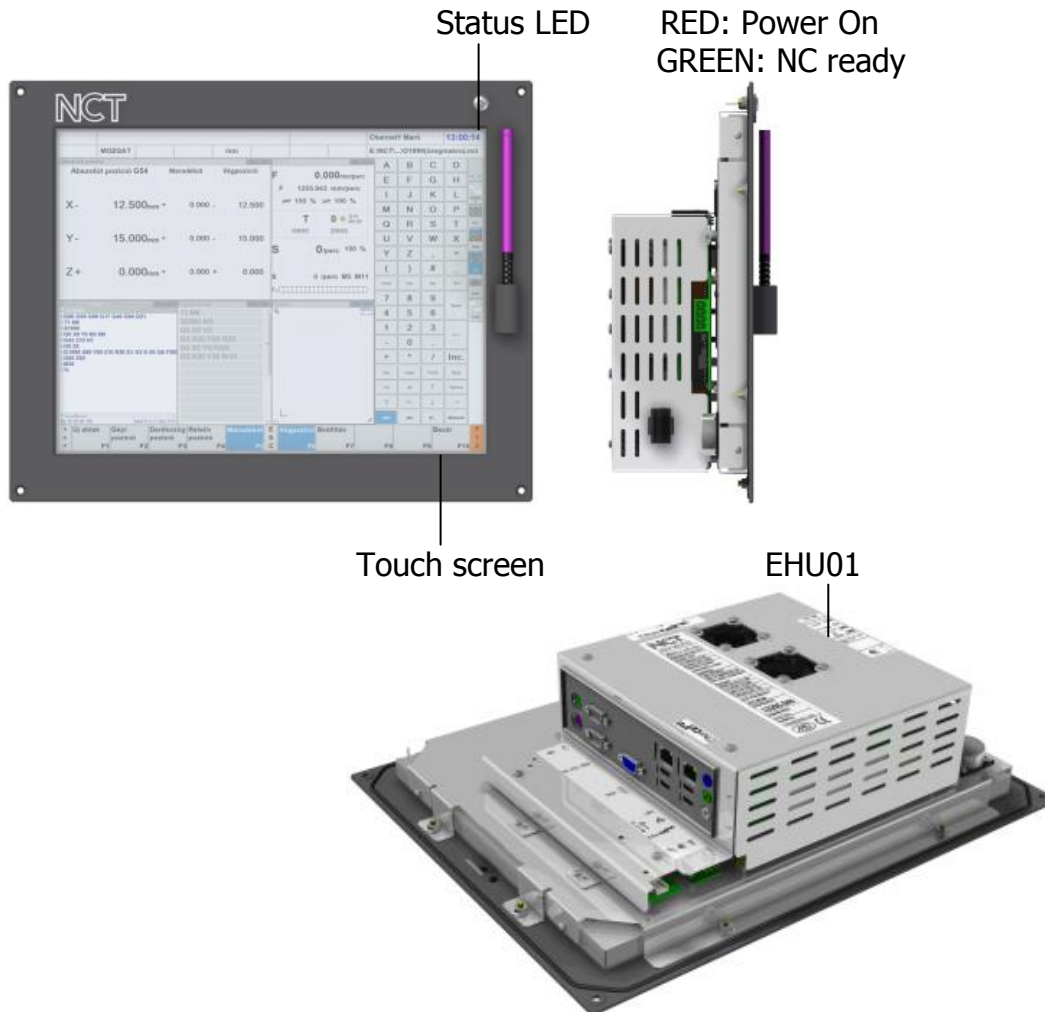
Unit can be connected to EtherCAT peripherals by 1 piece of EtherCAT connector and it can be connected to the computer network by 1 piece of Ethernet connector. There is a built in speaker in the unit, which give click sound after the releasing pushbuttons and sounds beep after touch probe touching. Sound files can be played via speaker connectot of the EHU01 unit. Later the VOICE ADVISER application will be built in.

WINDOWS CE operating system and software developed under this system NCT 201 are placed in a single device Compact Flash (CF).

In the basic version, data entry is via a virtual keyboard, shown on the display. The touch screen is protected by a self-adhesive foil

Model	DPU1901
NCT part No. (order number)	40-000011538-00
Screen size	19"
Control unit	EHU01
USB	3 pcs (optional, on the separate panel)
Speakers	1 pc.
Installation method	For panel mounting
Power supply voltage/Steady-state current/Inrush current	24 V DC/1,6 A/2,6 A
EtherCAT	1 piece 100 Mbit/s
Ethernet	1 piece 100 Mbit/s or 1 Gbit/s
Cooling fan	2 pcs in the EHU01
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	7.5 kg
Degree of protection IP/Degree of protection IP of the built in version	IP20 / IP54

DPU1501 / 15" Display and Processor Unit



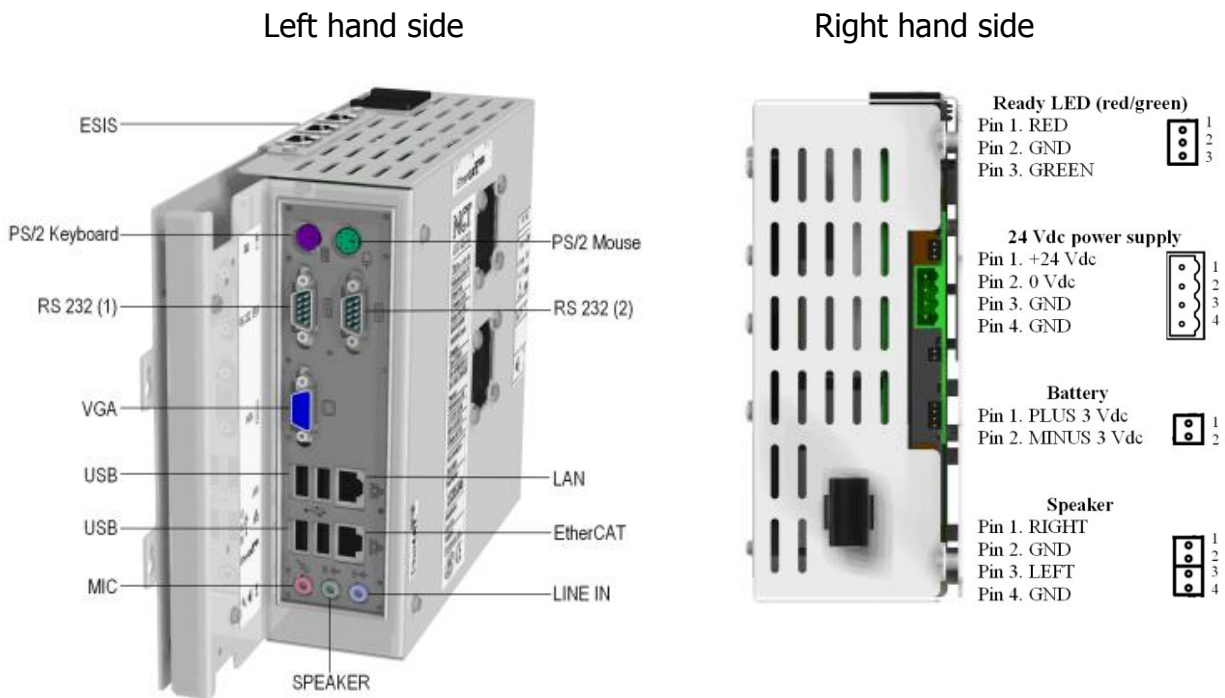
The DPU1501 is a TOUCH SCREEN control panel, display and central electronic in one unit. The electronic is an EHU01 unit located behind the display and connected to it via LVDS. There are 2 fans built into the standard version of the EHU01 to ensure smooth temperature distribution. If the unit is mounted into the closed metal box, it does not require further active cooling, or additional fans.

Unit can be connected to EtherCAT peripherals by 1 piece of EtherCAT connector and it can be connected to computer network by 1 piece of Ethernet connector. There is a built in speaker in the unit, which give click sound after the releasing pushbuttons and sounds beep after touch probe touching. Sound files can be played via speaker connectot of the EHU01 unit. Later the VOICE ADVISER application will be built in.

WINDOWS CE operating system and software developed under this system NCT 201 are placed in a single device Compact Flash (CF). In the basic version, data entry is via a virtual keyboard, shown on the display. The touch screen is protected by a self-adhesive foil

Model	DPU1501
NCT part No. (order number)	40-00011538-01
Screen size	15"
Control unit	EHU01
USB	3 pcs (optional, on the separate panel)
Speakers	1 piece
Installation method	For panel mounting
Power supply voltage/Steady-state current/Inrush current	24 VDC/1.6 A/2.6 A
EtherCAT	1 piece 100 Mbit/s
Ethernet	1 piece 100 Mbit/s or 1 Gbit/s
Cooling fan	2 pcs in the EHU01
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	5.0 kg
Degree of protection IP/Degree of protection IP of the built in version	IP20 / IP54

EHU01 / EtherCAT Host Unit (CPU)



EHU01 is the HOST unit (EtherCAT Host Unit) of EtherCAT (Ethernet for Control Automation Technology) network. Industrial applications need high reliability, low consumption, minimal heat generation, in addition real-time data management requires high CPU speed which supported by the industrial personal computer (IPC) constructed with Intel Atom CPU and Intel chip set. There are 2 fans built into the standard version of the EHU01 to ensure smooth temperature distribution. The CPU has got 2 pieces of Ethernet connectors. One of them is EtherCAT, the other one is connect the unit to general purpose 100 Mbit or super-high speed Gigabit Ethernet network. In the basic version the display connected to the LVDS by a special cable, suitable for direct connection, but the conventional VGA connector is also available for using PC monitor.

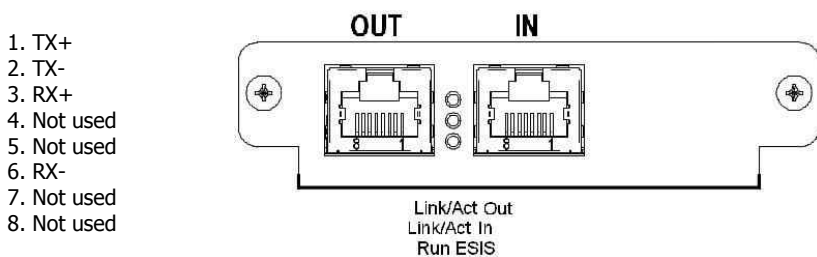
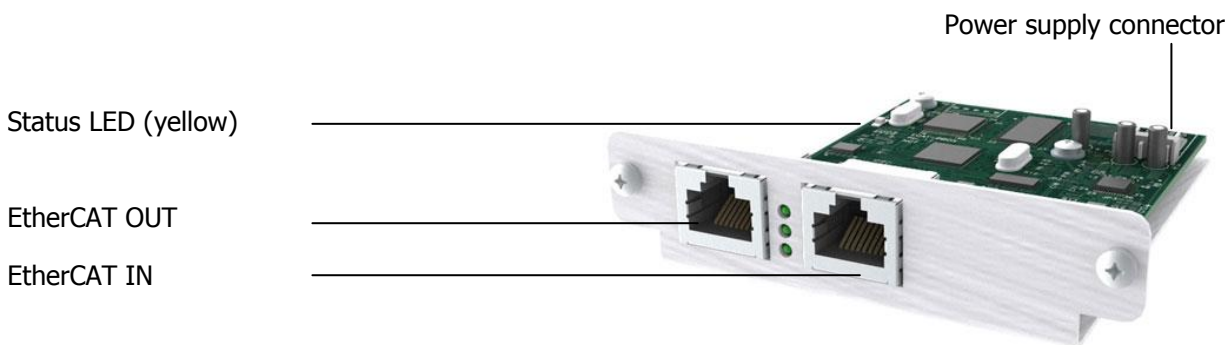
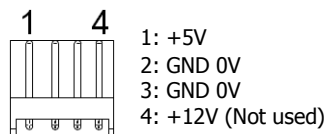
Lithium battery, located outside of the cover is used for powering electronics that still work after turning off the unit (clock, memory). The battery should be replaced approximately every 2-5 years, without switching off the unit or disassembling the cover.

The unit has mounting surface for the power supply of LCD display and the touch screen interface electronics.

There are mounting holes (keyholes) on both sides of the unit. The narrow part of this holes should be oriented upwards when mounting the unit.

Model	EHU01
NCT part No. (order number)	40-00010381-00
CPU	INTEL ATOM N270 processor
Chip set	Intel
Motherboard	Mini-ITX
DRAM memory	1 GB
L2 CACHE	512 KB
Hard disc	16 GB CF memory
USB	4 db USB 2.0
Operation system	WINDOWS Compact Embedded
Screen output terminal	VGA, LVDS
Ethernet	2 pcs Realtek Gigabit LAN
Software	NCT 201
Power supply voltage/Steady-state current/Inrush current	24 V DC/1.3 A/2.6 A
Cooling fan	2 pcs
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	1.9 kg
IP protection rating	IP20

ESIS / EtherCAT Software Integrity Slave unit



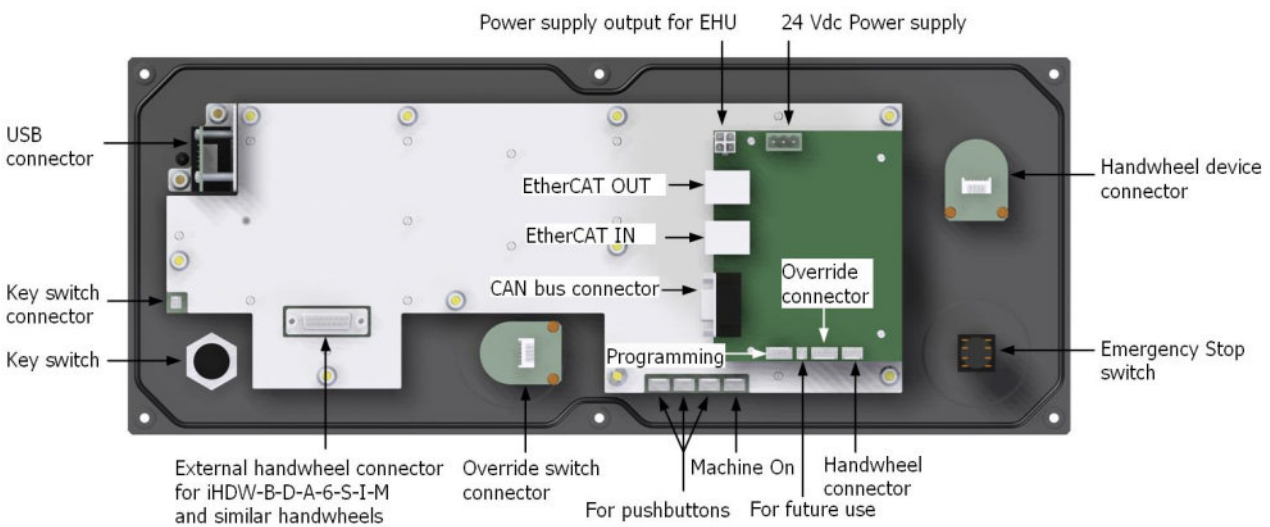
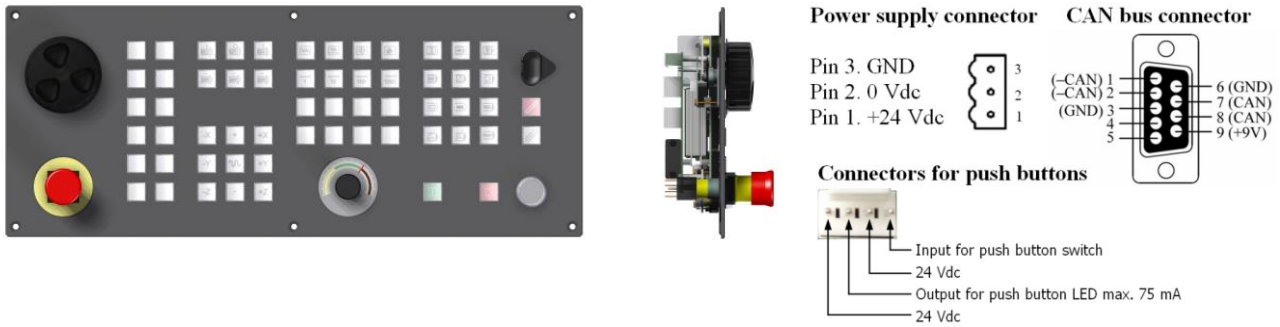
SLAVE unit for special purposes connected to NCT EtherCAT network. It has got 2 pieces of RJ 45 connectors: EtherCAT input and output

Functions:

1. Non-volatile high speed read-write memory for saving dynamically changing data of CNC software, it can be written by unlimited cycles.
2. This unit contains the list of options purchased by customer of CNC software. The customer can upgrade the list after purchasing new feature by writing code sent by NCT (software protection key function).
3. Handling of the operational time limit. (Paybit)

Model	Description	NCT part No. (order number)
ESIS	ESIS software protection slave unit (EtherCAT Software Integrity Slave) which can be sold as spare part only, without software.	40-00011540-99
ESIS-SW201	Basic option: ESIS SLAVE UNIT + NCT 201 SYSTEM SOFTWARE LICENCE This item includes the ESIS unit and the NCT 201 basic software configuration: 2 axes and 1 spindle in case of lathe and 3 axes and 1 spindle or 4 axes in case of mill. All the NCT 201 software options are included except options in the ESIS-201-OPxx option's list.	40-00011540-00
ESIS-SW201-OP01	NCT 201 SOFTWARE OPTION 01 Basic option + 1 axis or 1 spindle	40-00011540-01
ESIS-SW201-OP02	NCT 201 SOFTWARE OPTION 02 Basic option + 1 channel	40-00011540-02
ESIS-SW201-OP03	NCT 201 SOFTWARE OPTION 03 Basic option + Measuring and digitizing in the machine tool with touch probes	40-00011540-03
ESIS-SW201-OP04	NCT 201 SOFTWARE OPTION 04 Basic option + High Speed and High Precision Contouring	40-00011540-04
ESIS-SW201-OP05	NCT 201 SOFTWARE OPTION 05 Basic option + 5D machining	40-00011540-05

MK19 / Machine Operator Keyboard, placing under the DPU19xx



The machine builder can connect any machine keyboard to the DPU unit. It is not necessary to buy one of the recommended models from NCT. The system software allows creating your own machine operation panel through INPUT/OUTPUT PLC lines, by combination virtual buttons shown on the touch screen and the real buttons.

Besides of conventional NCT operating devices (HANDWHEEL, FEED OVERRIDE, JOG, MODE CHANGING BUTTONS, EMERGENCY STOP etc.) there are 20 pieces of free-use buttons and a key switch on the MK19 Machine Keyboard Panel.

All buttons of the NCT machine operation panel with LED light, which provides excellent visibility of buttons from any direction.

The operating panel electronics requires 24VDC power supply voltage. The buttons, LEDs and the OVERRIDE switch are connected to the panel electronics.

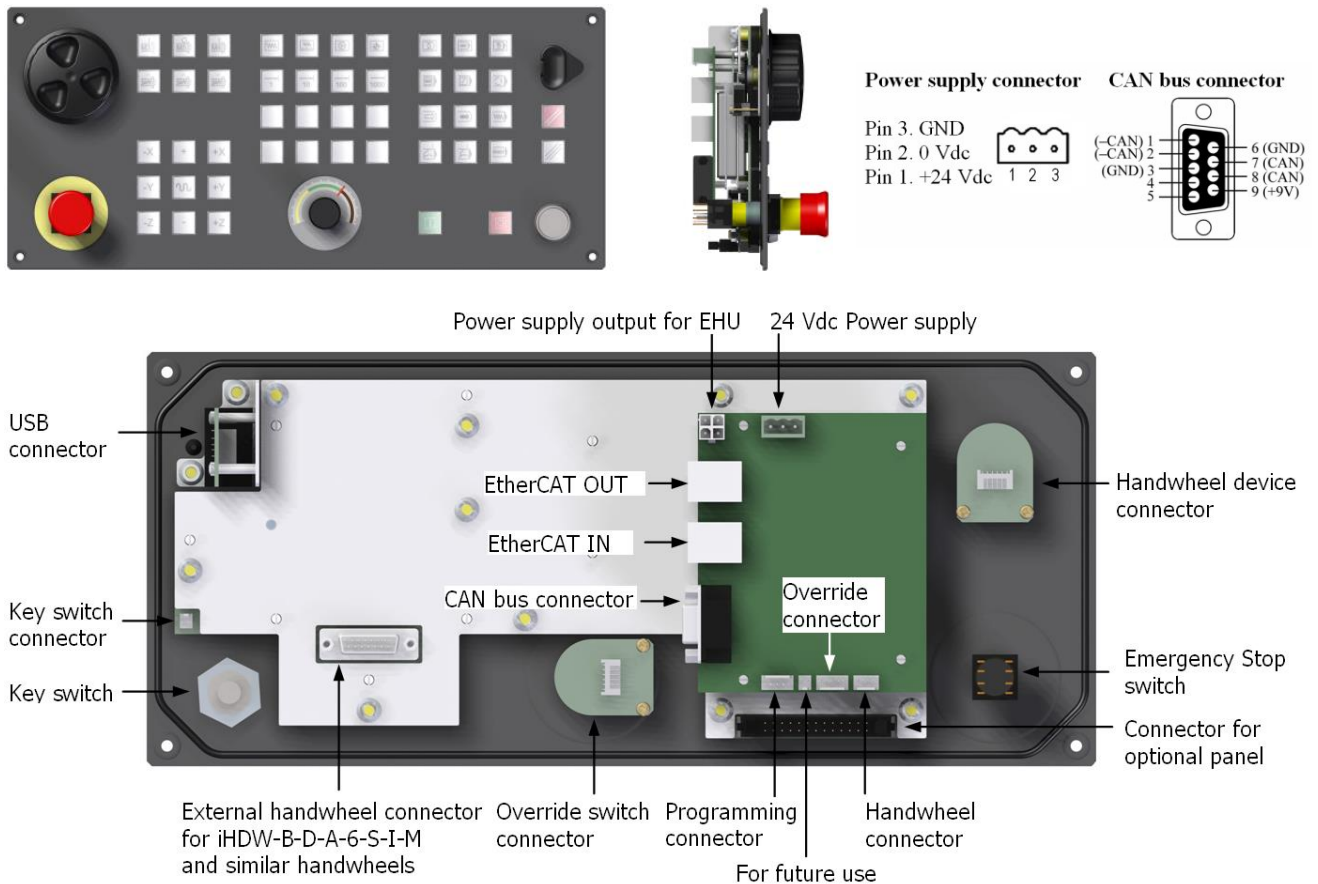
MK19 panel has two handwheel connections (one TTL and one CAN BUS) and one external handwheel connector.

The machine keyboard panel can be connected to the DPU1901 (containing the EHU01 central electronics) through 2 pieces of RJ45 connectors (EtherCAT IN and OUT) on the standard EtherCAT line.

USB connector on the MK19 panel can be used only in case you connect it to the one of the USB connectors on the EHU01 unit.

Model	MK19
NCT part No. (order number)	40-00010400-00
Number of buttons	59
Life cycle of buttons / manufacturer	10 ⁷ pushings / ALPS
LED light	Every button
Mounted buttons	Emergency Stop, Key switch
Handwheel connection	TTL, CAN BUS, External
Installation mode	For panel mounting
Power supply voltage/input current	24 VDC/0.4 A
Built-in handwheel	Optional
EtherCAT	IN/OUT 100 MB
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	3.0 kg
IP protection rating	IP20
IP protection rating of the built in version of the unit	IP54

MK15 / Machine Operator Keyboard, placing under the DPU15xx



The machine builder can connect any machine keyboard to the DPU unit. It is not necessary to buy one of the recommended models from NCT. The system software allows creating your own machine operation panel through INPUT/OUTPUT PLC lines, by combination virtual buttons shown on the touch screen and the real buttons.

Besides of conventional NCT operating devices (HANDWHEEL, FEED OVERRIDE, JOG, MODE CHANGING BUTTONS, EMERGENCY STOP etc.) there are 8 pieces of free-use buttons and a key switch on the MK15 Machine Keyboard Panel.

All buttons of the NCT machine operation panel with LED light, which provides excellent visibility of buttons from any direction.

The operating panel electronics requires 24VDC power supply voltage.

MK15 panel has two handwheel connections (one TTL and one CAN BUS) and one external handwheel connector.

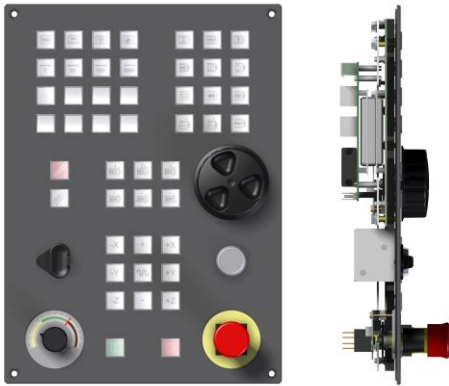
The machine keyboard panel can be connected to the DPU1501 (containing the EHU01 central electronics) through 2 pieces of RJ45 connectors (EtherCAT IN and OUT) on the standard EtherCAT line.

USB connector on the MK15 panel can be used only in case you connect it to the one of the USB connectors on the EHU01 unit.

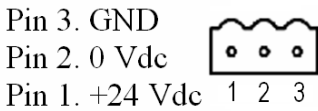
The number of buttons can be increased by the Optional Panel MK15OP.

Model	MK15
NCT part No. (order number)	40-00010400-01
Number of buttons	47
Life cycle of buttons / manufacturer	10 ⁷ pushings / ALPS
LED light	Every button
Mounted buttons	Emergency Stop, Key switch
Handwheel connection	TTL, CAN BUS, External
Installation mode	For panel mounting
Power supply voltage/input current	24 VDC/0,4 A
Built-in handwheel	Optional
EtherCAT	IN/OUT 100 MB
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	2.35 kg
IP protection rating	IP20
IP protection rating of the built in version of the unit	IP54

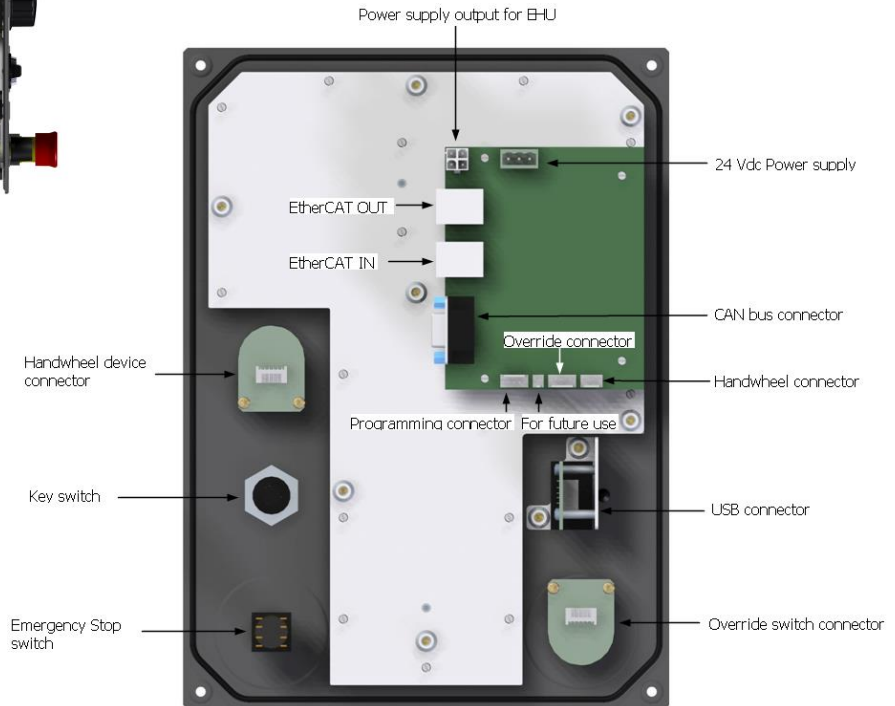
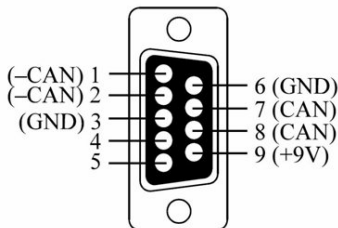
MK15V / Machine Operator Keyboard, placing on the left or right



Power supply connector



CAN bus connector



The machine builder can connect any machine keyboard to the DPU unit. It is not necessary to buy one of the recommended models from NCT. The system software allows creating your own machine operation panel through INPUT/OUTPUT PLC lines, by combination virtual buttons shown on the touch screen and the real buttons.

Besides of conventional NCT operating devices (HANDWHEEL, FEED OVERRIDE, JOG, MODE CHANGING BUTTONS, EMERGENCY STOP etc.) there are 8 pieces of free-use buttons and a key switch on the MK15V Machine Keyboard Panel.

All buttons of the NCT machine operation panel with LED light, which provides excellent visibility of buttons from any direction.

The operating panel electronics requires 24VDC power supply voltage.

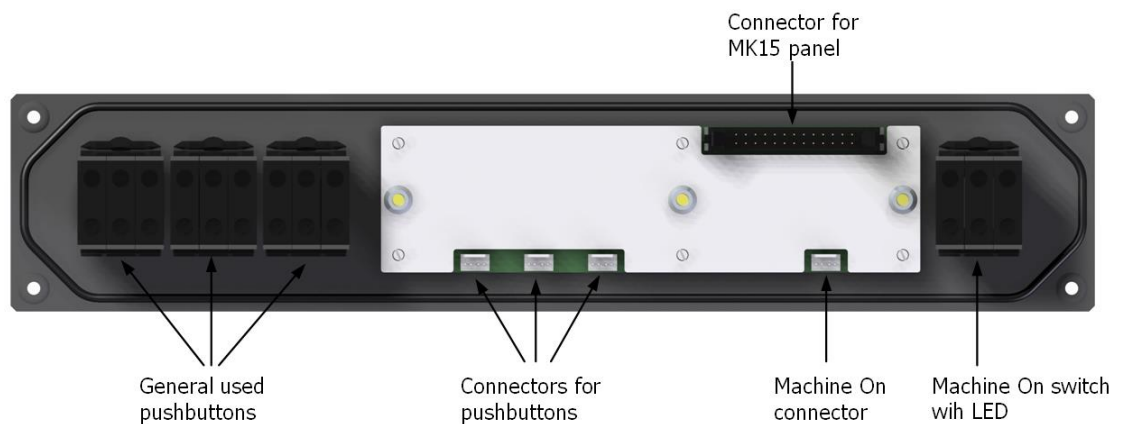
MK15V panel has two handwheel connections (one TTL and one CAN BUS).

The machine keyboard panel can be connected to the DPU1501 (containing the EHU01 central electronics) through 2 pieces of RJ45 connectors (EtherCAT IN and OUT) on the standard EtherCAT line.

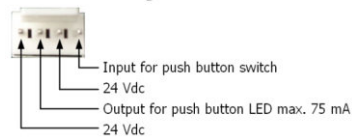
USB connector on the MK15V panel can be used only in case you connect it to the one of the USB connectors on the EHU01 unit.

Model	MK15V
NCT part No. (order number)	40-00010400-02
Number of buttons	47
Life cycle of buttons / manufacturer	10 ⁷ pushings / ALPS
LED light	Every button
Mounted buttons	Emergency Stop, Key switch
Handwheel connection	TTL, CAN BUS
Installation mode	For panel mounting
Power supply voltage/input current	24 VDC/0,4 A
Built-in handwheel	Optional
EtherCAT	IN/OUT 100 MB
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	2.5 kg
IP protection rating	IP20
IP protection rating of the built in version of the unit	IP54

MK15OP / 15" expansion machine operation panel



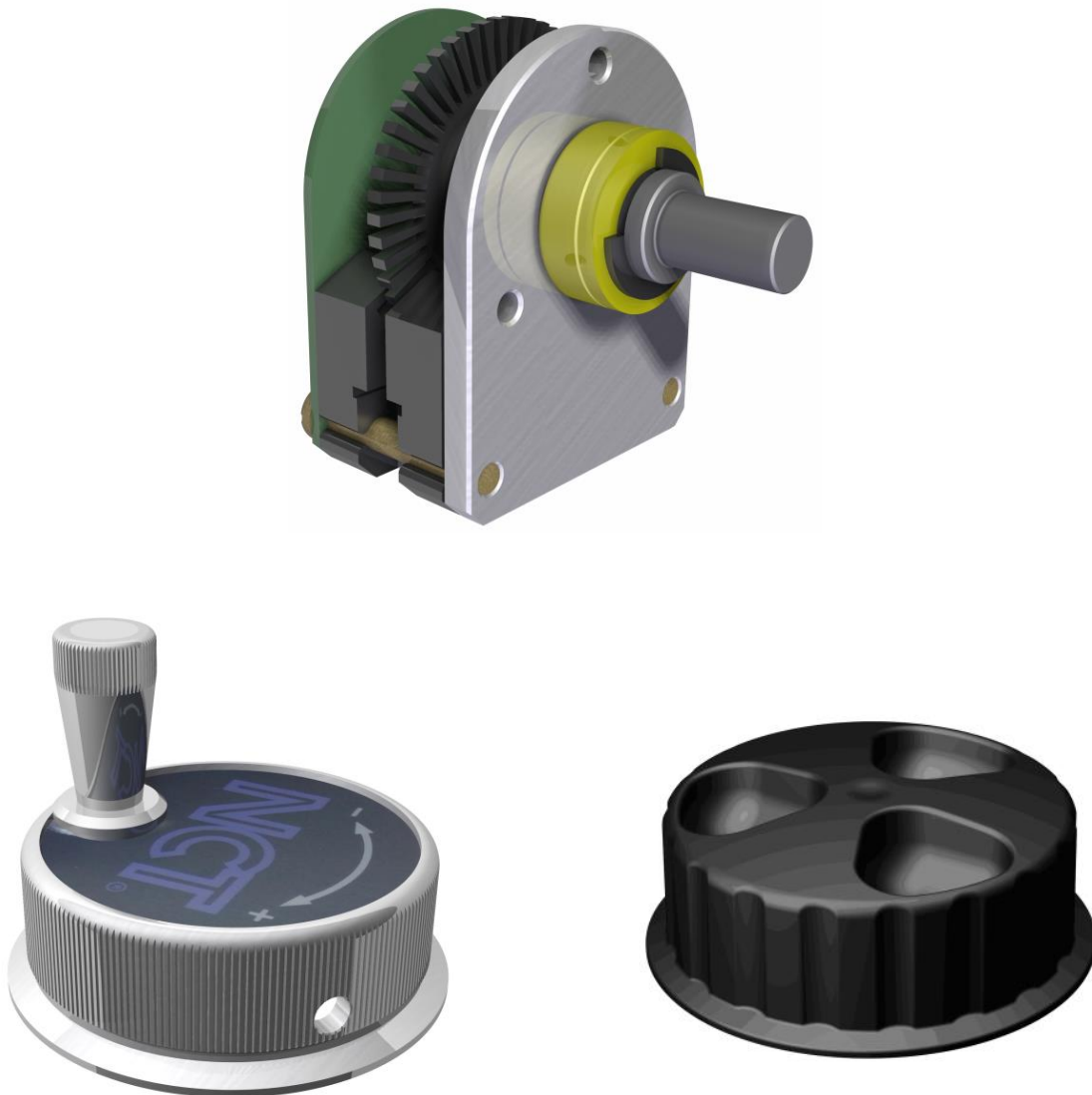
Connectors for push buttons



This is an additional panel for the increasing of the number of buttons for the Machine Keyboard Panel MK15. MK15OP panel contains 4 pieces of large buttons and 14 pieces of standard buttons. All buttons are equipped with LED light, which provides excellent visibility of buttons from any direction. MK15OP panel can be connected to the MK15 Machine Keyboard Panel by a ribbon cable.

Model	MK15OP
NCT part No. (order number)	40-00010400-03
Number of buttons	18
Life cycle of buttons / manufacturer	10 [^] 7 pushings / ALPS
LED light	Every button
Mounted buttons (4 pcs)	Machine On, general (e.g. Start/Stop)
Installation mode	For panel mounting
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	0.9 kg
IP protection rating	IP20
IP protection rating of the built in version of the unit	IP54

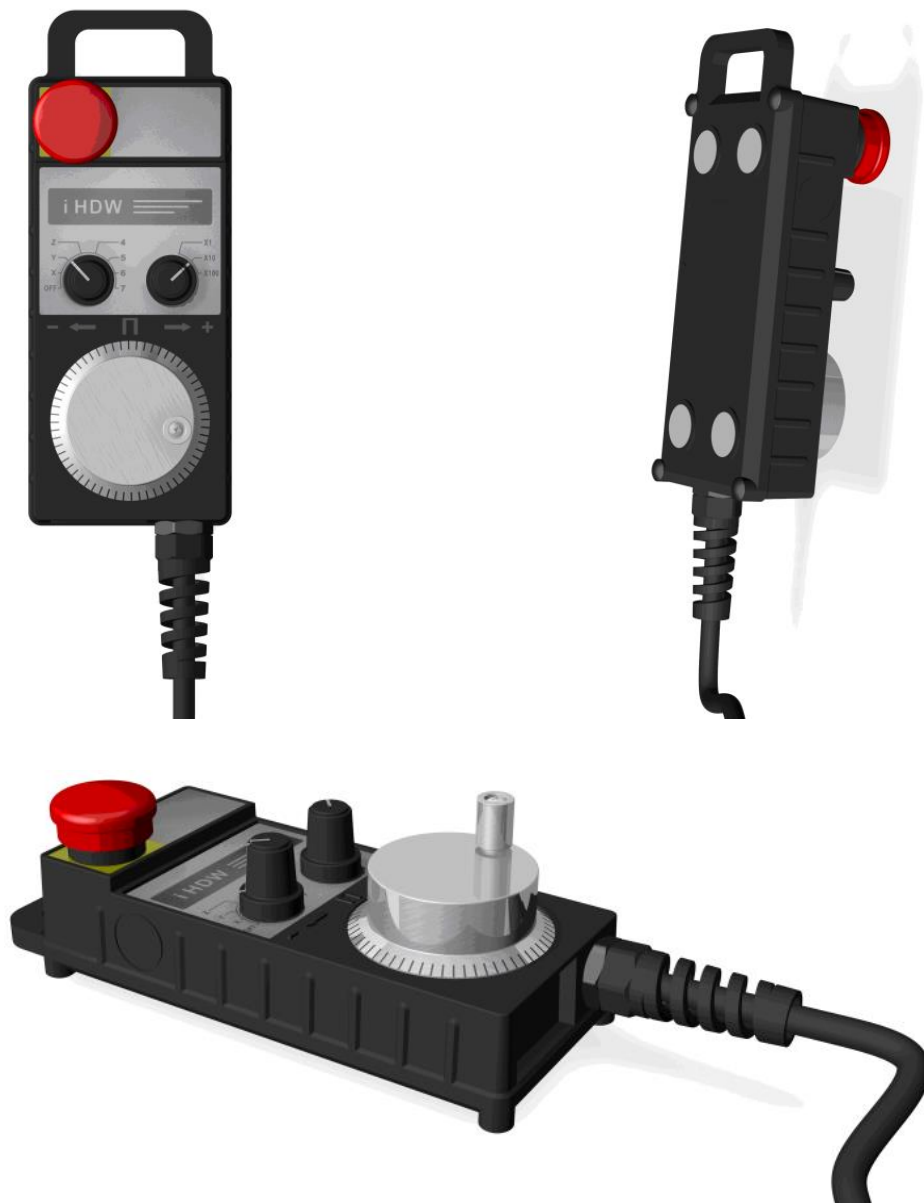
HWM / Built in magnetic handwheel



This magnetic handwheel can be built into the Machine Keyboard Panel. Handwheel HWM optionally can be mounted with two kind of rotary knobs. An aluminum knob with a crank and a plastic rotary knob can be chosen.

Model	HWM
NCT part No. (order number)	40-00011543-00
Output	TTL
Number of arresting	50
Stabilization	Magnetic
Measuring system	Magnetic
Power supply voltage/input current	5 Vdc/100 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	300 g
IP protection rating	IP20

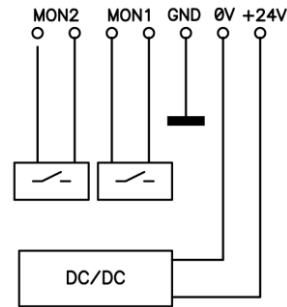
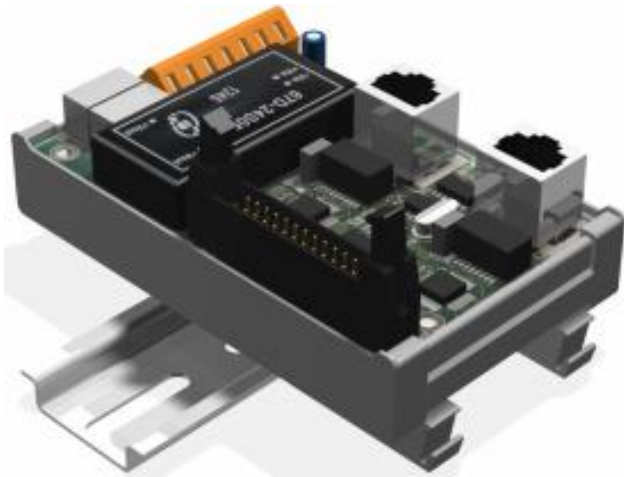
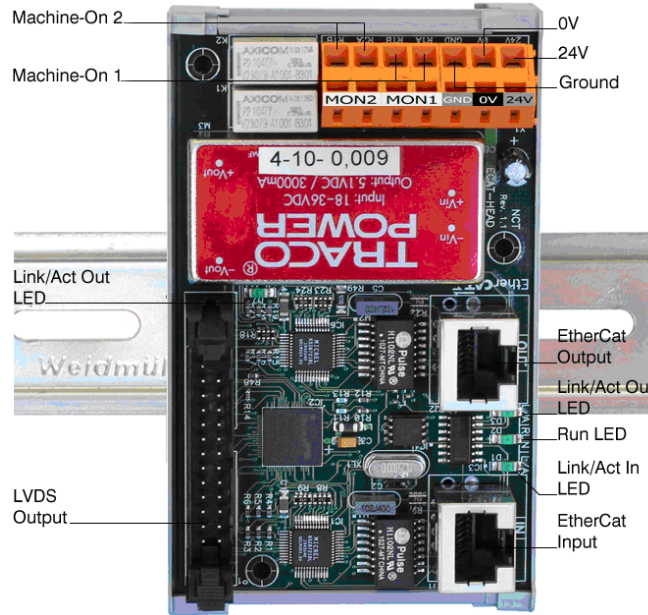
External Handwheel - iHDW



External handwheel iHDW can be connected to the Machine Keyboard Panel MK19 or MK15. This handwheel has four magnets on the bottom for more convenient fixation.

Model	iHDW-B-D-A-6-S-I-M
NCT part No. (order number)	40-00000025-01
Emergency Stop Switch	Yes
Axes selecting rotary switch	OFF, X, X, Z, 4, 5, 6
Inkremens/impulzes selection	1, 10, 100
Digital I/O signal level	24 Vdc
Number of impulses	100
Signal	A.B
Power supply voltage	5 Vdc
Input current	120 mA
Material of the case	Plastic
Operating/storing temperature/relative humidity	0...+50°C / -10...+70°C / 95% / RH35%/85%
Weight	1 kg
IP protection rating	IP65

EPU / EtherCAT Periphery coupler Unit



EtherCAT periphery coupler unit (EPU) is the locomotive of the train built from EtherCAT IO modules. It can be connected directly to STP cabling EtherCAT network. It has got 2 pieces of Ethernet (RJ45) connectors. One is the input and the other one is the output. The output of previous EtherCAT periphery connects to input, and output goes forward to the INPUT of the next EtherCAT periphery. We connect EtherCat units with STP cable (Shielded-Twisted-Pairs) and we use RJ45 connectors.

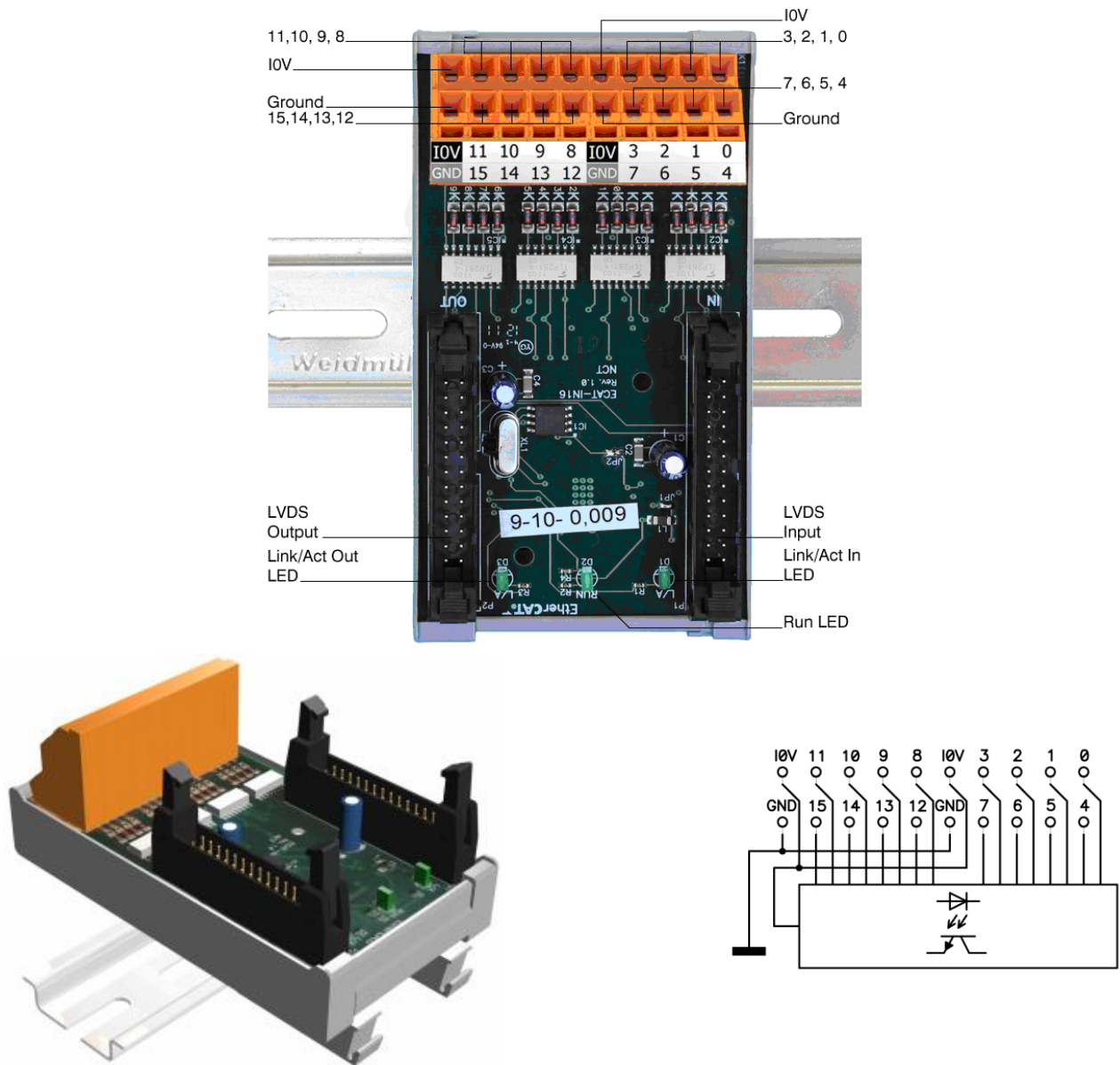
The task of this unit is coupling the high variety of IO modules to the EtherCAT bus. Besides of this it provides the power supply for the IO modules as well. The total current value determines the number of connectable units, which cannot be higher than the output current of the EPU unit.

The ready state of hardware and software units of each part of the whole EtherCAT network has shown in two relay outputs (Machine-On1 and Machine-On2) in each EPU units for better safety. If the ready status is reached, both relays are ON, and the output contacts are closed. If the status is not ready for operation, relays will open the contacts.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	EPU
NCT part No. (order number)	40-00010364-00
Max. load current of the LVDS bus	2.5 A
Input power	24 V (-15%/+20%)/max. 750 mA
Max. load on the Machine-On1 and Machine-On2 relays	24 V/2 A
Data transmission rate on Ethernet side (RJ45)	100 Mbaud
Operating/storage temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	140 g
IP protection rating	IP20

I16 / 16-channel input module, 1-wire connection

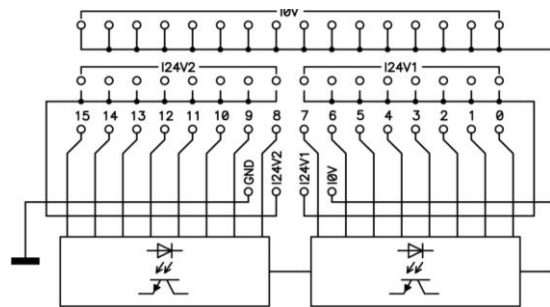
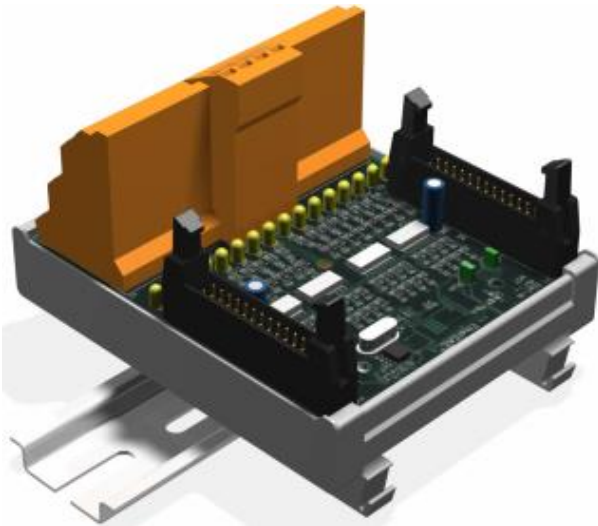
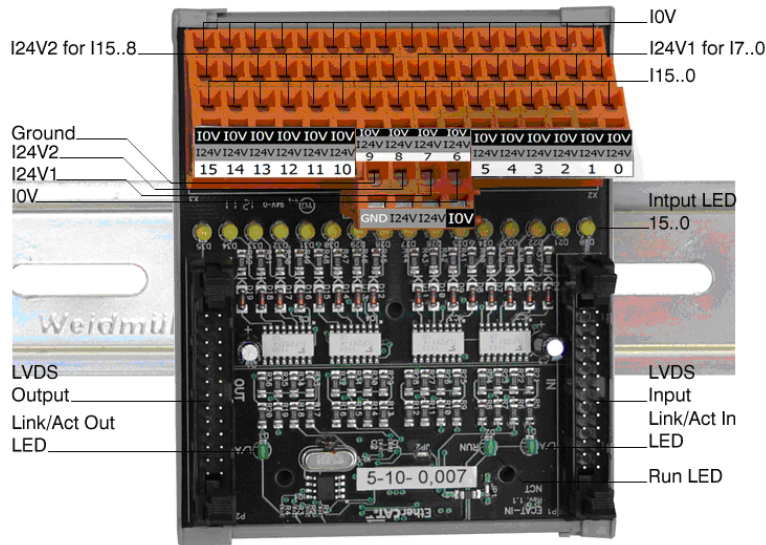


16-line digital input module, connected to EPU unit by LVDS bus (connection by flat-ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C” rail. It can receive 16 pieces of 24 VDC input signals (so-called PLC switching signal). Channels are galvanically isolated. The channels have no LED indication; their states are indicated by the display of the HOST unit.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	I16
NCT part No. (order number)	40-00010365-00
Number of inputs	16
„0” state signal level	0-10 VDC
„1” state signal level	15-30 VDC
Current consumption of the input line	10 mA
Input analogue delay	3 ms
Galvanic isolation	By optocoupler
Current consumption from the LVDS bus	100 mA
Operating/storage temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	100 g
IP protection rating	IP20

I16S / 16-channel input module, 3-wire connection

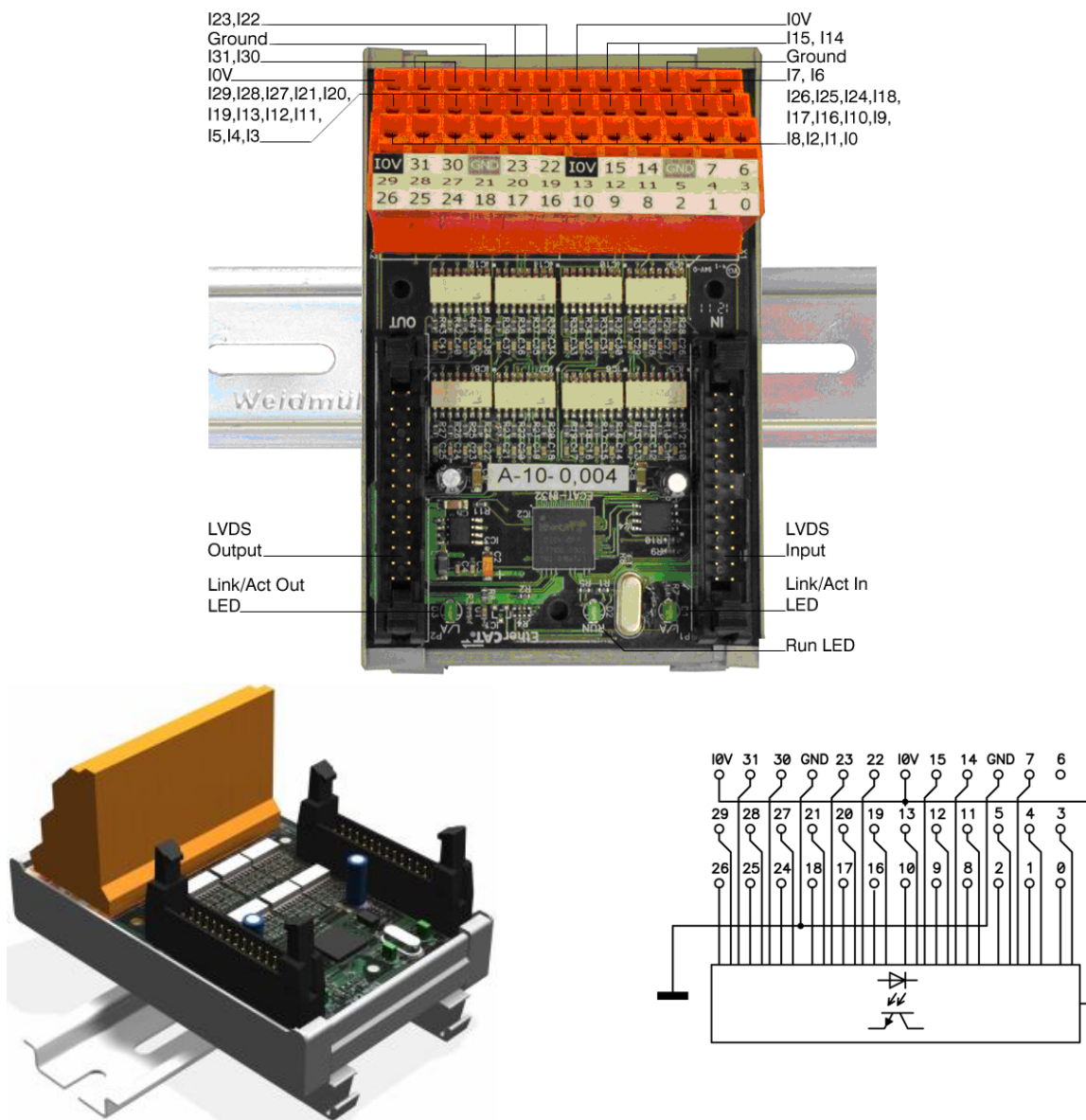


16-channel digital input module, connected to EPU unit by LVDS bus (connection by flat-ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C“ rail. It can receive 16 pieces of 24 VDC input signals (so-called PLC switching signal). Channels are galvanically isolated. The channels have LED indications. This input module is an ideal choice for inductive sensors and switches, because every input channel has a 0 V and a 24 VDC connecting point (the reason for 3-wire connection name).

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	I16S
NCT part No. (order number)	40-00010366-00
Number of inputs	16
„0“ state signal level	0-10 VDC
„1“ state signal level	15-30 VDC
Current consumption of the input line	10 mA
Input analogue delay	3 ms
Galvanic isolation	By optocoupler
Current consumption from the LVDS bus	100 mA
Operating/storage temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	145 g
IP protection rating	IP20

I32 / 32x1-channel input module, 1-wire connection

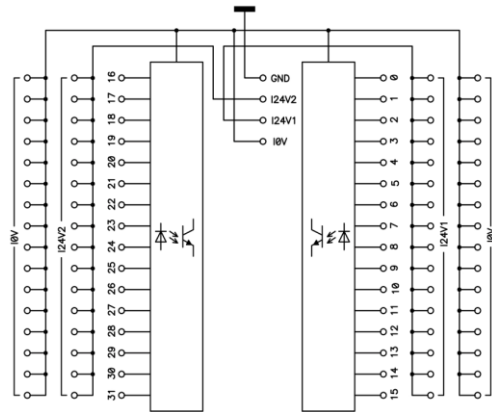
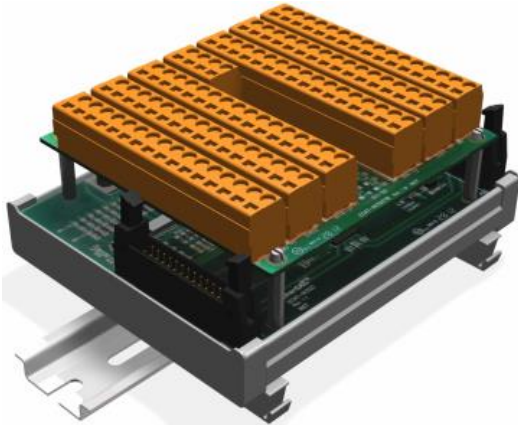
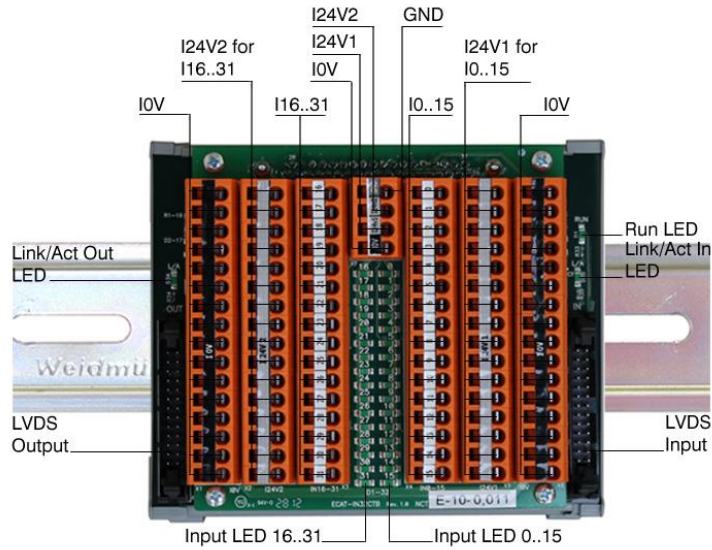


Input module, connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C” rail. It can receive 32 pieces of 24 VDC input signals (so-called PLC switching signal). Channels are galvanically isolated. The channels have no LED indication. States of the channels are indicated on the display of the HOST unit.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	I32
NCT part No. (order number)	40-00010367-00
Number of lines	32
„0” state signal level	0-10 VDC
„1” state signal level	15-30 VDC
Current drain on input line	10 mA
Input analogue delay	3 ms
Current consumption from LVDS bus	By optocoupler
Operating/storage temperature/relative humidity (without condensation)	70 mA
Weight	0...+55°C/-24...+85°C / 95%
IP protection rating	120 g
IP védettségi besorolás	IP20

I32S / 32-channel input module, 3-wire connection



Input module, connected to EPU via LVDS bus by flat ribbon cable. It can be placed in any position after EPU. It can be easily mounted mechanically to "C" rail.

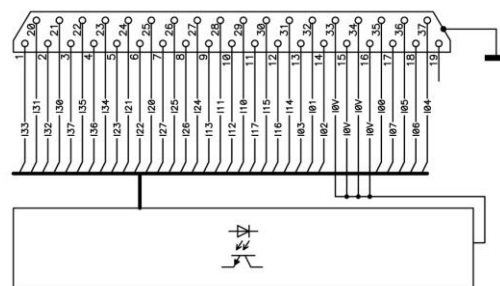
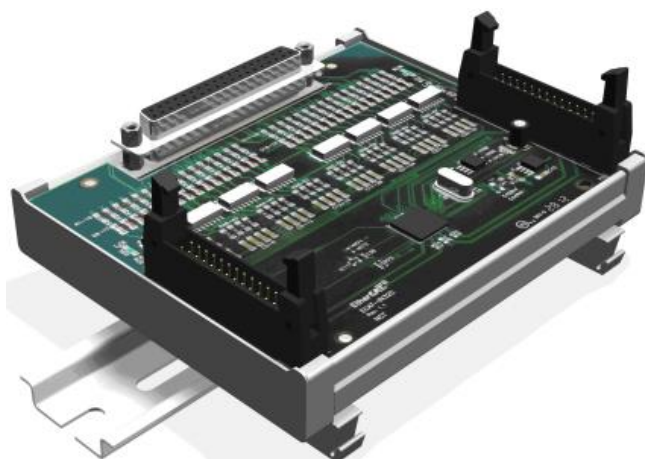
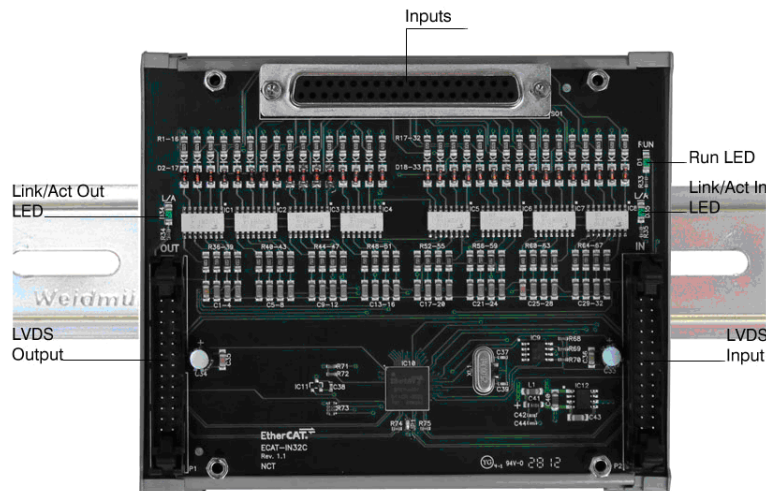
It can receive 32 pieces of 24 VDC input signals. Channels are galvanically isolated. The channels have LED indications. This input module is an ideal choice for inductive sensors and switches, because there are 0 V and a 24 VDC terminals for every input channel (the reason for 3-wire connection name).

The module consists of two pieces. The lower piece is the electronic board, the upper side includes the terminal connection points and the LEDs. Between the two parts there is a 37-pin D-SUB connector. Connector of the lower piece is compatible with the input connectors of the former NCT CNC controls, so it can be sold separately as well under the name I32C.

Further advantage of this unit is that the electronic part can be replaced without disconnection of the terminal wires. The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Megnevezés	I32S
NCT part No. (order number)	40-00010367-01
Number of lines	32
„0” state signal level	0-10 VDC
„1” state signal level	15-30 VDC
Current drain on input line	10 mA
Input analogue delay	3 ms
Galvanikus leválasztás	By optocoupler
Current consumption from LVDS bus	200 mA
Operating/storage temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	320 g
IP protection rating	IP20

I32C / 32-channel input module

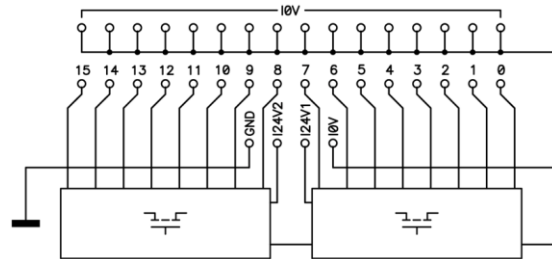
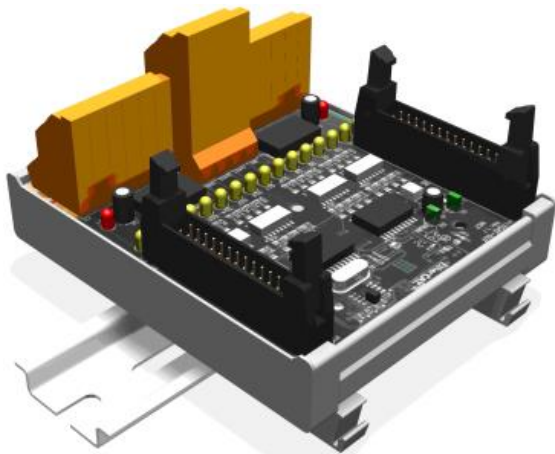
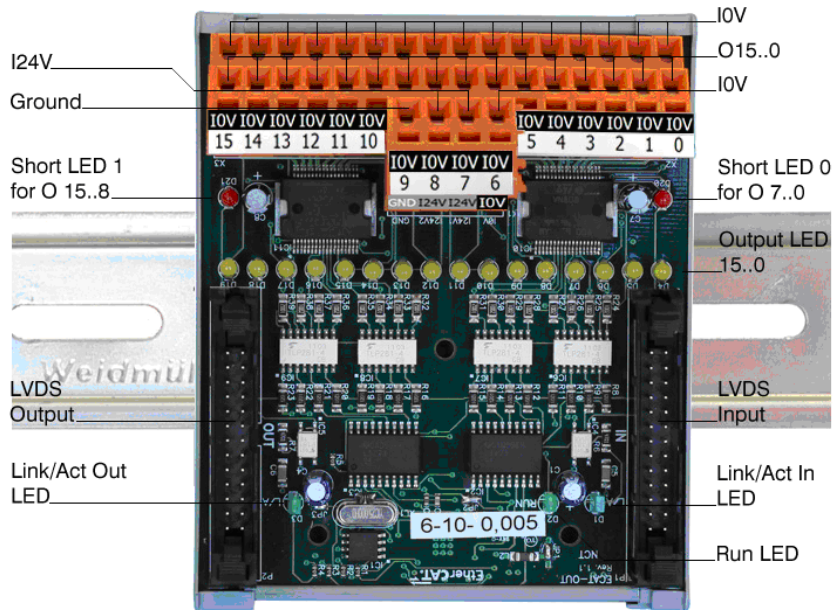


Input module, connected to EPU via LVDS bus by flat ribbon cable. It can be placed in any position after EPU. It can be easily mounted mechanically to "C" rail.
 It can receive 32 pieces of 24 VDC input signals. Channels are galvanically isolated. The 37-pin D-SUB connector is compatible with the INPUT connectors of the former NCT controls.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	I32C
NCT part No. (order number)	40-00010367-02
Number of lines	32
„0” state signal level	0-10 VDC
„1” state signal level	15-30 VDC
Current drain on input line	10 mA
Input analogue delay	3 ms
Galvanikus leválasztás	By optocoupler
Current consumption from LVDS bus	200 mA
Operating/storage temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	150 g
IP protection rating	IP20

O16 / 16-channel output module with transistor outputs



Output module, connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C” rail. It has 16 pieces of 24 VDC outputs switched by transistors. Channels are galvanically isolated. The signal states of channels are displayed by LED indications.

Short LED 1: lights= overload on lines 0-7

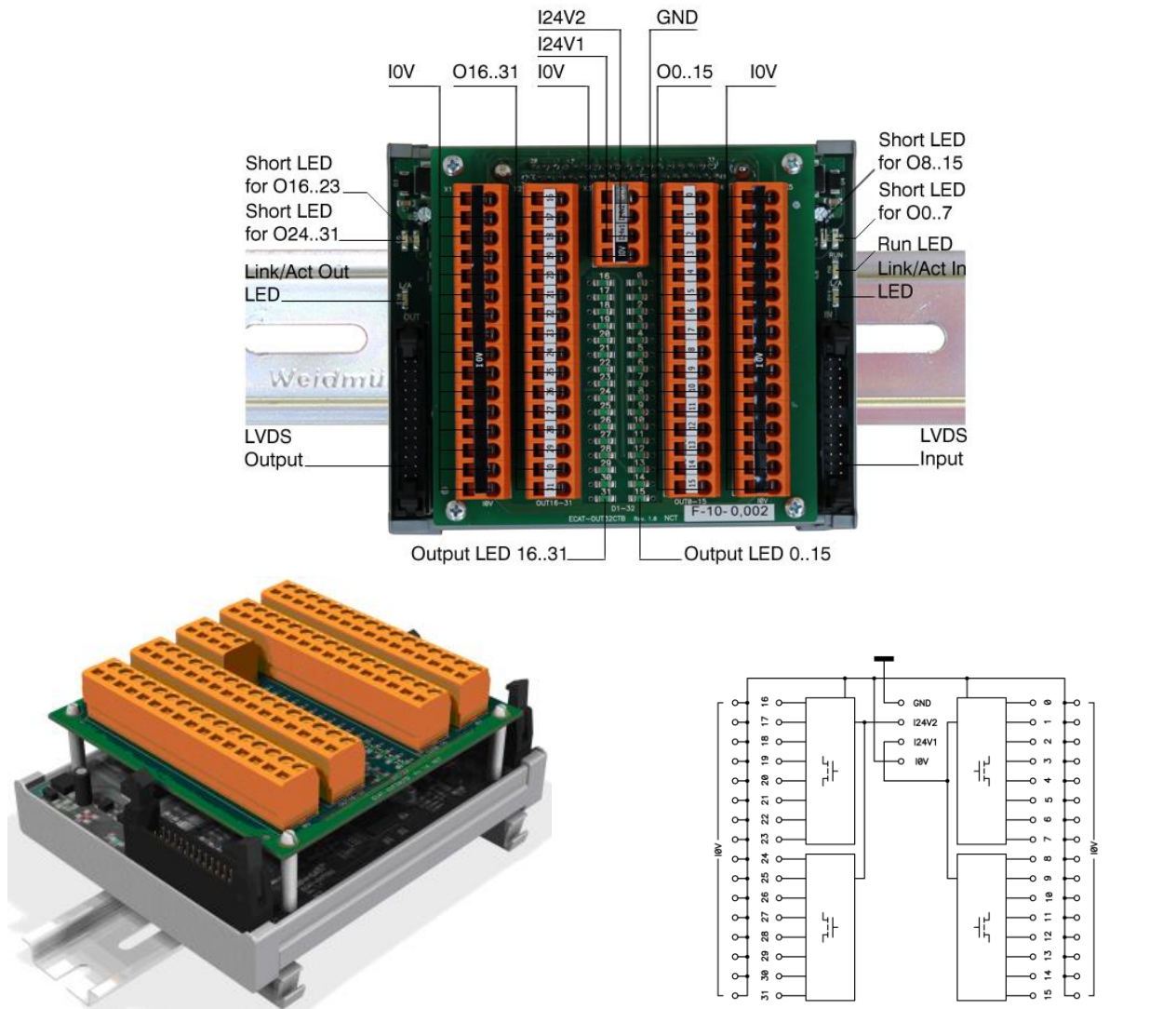
Short LED 2: lights= overload on lines 8-15

Output LED 0...15 lights: output is switched ON

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	O16
NCT part No. (order number)	40-00010368-00
Number of channels	16
Type of the output load	Resistive, inductive
Short-circuit protection	Overload protection per 8 channels
OFF state signal level	Break
ON state signal level	24 VDC (-15%/+20%)
Maximal load of the output line	500 mA
Current consumption from the LVDS bus	150 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	150 g
IP protection rating	IP20

O32S / 32-channel output module with transistor outputs



Output module, connected to EPU via LVDS bus by flat ribbon cable. It can be placed in any position after EPU. It can be easily clamped mechanically to "C" rail.

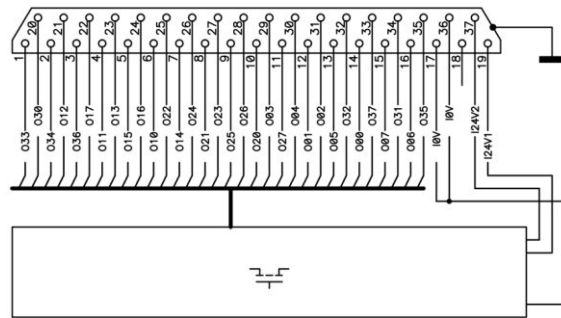
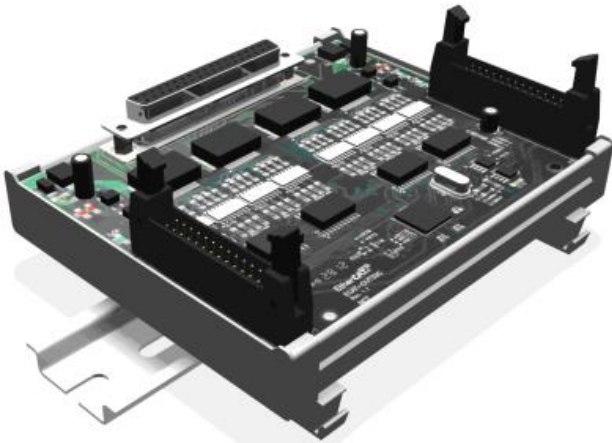
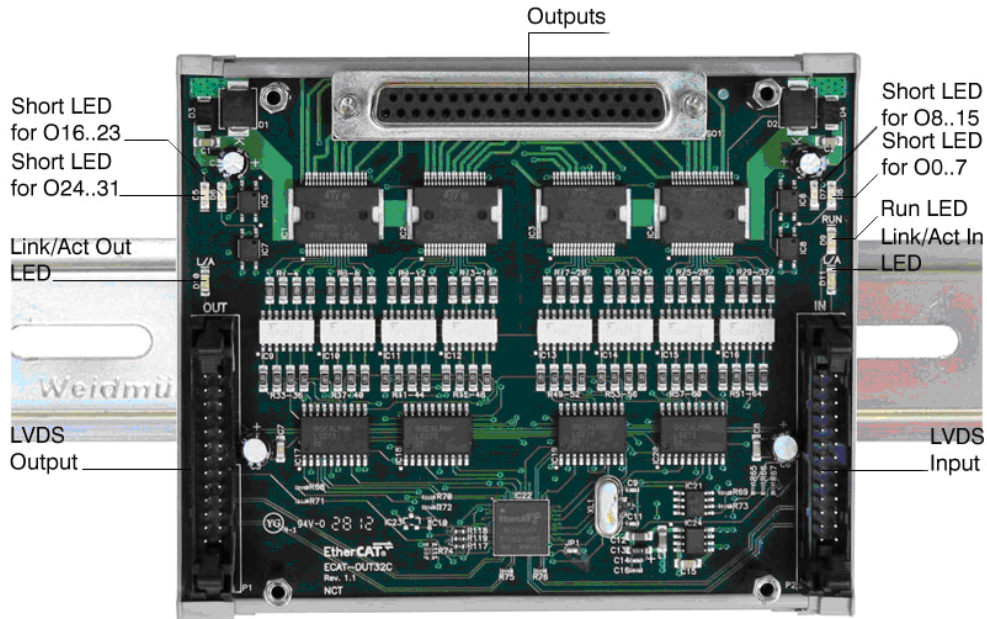
It has 32 pieces of 24 VDC/500 mA outputs switched by transistors. Channels are galvanically isolated. The signal states of channels are displayed by LED indications.

- Short LED 1: lights=overload on lines 0-7
- Short LED 2: lights= overload on lines 8-15
- Short LED 3: lights= overload on lines 16-23
- Short LED 4: lights= overload on lines 24-31
- Output LED 0...31 lights: output is switched ON

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue..

Model	O32S
NCT part No. (order number)	40-00010368-01
Number of channels	32
Type of the output load	Resistive, inductive
Short-circuit protection	Overload protection per 8 channels
OFF state signal level	Break
ON state signal level	24 VDC (-15%/+20%)
Maximal load of the output line	500 mA
Current consumption from the LVDS bus	300 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	300 g
IP protection rating	IP20

O32C / 32-channel output module with transistor outputs



Output module, connected to EPU via LVDS bus by flat ribbon cable. It can be placed in any position after EPU. It can be easily clamped mechanically to "C" rail.

It has 32 pieces of 24 VDC/500 mA outputs switched by transistors. Channels are galvanically isolated.

The 37 pin D-SUB connector is compatible with the OUTPUT connectors of the former NCT controls.

Short LED 1: lights= overload on lines 0-7

Short LED 2: lights= overload on lines 8-15

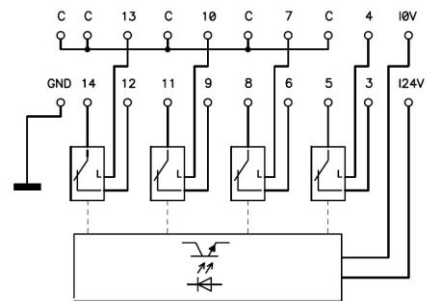
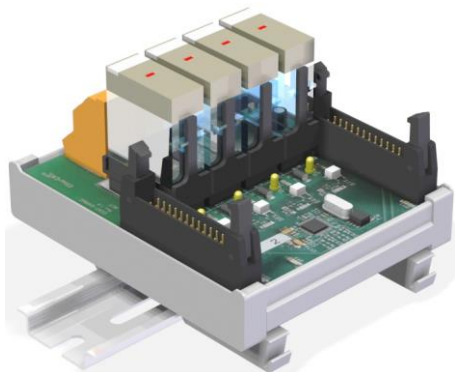
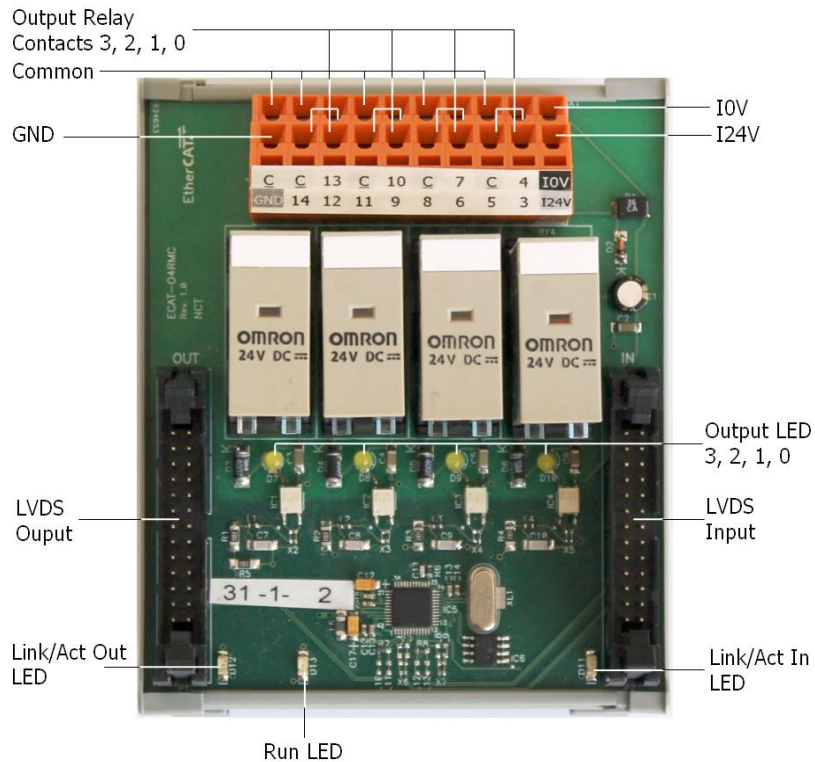
Short LED 3: lights= overload on lines 16-23

Short LED 4: lights= overload on lines 24-31.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	O32C
NCT part No. (order number)	40-00010368-02
Number of channels	32
Type of output load	Resistive, inductive
Short-circuit protection	Overload protection per 8 channels
OFF state signal level	Break
ON state signal level	24 VDC (-15%/+20%)
Maximal load of the output line	500 mA
Current consumption from the LVDS bus	300 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	150 g
IP protection rating	IP20

O4RM / 4 -channel Relay output module with Morse contact



Output relay module, connected to EtherCAT head unit (EPU) by LVDS bus (connection by flat ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C” rail.

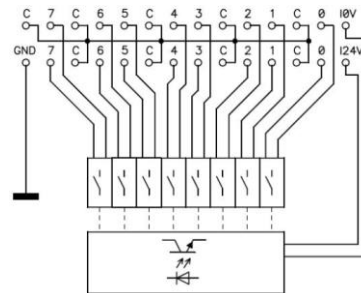
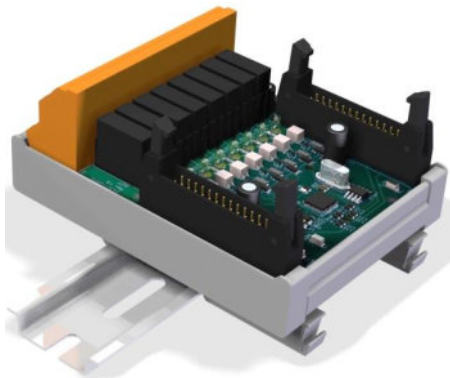
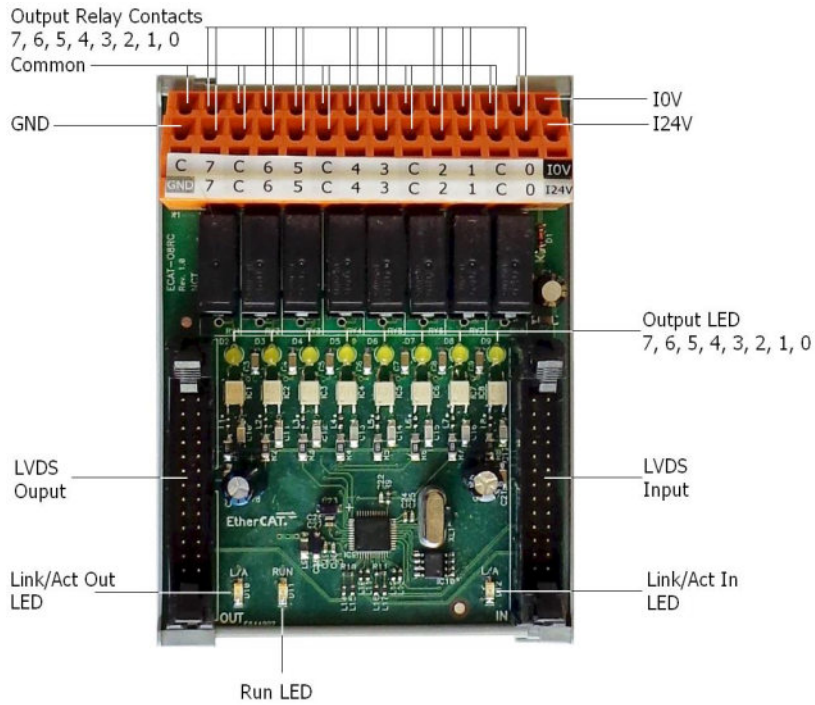
There are 4 pieces of 24 VDC output relays with Morse contact in the module. The signal states of channels are displayed by LED indications.

Output LED 0...3 lights: output switched ON

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Module	O4RM
NCT part No. (order number)	40-00010369-10
Number of channels	4
OFF state	Relay is free of current (released state)
ON state	The relay is turned ON
Maximal continuous static load on relay contact	10 A
Maximal switching current	7,5 AAC, 5 ADC
Switch voltage	125 VDC, 380 VAC
Switching cycle number	Mechanical: 20x10 ⁶ , Electrical: 10 ⁵
Switch delay	15 ms
Isolation voltage	1000 VAC
Current consumption from the LVDS bus	120 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	250 g
IP protection rating	IP20

O8RC / 8 -channel Relay output module with normally open contacts

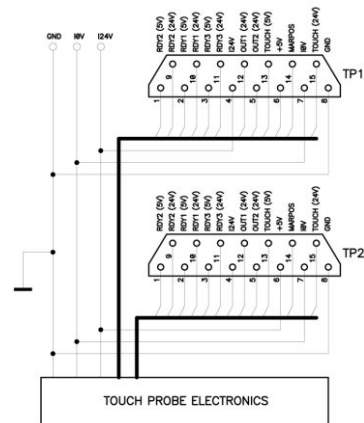
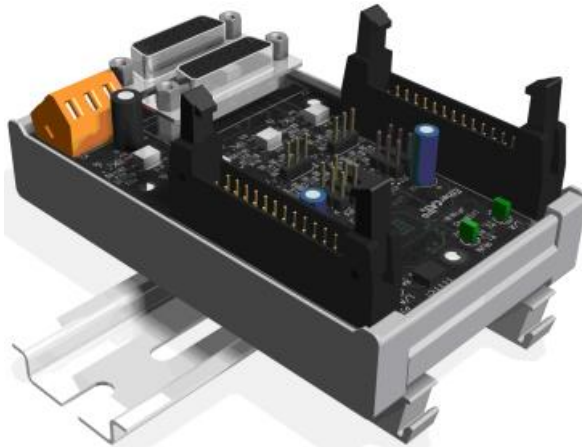
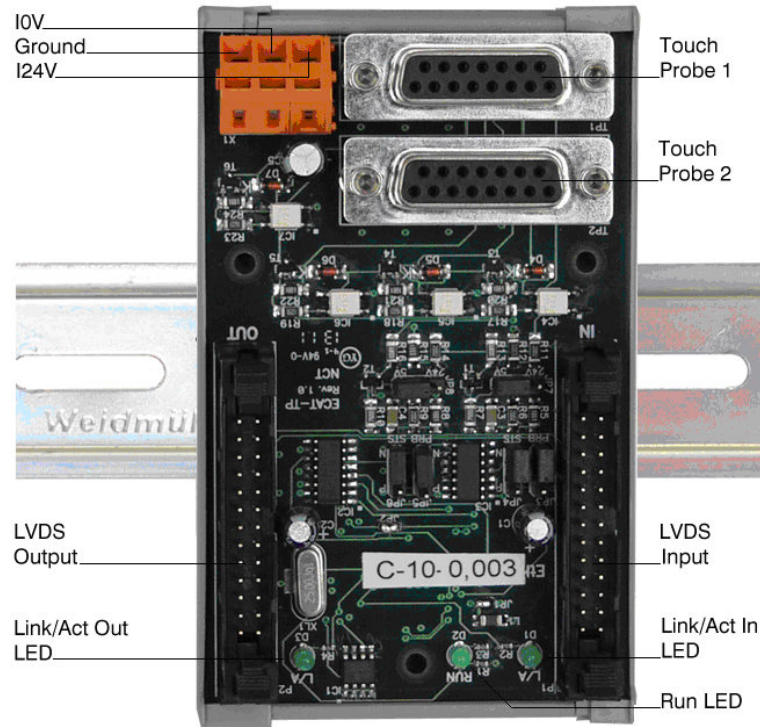


Output relay module, connected to EtherCAT head unit (EPU) by LVDS bus (connection by flat ribbon cable). It can be placed in any position after EPU. It can be easily clamped mechanically to „C“ rail. There are 8 pieces of 24 VDC output relays with normally open contacts in the module. The signal states of channels are displayed by LED indications. Output LED 0...7 lights: output switched ON.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	O8RC
NCT part No. (order number)	40-00010370-10
Number of channels	8
OFF state	Relay contact open (released state)
ON state	Relay contact closed
Maximal continuous static load on relay contact	5 A
Maximal switching current	2 AAC, 2 ADC
Switching voltage	30 VDC, 250 VAC
Switching cycle number	Mechanical: 20x10 ⁶ , Electrical: 10 ⁵
Switching delay	10 ms
Isolation voltage	750 VAC
Current consumption from the LVDS bus	120 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	200 g
IP protection rating	IP20

ETPC / 2-channel Touch Probe Controller

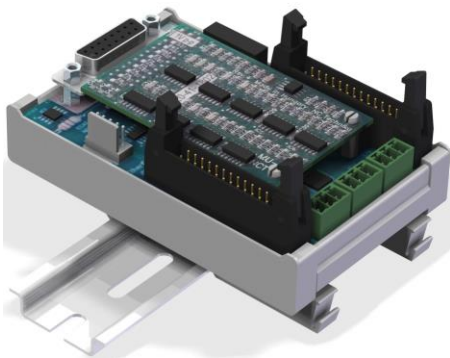
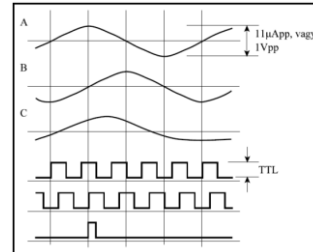
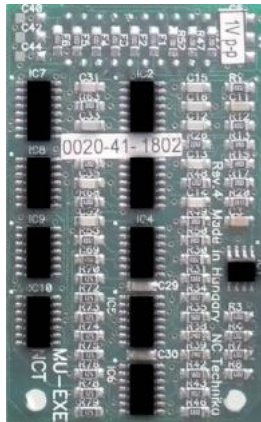


Interface module for touch probes giving contact signals, connected to the EPU unit by LVDS bus (connection by flat ribbon cable). It can place to any position after EPU. It can be easily clamped mechanically to „C“ rail. It can receive 2 pieces of touch probes. The positions of all axes and spindles will be stored in the closing instant of the contact if the touch probe is in the enabled state. The signal states of channels are displayed by LED indications.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	ETPC
NCT part No. (ordering number)	40-00010378-00
Number of connectible probes	2
Number of 24 VDC inputs per probe	4
Number of 24 VDC outputs per probe	4
Current consumption of module from LVDS bus	100 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	110 g
IP protection rating	IP20

MUEXE / SINUS/COSINUS module with 5 x interpolation (guest module of TTLAC)



MUEXE mounted on the TTLAC module

Pins of MUEXE mounted on the TTLAC

ENCODER	CAN	ANALOG
1: A+	1: CANH	1: ANOUT
2: GND	2: CANL	2: GND
3: B-	3: GND	3: GND
4: R+		
5: 5V		
9: A-		
10: B+		
11: GND		
12: R-		
14: 5V		
shielding:		
connector shield		

MUEXE interpolates of the sinusoidal signals of the measuring system 5 times so that each sine period corresponds to 5 TTL signal periods.

- Converts 11 µA/TTL or 1 Vpp/TTL signals
- Interpolation rate: 5
- Interface of 11 µApp or 1 Vpp signals of HEIDENHAIN measuring devices for the NCT controllers
- MUEXE can be connected to the TTLAC guest module
- MUEXE can be connected to the MU2 guest plate of NCT 100 –series controllers

After mounting this MUEXE on the TTLAC module the SINUS 1 Vpp, or 11 µApp signals of the measuring system will be converted to TTL signals received by TTLAC.

Characteristics of the mounted module (TTLAC+MUEXE-XS):

This module is connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed to any position after EPU. It can be easily clamped mechanically to „C” rail.

Features:

1. Receiving and computing signals from 1 piece of SINUS encoder (with 5 x interpolation), generating absolute position and transferring it to the HOST unit (EHU).
2. Creating 1 pc. of +/- 10 VDC data on the analogue output or CAN bus with the resolution of max. 2[^]15 generated by the HOST.

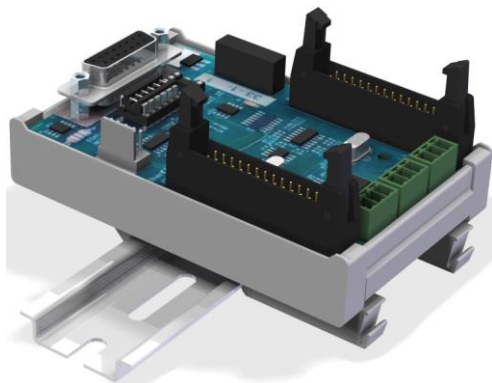
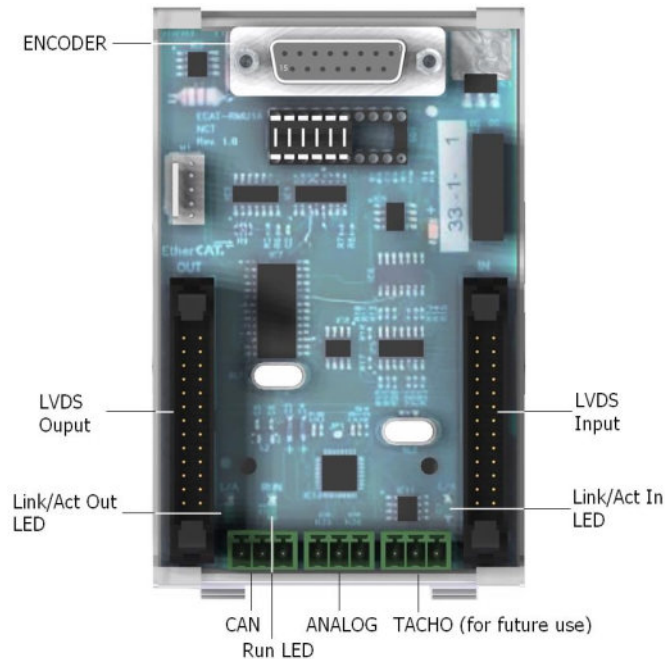
The most frequent application is to connect servo drives to the NCT 201 CNC controls, which servo drives have +/- 10 VDC speed or pulse-string (CAN bus) speed command signals. Naturally the module is capable for receiving and computing the signals of any SINUS encoder and generates analogue outputs for any purpose.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	MUEXE-VS (data for: TTLAC+MUEXE-XS)	MUEXE-AS (data for: TTLAC+MUEXE-XS)
MUEXE NCT part No. (ordering number)	40-00001155-01	40-00001155-02
Number of SINUS inputs	1	1
Number of +/-10 V analogue outputs	1	1
Sinusoidal signal inputs	A+, A-, B+, B-, R+, R-	A+, A-, B+, B-, R+, R-
Sinusoidal signal level	1 Vpp	11 µApp
Maximal encoder frequency	200 kHz	200 kHz
Analogue output resolution	+/-10 V / 2 [^] 15	+/-10 V / 2 [^] 15
Current consumption of the module from LVDS bus	200 mA (without encoder)	200 mA (without encoder)
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%	0...+55°C/-24...+85°C / 95%

Weight		220 g
IP protection rating		IP20

TTLAC / module with 1 TTL encoder input, 1 analog output and CAN bus



ENCODER	CAN	ANALOG
1: A	1: CANH	1: ANOUT
2: GND	2: CANL	2: GND
3: BN	3: GND	3: GND
4: C		
5: 5V		
9: AN		
10: B		
11: GND		
12: CN		
14: 5V		
shielding:		
connector shield		

TTLAC module serves as interface for the TTL encoders, generates analog and CAN bus outputs.

This module is connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed to any position after EPU. It can be easily clamped mechanically to „C” rail.

Features:

- Receiving and computing signals from 1 piece of TTL incremental encoder, generating absolute position and transferring it to the HOST unit (EHU).
- Provides data with the resolution of max. 2^{15} , generated by the HOST unit on the 1 piece of +/- 10 VDC analogue output and CAN bus.

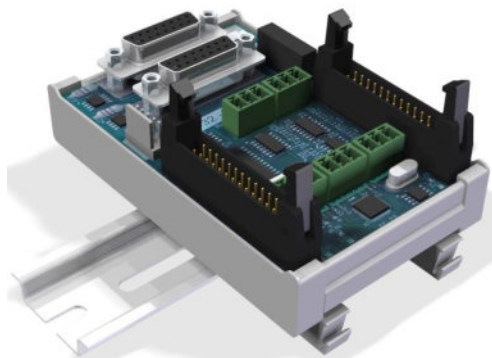
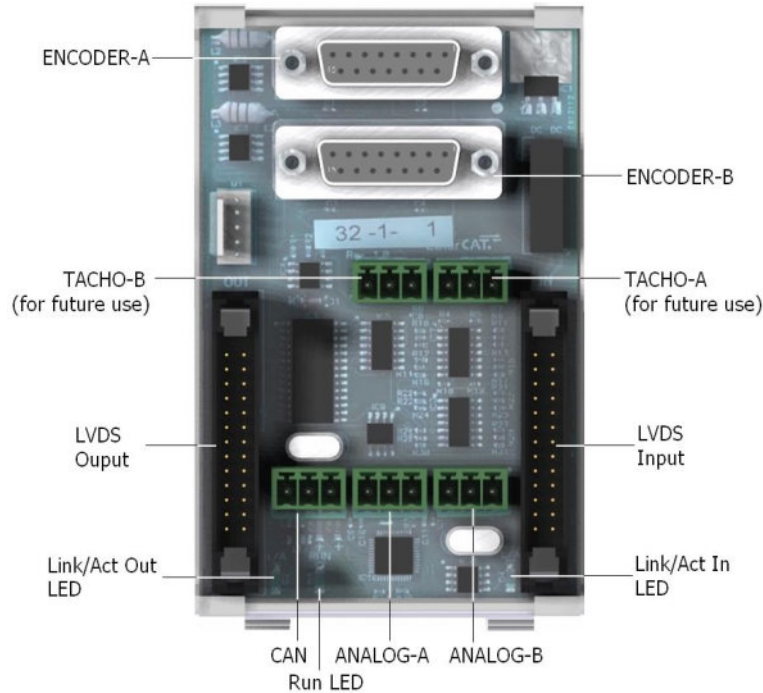
The most frequent application is to connect servo drives to the NCT 201 CNC controls, which servo drives have +/- 10 VDC speed or digital (CAN bus) command signals. Naturally the module is capable for receiving and computing the signals of any TTL incremental encoder and generates analogue outputs for any purpose.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

TTLAC also serves as a motherboard for MUEXE (in case of SINUS/COSINUS encoders) which can be easily mounted on the TTLAC.

Model	TTLAC
NCT part No. (ordering number)	40-00010379-20
Number of TTL inputs	1
Number of +/-10 V analogue outputs	1
Signals of TTL input	A, AN, B, BN, C, CN
Maximal encoder frequency	200 kHz
Analogue output resolution	+/-10 V / 2^{15}
CAN BUS output	For 1 piece of servo amplifier
Current consumption of the module from LVDS bus	200 mA (without encoder)
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	220 g
IP protection rating	IP20

TTLAC2 / module with 2 TTL encoder inputs, 2 analog outputs and CAN bus



ENCODER-A ENCODER-B	CAN	ANALOG-A ANALOG-B
1: A	1: CANH	1: ANOUT
2: GND	2: CANL	2: GND
3: BN	3: GND	3: GND
4: C		
5: 5V		
9: AN		
10: B		
11: GND		
12: CN		
14: 5V		
shielding: connector shield		

TTLAC module serves as interface for the TTL encoders, generates analog and CAN bus outputs.

This module is connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed to any position after EPU. It can be easily clamped mechanically to „C” rail.

Features:

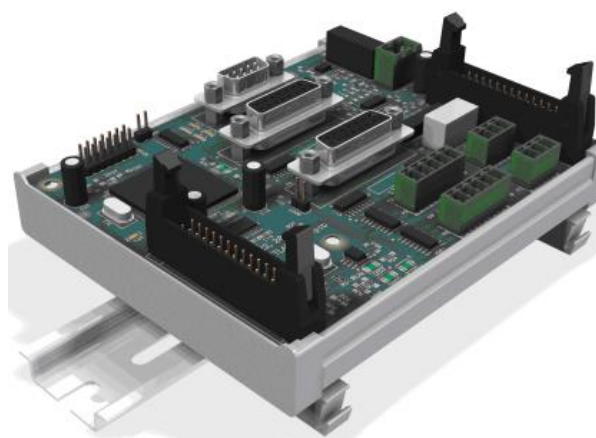
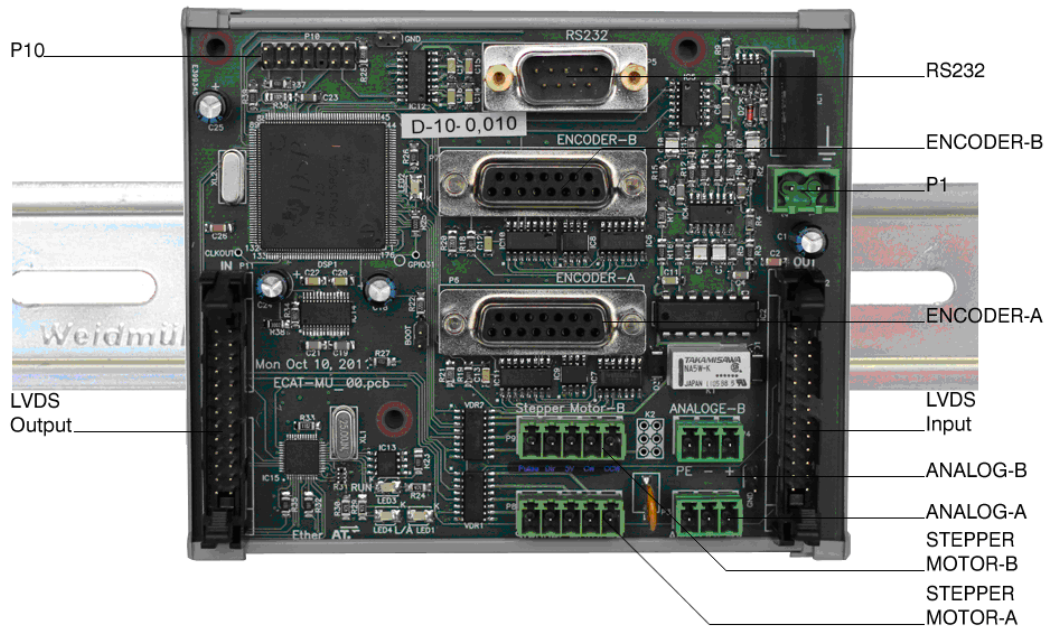
- Receiving and computing signals from 2 pieces of TTL incremental encoder, generating absolute position and transferring it to the HOST unit (EHU).
- Provides data with the resolution of max. 2^{15} , generated by the HOST unit on the 2 pieces of +/- 10 VDC analogue output and CAN bus.

The most frequent application is to connect servo drives to the NCT 201 CNC controls, which servo drives have +/- 10 VDC speed or digital (CAN bus) command signals. Naturally the module is capable for receiving and computing the signals of any TTL incremental encoder and generates analogue outputs for any purpose.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	TTLAC2
NCT part No. (ordering number)	40-00010379-10
Number of TTL inputs	2
Number of +/-10 V analogue outputs	2
Signals of TTL input	A, AN, B, BN, C, CN
Maximal encoder frequency	200 kHz
Analogue output resolution	+/-10 V / 2^{15}
CAN BUS output	For 2 pieces of servo amplifier
Current consumption of the module from LVDS bus	200 mA (without encoder)
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	220 g
IP protection rating	IP20

TTLAI / 2-channel TTL encoder input with 2-channel Analogue and Digital output modules



<p>ENCODER-A and ENCODER-B</p> <p>1: A 2: GND 3: BN 4: C 5: 5V 9: AN 10: B 11: GND 12: CN 14: 5V shielding: connecnor shield P1: for EXTERNAL GROUND (if required by noise protection)</p>	<p>STEPPER MOTOR-A STEPPER MOTOR-B</p> <p>Output constructed for optocoupling input Loading current: 500mA Maximal frequency: 200 kHz CW: clockwise CCW: counter clockwise 5V: 5V on shotr-circuit protected output Dir: define direction Pulse: shift pulse output P5 and P10: for service purposes ANALOG-A and ANALOG-B shielded-twisted pairs required for wiring PE: shielding - : ground point of analogue signal + : high-potential point of analogue signal</p>
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TTL encoder interface which generates digital and analogue outputs as well. This module is connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed to any position after EPU. It can be easily clamped mechanically to „C“ rail.

Features:

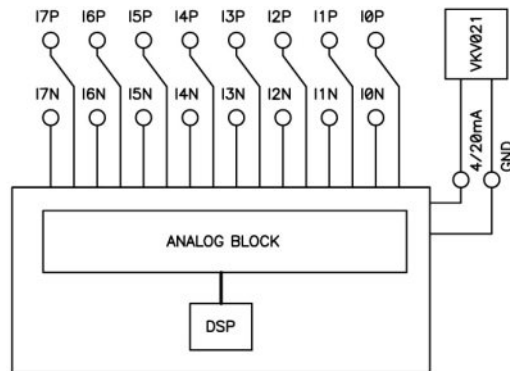
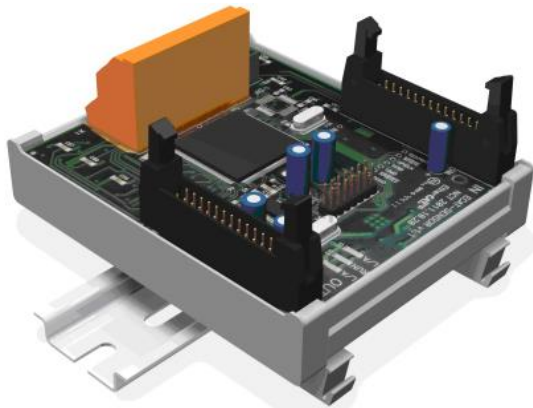
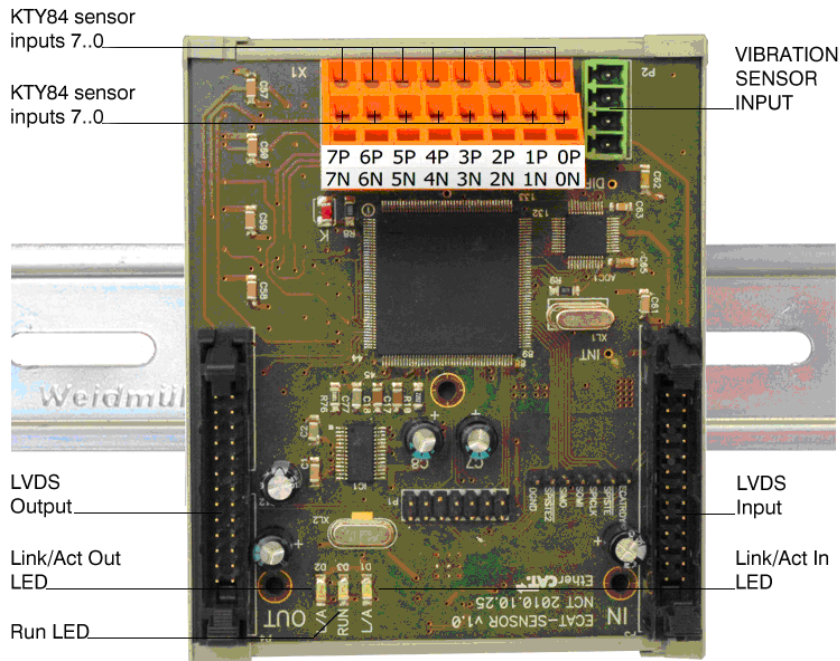
- Receiving and computing signals from 2 pieces of TTL incremental encoders, generating absolute position and transferring it to the HOST unit.
- Generating 2 pc. of +/- 10 VDC analogue outputs with the resolution of 2¹⁵, or generating pulse-string on frequency adjusted by the HOST. It can generate pulse string forward/backwards for two channels or generates pulse-strings for one channel while for the other channel it can issue the moving direction.

The most frequent application is to connect servo drives to the NCT 201 CNC controls, which servo drives have +/- 10 VDC speed or pulse-string speed command signals. Naturally the module is capable for receiving and computing the signals of any TTL incremental encoder and generates analogue outputs for any purpose.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	TTLAI
NCT part No. (ordering number)	40-00010379-00
Number of TTL inputs	2
Number of +/-10 V analogue outputs	2
Signals of TTL input	A, AN, B, BN, C, CN
Maximal encoder frequency	200 KHz
Analogue output resolution	+/-10 V / 2 ¹⁵
Analogue output/pulse string selection	Switch on board
Current consumption of the module from LVDS bus	200 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	220 g
IP protection rating	IP20

SENS / 8+1-channel analogue sensor input module



Analogue signal receiver and computing module connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can place to any position after EHU. It can be easily clamped mechanically to „C” rail.

Features:

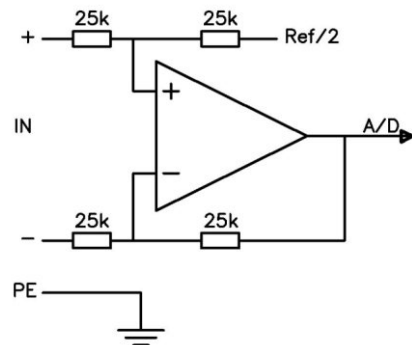
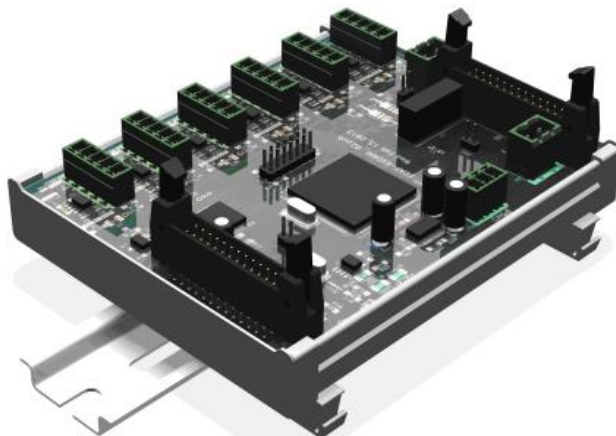
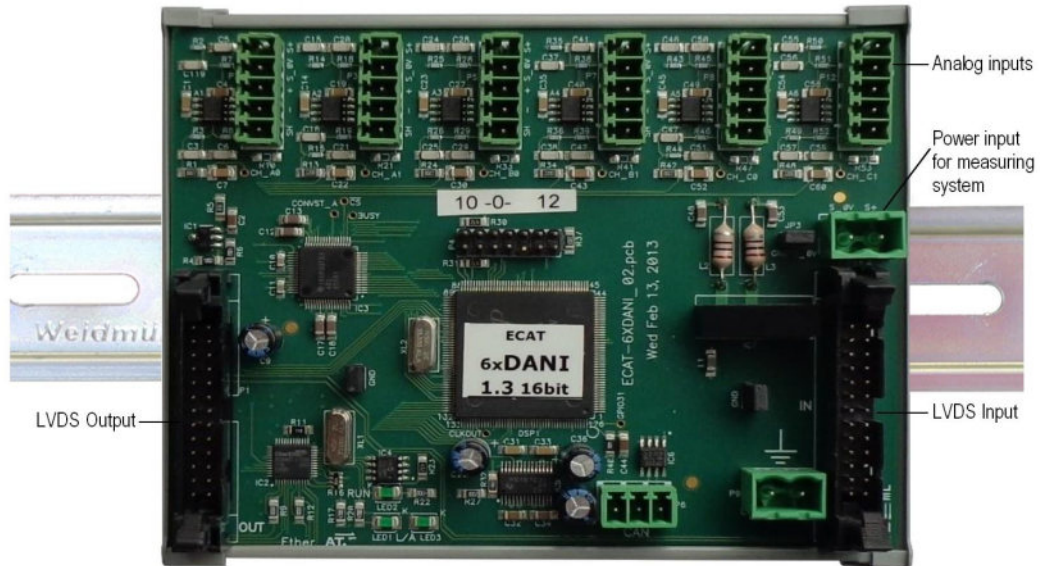
1. Receiving and computing 8 pieces of analogue thermal sensors with 2^{12} resolution and transferring them to the HOST unit.
2. Receiving and computing 1 analogue signal with 2^{12} resolution (optionally: 2^{16} resolution) and transferring it to the HOST unit.

Application: temperature measurement on 8 channels and analysis of vibration on 1 channel. It can manage machine tool diagnostics being connected to NCT 201 CNC control.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	SENS
NCT part No. (order number)	40-00010380-00
Number of analogue inputs	8+1
Resolution	8 pieces 2^{12} + 1 piece 2^{12} (optionally: 2^{16})
Current consumption of the module from LVDS bus	200 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	140 g
IP protection rating	IP20

DANI / 6-channel analogue input module



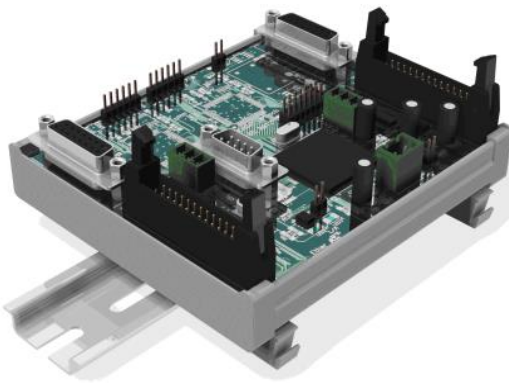
The schematic circuit of an analogue input

Analogue/digital converter module connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can place to any position after EHU. It can be easily clamped mechanically to „C“ rail. It converts +/- 10 V analogue differential input signals in 6 channels to digital data and sends it to EHU unit via EtherCAT bus. 0-20 mA signal transmission can be realized by using this card connecting 500 Ω resistor between inputs.

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	DANI
NCT part No. (order number)	40-00010379-01
Number of analogue inputs	6
Type of signal receive	Differential input
Resolution	2 ¹²
Input resistance	50 Ω
Maximum of the common mode voltage	15 V
Current consumption of the module from LVDS bus	120 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	110 g
IP protection rating	IP20

TTLCAN / 2-channel TTL encoder inputs and 2 pieces of CAN BUS outputs



ENCODER-A and ENCODER-B	
1:	A
2:	GND
3:	BN
4:	C
5:	5V
9:	AN
10:	B
11:	GND
12:	CN
14:	5V
shielding: connector shield	
P1: to connect EXTERNAL GROUND (if required by noise protection)	

TTL encoder input and CAN BUS digital output generating module connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be placed to any position after EPU. It can be easily clamped mechanically to „C” rail.

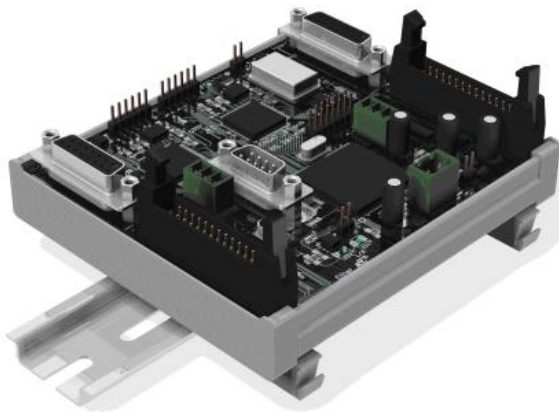
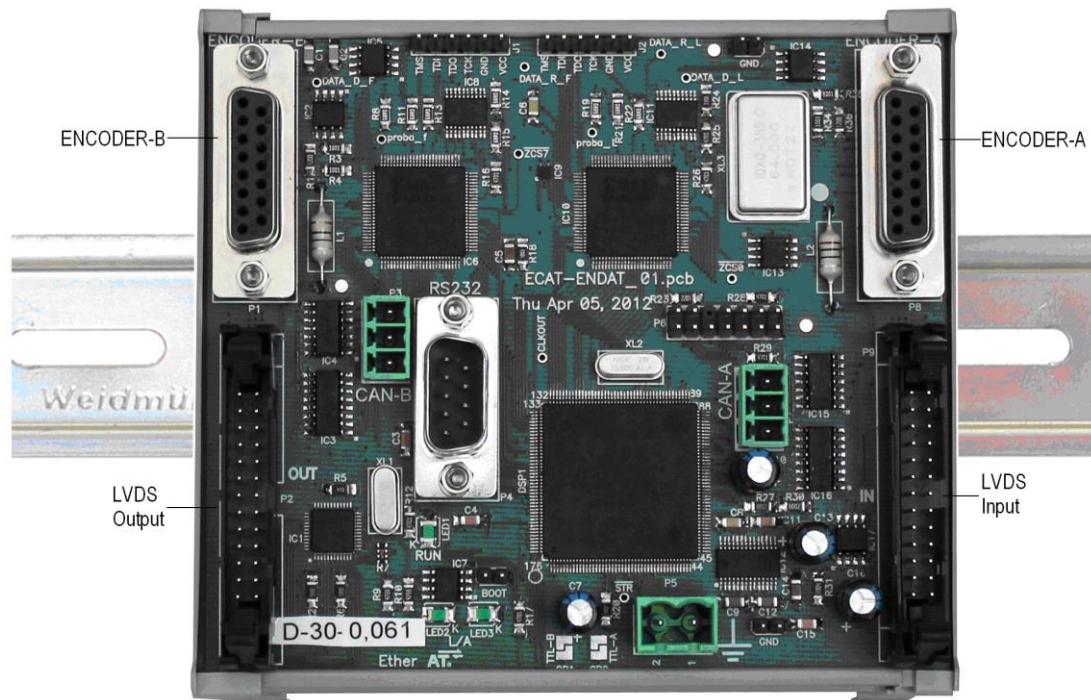
Features:

1. Receiving and computing signals from 2 pc. TTL incremental encoders, generating absolute position and transferring it to the HOST unit.
2. Issues 2 pc. CAN BUS digital
3. The most frequent application is connecting the former NCT servo drives with CAN BUS to the NCT 201 CNC control

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	TTLCAN
NCT part No. (ordering number)	40-00010379-02
Number of TTL inputs	2
Number of CAN BUS outputs	2
Signals of TTL input	A, AN, B, BN, C, CN
Maximal encoder frequency	200 KHz
Power consumption of the module from LVDS bus	200 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	220 g
IP protection rating	IP20

ENDAT / 2-channel EnDat 2.2 interface



<p>EnDat 2.2 socket</p> <ul style="list-style-type: none"> 2: GND 4: Clock 5: 5V 11: GND 12: ClockN 13: DataN 14: 5V 15: Data shielding: connector shield 	
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EnDat 2.2 encoder connection module connected to EPU unit by LVDS bus (connection by flat ribbon cable). It can be put in any position after EPU. It can be easily clamped mechanically to „C“ rail. Connects 2 pieces of EnDat 2.2 absolute encoders. It receives the absolute positions, processes them and transfers them via EtherCAT to the HOST unit.

The most frequent application is connecting HEIDENHAIN EnDat 2.2 linear encoders to the NCT 200 CNC controls

The statuses of Run and Link/Act LEDs of this card are summarized in the foreword chapter of this catalogue.

Model	ENDAT
NCT part No. (ordering number)	40-00010379-03
Number of EnDat 2.2 channels	2
Power consumption of the module from LVDS bus	180 mA
Operating/storing temperature/relative humidity (without condensation)	0...+55°C/-24...+85°C / 95%
Weight	210 g
IP protection rating	IP20

NCT EtherCAT servo drives

Structure of NCT drive systems

NCT drive system contains a power supply and an optional number of servo amplifiers and servomotors, each servo amplifier is connected to a motor. The system does not need transformer in case of voltage levels customary in Europe. The line chokes have built-in the smaller power supplies but they are separate units in case of larger power supplies. Since the depths of the different modules are the same and all electric connectors are placed on the front panel, thus can be placed in one row and an aesthetic, clear, cable-friendly system can be constructed. The order of the modules is optional; they can even be placed in several rows. The direct line supply and the modular construction characteristic to NCT drive systems make the electric planning, the implementation of line supply as well as the possible future enhancement or module replacement simple.

NCT EtherCAT servo amplifiers

NCT EtherCAT servo amplifiers developed and produced by NCT Kft. together with the appropriate – also produced by NCT - synchronous and asynchronous servomotors create high-accuracy servo drives meeting the tough economic, environmental and technical requirements concerning precision drives of modern automatic machine tools and machining centers. Control algorithms of the servo amplifiers ensure fast and high dynamic speed regulation and positioning for using it high speed and high precision machining.

The servo amplifier supplied by direct-current (DC) bus generates by pulse width modulation three-phase voltage needed for the supply of motor. High-voltage switch elements are IGBT supplied with heat and over-current protection integrated in a common package, while all control and information tasks are accomplished by a microprocessor (DSP). The switching frequency of the output voltage is constant, yet it is formed as base harmonic of variable-width pulse sequence. The modulation is space-vector-controlled with superior current and speed as well as position control loops. Supply of rectangular-field synchronous machine, sine-field synchronous machine as well as asynchronous machine is possible by choosing the appropriate program.

Servo amplifiers can be connected to any standard EtherCAT HOST (EHU) unit because they use standard Ethercat (industrial ETHERNET) communication channel. CAN communication system is an additional channel it provides the high-speed communication between servo drive and servo drive, in special applications.

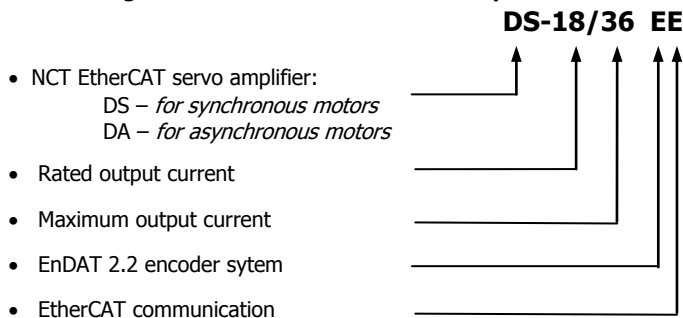
Servo amplifiers receive digital reference signal via EtherCAT and/or CAN system.

NCT EtherCAT servo amplifiers are developed especially for the real time EtherCAT communication system that is beneficial for the short regulation cycles. Cycle time is very short even in networks containing a large number of devices (synchronicity and simultaneity).

Main features of NCT EtherCAT servo amplifiers

- High-speed EtherCAT communication system
- Flexible choices for motors (synchronous, linear, torque, asynchronous)
- Compact design to construct multi channel servo drive systems
- PTC thermistor input for motor overheat protection

Model designation of NCT EtherCAT servo amplifiers



Important note!

EnDat 2,2 measuring system is product of HEIDENHAIN GmbH.

NCT servo drives models DA... with EnDat 2,2 measuring system also can receive signals of TTL incremental measuring systems.

NCT EtherCAT Servo amplifiers 7-segments display state codes

Decimal point should be always blinking on the 7-segment display.

If the decimal point blinks cyclically, then CPU card works.

If the decimal point does not blink, or blinks without cycle, then CPU card does not work or display failure.

Decimal point blinking cycle is 1 Hz: Normal operation.

Decimal point blinking cycle is 2 Hz: Speed controller integrator „frozen“.

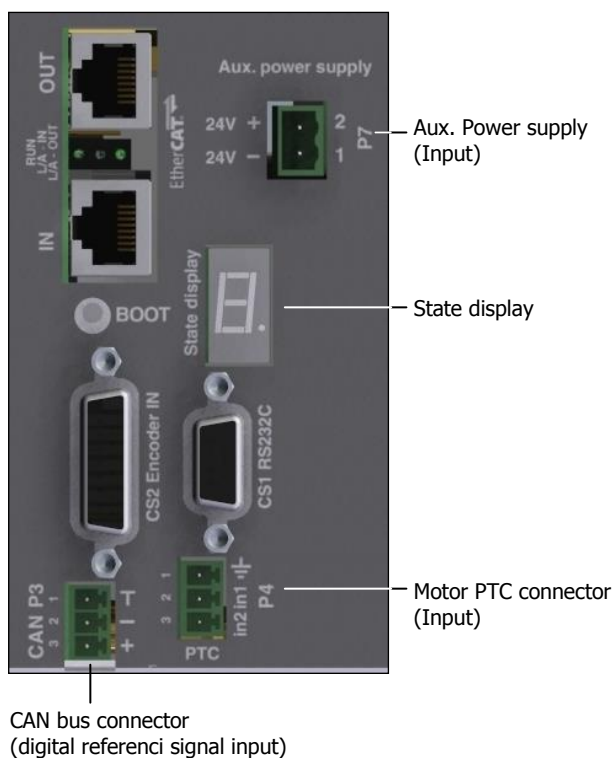
Additional display codes:

- Empty display – Servo drive disabled
- 1 – Servo drive enabled and 1. parameter set is active
- 2 – Servo drive enabled and 2. parameter set is active
- 3 – Servo drive enabled and 3. parameter set is active
- b – Servo drive enabled and it is in "braked" operation mode
- E – Error. Two characters succeeded after this character. (error code)

Error code	Short description of error	Action
01	EnData Error: EnDat encoder error on „A” channel	Run out
03	IncrA Encoder Error: Incremental encoder error	Run out
04	Low motor temperature. Temperature sensor of EnDat encoder shows temperature less than 5°C.	Stop
05	BUS Voltage: Overvoltage on the DC bus	Run out
06	Peak Current Overcurrent on the motor. Current exceeds the set value (I_peak).	Run out
07	Current Offset: Current measuring offset error. Measured phase currents exceed set value in zero current condition.	Stop
08	Hall Error: Commutation signal error	Stop
09	Follower Error: Speed following error. Motor speed differs from base signal.	Stop
11	OverSpeed. Motor speed exceeds the set maximum value.	Run out
12	CurDiffErr. Current symmetry error between phasesA and B. Measured difference between phase currents exceeds set value in zero current condition	Stop
13	Forbidden mode change of the EtherCAT communication interface	Stop
14	EtherCAT Init Error. Bad adress and data length setted by Master (NC) in thr Slave unit (Servo).	Run out
15	EtherCAT WatchDog Timeout. If Timeout activated after the first 128 messages passed.	Stop
16	PDPINT	Run out
17	Enable Error. Drive disabled when the motor speed is N>20 rpm (prevents motor run out).	Stop
19	Overheat protection activated. Endat encoder temperature exceeds the set value (normally 95°C).	Stop
20	Motor overload. Overload protection activated. Motor current permanently exceeds the rated value In.	Stop
21	CANA Bus Error	Stop
22	CANA Timeout Error	Stop
30	Parameter table checksum error. Incorrect data in parameter table.	Stop
31	EtherCAT Slave WatchDog Timeout	Stop
32	Serial flash access error. (parameter table write/read)	Stop

Electric wiring of NCT EtherCAT Servo amplifiers

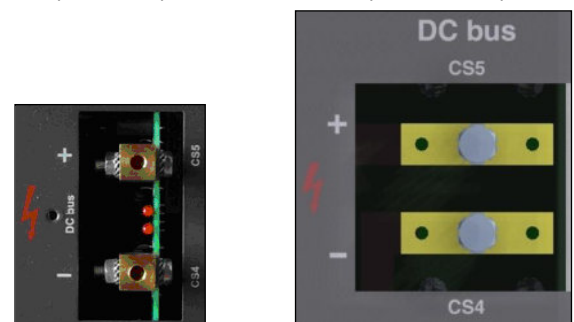
Control panel of NCT Servo amplifiers



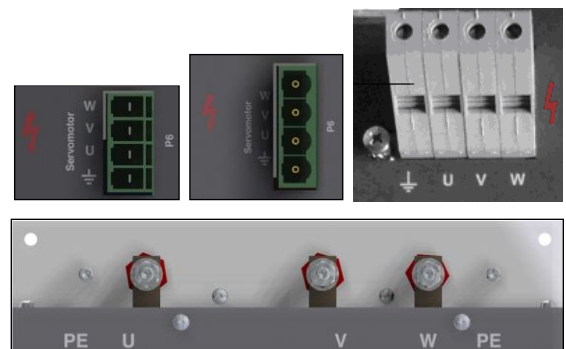
DC bus connection

DS-2/4 – DA-48/72

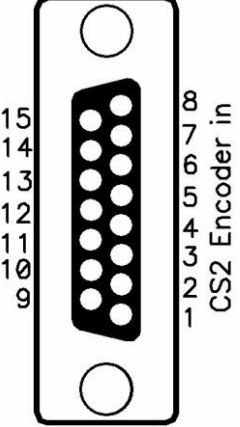
DS100/150 – DA180/225



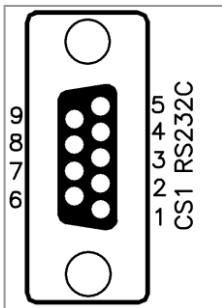
Motor connectors (various)



Encoder connector

DSUB connector	For EnDat encoder	For Inkremental encoder
	1: <i>Not used</i>	1: A signal
	2: Supply voltage ground (GND)	2: Supply voltage ground (GND)
	3: <i>Not used</i>	3: B signal
	4: Clock	4: C signal
	5: Positive supply voltage (5V)	5: Positive supply voltage (5V)
	6: <i>Not used</i>	6: I commutation signal
	7: <i>Not used</i>	7: II commutation signal
	8: <i>Not used</i>	8: III commutation signal
	9: <i>Not used</i>	9: A signal
	10: <i>Not used</i>	10: B signal
	11: Supply voltage ground (GND)	11: Supply voltage ground (GND)
	12: Clock	12: C signal
	13: DATA	13: <i>Not used</i>
	14: Positive supply voltage (5V)	14: Positive supply voltage (5V)
	15: DATA	15: <i>Not used</i>
Shielding: connector housing	Shielding: connector housing	

RS232C connector



NCT EtherCAT servo amplifier model range

Model	DS-2/4EE	DS-6/12EE	DS-12/24EE	DS-18/36EE	DS-24/48EE	DS-36/72EE	DS-100/150EE	
Rated DC voltage	540 V	540 V	540 V	540 V	540 V	540 V	540 V	
Output voltage	0...400V	0...400V	0...400V	0...400V	0...400V	0...400V	0...400V	
Rated output current	2 A	6 A	12 A	18 A	24 A	36 A	100 A	
Maximum output current	4 A	12 A	24 A	36 A	48 A	72 A	150 A	
Peak current	9 A	14.5 A	45 A	67 A	100 A	150 A	300 A	
Rated output power	1,2 kVA	2.5 kVA	7,5 kVA	10 kVA	15 kVA	22 kVA	62 kVA	
Temperature range	0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C	
IP protection rating	IP00	IP00	IP00	IP00	IP00	IP00	IP00	
Size	90x295x200 mm	90x295x200 mm	130x295x200 mm	130x295x200 mm	150x380x400 mm	150x380x400 mm	300x380x282 mm	
Weight	2,5 kg	2,5 kg	4,5 kg	4,5 kg	11 kg	11 kg	25 kg	
Model		DA-8/12EE	DA-16/24EE	DA-24/36EE	DA-32/48EE	DA-48/72EE	DA-120/150EE	DA-180/225EE
Rated DC voltage		540 V	540 V	540 V	540 V	540 V	540 V	540 V
Output voltage		0...400V	0...400V	0...400V	0...400V	0...400V	0...400V	0...400V
Rated output current		8 A	16 A	24 A	32 A	48 A	120 A	180 A
Maximum output current		12 A	24 A	36 A	48 A	72 A	150 A	225 A
Peak current		25 A	45 A	67 A	100 A	150 A	300 A	400 A
Rated output power		5.5 kVA	10 kVA	13,5 kVA	20 kVA	30 kVA	75 kVA	112 kVA
Maximal motor power		3,5 kW	7 kW	11 kW	15 kW	22 kW	55 kW	100 kW
Temperature range		0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C	0...40 °C
IP protection rating		IP00	IP00	IP00	IP00	IP00	IP00	IP00
Size		90x295x200 mm	130x295x200 mm	130x295x200 mm	150x380x400 mm	150x380x400 mm	300x380x282 mm	300x380x282 mm
Weight		2,5 kg	4,5 kg	4,5 kg	11 kg	11 kg	25 kg	25 kg

DS-2/4EE, DS-6/12EE and DA-8/12EE servo amplifiers



Fan mounted only on the DA-8/12EE drive.

The pinout of connectors is in the introduction of "NCT EtherCAT servo amplifiers" in chapter "Electric connection of NCT EtherCAT servo amplifiers".

„BOOT“ button on faceplate is only for service purposes. The states of 7-segments display are in chapter "NCT EtherCAT Servo amplifiers 7-segments display state codes".

These are the smallest devices of NCT EtherCAT servo amplifier series.

The servo amplifiers have got EtherCAT (industrial ETHERNET) communication system, so they can optimally connect to any standard EtherCAT HOST unit.

Servo amplifiers also can operate in speed- or position-controlled operating mode.

Servo amplifiers can receive digital reference signals via EtherCAT channel.

NCT EtherCAT servo amplifiers developed especially for EtherCAT real-time Ethernet systems, therefore short controlling cycle time is very important feature, it is independent from the number of connected devices, so it can increase the number of simultaneously controlled axes (synchronicity and simultaneity).

Model	DS-2/4EE	DS-6/12EE	DA-8/12EE
NCT part No. (order number)	40-00010382-00	40-00010285-00	40-00010388-00
Rated DC voltage	540 V	540 V	540 V
Output voltage	0...400V	0...400V	0...400V
Rated output current	2 A	6 A	8 A
Maximum output current	4 A	12 A	12 A
Peak current	9 A	14.5 A	25 A
Rated output power	1,2 kVA	2.5 kVA	5.5 kVA
Maximal motor power	-	-	3.5 kW
Temperature range	0...40 °C	0...40 °C	0...40 °C
IP protection rating	IP00	IP00	IP00
Weight	2,5 kg	2,5 kg	2,5 kg

DS-12/24EE, DS-18/36EE, DA-16/24EE and DA-24/36EE servo amplifiers



Fan mounted only on the DA-16/24EE and DA-24/36EE drives.

The pinout of connectors is in the introduction of "NCT EtherCAT servo amplifiers" in chapter "Electric connection of NCT EtherCAT servo amplifiers".

„BOOT” button on faceplate is only for service purposes. The states of 7-segments display are in chapter "NCT EtherCAT Servo amplifiers 7-segments display state codes".

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Servo amplifiers also can operate in speed- or position-controlled operating mode.

Servo amplifiers can receive digital reference signals via EtherCAT channel.

NCT EtherCAT servo amplifiers developed especially for EtherCAT real-time Ethernet systems, therefore short controlling cycle time is very important feature, it is independent from the number of connected devices, so it can increase the number of simultaneously controlled axes (synchronicity and simultaneity).

Model	DS-12/24EE	DS-18/36EE	DA-16/24EE	DA-24/36EE
NCT part No. (order number)	40-00010286-00	40-00010287-00	40-00010389-00	40-00010390-00
Rated DC voltage	540 V	540 V	540 V	540 V
Output voltage	0...400V	0...400V	0...400V	0...400V
Rated output current	12 A	18 A	16 A	24 A
Maximum output current	24 A	36 A	24 A	36 A
Peak current	45 A	67 A	45 A	67 A
Rated output power	8 kVA	12 kVA	11 kVA	17 kVA
Maximal motor power	-	-	7 kW	11 kW
Temperature range	0...40 °C	0...40 °C	0...40 °C	0...40 °C
IP protection rating	IP00	IP00	IP00	IP00
Weight	4,5 kg	4,5 kg	4,5 kg	4,5 kg

DS-24/48EE, DS-36/72EE, DA-32/48EE and DA-48/72EE servo amplifiers



The pinout of connectors is in the introduction of "NCT EtherCAT servo amplifiers" in chapter "Electric connection of NCT EtherCAT servo amplifiers".

„BOOT“ button on faceplate is only for service purposes. The states of 7-segments display are in chapter "NCT EtherCAT Servo amplifiers 7-segments display state codes".

The servo amplifiers have got EtherCAT (industrial ETHERNET) communication system, so they can optimally connect to any standard EtherCAT HOST unit.

Servo amplifiers also can operate in speed- or position-controlled operating mode.

Servo amplifiers can receive digital reference signals via EtherCAT channel.

NCT EtherCAT servo amplifiers developed especially for EtherCAT real-time Ethernet systems, therefore short controlling cycle time is very important feature, it is independent from the number of connected devices, so it can increase the number of simultaneously controlled axes (synchronicity and simultaneity).

Model	DS-24/48EE	DS-36/72EE	DA-32/48EE	DA-48/72EE
NCT part No. (order number)	40-00010288-00	40-00010289-00	40-00010391-00	40-00010392-00
Rated DC voltage	540 V	540 V	540 V	540 V
Output voltage	0...400V	0...400V	0...400V	0...400V
Rated output current	24 A	36 A	32 A	48 A
Maximum output current	48 A	72 A	48 A	72 A
Peak current	100 A	150 A	100 A	150 A
Rated output power	17 kVA	25 kVA	22 kVA	33 kVA
Maximal motor power	-	-	15 kW	22 kW
Temperature range	0...40 °C	0...40 °C	0...40 °C	0...40 °C
IP protection rating	IP00	IP00	IP00	IP00
Weight	11 kg	11 kg	11 kg	11 kg

DS-100/150EE, DA-120/150EE and DA-180/225EE servo amplifiers



Dimension of grounding and connection screws: M8.



The pinout of connectors is in the introduction of "NCT EtherCAT servo amplifiers" in chapter "Electric connection of NCT EtherCAT servo amplifiers".

„BOOT" button on faceplate is only for service purposes. The states of 7-segments display are in chapter "NCT EtherCAT Servo amplifiers 7-segments display state codes".

The servo amplifiers have got EtherCAT (industrial ETHERNET) communication system, so they can optimally connect to any standard EtherCAT HOST unit.

Servo amplifiers also can operate in speed- or position-controlled operating mode.

Servo amplifiers can receive digital reference signals via EtherCAT channel.

NCT EtherCAT servo amplifiers developed especially for EtherCAT real-time Ethernet systems, therefore short controlling cycle time is very important feature, it is independent from the number of connected devices, so it can increase the number of simultaneously controlled axes (synchronicity and simultaneity).

Model	DS-100/150EE	DA-120/150EE	DA-180/225EE
NCT part No. (order number)	40-00010383-00	40-00010393-00	40-00010394-00
Rated DC voltage	540 V	540 V	540 V
Output voltage	0...400V	0...400V	0...400V
Rated output current	100 A	120 A	180 A
Maximum output current	150 A	150 A	225 A
Peak current	300 A	300 A	400 A
Rated output power	62 kVA	83 kVA	125 kVA
Maximal motor power	-	55 kW	100 kW
Temperature range	0..40 °C	0..40 °C	0..40 °C
IP protection rating	IP00	IP00	IP00
Weight	25 kg	25 kg	25 kg

NCT Power Supply Units

Structure of NCT drive systems

Servo amplifiers of NCT drive system do not contain rectifier unit, each servo amplifier supplied by a separated power supply module. The power supply units and servo amplifier units connected via DC bus. The depths of the different modules are the same and all electric connectors are placed on the front panel, thus can be placed in one row and an aesthetic, clear, cable-friendly system can be generated. The order of the modules is optional, they can even be placed in several rows. The direct line supply and the modular construction characteristic to NCT drive systems make easier the electric planning, the implementation of line supply as well as the possible future enhancement or module replacement simple.

NCT Power Supply Units (DPS, DPB)

The most important task of NCT power supply units is to supply the servo amplifiers with energy. The servo amplifier inputs demand DC voltage that may only alter slightly in function of the loading. The rectified voltage of the three-phase line is directly connected to the DC bus output of NCT power supply units; the rippled rectified voltage is almost entirely smoothed by the capacitor battery on the DC bus. The line voltage and the line choke voltage basically determine the voltage of the DC bus. The task of the line choke is to decrease the harmonic content of the current absorbed or recuperated from the line. The line choke of DPB power supply units is a separated unit because of its big size.

The NCT power supply units include a soft start system switching on and off in function of the DC bus voltage and charge the large-scale capacitor battery. The voltages of switch-on and switch-off differ. Provided the bus voltage is less than half of the nominal value, the soft start switches on, if however the bus voltage rises above 80% of the nominal value, the soft start switches off. Without soft start the over-current protection in front of the supply unit would immediately detach upon power-on.

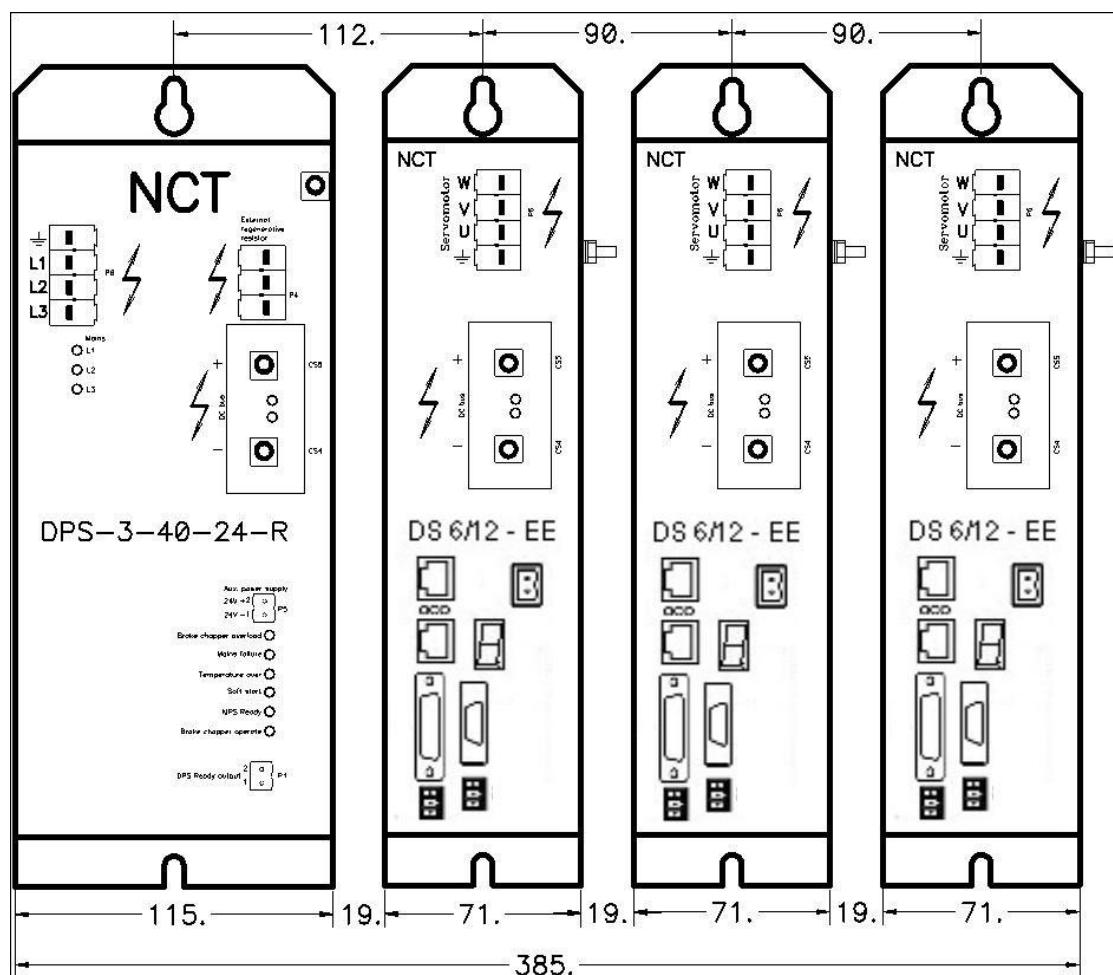
There is an operation mode (brake mode) in all drive systems, when the power flows from the motor to the main supply unit. The power supply unit transforms this power into heat on braking resistors or the recuperative unit charge back to power supply.

There is no braking resistor in standard DPS power supply unit, so it does not heat the power supply unit and also the electric cabinet. Power supplies can be mounted with internal brake resistors as an option. Calculating the external braking resistor has to be done very carefully. Recuperative power supply is recommended in case of frequent braking even for the small power supplies.

DPB power supply units force the power occurring upon brake back to the three-phase line.

Layout plan

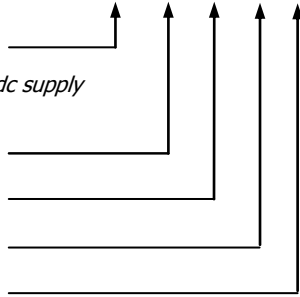
Often three DS6/12EE servo amplifiers are used together with one DPS-3-40-24-R main power supply. Diagram of the recommended setting-in of this configuration is shown below as an example.



Model designation of NCT power supplies

DiPS-3-40-20-R

- NCT power supply:
 - DPS – with brake resistor
 - DiPS – with brake resistor and 24 Vdc supply
 - DPB – recuperative
- Three-phase power supply
- Voltage (40=3x400 V)
- Load current (A)
- Internal brake resistor (option)



NCT power supply model range

Model	DPS-3-40-24	DiPs-3-40-20	DIPs-3-23-20	DPB-3-40-80	DPB-3-40-160	iPS1	iPS2
NCT part No. (order number)	40-00000645-00	40-00000647-00	40-00000647-01	40-00000648-00	40-00000649-00	40-00001132-00	40-00001132-01
Input voltage	3 x 400 V _{ac}	3 x 400 V _{ac}	3 x 230 V _{ac}	3 x 400 V _{ac}	3 x 400 V _{ac}	1 x 230 V _{ac} / 1 x 400 V _{ac}	1 x 230 V _{ac} / 1 x 400 V _{ac}
Input current	3x20 A _{eff}	3x16 A _{eff}	3x16 A _{eff}	3 x 63 A _{eff}	3 x 125 A _{eff}	1 x 1.2 A _{eff} / 1 x 0.7 A _{eff}	1 x 2.4 A _{eff} / 1 x 1.4 A _{eff}
Output voltage	540 V _{dc}	540 V _{dc}	310 V _{dc}	540 V _{dc}	540 V _{dc}	24 V _{dc}	24 V _{dc}
Load current	24 A _{dc}	20 A _{dc}	20 A _{dc}	80 A _{dc}	160 A _{dc}	6 A _{dc} / 10 A _{dc}	2x6A _{dc} / 2x10A _{dc}
Internal brake resistor (option, R in designation)	150 Ω (DPS-3-40-24-R)	240 Ω (DiPs-3-40-20-R)	240 Ω (DIPs-3-23-20-R)	nincs	-	-	-
External brake resistor minimum value	22 Ω	22 Ω	22 Ω	-	-	-	-
External brake resistor power	600 W	600 W	600 W	-	-	-	-
Maximum ambient temperature	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
IP protection rating	IP00	IP00	IP00	IP00	IP00	IP00	IP00
Heat dissipation	100 W	100 W	100 W	300 W	600 W	20 W	20 W
Line choke type	-	-	-	DRC-3-40-80	DRC-3-40-160	-	-
Rated overload protection	-	-	-	40...80 A	80...160 A	-	-
Weight	5,8 kg	7,0 kg	7,0 kg	12 kg	20 kg	2,4 kg	3,0 kg

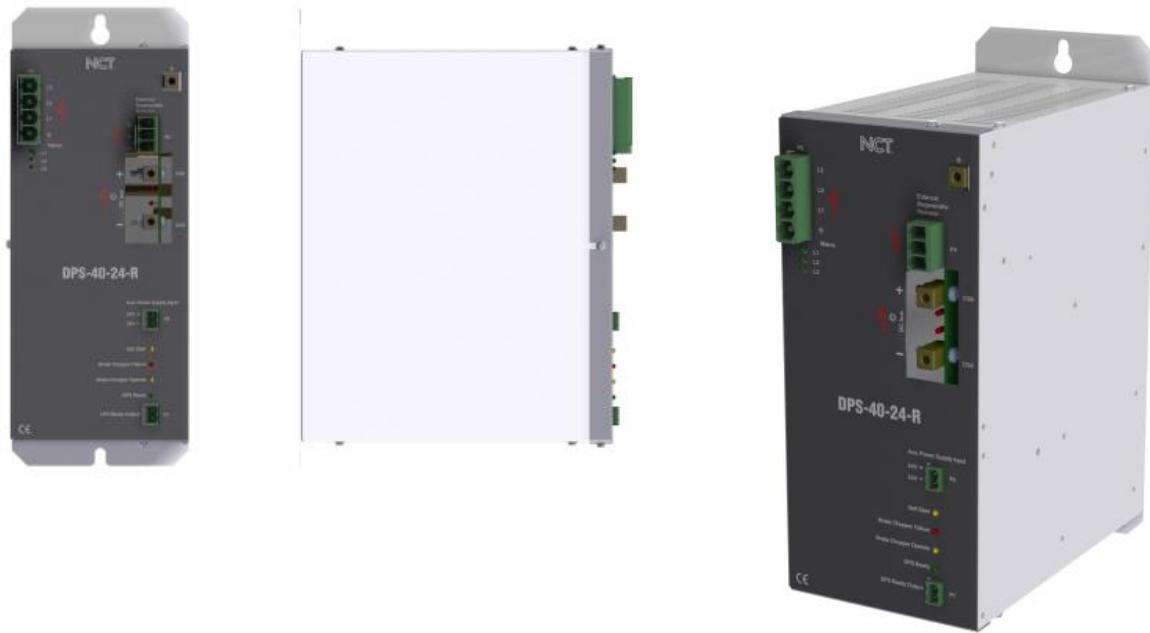
NCT line choke model range (see in the ACCESSORIES chapter)

Model	DRC-3-40-80	DRC-3-40-160
NCT part No. (order number)	40-00000650-00	40-00000651-00
Rated inductivity	0,5 mH	0,25 mH
Line voltage	3x400V	3x400V
Rated current	3x80 A	3x160 A
Saturation current	200 A	400 A
IP protection rating	IP00	IP00
Weight	25 kg	39 kg

NCT brake resistor model range (see in the ACCESSORIES chapter)

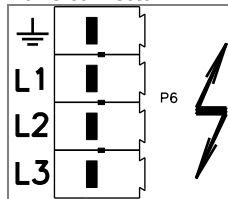
Model	FZG 500x65-22	FZZG 400x65-22
NCT part No. (order number)	40-00000646-01	40-00000646-02
Rated resistance	22 Ohm	22 Ohm
Maximum ambient temperature	40 °C	40 °C
IP protection rating	IP00	IP00
Load	800 W	1200 W
Weight	2,8 kg	4,3 kg

DPS-3-40-24 power supply unit

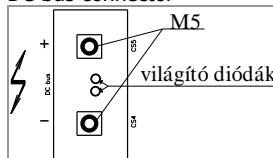


Pinout of the connectors:

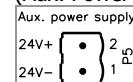
Mains connector



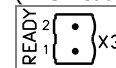
DC bus connector



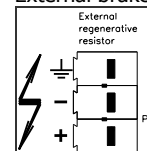
Auxiliary power supply connection (input) 24 Vdc 500 mA
(Aux. Power Supply Input)



Power supply unit ready connection (output) 0.5 A
(DPS Ready Output)



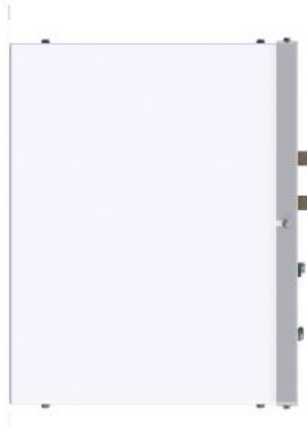
External brake resistor (External Regenerative Resistor)



The most important task of NCT power supply units is to supply the servo amplifiers with energy. The servo amplifier inputs demand DC voltage that may only alter slightly in function of the loading. The rectified voltage of the three-phase line is directly connected to the DC bus output of NCT power supply units, the rippled rectified voltage is almost entirely smoothed by high-power capacitor battery on the DC bus or DC line choke. The line voltage and the line choke voltage basically determine the voltage of the DC bus. The built-in braking resistor is option for supply unit. Braking power consumed by external braking resistor in standard construction.

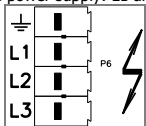
Model	DPS-3-40-24
NCT part No. (order number)	40-00000645-00
Input voltage	3 x 400 V _{ac}
Input current	3x20 A _{eff}
Output voltage	540 V _{dc}
Rated output current	24 A _{dc}
Internal brake resistor (option)	150 Ω
Minimum external brake resistor	22 Ω
External resistor power	600 W
Maximum ambient temperature	45 °C
IP protection rating	IP00
Heat dissipation	100 W
Weight	5,8 kg

DiPS-3-40-20 power supply unit

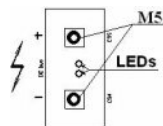


Pinout of the connectors:

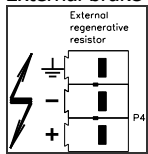
Mains connector
Terminals in case of 1-phase power supply: L1 and L3



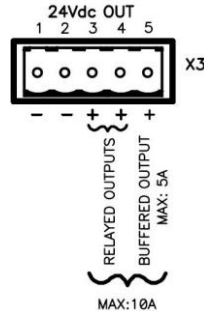
DC Bus connector



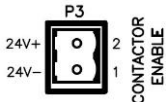
External brake resistor



Auxiliary power supply connector
24 Vdc 5/10 A (output)



Contactor enabling (input)

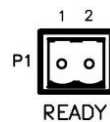


„BOOT“ button on faceplate is only for service purposes. „RELAYED OUTPUTS“ can be reactivated by pressing „RESET“ button after short circuit on this output.

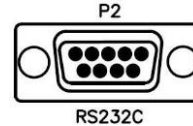
The states of 7-segments display:

- Blinking decimal point: „CONTACTOR ENABLE“ input disabled
- C and blinking decimal point: „CONTACTOR ENABLE“ input enabled, but the power supply is not ready for operation (soft starting)
- 1 and blinking decimal point: power supply is ready for operation (3x400 V line)
- 2 and blinking decimal point: power supply is ready for operation (3x230 V line)
- H and blinking decimal point: overheated cooling rib
- F and blinking decimal point: bus voltage ids too high
- P and blinking decimal point: PDPINT error

Power supply unit ready signal connector (output) 0.5 A



RS232C serial port (only for service purposes)



The most important task of NCT power supply units is to supply the servo amplifiers with energy. The servo amplifier inputs demand DC voltage that may only alter slightly in function of the loading. Two contactors (main- and soft starter contactors) of DiPs unit can operate only in case of supplying the CONTACTOR ENABLE input by a 24 Vdc voltage. There is no rectified voltage on the DC bus in any other case (no one of contactors are enabled). This means that is no reason to build additional contactor for power off the DC bus. The built-in braking resistor is option for supply unit. Braking power consumed by external braking resistor in standard construction. This power supply also supplies 24 V DC auxiliary voltage for electric cabinet. The power supply also works from DC bus voltage (540 V DC) of servo drive system, in case of emergency stop or power failure. It can control braking of motors until bus voltage does not decrease 200 V DC. Operating principle of „RELAYED OUTPUTS“ and „BUFFERED OUTPUT“ are same as units iPS1 and iPS2 (see there).

Model	DiPS-3-40-20	DiPS-3-23-20
NCT part No. (order number)	40-00000647-00	40-00000647-01
Input voltage	3 x 400 V _{ac}	3 x 230 V _{ac}
Input current	3x16 A _{eff}	3x16 A _{eff}
Output voltage	540 V _{dc}	310 V _{dc}
Rated output current	20 A _{dc}	20 A _{dc}
Internal brake resistor (option)	240 Ω (DiPs 3-40-20-R)	240 Ω (DiPs 3-23-20-R)
Minimum external brake resistor	22 Ω	22 Ω
External resistor power	600 W	600 W
Maximum ambient temperature	45 °C	45 °C
IP protection rating	IP00	IP00
Heat dissipation	100 W	100 W
Weight	7,0 kg	7,0 kg

DPB-3-40-80 power supply unit

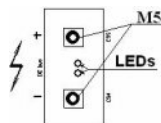


Pinout of the connectors:

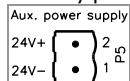
Mains connector



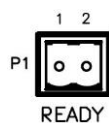
DC Bus connector



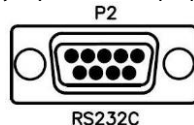
Auxiliary power supply connection 24 Vdc 500 mA (input)



Power supply unit ready signal connection (output) 0.5 A



RS232C serial port (only for service purposes)



„BOOT“ button on faceplate is only for service purposes.

The states of 7-segments display:

- L and blinking decimal point: Missing at least 1 supply phase
- 0 and blinking decimal point: power supply is ready for operation (3x400 V line)
- H and blinking decimal point: overheated cooling rib
- F and blinking decimal point: bus voltage too high
- P and blinking decimal point: PDPINT error

The most important task of NCT power supply units is to supply the servo amplifiers with energy. The servo amplifier inputs demand DC voltage that may only alter slightly in function of the loading. The rectified voltage of the three-phase line is directly connected to the DC bus output of NCT power supply units, the rippled rectified voltage is almost entirely smoothed by high-power capacitor battery on the DC bus or DC line choke. The line voltage and the line choke voltage basically determine the voltage of the DC bus. This power supply recuperates energy back to mains in brake operation.

Model	DPB-3-40-80
NCT part No. (order number)	40-00000648-00
Input voltage	3 x 400 V _{ac}
Input current	3 x 63 A _{eff}
Output voltage	540 V _{dc}
Rated output current	80 A _{dc}
Maximum ambient temperature	45 °C
IP protection rating	IP00
Heat dissipation	300 W
Line choke	DRC-3-40-80
Rated overload protection	40...80 A
Weight	12 kg

DPB-3-40-160 power supply unit

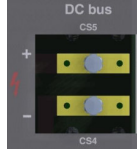


Pinout of the connectors:

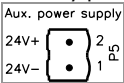
Mains connector



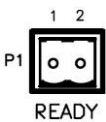
DC Bus connector



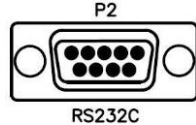
Auxiliary power supply connection 24 Vdc 500 mA (input)



Power supply unit ready signal connection (output) 0.5 A



RS232C serial port (only for service purposes)

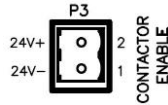


„BOOT” button on faceplate is only for service purposes.

The states of 7-segments display:

- L and blinking decimal point: Missing at least 1 supply phase
- C and blinking decimal point: Supply mains is ready, but the power supply is not ready for operation (soft starting)
- 3 and blinking decimal point: power supply is ready for operation (3x400 V line)
- H and blinking decimal point: overheated cooling rib
- F and blinking decimal point: bus voltage too high
- P and blinking decimal point: PDPINT error

Contactor enabling (input)



The most important task of NCT power supply units is to supply the servo amplifiers with energy. The servo amplifier inputs demand DC voltage that may only alter slightly in function of the loading. The rectified voltage of the three-phase line is directly connected to the DC bus output of NCT power supply units, the rippled rectified voltage is almost entirely smoothed by high-power capacitor battery on the DC bus or DC line choke. The line voltage and the line choke voltage basically determine the voltage of the DC bus.

This power supply recuperates energy back to line in brake operation.

Two contactors (main- and soft starter contactors) of DPB-3-40-80 unit can operate only in case of supplying the CONTACTOR ENABLE input by a 24 Vdc voltage. There is no rectified voltage on the DC bus in any other case (no one of contactors are enabled). This means that is no reason to build additional contactor for power off the DC bus.

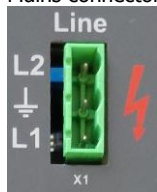
Model	DPB-3-40-160
NCT part No. (order number)	40-00000649-00
Input voltage	3 x 400 V _{ac}
Input current	3 x 125 A _{eff}
Output voltage	540 V _{dc}
Rated output current	160 A _{dc}
Maximum ambient temperature	45 °C
IP protection rating	IP00
Heat dissipation	600 W
Line choke	DRC-3-40-160
Rated overload protection	80...160 A
Weight	20 kg

iPS1 and iPS2 power supply units



Pinout of the connectors:

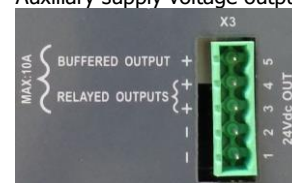
Mains connector (primary input)



540 Vdc (input – if buffered and rectified DC voltage is also available)



Auxiliary supply voltage output 24 Vdc 6/10 A



iPS2 unit has two of them

Power supply units iPS1 and iPS2 supply 24 V DC voltage for electric cabinet. The input voltage can be 230 V AC or 400 V AC. Unit iPS1 has one 24 Vdc connector (X3), while unit iPS2 has two such connectors.

The power supply also works from DC bus voltage (540 V DC) of servo drive system, to control the braking of motors in case of emergency stop or power failure.

Normally the connectors „RELAYED OUTPUTS“ and „BUFFERED OUTPUT“ are the same, each connector supply the +24 Vdc.

If the current of the RELAYED OUTPUTS becomes extremely high (e.g. short circuit), the unit powers off the RELAYED OUTPUTS within couples of milliseconds (short circuit sensor is enabling). During this power off process (before shutting down) the voltage on the BUFFERED OUTPUT remains on the required level.

This means that BUFFERED OUTPUT is recommended for the supplying of important units of the machine tool (controls, drives, ECAT units). RELAYED OUTPUTS is not recommended for the power supply of these important unit because this units have large capacitors in their input, which can cause the false operation of the short circuit sensor when switching them in. Besides of this, these units normally have short circuit protection (e.g. fuse).

RELAYED OUTPUTS can be used for units which has inductive elements (contactor, brake e.t.c). Connectors for -24V and RELAYED OUTPUTS are doubled to make connections easier.

Model	iPS1		iPS2	
NCT part No. (order number)	40-00001132-00		40-00001132-01	
Input voltage	1 x 230 V _{ac}	1 x 400 V _{ac}	1 x 230 V _{ac}	1 x 400 V _{ac}
Input current	1x1.2 A _{eff}	1x0.7 A _{eff}	1x2.4 A _{eff}	1x1.4 A _{eff}
Output voltage	24 Vdc	24 Vdc	2x24 Vdc	2x24 Vdc
Output current	6 A	10 A	2x6 A	2x10 A
Maximum ambient temperature	45 °C	45 °C	45 °C	45 °C
IP protection rating	IP00	IP00	IP00	IP00
Heat dissipation	20 W	20 W	40 W	40 W
Weight	2,4 kg	2,4 kg	3,0 kg	3,0 kg

NCT Synchronous servomotors

NCT servomotor series, „A” and „Ai” are developed and produced by NCT Kft. Motors are prepared especially for the precision drive of automatic machine-tools. Thanks to the special configuration, these motors meet high-level dynamic requirements of modern machine tools; they are built for long life, and have a maintenance-free operation.

Construction of the servomotors „A” series

The motors are permanent magnet synchronous machines with three-phase eight pole star-connected winding on the stator, and eight-pole rotor built from permanent magnets. The incremental or absolute value encoder is mounted on the non-drive end of the motor, which also provides information about the position of the pole-core relative to the stator winding. The stator is totally enclosed and the bearings of shaft extension are sealed. The cable connectors are also sealed. Thermal loss drained in a natural way -no external fan needed- so the motors are robust. Both the excitation of the stator and the magnetic induction in the air-gap produced by the rotor are quite sinusoidal, so the torque of the motor can be exactly controlled independently of the pole-core position, because of this an extremely accurate speed control can be realized appropriately.

The color of the rating plate of „A” series servomotors is yellow.

Construction of the servomotors „Ai” series

The construction of series „Ai” motors is identical to the series „A” motors except the material of the rotor magnets. Thanks to the rare earth metal magnets (Neodymium or Samarium-cobalt) on the rotor of the „Ai” motors they can produce much more torque, speed and power than „A” in the same motor size, and inertia of „Ai” motors much less than adequate „A” motors.

The color of the rating plate of „A” series servomotors is white.

Designation of the motor models

- **NCT synchronous servomotor:**

A – NCT A series
Ai – NCT Ai series

- **With brake**

- **Rated torque (3 Nm)**

- **DC bus voltage (540V)**

- **Rated speed (3000 min⁻¹)**

- **Encoder:**

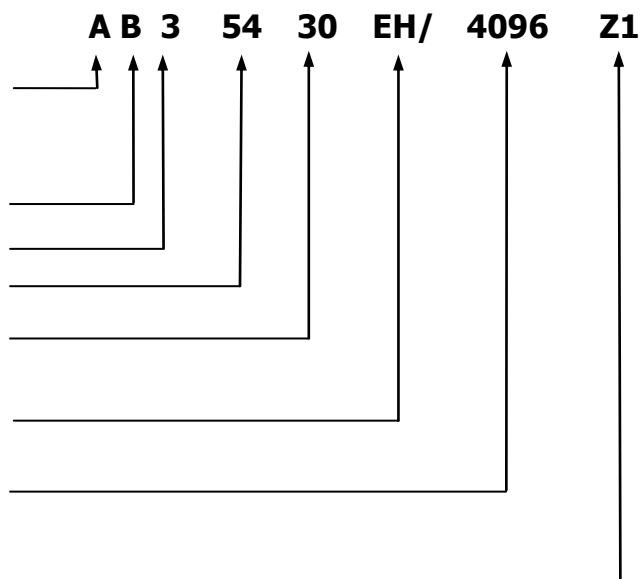
EH - digital encoder HEIDENHAIN
4096 - pulse/rev incremental
M- absolute multiturn
S - absolute singleturn

- **Customized design**

Without mark – basic design: cylindrical shaft without keyway

Z1 – cylindrical shaft with keyway without key

Z2 – tapered shaft without keyway



Definitions of the motor technical data

M₀	continuous torque at zero speed
I₀	line current at M₀
P_n	rated continuous output power
M_n	rated torque
I_n	line current at M_n
n_n	rated speed
M_{max}	maximal torque
I_{max}	line current at M_{max}
n_{max}	maximal speed
K_e	voltage coefficient (no-load line voltage at 1000 min ⁻¹ speed)
U_{Dcbusz}	DC bus rated voltage of motor servo amplifier

Designation of NCT synchronous servomotors

Only the first part of model designation is indicated in the following two charts. For example: AB3-54-30-....
The second part of the model designation contains the main options:

1. -EH/4096 Standard design, cylindrical shaft without keyway, with incremental encoder
2. -EH/4096-Z1 Cylindrical shaft with keyway without key, with incremental encoder
3. -EH/4096-Z2 Tapered shaft with keyway without key, with incremental encoder
4. -EH/M Standard design, cylindrical shaft without keyway, with multiturn absolute encoder
5. -EH/M-Z1 Cylindrical shaft with keyway without key, with multiturn absolute encoder
6. -EH/M-Z2 Tapered shaft with keyway without key, with multiturn absolute encoder

The full model designation of this motor: AB3-54-30-EH/4096-Z1

Servomotors „A” series with ferrite magnets

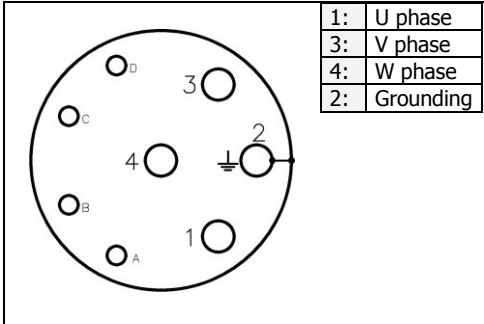
Model (without brake)	Model (with brake)	Static torque	Static current	Rated speed
A1-54-30-.....	AB1-54-30-.....	1.1 Nm	1.0 A	3000 min ⁻¹
A2-54-30-.....	AB2-54-30-.....	2.2 Nm	2.0 A	3000 min ⁻¹
A3-54-30-.....	AB3-54-30-.....	3.0 Nm	2.5 A	3000 min ⁻¹
A6-54-30-.....	AB6-54-30-.....	6.0 Nm	4.5 A	3000 min ⁻¹
A9-54-30-.....	AB9-54-30-.....	9.0 Nm	6.0 A	3000 min ⁻¹
A12-54-20-.....	AB12-54-20-.....	12.0 Nm	8.8 A	2000 min ⁻¹
A22-54-20-.....	AB22-54-20-.....	22.0 Nm	15.0 A	2000 min ⁻¹
A30-54-20-.....	AB30-54-20-.....	30.0 Nm	19.5 A	2000 min ⁻¹
A38-54-20-.....	AB38-54-20-.....	38 Nm	18.0 A	2000 min ⁻¹

Servomotors „Ai” series with rare earth magnets

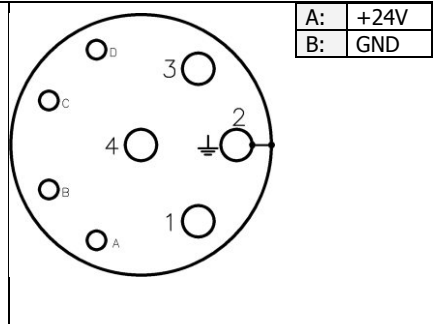
Model (without brake)	Model (with brake)	Size	Static torque	Static current	Rated speed
Ai2.5-54-40-.....	AiB2.5-54-40-.....	A1	2,5 Nm	2,3 A	4000 min ⁻¹
Ai5-54-40-.....	AiB5-54-40-.....	A2	5,0 Nm	4,6 A	4000 min ⁻¹
Ai8-54-30-.....	AiB8-54-30-.....	A3	8,4 Nm	6,0 A	3000 min ⁻¹
Ai15-54-26-.....	AiB15-54-26-.....	A6	17,0 Nm	13,0 A	2600 min ⁻¹
Ai28-54-25-.....	AiB28-54-25-.....	A12	29,0 Nm	18,8 A	2500 min ⁻¹
Ai50-54-20-.....	AiB50-54-20-.....	A22	51,0 Nm	32,6 A	2000 min ⁻¹
Ai70-54-20-.....	AiB70-54-20-.....	A30	70,0 Nm	40,0 A	2000 min ⁻¹

Pinout of the connectors of NCT synchronous servomotors

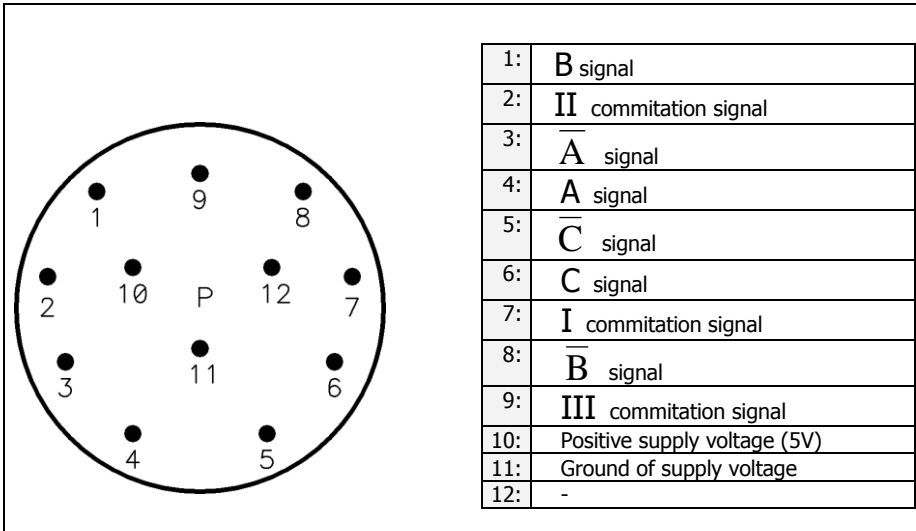
Pinout of power-current connector viewed from the connection



Pinout of braking unit connector viewed from the connection

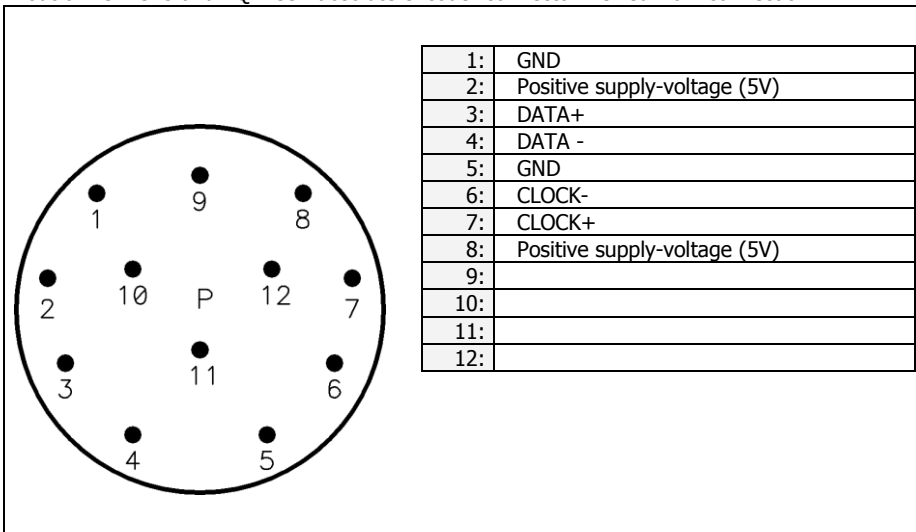


Pinout of ERN1326 incremental encoder connector viewed from connection:

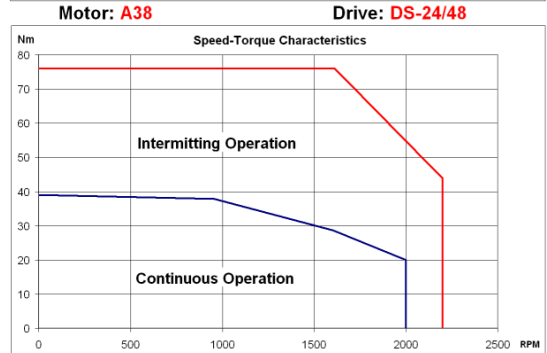
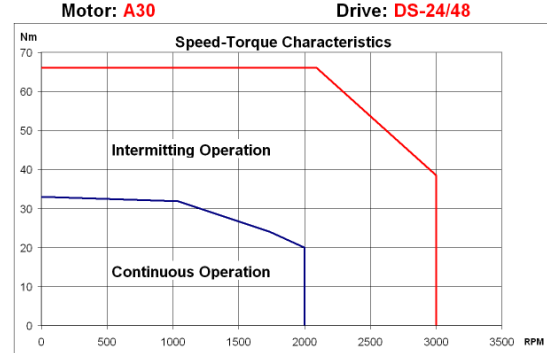
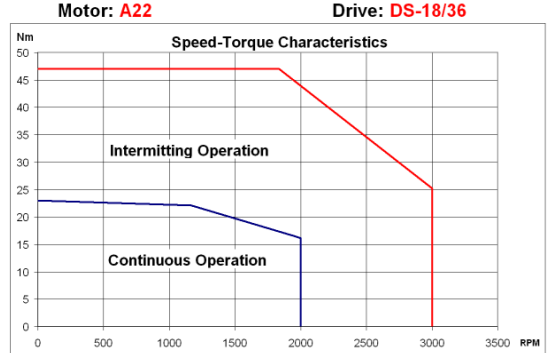
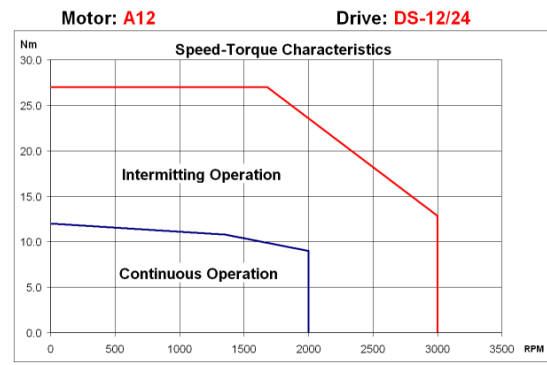
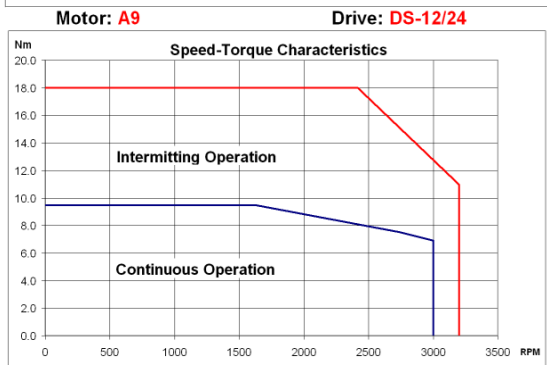
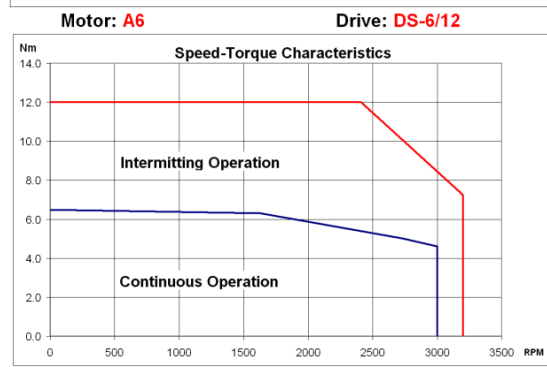
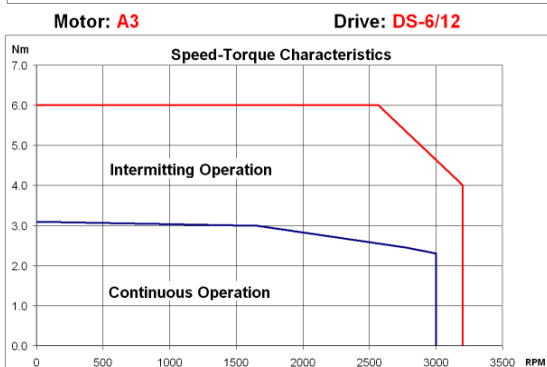
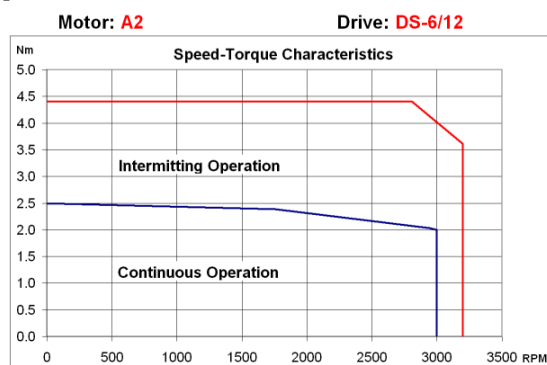
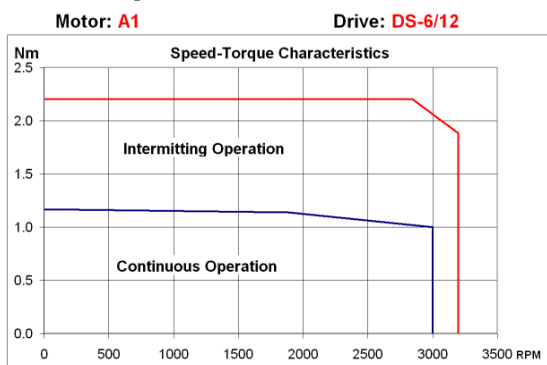


The inverted commutation signals are not connected to connector.

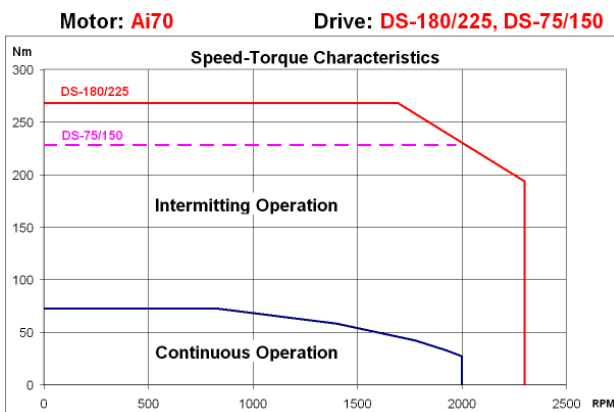
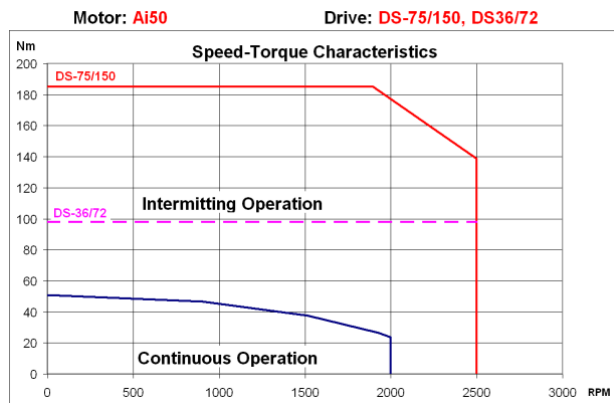
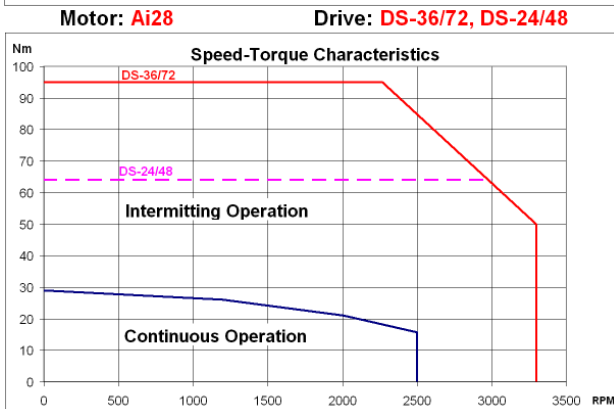
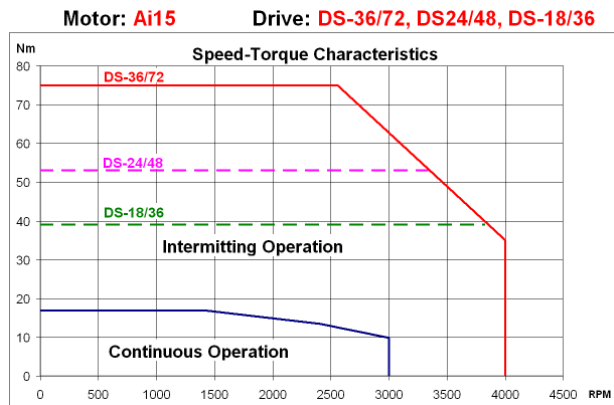
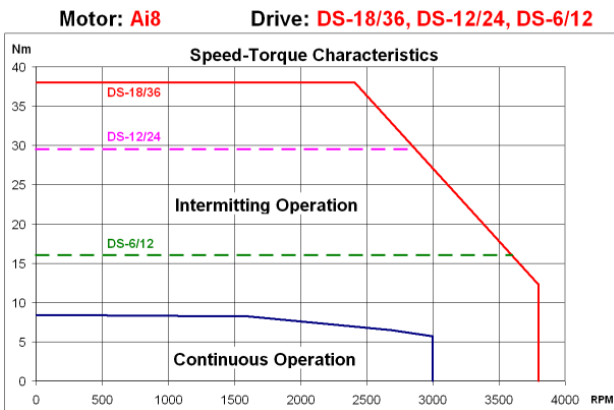
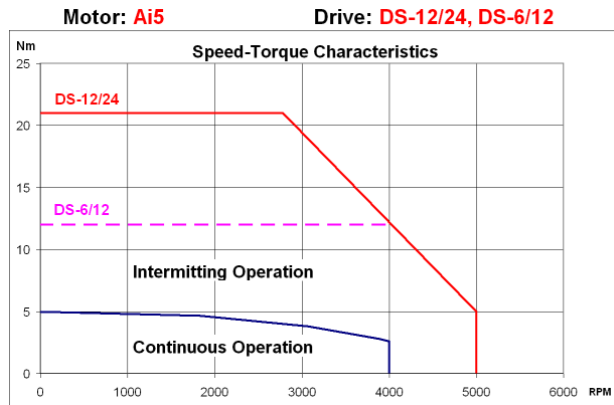
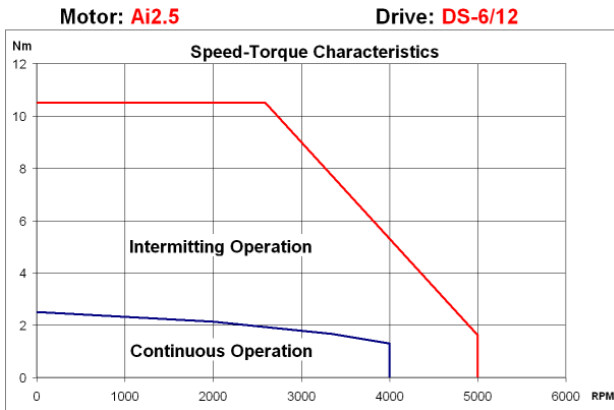
Pinout of ECN1325 and EQN1337 absolute encoder connector viewed from connection:



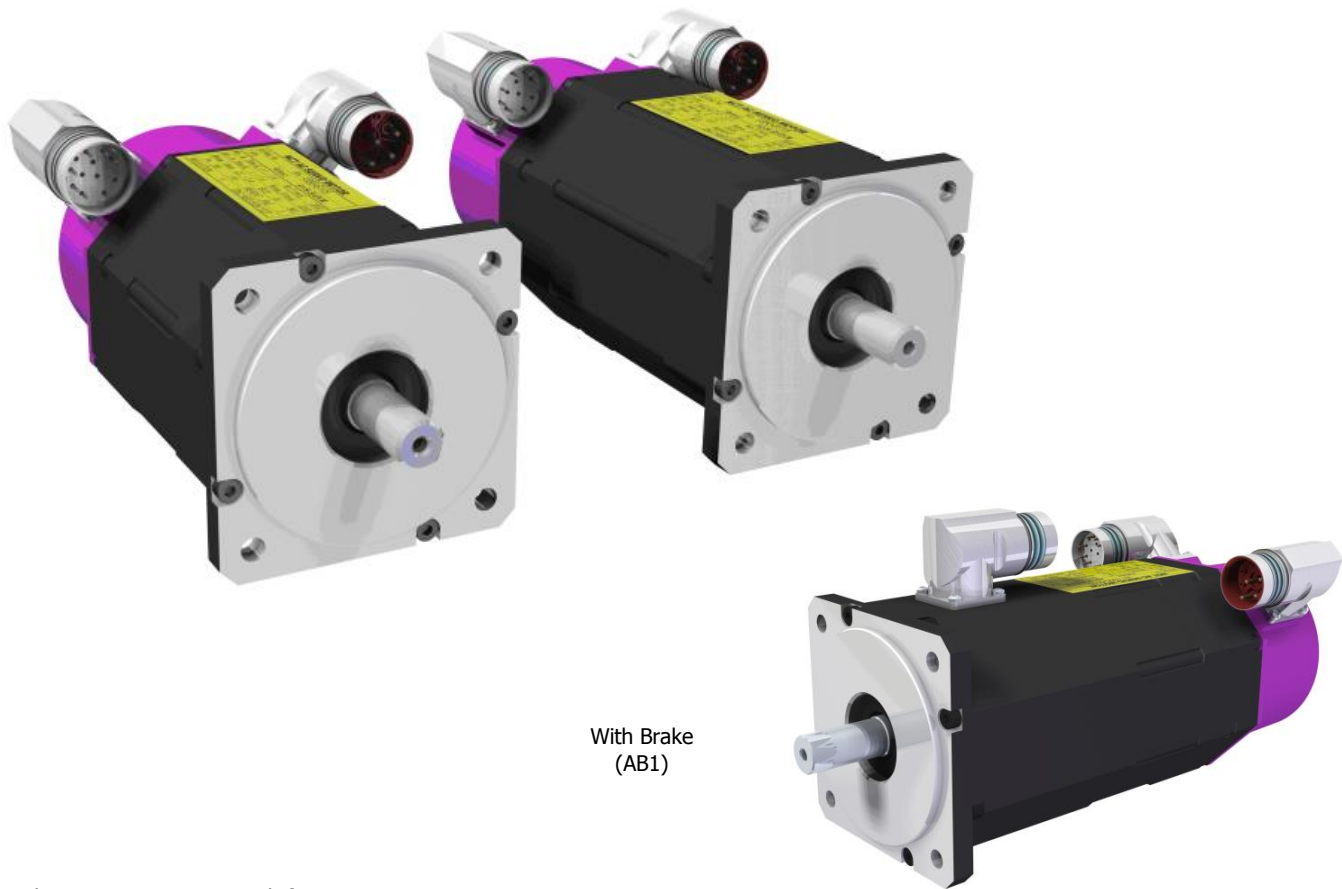
Speed-Torque curves of NCT A1, A2,...A38 synchronous servomotors



Speed-Torque curves of NCT Ai2.5, Ai5, ...Ai70 synchronous servomotors



NCT A1 and A2 synchronous servomotors



With Brake
(AB1)

Synchronous servomotors with ferrite magnets.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings” chapter of this catalogue.

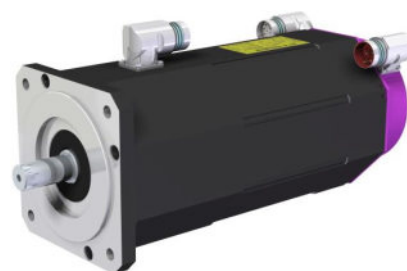
Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	A1..., AB1...	A2..., AB2...
NCT part No. (order number)	40-00011014-00	40-00011005-00
Static torque, M_0	1.1 Nm	2.2 Nm
Static current, I_0	1.0 A	2.0 A
Rated power, P_n	310 W	620 W
Rated torque, M_n	1.0 Nm	2.0 Nm
Rated current, I_n	0.9 A	1.8 A
Rated speed, n_n	3000 min ⁻¹	3000 min ⁻¹
Maximal torque, M_{max}	2.2 Nm	4.4 Nm
Maximal current, I_{max}	2.5 A	5.0 A
Maximal speed, n_{max}	3200 min ⁻¹	3200 min ⁻¹
Voltage coefficient, K_e	71 V/(1000 min ⁻¹)	75V/(1000 min ⁻¹)
DC bus voltage, U_{Dcbusz}	540 V	540 V
Moment of inertia (without brake), J	4 kgcm ²	7.0 kgcm ²
Weight (without/with brake), m	3/3,8 kg	4/4,8 kg
Line resistance (between terminals), R	37.3 Ω	14.5 Ω
IP protection rating	IP55	IP55
Insulation rating	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096
Absolute encoder single-/multiturn	ECN1325/EQN1337	ECN1325/EQN1337
Brake unit	Optional	Optional

NCT A3, A6 and A9 synchronous servomotors



With Brake
(AB6)



Synchronous servomotors with ferrite magnets.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	A3..., AB3...	A6..., AB6...	A9..., AB9...
NCT part No. (order number)	40-00011008-00	40-00011011-00	40-0010402-00
Static torque, M_0	3.0 Nm	6.0 Nm	9.0 Nm
Static current, I_0	2.5 A	4.5 A	6.0 A
Rated power, P_n	720 W	1440 W	2170 W
Rated torque, M_n	2.3 Nm	4.6 Nm	6.9 Nm
Rated current, I_n	1.9 A	3.5 A	4.6 A
Rated speed, n_n	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Maximal torque, M_{max}	6.0 Nm	12.0 Nm	18 Nm
Maximal current, I_{max}	6.2 A	11.0 A	15.0 A
Maximal speed, n_{max}	3200 min ⁻¹	3200 min ⁻¹	3200 min ⁻¹
Voltage coefficient, K_e	90 V	95 V	95 V
DC bus voltage, U_{Dcbusz}	540 V	540 V	540 V
Moment of inertia (without brake), J	16 kgcm ²	32 kgcm ²	47.6 kgcm ²
Weight without brake, m	7.5 kg	12 kg	16.5 kg
Weight with brake, m	11 kg	15.5 kg	20 kg
Line resistance (between terminals), R	9.5 Ω	3.6 Ω	2.1 Ω
IP protection rating	IP55	IP55	IP55
Insulation rating	F	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096	ERN1326/4096
Absolute encoder single-/multiturn	ECN1325/EQN1337	ECN1325/EQN1337	ECN1325/EQN1337
Brake unit	Optional	Optional	Optional

NCT A12, A22, A30 and A38 synchronous servomotors



Synchronous servomotors with ferrite magnets.

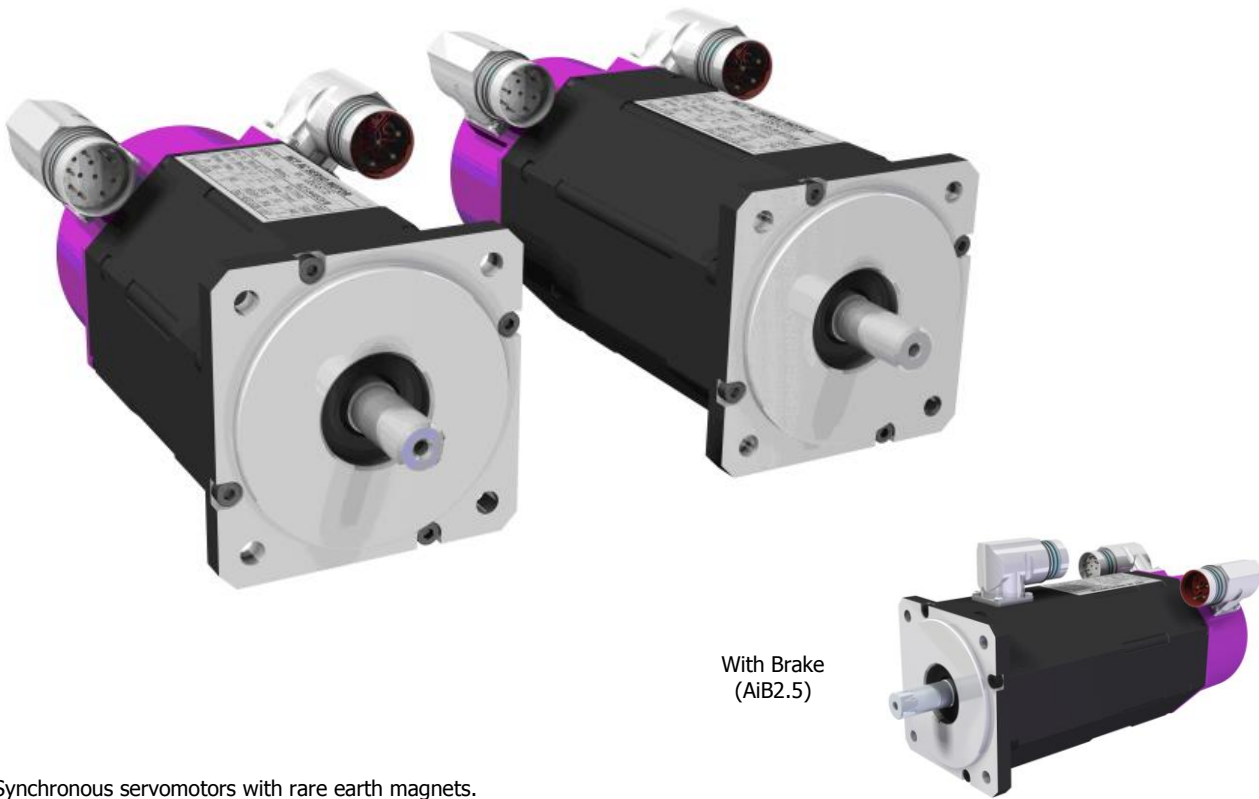
Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	A12..., AB12...	A22..., AB22...	A30..., AB30...	A38..., AB38
NCT part No. (order number)	40-00011014-00	40-00011017-00	40-00011020-00	40-00011023-00
Static torque, M_0	12.0 Nm	22 Nm	30 Nm	38 Nm
Static current, I_0	8.8 A	15 A	19.5 A	18 A
Rated power, P_n	1890 W	3380 W	4190 W	5230 W
Rated torque, M_n	9 Nm	16.1 Nm	20 Nm	25 Nm
Rated current, I_n	6.6 A	11 A	13 A	11.8 A
Rated speed, n_n	2000 min ⁻¹	2000 min ⁻¹	2000 min ⁻¹	2000 min ⁻¹
Maximal torque, M_{max}	27 Nm	47 Nm	66 Nm	76 Nm
Maximal current, I_{max}	24 A	36 A	48 A	42 A
Maximal speed, n_{max}	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹	2200 min ⁻¹
Voltage coefficient, K_e	90 V	90 V	93 V	135 V
DC bus voltage, U_{Dcbusz}	540 V	540 V	540 V	540 V
Moment of inertia (without brake), J	64 kgcm ²	124 kgcm ²	147.6 kgcm ²	224 kgcm ²
Weight without brake, m	18 kg	30 kg	43 kg	56 kg
Weight with brake, m	21 kg	33 kg	46 kg	59 kg
Line resistance (between terminals), R	1.31 Ω	0.49 Ω	0.296 Ω	0.483 Ω
IP protection rating	IP55	IP55	IP55	IP55
Insulation rating	F	F	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096	ERN1326/4096	ERN1326/4096
Absolute encoder singleturn	ECN1325	ECN1325	ECN1325	ECN1325
Absolute encoder multiturn	EQN1337	EQN1337	EQN1337	EQN1337
Brake unit	Optional	Optional	Optional	Optional

NCT Ai2.5 and Ai5 synchronous servomotors



With Brake
(AiB2.5)

Synchronous servomotors with rare earth magnets.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	Ai2.5..., AiB2.5...	Ai5..., AiB5...
NCT part No. (order number)	40-00011064-00	40-00010290-00
Static torque, M_0	2,5 Nm	5 Nm
Static current, I_0	2,3 A	4,6 A
Rated power, P_n	550 W	1100 W
Rated torque, M_n	1.3 Nm	2.6 Nm
Rated current, I_n	1,2 A	2.4 A
Rated speed, n_n	4000 min ⁻¹	4000 min ⁻¹
Maximal torque, M_{max}	10.5 Nm	28 Nm
Maximal current, I_{max}	11 A	33,5 A
Maximal speed, n_{max}	5000 min ⁻¹	5000 min ⁻¹
Voltage coefficient, K_e	73 V	73 V
DC bus voltage, U_{Dcbusz}	540 V	540 V
Moment of inertia (without brake), J	4 kgcm ²	7.0 kgcm ²
Weight (without/with brake), m	3/3,8 kg	4/4,8 kg
Line resistance (between terminals), R	8,73 Ω	3,05 Ω
IP protection rating	IP55	IP55
Insulation rating	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096
Absolute encoder single-/multiturn	ECN1325/EQN1337	ECN1325/EQN1337
Brake unit	Optional	Optional

NCT Ai8 and Ai15 synchronous servomotors



Synchronous servomotors with rare earth magnets.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	Ai8..., AiB8...	Ai15..., AiB15...
NCT part No. (order number)	40-00010291-00	40-00010276-00
Static torque, M_0	8,4 Nm	17 Nm
Static current, I_0	6 A	13 A
Rated power, P_n	1800 W	2700 W
Rated torque, M_n	5,8 Nm	9,9 Nm
Rated current, I_n	4,5 A	8,4 A
Rated speed, n_n	3000 min ⁻¹	2600 min ⁻¹
Maximal torque, M_{max}	38 Nm	75 Nm
Maximal current, I_{max}	28,5 A	68 A
Maximal speed, n_{max}	3800 min ⁻¹	4000 min ⁻¹
Voltage coefficient, K_e	91,5 V	82 V
DC bus voltage, U_{Dcbusz}	540 V	540 V
Moment of inertia (without brake), J	16 kgcm ²	32 kgcm ²
Weight without brake, m	7.5 kg	12 kg
Weight with brake, m	11 kg	15.5 kg
Line resistance (between terminals), R	1,78 Ω	0,466 Ω
IP protection rating	IP55	IP55
Insulation rating	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096
Absolute encoder single-/multiturn	ECN1325/EQN1337	ECN1325/EQN1337
Brake unit	Optional	Optional

NCT Ai28, Ai50 and Ai70 synchronous servomotors



With Brake
(AiB50)



Synchronous servomotors with rare earth magnets.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Electrical connections: Power connector, encoder connector, brake unit supply voltage connector (in brake version). Pinouts are specified in the introduction of motor chapter of this catalogue.

Model	Ai28..., AiB28...	Ai50..., AiB50...	Ai70..., AiB70...
NCT part No. (order number)	40-00010277-00	40-0010278-00	40-00010279-00
Static torque, M_0	29 Nm	51 Nm	70 Nm
Static current, I_0	18,8 A	32,6 A	40 A
Rated power, P_n	4130 W	4980 W	5600 W
Rated torque, M_n	15,8 Nm	23,7 Nm	27 Nm
Rated current, I_n	10,6 A	16 A	16 A
Rated speed, n_n	2500 min ⁻¹	2000 min ⁻¹	2000 min ⁻¹
Maximal torque, M_{max}	95 Nm	185 Nm	265 Nm
Maximal current, I_{max}	72 A	150 A	180 A
Maximal speed, n_{max}	3300 min ⁻¹	2500 min ⁻¹	2300 min ⁻¹
Voltage coefficient, K_e	98 V	98 V	110 V
DC bus voltage, U_{Dcbus}	540 V	540 V	540 V
Moment of inertia (without brake), J	64 kgcm ²	124 kgcm ²	147.6 kgcm ²
Weight without brake, m	18 kg	30 kg	43 kg
Weight with brake, m	21 kg	33 kg	46 kg
Line resistance (between terminals), R	0,34 Ω	0,125 Ω	0,092 Ω
IP protection rating	IP55	IP55	IP55
Insulation rating	F	F	F
Incremental encoder/resolution	ERN1326/4096	ERN1326/4096	ERN1326/4096
Absolute encoder single-/multiturn	ECN1325/EQN1337	ECN1325/EQN1337	ECN1325/EQN1337
Brake unit	Optional	Optional	Optional

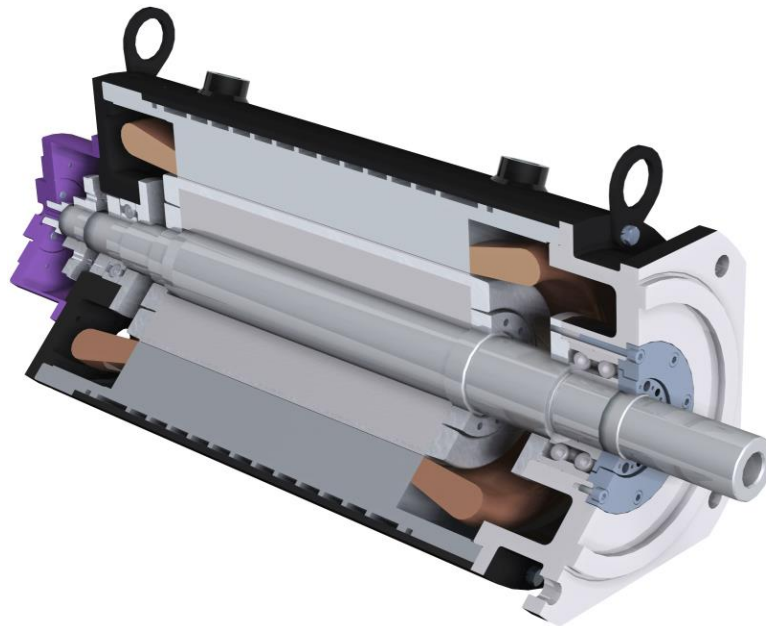
NCT Asynchronous servomotors

NCT asynchronous servomotors have been specifically designed for spindles of automatic machine tools. Thanks to the special configuration, these motors meet high-level dynamic requirements of modern machine tools; they are built for long life, and have a maintenance-free operation. The hollow shaft of AIS spindle motors allows cooling-lubricating medium to be fed to an internally cooled tool (CTS) in case of direct drive.

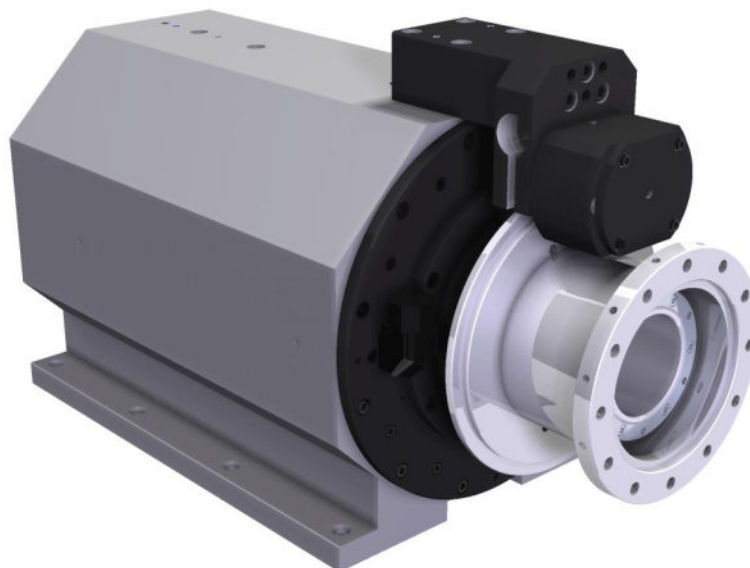
AMS type motors can call as compact power spindle, because these integrated to a lathe spindle. Their dynamic rigidity and low vibration tendency make a further leap in machining quality.

ADVANTAGES OF POWER SPINDLE OPPOSE TO CONVENTIONAL BELT DRIVE:

- Higher dynamics because of smaller inertial mass, lower loss, lower current drain
- Better workpiece geometry thanks to the lack of deformation caused by belt tension
- Higher lifetime, better surface quality on workpiece and higher tool edge life thanks to much lower vibration level
- Better workpiece geometrical and repeating accuracy, longer lifetime of bearing thanks to lower heat deformation because of high liquid cooling



NCT asynchronous motor AIS



NCT asynchronous power spindle AMS

Designation of the AiS and AMS models

AiS 100L W 15 H

- **Motor group:**
AiS – NCT „AiS“ series
AMS – NCT „AMS“ series
- **Frame size**
- **Cooling method:**
W – Water cooling
- **Rated speed** (1500 min⁻¹)
Star/Delta reconnectable motors have two codes e.g: 10-25 (1000/2500 rpm)
- **Shaft option:**
H – Hollow shaft, Spindle Nose/Hole (A2-5/32, A2-6/53, A2-8/75)

Designation of the VM motor models

VM 132M 54 40 20 06 Z1

- **Motor group:**
VM – NCT „VM“ series
- **Frame size**
- **Protection** (IP54)
- **Voltage** (400 Vac)
- **Rated speed** (2000 min⁻¹)
- **Max. speed** (6000 min⁻¹)
- **Special design**
Without designation – Basic design: cylindrical shaft end without keyway
Z1 – Cylindrical shaft end with keyway, without key

Designation of the MCA motor models

M C A 13I 34

- **Motor group:**
M – NCT „M“ series
- **Three phase AC current**
- **Forced ventilated**
- **Frame size**
- **Rated speed/100 rpm**

Designation of the DA motor models

DA F - 100B - 54 - A - 17 - 5

- **Motor group:**
DA – NCT „DA“ series
- **Mounting form**
No letter – Foot mounting
F – Flange mounting
- **Frame size**
- **Protection** (IP54)
- **Separate axial fan**
- **Rated speed** (1750 min⁻¹)
- **Mains voltage/motor voltage**
5 – 400V / 360 V

Definitions of the motor technical data

M₀	continuous torque at zero speed
I₀	phase current at M₀
P_n	rated power
M_n	rated torque
I_n	phase current at M_n
U_n	line voltage at M_n
n_n	rated speed
f_n	rated frequency
I_μ	magnetizing current
cosφ_n	power factor
η_n	efficiency
n_{ngy}	limit speed of field weakening (constant power)
M_{max}	maximum torque
n_{max}	maximum speed

NCT asynchronous motor chart

Motor Model	Note	Rated Output P _n	Rated Current I _n	Rated Torque M _n	Rated speed n _n	Max. speed n _{max}
AiS100LW20H (out of production)	Flange	15 kW	32 A	72 Nm	2000 min ⁻¹	15000 min ⁻¹
AiS100LW15-26H (Y/D)	Flange	10.5/20 kW	24/46 A	67/72 Nm	1500/2650 min ⁻¹	10000/15000 min ⁻¹
AiS132LW15H (out of production)	Flange	22 kW	55 A	140 Nm	1500 min ⁻¹	10000 min ⁻¹
AiS132LW08-15H (Y/D)	Flange	12.6/22 kW	29.4/48 A	140/140 Nm	860/1500 min ⁻¹	10000/10000 min ⁻¹
AMS112MW20-A2-5/32	Power Spindle	9.5 kW	27 A	45 Nm	2000 min ⁻¹	6000 min ⁻¹
AMS180MW10-25-A2-6/53 (Y/D)	Power Spindle	18.2/23.4 kW	47.5/47.4 A	173.8/89.4 Nm	1000/2500 min ⁻¹	6000 min ⁻¹
AMS180MW10-25-A2-8/75 (Y/D)	Power Spindle	18.2/23.4 kW	47.5/47.4 A	173.8/89.4 Nm	1000/2500 min ⁻¹	6000 min ⁻¹
VM-90L-54-40-20-12	Feet+Flange	5,17 kW	9,99 A	24,7 Nm	2000 min ⁻¹	12000 min ⁻¹
VM-100S-54-40-15-08	Feet+Flange	5,73 kW	11,68 A	36,5 Nm	1500 min ⁻¹	8000 min ⁻¹
VM-100M-54-40-15-08	Feet+Flange	8,92 kW	17,7 A	56,8 Nm	1500 min ⁻¹	8000 min ⁻¹
VM-100L-54-40-10-08	Feet+Flange	9,16 kW	18,75 A	87,5 Nm	1000 min ⁻¹	8000 min ⁻¹
VM-100L-54-40-15-08	Feet+Flange	13,08 kW	25,89 A	83,3 Nm	1500 min ⁻¹	8000 min ⁻¹
VM-100L-54-40-20-12	Feet+Flange	17,38 kW	33 A	83 Nm	2000 min ⁻¹	12000 min ⁻¹
VM-132S-54-40-15-06	Feet+Flange	17,37 kW	31,69 A	110,8 Nm	1500 min ⁻¹	6000 min ⁻¹
VM-132M-54-40-20-06	Feet+Flange	27,75 kW	47,88 A	132,5 Nm	2000 min ⁻¹	6000 min ⁻¹
VM-132L-54-40-15-06	Feet+Flange	26,17 kW	46,69 A	166,6 Nm	1500 min ⁻¹	6000 min ⁻¹
VM-160S-54-40-10-04	Feet+Flange	27,75 kW	52,53 A	265 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-160S-54-40-15-04	Feet+Flange	39,27 kW	70,12 A	250 Nm	1500 min ⁻¹	4000 min ⁻¹
VM-160M-54-40-05-04	Feet+Flange	19,44 kW	41,26 A	320 Nm	580 min ⁻¹	4000 min ⁻¹
VM-160M-54-40-10-04	Feet+Flange	31,94 kW	60,37 A	305 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-160L-54-40-10-04	Feet+Flange	35,08 kW	65,52 A	335 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-180S-54-40-10-04	Feet+Flange	40,98 kW	78,46 A	391.3 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-180M-54-40-05-04	Feet+Flange	34,01 kW	68,95 A	560 Nm	580 min ⁻¹	4000 min ⁻¹
VM-180M-54-40-10-04	Feet+Flange	57,6 kW	110,36 A	550 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-180L-54-40-05-04	Feet+Flange	38,87 kW	78,8 A	640 Nm	580 min ⁻¹	4000 min ⁻¹
VM-180L-54-40-10-04	Feet+Flange	64,93 kW	122,89 A	620 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-180L-54-40-15-04	Feet+Flange	90,01 kW	162,44 A	573 Nm	1500 min ⁻¹	4000 min ⁻¹
VM-225S-54-40-05-04	Feet+Flange	40,39 kW	80,08 A	665 Nm	580 min ⁻¹	4000 min ⁻¹
VM-225S-54-40-10-04	Foot Mounted	68,07 kW	130,24 A	650 Nm	1000 min ⁻¹	4000 min ⁻¹
VM-225S-54-40-15-04	Foot Mounted	99,12 kW	177,17 A	631 Nm	1500 min ⁻¹	4000 min ⁻¹
VM-225M-54-40-05-04	Foot Mounted	55,88 kW	112,02 A	920 Nm	580 min ⁻¹	4000 min ⁻¹
VM-225M-54-40-10-04	Foot Mounted	94,25 kW	184,56 A	900 Nm	1000 min ⁻¹	4000 min ⁻¹
MCA 13I34	Flange	2.2 kW	6.0 A	6.3 Nm	3410 min ⁻¹	8000 min ⁻¹
MCA 14L35	Flange	3.9 kW	9.1 A	10.8 Nm	3455 min ⁻¹	8000 min ⁻¹
DA 100B 54 A 17-5	Foot Mounted	11.0 kW	27.8 A	60.0 Nm	1750 min ⁻¹	8000 min ⁻¹
DA F 100B 54 A 17-5	Flange					
DA FF 100B 54 A 17-5	Feet+Flange					
DA 132K 23 A 10-5	Foot Mounted	15.0 kW	38.0 A	143 Nm	1000 min ⁻¹	5000 min ⁻¹
DA F 132K 23 A 10-5	Flange					
DA FF 132K 23 A 10-5	Feet+Flange					
DA 132L 23 A 10-5	Foot Mounted	20.0 kW	48.0 A	191 Nm	1000 min ⁻¹	5000 min ⁻¹
DA F 132L 23 A 10-5	Flange					
DA FF 132L 23 A 10-5	Feet+Flange					

NCT AiS asynchronous servomotors

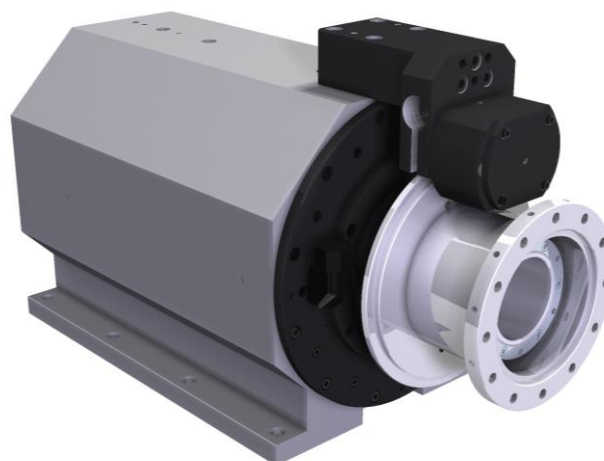
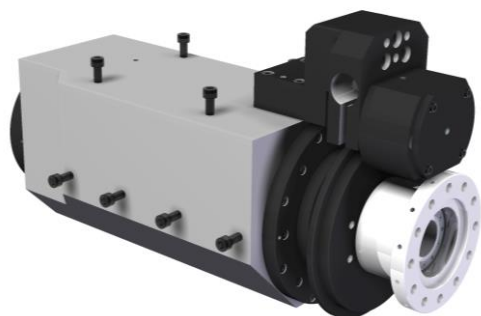


Liquid-cooled asynchronous servomotors mainly used for machine tool spindle drives.

Electrical connections: power connector, encoder connector (loose leads without terminal box).

Model	AiS100LW20H (out of production)	AiS100LW15-26H	AiS132LW15H (out of production)	AiS132LW08-15H
NCT part No. (order number)	40-00010203-00	40-00010202-01	40-00010204-00	40-00010204-01
Rated power, P_n	15 kW	10.5/20.0 kW	22.0 kW	12.6/22 kW
Rated torque, M_n	72 Nm	67/72 Nm	140 Nm	140/140 Nm
Rated current, I_n	32 A	24/46 A	55 A	29.4/48 A
Magnetizing current, I_{μ}	12 A	12/23 A	23 A	20/20 A
Rated speed, n_n	2000 min ⁻¹	1500/2650 min ⁻¹	1500 min ⁻¹	860/1500 min ⁻¹
Field reduction limit, n_{mgy}	8500 min ⁻¹	7200/11000 min ⁻¹	6500 min ⁻¹	2850/5000 min ⁻¹
Maximal speed, n_{max}	15000 min ⁻¹	10000/15000 min ⁻¹	10000 min ⁻¹	10000 min ⁻¹
Rated frequency f_n	68.5 Hz	51.5/91 Hz	51.1 Hz	29.6/51.1 Hz
Power coefficient, $\cos\phi_n$	0.89	0.85/0.83	0.84	0.74/0.87
Efficiency, η_n	0.91	0.90/0.915	0.92	0.88/0.92
Rated voltage, U_n	330 V	330 V Y/300 V D	300 V	380 V Y/330 V D
Moment of inertia, J	440 kgcm ²	440 kgcm ²	1100 kgcm ²	1100 kgcm ²
Weight, m	85 kg	85 kg	160 kg	160 kg
IP protection rating	IP54	IP54	IP54	IP54
Insulation rating	F	F	F	F
Cooling	Folyadékhűtés	Folyadékhűtés	Folyadékhűtés	Folyadékhűtés
Encoder type	GEL 244	GEL 244	GEL 244	GEL 244
Encoder resolution/signal	256/TTL	256/TTL	256/TTL	256/TTL

NCT AMS power spindles

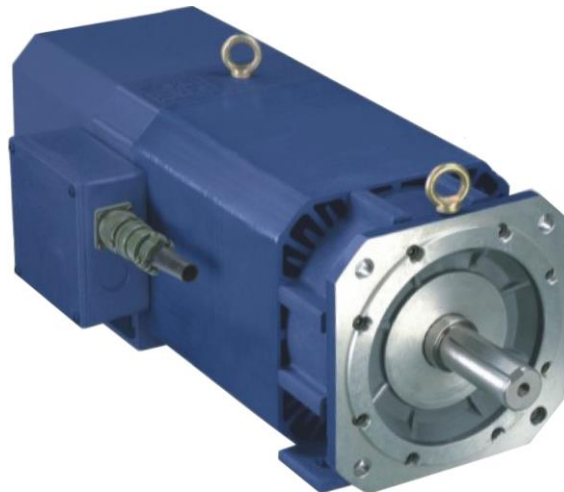


Compact power spindle with liquid cooled asynchronous servomotor.

Electrical connections: power connector, encoder connector (loose leads without terminal box).

Model	AMS112MW20-A2-5/32	AMS180MW10-25-A2-6/53	AMS180MW10-25-A2-8/75
NCT part No. (order number)	40-00010299-00	40-00010300-00	40-00010301-00
Rated power, P_n	9,5 kW	18,2/23,4 kW	18,2/23,4 kW
Rated torque, M_n	45 Nm	173,8/89,4 Nm	173,8/89,4 Nm
Rated current, I_n	27 A	47,5/47,4 A	47,5/47,4 A
Magnetizing current, I_μ	18 A	25/17 A	25/17 A
Rated speed, n_n	2000 min ⁻¹	1000/2500 min ⁻¹	1000/2500 min ⁻¹
Field reduction limit, n_{mqv}	4500 min ⁻¹	2800/6000 min ⁻¹	2800/6000 min ⁻¹
Maximal speed, n_{max}	6000 min ⁻¹	6000 min ⁻¹	6000 min ⁻¹
Rated frequency f_n	70.1 Hz	34,8/84,5 Hz	34,8/84,5 Hz
Power coefficient, $\cos\varphi_n$	0.77	0,8/0.86	0,8/0.86
Efficiency, η_n	0.85	0,87/0.92	0,87/0.92
Rated voltage, U_n	310 V	320/360 V Y/D	320/360 V Y/D
Moment of inertia, J	360 kgcm ²	5000 kgcm ²	5000 kgcm ²
Weight, m	44 kg	122 kg	122 kg
IP protection rating	IP54	IP54	IP54
Insulation rating	F	F	F
Cooling	Folyadékhűtés	Folyadékhűtés	Folyadékhűtés
Type of encoder (magnetic)	ERM200 900RA A05	ERM200 1200RA A03	ERM200 1200RA A03
Type of sensor	AK ERM 280	AK ERM 280	AK ERM 280
Spindle Nose	A2-5	A2-6	A2-8
Spindle hole	32 mm	53 mm	75 mm

VM90 and VM100 asynchronous servomotors



Totally enclosed, air-cooled asynchronous servomotors.

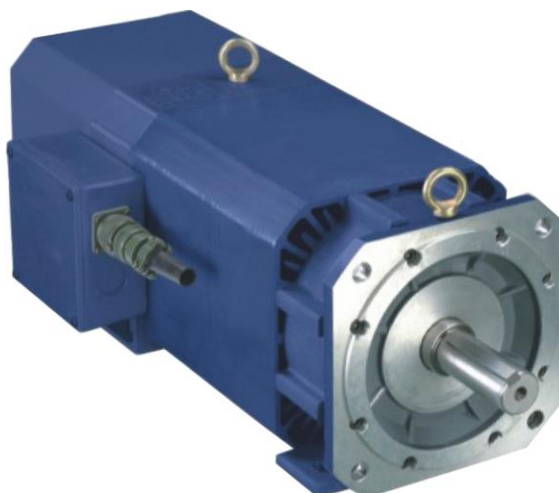
Electrical connections: power connector (6 terminals 230/400 V D/Y), encoder connector, fan connector (in terminal box).

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	VM90L-54-40-20-12	VM100S-54-40-15-08	VM100M-54-40-15-08	VM100L-54-40-10-08	VM100L-54-40-15-08	VM100L-54-40-20-12
NCT part No. (order number)	40-00011520-00		40-00010522-00		40-00010521-00	40-00010435-00
Rated power, P_n	5,17 kW	5,73 kW	8,92 kW	9,16 kW	13,08 kW	17,38 kW
Rated torque, M_n	24,7 Nm	36,5 Nm	56,8 Nm	87,5 Nm	83,3 Nm	83 Nm
Rated current, I_n	9,99 A	11,68 A	17,7 A	18,75 A	25,89 A	33 A
Magnetizing current, I_μ	5 A	5 A	7 A	8 A	8 A	11 A
Rated speed, n_n	2000 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹	1000 min ⁻¹	1500 min ⁻¹	2000 min ⁻¹
Field reduction limit, n_{max}	4000 min ⁻¹	3300 min ⁻¹	3300 min ⁻¹	2200 min ⁻¹	3300 min ⁻¹	4000 min ⁻¹
Maximal speed, n_{max}	12000 min ⁻¹	8000 min ⁻¹	8000 min ⁻¹	8000 min ⁻¹	8000 min ⁻¹	12000 min ⁻¹
Rated frequency f_n	68,87 Hz	52,08 Hz	51,87 Hz	35,01 Hz	51,55 Hz	68,38 Hz
Power coefficient, $\cos\phi_n$	0,87	0,83	0,85	0,83	0,85	0,88
Efficiency, η_n	0,86	0,85	0,86	0,85	0,86	0,86
Rated voltage, U_n	400 V	400 V	400 V	400 V	400 V	400 V
Moment of inertia, J	136 kgcm ²	245 kgcm ²	353 kgcm ²	405 kgcm ²	405 kgcm ²	405 kgcm ²
Weight, m	38 kg	51 kg	68 kg	83 kg	83 kg	83 kg
IP protection rating	IP54	IP54	IP54	IP54	IP54	IP54
Insulation rating	F	F	F	F	F	F
Encoder type	TTL	TTL	TTL	TTL	TTL	TTL
Encoder resolution	1024	1024	1024	1024	1024	1024

VM132 asynchronous servomotors



Totally enclosed, air-cooled asynchronous servomotors.

Electrical connections: power connector (6 terminals 230/400 V D/Y), encoder connector, fan connector (in terminal box).

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	VM132S-54-40-15-06	VM132M-54-40-20-06	VM132L-54-40-15-06
NCT part No. (order number)	40-00010436-00	40-00010447-00	40-00010437-00
Rated power, P_n	17,37 kW	27,75 kW	26,17 kW
Rated torque, M_n	110,6 Nm	132,5 Nm	166,6 Nm
Rated current, I_n	31,69 A	47,88 A	46,69 A
Magnetizing current, I_u	11 A	15 A	15 A
Rated speed, n_n	1500 min ⁻¹	2000 min ⁻¹	1500 min ⁻¹
Field reduction limit, n_{mqv}	3300 min ⁻¹	4000 min ⁻¹	3300 min ⁻¹
Maximal speed, n_{max}	6000 min ⁻¹	6000 min ⁻¹	6000 min ⁻¹
Rated frequency f_n	51,49 Hz	67,96 Hz	51,33 Hz
Power coefficient, $\cos\varphi_n$	0,86	0,89	0,87
Efficiency, η_n	0,92	0,94	0,93
Rated voltage, U_n	400 V	400 V	400 V
Moment of inertia, J	650 kgcm ²	770 kgcm ²	1010 kgcm ²
Weight, m	105 kg	120 kg	152 kg
IP protection rating	IP54	IP54	IP54
Insulation rating	F	F	F
Encoder type	TTL	TTL	TTL
Encoder resolution	1024	1024	1024

VM160 asynchronous servomotors



Totally enclosed, air-cooled asynchronous servomotors.

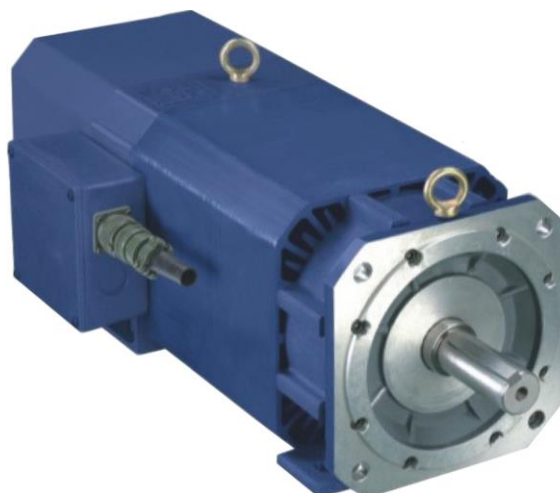
Electrical connections: power connector (6 terminals 230/400 V D/Y), encoder connector, fan connector (in terminal box).

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	VM160S-54-40- 10-04	VM160S-54-40- 15-04	VM160M-54-40- 05-04	VM160M-54-40- 10-04	VM160L-54-40- 10-04
NCT part No. (order number)		40-00010449-00	40-00010448-00	40-00010448-01	40-00011523-00
Rated power, P_n	27,75 kW	39,27 kW	19,44 kW	31,94 kW	35,08 kW
Rated torque, M_n	265 Nm	250 Nm	320 Nm	305 Nm	335 Nm
Rated current, I_n	52,53 A	70,12 A	41,26 A	60,37 A	65,52 A
Magnetizing current, I_μ	16 A	18 A	15 A	19 A	20 A
Rated speed, n_n	1000 min ⁻¹	1500 min ⁻¹	580 min ⁻¹	1000 min ⁻¹	1000 min ⁻¹
Field reduction limit, n_{max}	2200 min ⁻¹	3300 min ⁻¹	1200 min ⁻¹	2200 min ⁻¹	2200 min ⁻¹
Maximal speed, n_{max}	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹
Rated frequency f_n	34,61 Hz	51,23 Hz	20,12 Hz	34,51 Hz	34,29 Hz
Power coefficient, $\cos\phi_n$	0,82	0,86	0,8	0,83	0,84
Efficiency, η_n	0,93	0,94	0,85	0,92	0,92
Rated voltage, U_n	400 V	400 V	400 V	400 V	400 V
Moment of inertia, J	1860 kgcm ²	1860 kgcm ²	2300 kgcm ²	2300 kgcm ²	2560 kgcm ²
Weight, m	240 kg	240 kg	265 kg	265 kg	282 kg
IP protection rating	IP54	IP54	IP54	IP54	IP54
Insulation rating	F	F	F	F	F
Encoder type	TTL	TTL	TTL	TTL	TTL
Encoder resolution	1024	1024	1024	1024	1024

VM180 asynchronous servomotors



Totally enclosed, air-cooled asynchronous servomotors.

Electrical connections: power connector (6 terminals 230/400 V D/Y), encoder connector, fan connector (in terminal box).

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	VM180S-54-40-10-04	VM180M-54-40-05-04	VM180M-54-40-10-04	VM180L-54-40-05-04	VM180L-54-40-10-04	VM180L-54-40-15-04
NCT part No. (order number)	40-00010434-00	40-00011571-00	40-00011571-01	40-00011570-00	40-00011570-01	40-00011570-02
Rated power, P_n	40.98 kW	34.01 kW	57.6 kW	38,87 kW	64.93 kW	90,1 kW
Rated torque, M_n	391.3 Nm	560 Nm	550 Nm	640 Nm	620 Nm	573 Nm
Rated current, I_n	78.4 A	68.95 A	110.36 A	78,8 A	122.89 A	162,44 A
Magnetizing current, I_μ	20 A	20 A	35 A	28 A	40 A	45 A
Rated speed, n_n	1000 min ⁻¹	580 min ⁻¹	1000 min ⁻¹	580 min ⁻¹	1000 min ⁻¹	1500 min ⁻¹
Field reduction limit, n_{mgv}	2200 min ⁻¹	1200 min ⁻¹	2200 min ⁻¹	1200 min ⁻¹	2200 min ⁻¹	3300 min ⁻¹
Maximal speed, n_{max}	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹
Rated frequency f_n	34.01 Hz	19,89 Hz	33,98 Hz	19,83 Hz	33,91 Hz	50,66 Hz
Power coefficient, $\cos\varphi_n$	0.82	0.80	0.81	0.8	0.82	0.86
Efficiency, η_n	0.92	0.89	0.93	0.89	0.93	0.93
Rated voltage, U_n	400 V	400 V	400 V	400 V	400 V	400 V
Moment of inertia, J	5000 kg cm ²	6900 kg cm ²	6900 kg cm ²	7770 kg cm ²	7770 kg cm ²	7770 kg cm ²
Weight, m	370 kg	440 kg	440 kg	500 kg	500 kg	500 kg
IP protection rating	IP54	IP54	IP54	IP54	IP54	IP54
Insulation rating	F	F	F	F	F	F
Encoder type	TTL	TTL	TTL	TTL	TTL	TTL
Encoder resolution	1024	1024	1024	1024	1024	1024

VM225 asynchronous servomotors



No Flange!

Totally enclosed, air-cooled asynchronous servomotors.

Electrical connections: power connector (6 terminals 230/400 V D/Y), encoder connector, fan connector (in terminal box).

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	VM225S-54-40-05-04	VM225S-54-40-10-04	VM225S-54-40-15-04	VM225M-54-40-05-04	VM225M-54-40-10-04
NCT part No. (order number)	40-00011572-00	40-00011572-01	40-00011572-02	40-00011573-00	40-00011573-01
Rated power, P_n	40,39 kW	68,07 kW	99,12 kW	55,88 kW	94,25 kW
Rated torque, M_n	665 Nm	650 Nm	631 Nm	920 Nm	900 Nm
Rated current, I_n	80.08 A	130.24 A	177.17 A	112,02 A	184,56 A
Magnetizing current, I_μ	25 A	30 A	40 A	35 A	40 A
Rated speed, n_n	580 min ⁻¹	1000 min ⁻¹	1500 min ⁻¹	580 min ⁻¹	1000 min ⁻¹
Field reduction limit, n_{mov}	1200 min ⁻¹	2200 min ⁻¹	3300 min ⁻¹	1500 min ⁻¹	3300 min ⁻¹
Maximal speed, n_{max}	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹
Rated frequency f_n	19,75 Hz	33,91 Hz	50,61 Hz	19,73 Hz	33,89 Hz
Power coefficient, $\cos\phi_n$	0.80	0.82	0.85	0.80	0.81
Efficiency, η_n	0.91	0.92	0.95	0.90	0.91
Rated voltage, U_n	400 V	400 V	400 V	400 V	400 V
Moment of inertia, J	14790 kg cm ²	14790 kg cm ²	14790 kg cm ²	19300 kg cm ²	19300 kg cm ²
Weight, m	635 kg	635 kg	635 kg	735 kg	735 kg
IP protection rating	IP54	IP54	IP54	IP54	IP54
Insulation rating	F	F	F	F	F
Encoder type	TTL	TTL	TTL	TTL	TTL
Encoder resolution	1024	1024	1024	1024	1024

MCA asynchronous servomotors



Totally enclosed, air-cooled small asynchronous servomotors.

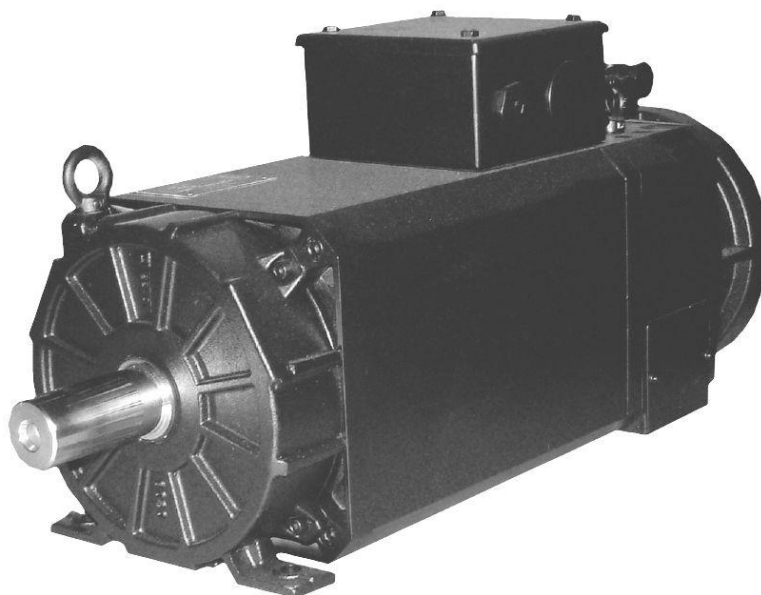
Electrical connections: Power connector, Encoder connector, Fan connector. Encoder connector is compatible with connector of the NCT synchronous servomotors. Other two connectors should be clarified in the quotation.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	MCA 13I34	MCA 14L35
NCT part No. (order number)	40-00000069-00	40-00000071-00
Static torque, M_0	7.0 Nm	13.5 Nm
Static current, I_0	6.3 A	10.5 A
Rated power, P_n	2.2 kW	3.9 kW
Rated torque, M_n	6.3 Nm	13.5 Nm
Rated current, I_n	6.0 A	9.1 A
Rated speed, n_n	3410 min ⁻¹	3455 min ⁻¹
Maximal torque, M_{max}	32 Nm	60 Nm
Maximal current, I_{max}	8000 min ⁻¹	8000 min ⁻¹
Rated frequency f_n	120 Hz	120 Hz
Efficiency, η_n	0.72	0.79
Rated voltage, U_n	390 V	390 V
Moment of inertia, J	8.3 kgcm ²	19.2 kgcm ²
Weight, m	12 kg	16.9 kg
IP protection rating	IP54	IP54
Insulation rating	F	F
Encoder type	OIH48-1024P6-L6-5V	OIH48-1024P6-L6-5V
Encoder resolution	1024	1024
Single phase fan Voltage/Current	210-240 V, 50-60 Hz / 0.12 A	210-240 V, 50-60 Hz / 0.12 A

DA100B54 asynchronous servomotors (IP54)



Totally enclosed, air-cooled large asynchronous servomotors.

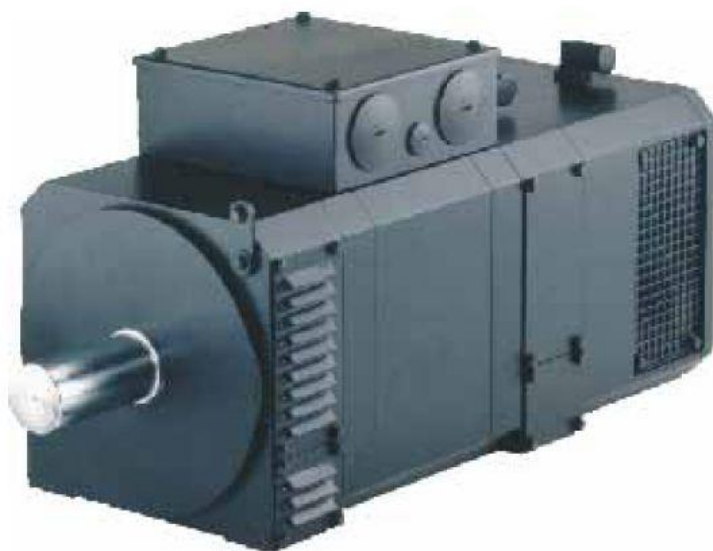
Electrical connections: Power connector (in the terminal box), Encoder connector, Fan connector. Connectors for the encoder and the fan should be clarified in the quotation.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

Model	DA 100B 54 A 17-5	DA F 100B 54 A 17-5	DA FF 100B 54 A 17-5
NCT part No. (order number) (DAF100B54A17-5)	40-00000089-00		
Rated power, P_n	11.0 kW		
Rated torque, M_n	60 Nm		
Rated current, I_n	27.8 A		
Magnetizing current, I_μ	15.2 A		
Rated speed, n_n	1750 min ⁻¹		
Field reduction limit, n_{mqy}	3500 min ⁻¹		
Maximal speed, n_{max}	8000 min ⁻¹		
Rated frequency f_n	60.3 Hz		
Power coefficient, $\cos\varphi_n$	0.78		
Efficiency, η_n	0.878		
Rated voltage, U_n	335 V		
Moment of inertia, J	340 kgcm ²		
Weight, m	75 kg		
IP protection rating	IP54		
Insulation rating	F		
Encoder type	ERN420		
Encoder resolution	1024		

DA132K23 and DA132L23 asynchronous servomotors (IP23)



Large size, through ventilated, air-cooled asynchronous servomotors.

Electrical connections: Power connector (in the terminal box), Encoder connector, Fan connector. Connectors for the encoder and the fan should be clarified in the quotation.

Outline drawing:

Outline drawings of motors can be found in the „Outline drawings“ chapter of this catalogue.

	DA 132K 23 A 10-5	DA F 132K 23 A 10-5	DA FF 132K 23 A 10-5
Model	DA132K23A10-5		DA132L23A10-5
NCT part No. (order number)	40-00000097-00		40-00001134-00
Rated power, P_n	15 kW		20 kW
Rated torque, M_n	143 Nm		191 Nm
Rated current, I_n	38.0 A		42.0 A
Magnetizing current, I_μ	18.6 A		23.9 A
Rated speed, n_n	1000 min ⁻¹		1000 min ⁻¹
Field reduction limit, n_{mg}	2600 min ⁻¹		2200 min ⁻¹
Maximal speed, n_{max}	5000 min ⁻¹		5000 min ⁻¹
Rated frequency f_n	35.0 Hz		34.8 Hz
Power coefficient, $\cos\varphi_n$	0.82		0.82
Efficiency, η_n	0.835		0.862
Rated voltage, U_n	335 V		345 V
Moment of inertia, J	740 kgcm ²		1050 kgcm ²
Weight, m	128 kg		158 kg
IP protection rating	IP23		IP23
Insulation rating	F		F
Encoder type	ERN420		ERN420
Encoder resolution	1024		1024

NCT signal cables

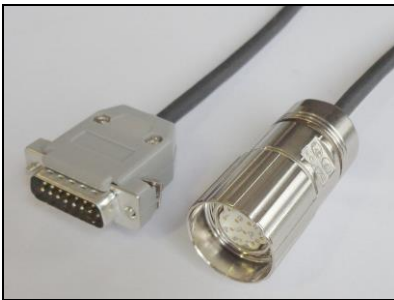
NCT-ETC-K
(EtherCat cable)



NCT-TTL-K
(TTL encoder cable)



NCT-EDT-K
(EnDat encoder cable)



NCT-SIN-K
(Sinusoidal encoder cable)



NCT highly flexible shielded signal cables with connectors.

NCT-ETC-K: EtherCat cable for communication between NCT 201 control and periferies.

NCT-EDT-K: EnDat encoder cable between NCT servo amplifier and NCT servomotors with EnDat encoder.

NCT-TTL-K: Encoder cable between NCT servo amplifier and NCT servomotors with incremental encoder.

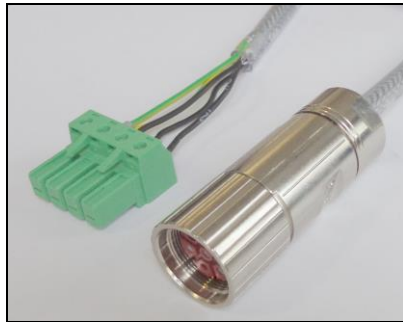
NCT-SIN-K: Encoder cable between NCT 201 control and sinusoidal encoder on the machine tool.

Characters „XX” in the part numbers indicate the cable length in m (eg. 06 means 6 m) except lengths smaller than 1 m where the first character is always 9 (e.g. 93 means 0.3 m).

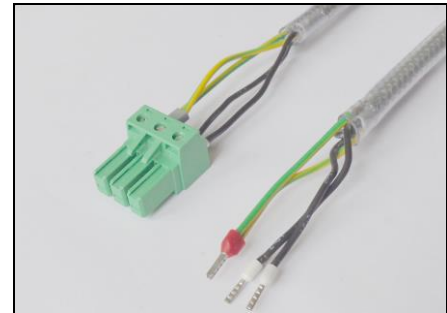
Model	NCT-ETC-K (EtherCat Cable)	NCT-EDT-K (EnDat cable)	NCT-TTL-K (TTL cable)	NCT-SIN-K (Sinusoidal cable)
NCT part No. (order number)	40-00010407-XX	40-00010406-XX	40-00010408-XX	40-00010409-XX
Cable length (m)	0.2, 0.3, 0.5, 1, 2, 3, 5, 6, 8, 10, 12, 15, 20, 25, 30	3, 5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30
No of wires x cross section (mm ²)	4xAWG27	16x0,08	10x0,14 + 2x0,5	3x2x0,14 + 2x0,5
Temperature (°C)	-10-tól +80-ig	-10-tól +85-ig	-30-tól +80-ig	-30-tól +80-ig
Voltage (V)	100	30	350	350

NCT motor cables

NCT-MOT-K1.5
(Motor cable)



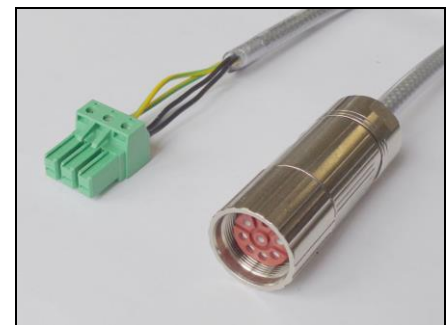
NCT-RES-K1.5
(Brake cable)



NCT-MOT-K2.5
(Motor cable)



NCT-BRK-K
(Brake resistor cable)



NCT highly flexible shielded motor cables with connectors.

NCT-MOT-K1.5: Motor cable between NCT servo amplifier and NCT A1, A2, A3, A6, A9, A12, Ai2.5, Ai5, Ai8, Ai15 servomotors.

NCT-MOT-K2.5: Motor cable between NCT servo amplifier and NCT A22, A30, A38, Ai28 servomotors.

NCT-MOT-K4.0: Motor cable between NCT servo amplifier and NCT Ai50, Ai70 servomotors.

NCT-BRK-K: Brake cable for NCT synchronous servomotors with brake.

NCT-RES-K1.5 Brake resistor cable between brake resistor and DPS and DiPS power supply units.

Characters „XX” in the part numbers indicate the cable length in m (eg. 06 means 6 m).

Model	NCT-MOT-K1.5 (Motor cable)	NCT-MOT-K2.5 (Motor cable)	NCT-MOT-K4.0 (Motor cable)	NCT-BRK-K (Brake cable)	NCT-RES-K1.5 (Resistor cable)
NCT part No. (order number)	40-00010410-XX	40-00010411-XX	40-00010412-XX	40-00010414-XX	40-00010413-XX
Cable length (m)	5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30	5, 6, 8, 10, 12, 15, 20, 25, 30
No of wires x cross section (mm ²)	4x1,5	4x2,5	4x4	4x1,5	4x1,5
Temperature (°C)	-30-tól +80-ig	-30-tól +80-ig	-30-tól +80-ig	-30-tól +80-ig	-30-tól +80-ig
Voltage (V)	600/1000	600/1000	600/1000	600/1000	600/1000

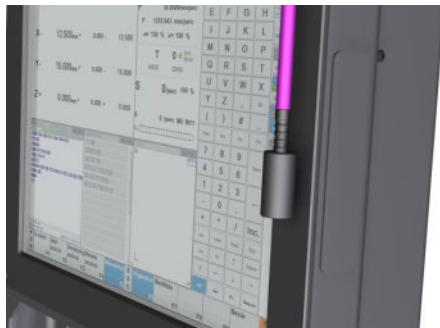
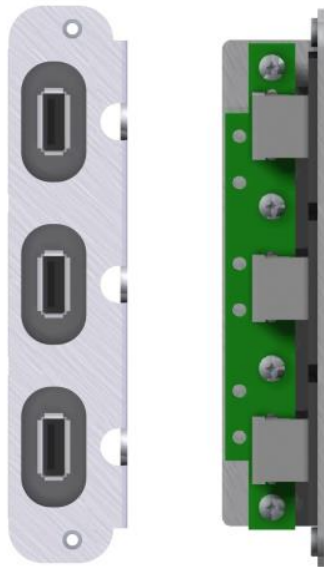
Operating boxes



Ergonomic design operating boxes with powder coating for machine keyboards MK15, MK15OP and MK19 (NCT201 control). Operating boxes can be used for upper and lower pendants of machine tools (by means of PK-01 rotating joint). Slant front panel of boxes provides comfortable operation. Removable back cover with silicon rubber gasket provides easy access for wiring and servicing. An optional USB panel can be mounted on the side of the box, while on the bottom side there is a hole for the socket of the external handwheel.

Model	MKB15	MKB15OP	MKB19
NCT part No. (order number)	40-00011564-00	40-00011564-02	40-00011564-01
Dimensions:	375x467x133	375x542x133	452x556x133
Machine keyboard to built in	MK15	MK15+MK15OP	MK19
Material	Powder coated steel sheet	Powder coated steel sheet	Powder coated steel sheet
Weight	5,8 kg	7,1 kg	8 kg

USB panel



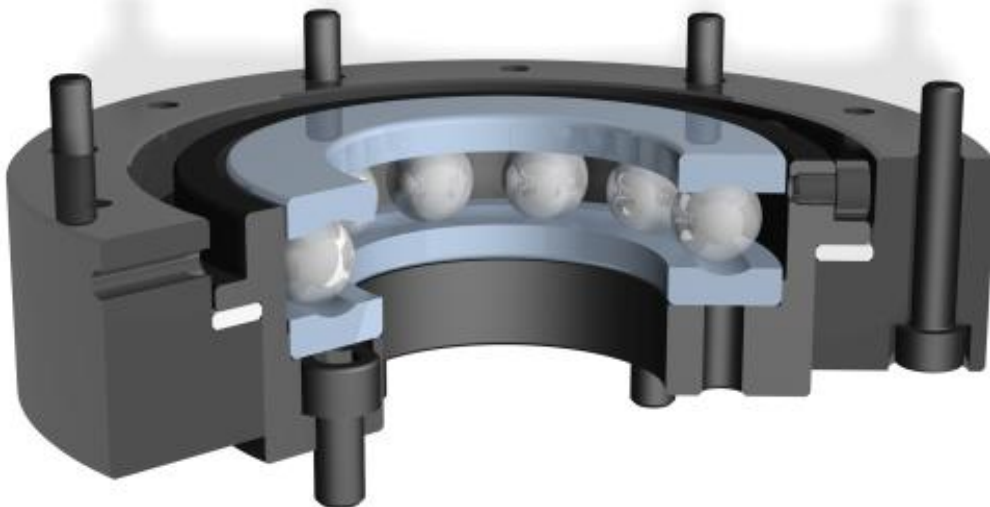
3 pieces of USB sockets for NCT 201 control.

It can be mounted on the operating box or on the other convenient boxes or walls.

USB sockets can be wired to the EHU01 unit. USB panel is a standard device for the DPU1901 unit, while it is optional for DPU1501.

Model	DPU5B-19
NCT part No. (order number)	40-00011575-00
Dimensions:	55x150x22
Material	Steel sheet
Weight	100 g

Rotating joint for operating boxes



Rotating joint with bearing and sleeve for joining the operating box and the upper or lower pendants of machine tools.
Range of the rotation angle can be adjusted by the stop screws.
Hole pattern and design of the unit allow the mounting in any angle direction.

Model	PK-01
NCT part No. (order number)	40-00011568-00
Dimensions	∅119x30.5
Material of housing	Steel
Weight	1,9 kg

Input devices



MKS Keyboard and mouse tray



Logitech K310 keyboard



Logitech M570 Trackball

Logitech K310 „washable“ USB keyboard
Key characters are laser printed and UV coated.

Logitech M570 wireless trackball with small wireless USB receiver. One AA battery (pre-installed).

MKS keyboard and mouse tray for NCT201 CNC controls mounted into MKB15, MKB15OP or MKB19 operating boxes.

Model	K310 Keyboard	M570 Trackball	MKS keyboard and mouse tray
NCT part No. (order number)	40-00011564-21	40-00011564-20	40-00011564-10
Dimensions	435x140x20	130x80x50	450x180x60
Material	Plastic	Plastic	Steel sheet
Weight	0,47 kg	0,15 kg	0,8 kg

Document holder



DKT-01 Document holder



Optional document holder for NCT201 CNC controls mounted into MKB15, MKB15OP or MKB19 operating boxes. Document holder can be pulled out to the right or left hand side depending on the installation.

Model	DKT-01
NCT part No. (order number)	40-00011564-11
Dimensions	367x312x30
Material	Steel sheet
Weight	1,5 kg

WIFI / NCT 201 WIFI ROUTER



Indoor enclosure for router

StationBox® InSpot



Power adaptor

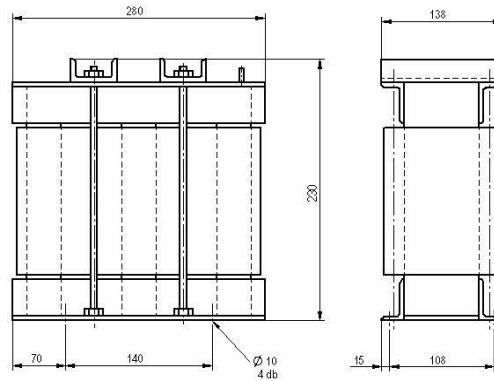


- This communication device serves to organize the NCT 201 controls into the WIFI network.
- Each NCT 201 control should be connected to the separate ROUTER.
- Central server should be connected to such a ROUTER as well. This means that for N pieces of NCT 201 control you would need N+1 pieces of ROUTERS for the WIFI network.

The is a wireless router with a new generation 600 MHz CPU and more processing power. It has five Ethernet ports, one of them is capable for 24V,500mA PoE. Router has a high power WiFi, USB port and antennas built into plastic enclosure. Router mounted into a protective indoor enclosure (model: Inspot). Power adaptor attached.

Model	WIFI
NCT part No. (order number)	40-00011583-00
Wireless network	802.11b/g/n
Power consumption	7 W
Power adaptor	24 Vdc 0.8 A
Dimensions	113x138x29mm
Operating/storing temperature/relative humidity (without condensation)	-20...+50°C/-24...+85°C / 95%
Weight	400 g
IP protection rating	IP20

DRC 3-40-80 three-phase line choke



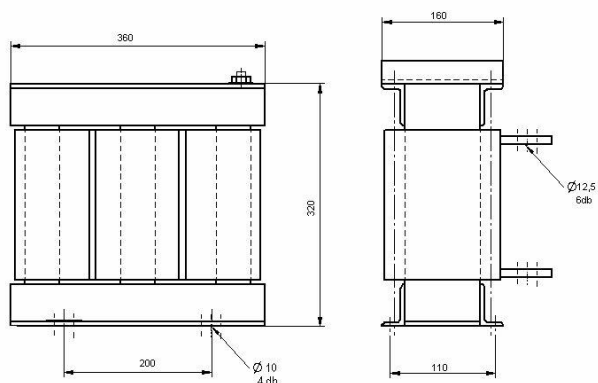
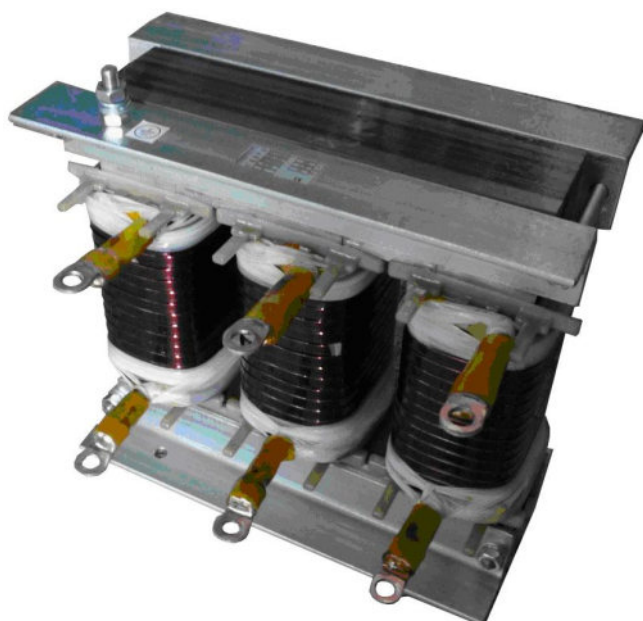
Electrical wiring:
Mains, Output

This three-phase line choke developed for DPB power supplies.

The task of the line choke is to decrease the harmonic content of the current absorbed or recuperated from the mains. The line choke of DPB power supply units is a separate unit because of its big size, it has not built in the case of power supply.

Model	DRC-3-40-30
NCT part No. (order number)	40-0000650-00
Rated inductivity	0,5 mH
Line voltage	3x400V
Rated current	3x80 A
Saturation current	200 A
IP protection rating	IP00
Weight	25 kg

DRC-3-40-160 three-phase line choke



Electrical wiring:
Mains, Output

This three-phase line choke developed for DPB power supplies.

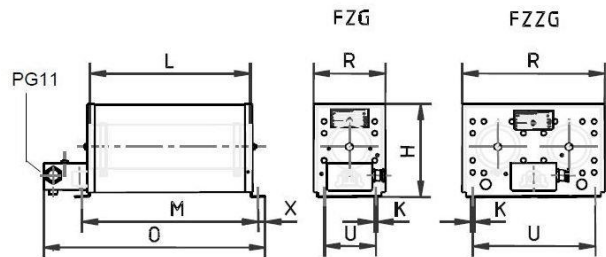
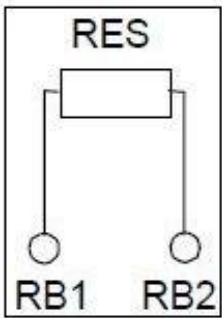
The task of the line choke is to decrease the harmonic content of the current absorbed or recuperated from the mains. The line choke of DPB power supply units is a separate unit because of its big size, it has not built in the case of power supply.

Model	DRC-3-40-160
NCT part No. (order number)	40-00000651-00
Rated inductivity	0,25 mH
Line voltage	3x400V
Rated current	3x160 A
Saturation current	400 A
IP protection rating	IP00
Weight	39 kg

FZG and FZZG brake resistors



Wiring:

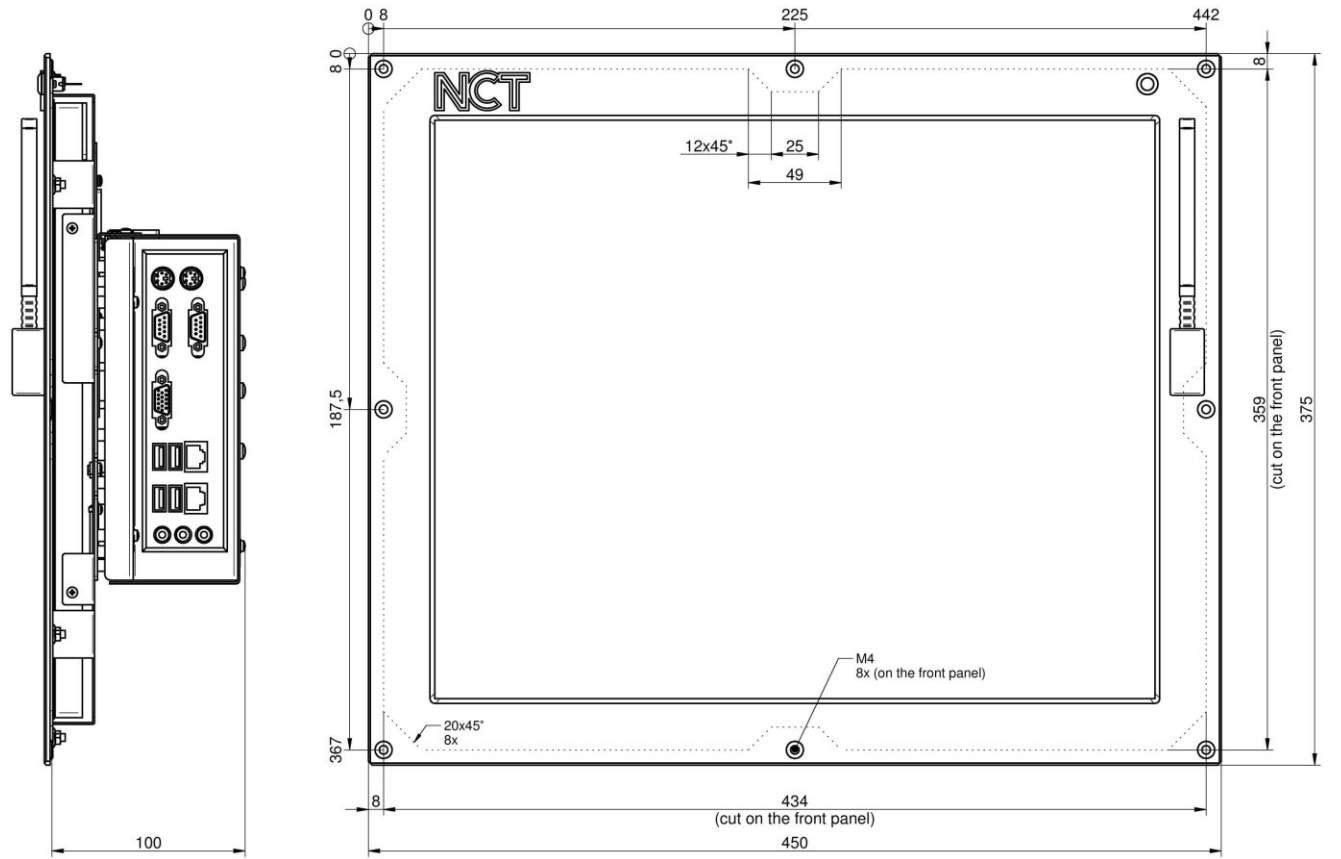


Model	H	K	M	O	R	U	X
FZG 500x65	120	6,5	530	586	92	64	10
FZZG 400x65	120	6,5	426	486	185	150	10

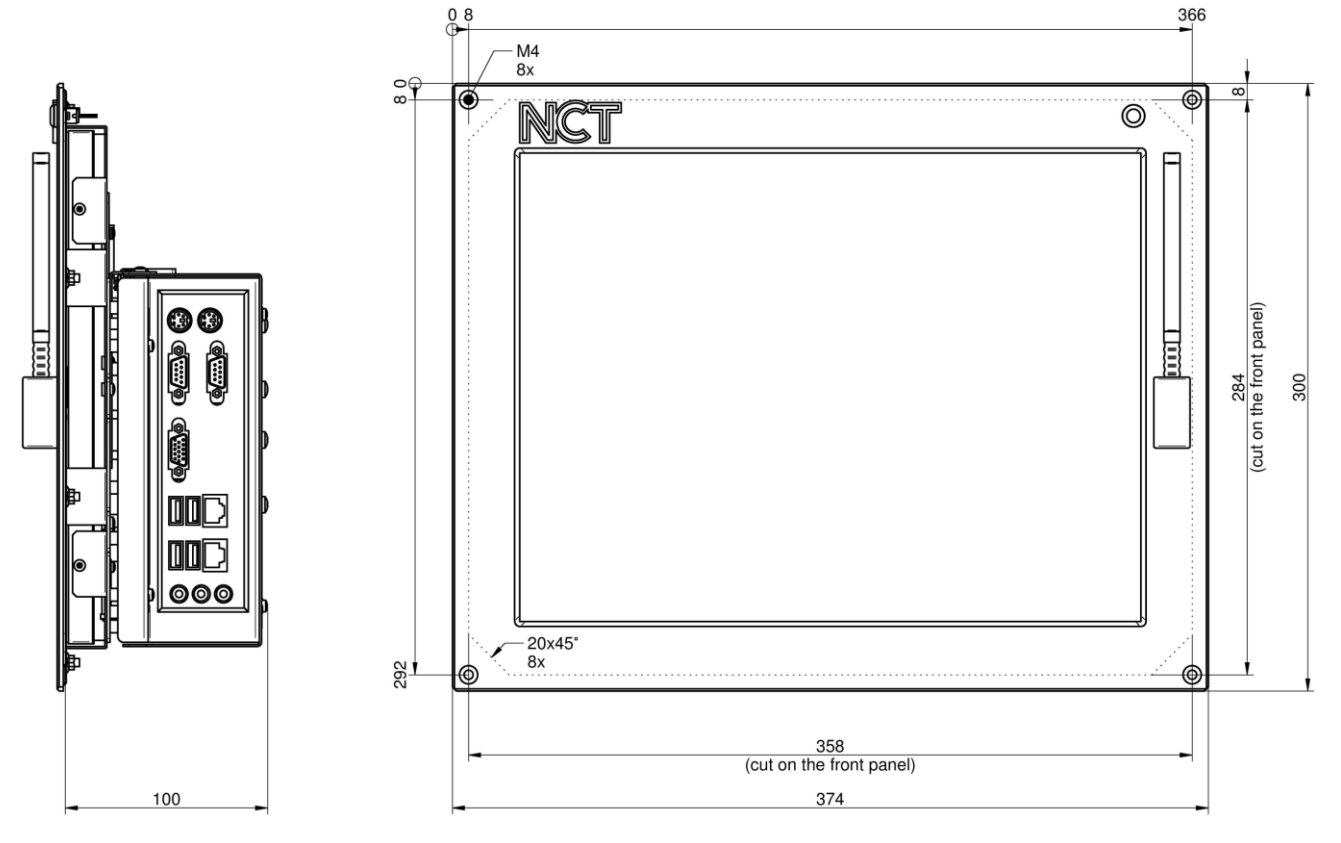
These external brake resistors recommended for using with DPS and DiPS power supplies.
 The task of brake resistor is to transform power flows from motor back to power supply into heat in braking.

Model	FZG-500x65-22	FZZG-400x65-22
NCT part No. (order number)	40-00000646-01	40-00000646-02
Rated resistance	22 Ohm	22 Ohm
Maximum ambient temperature	40 °C	40 °C
IP protection rating	IP00	IP00
Load	800 W	1200 W
Weight	2,8 kg	4,3 kg

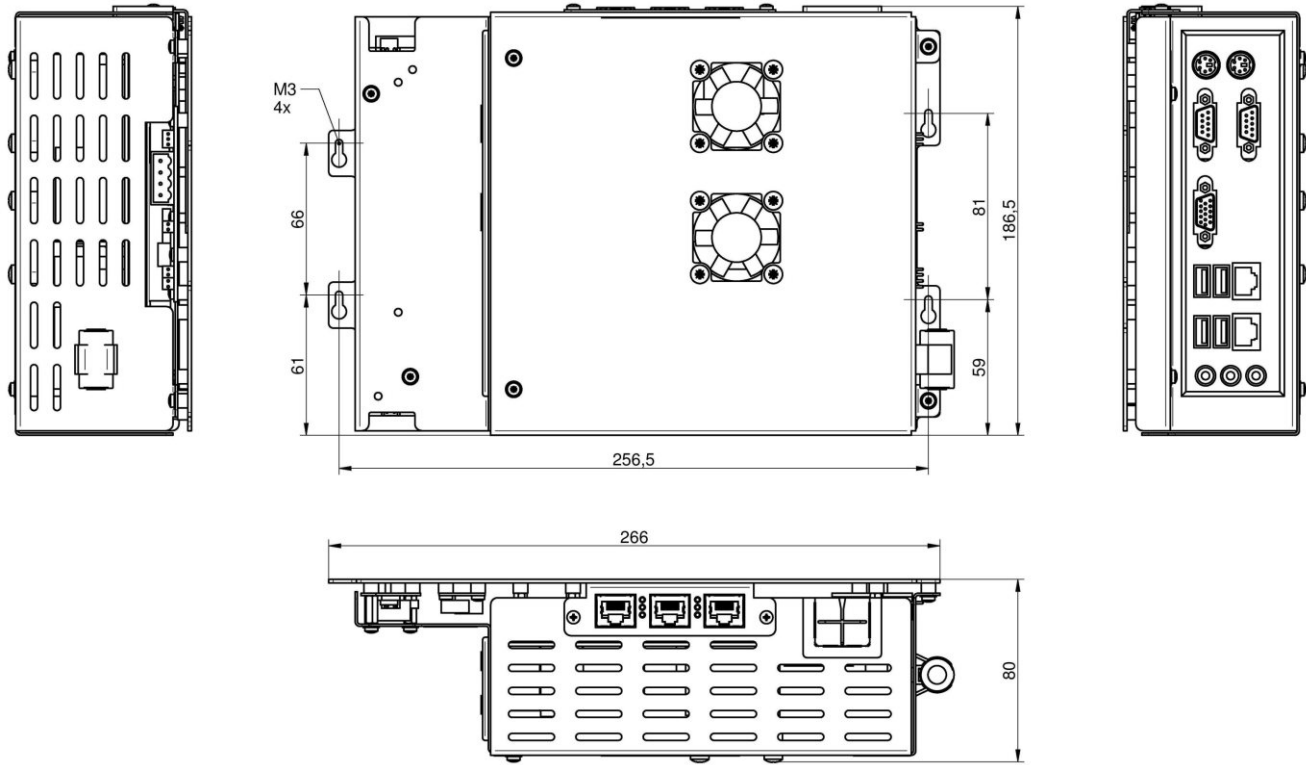
DPU1901



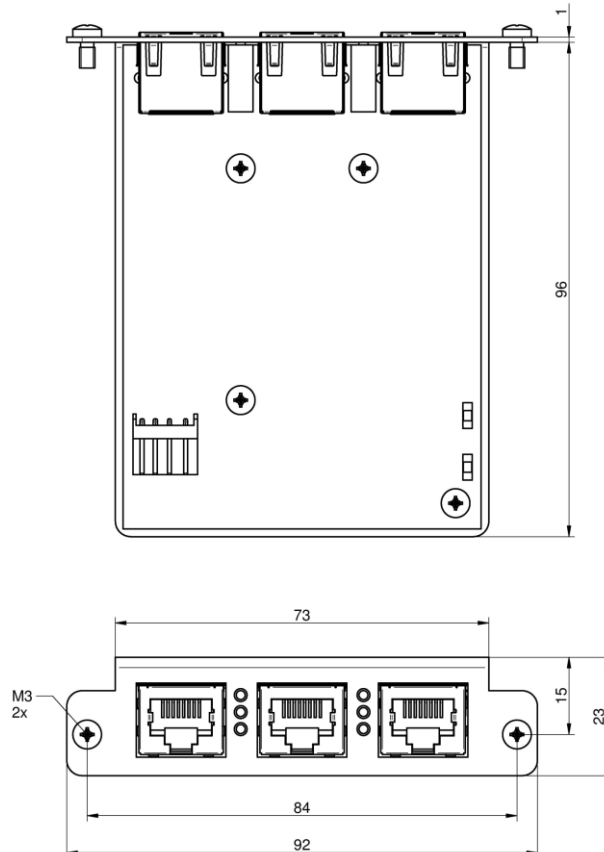
DPU1501



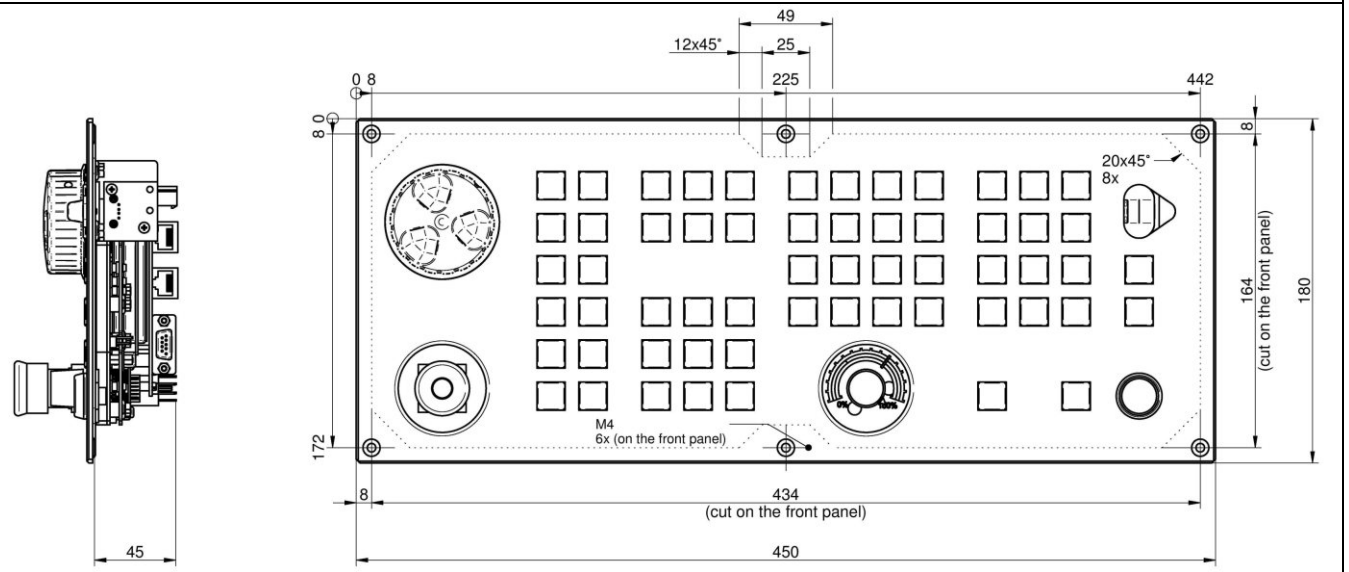
EHU01



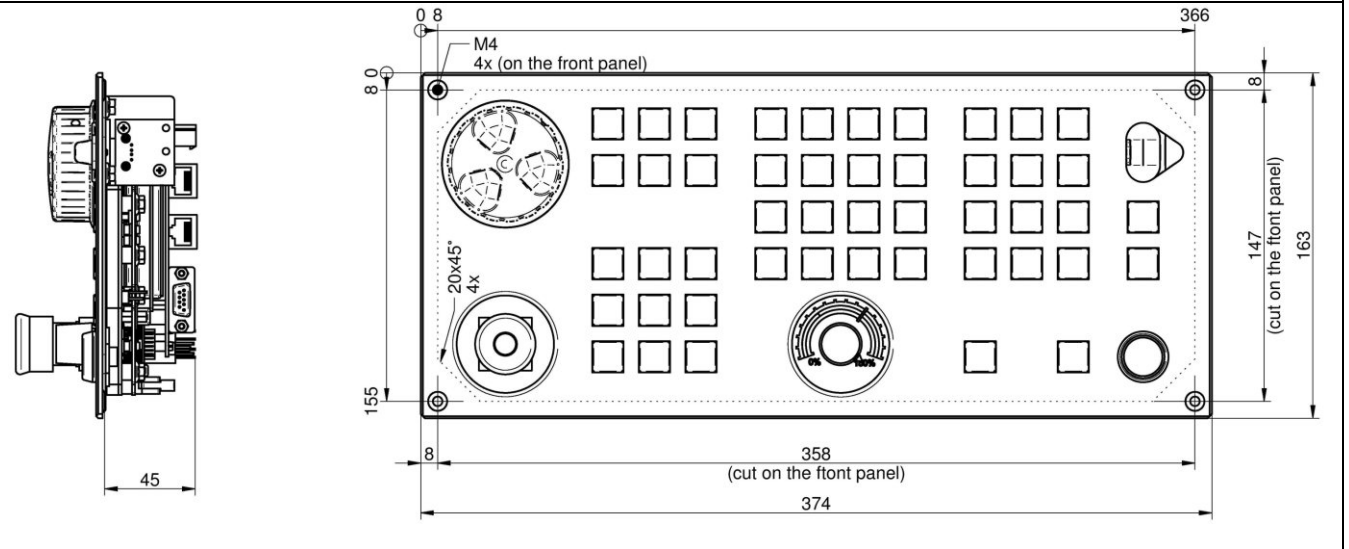
ESIS



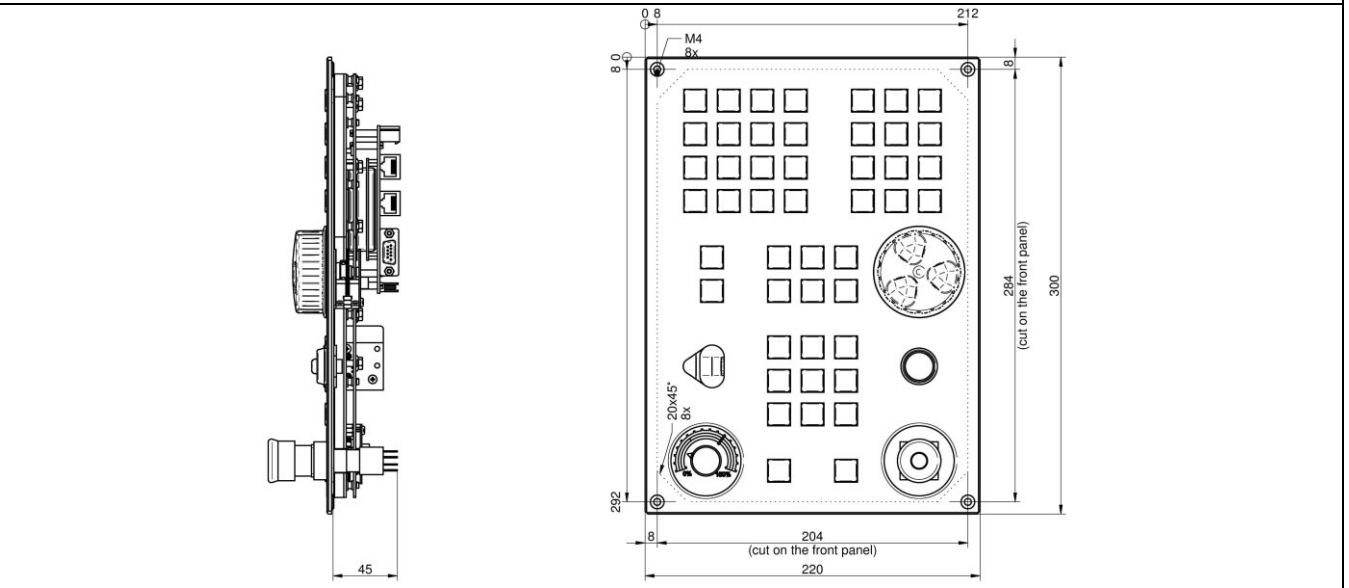
MK19



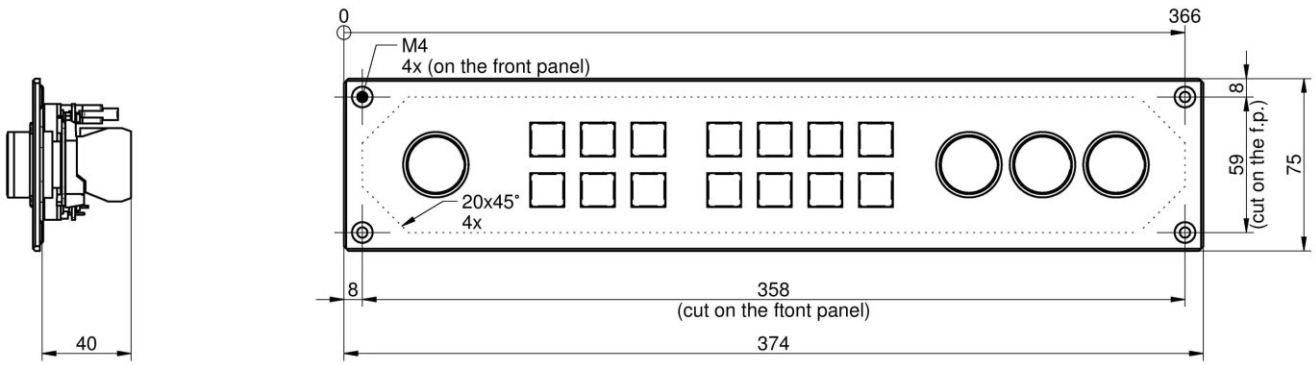
MK15



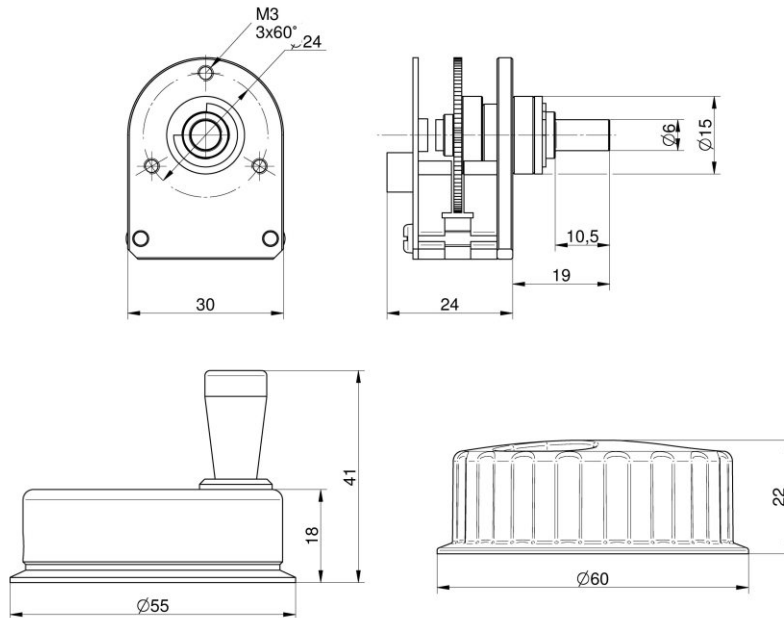
MK15V



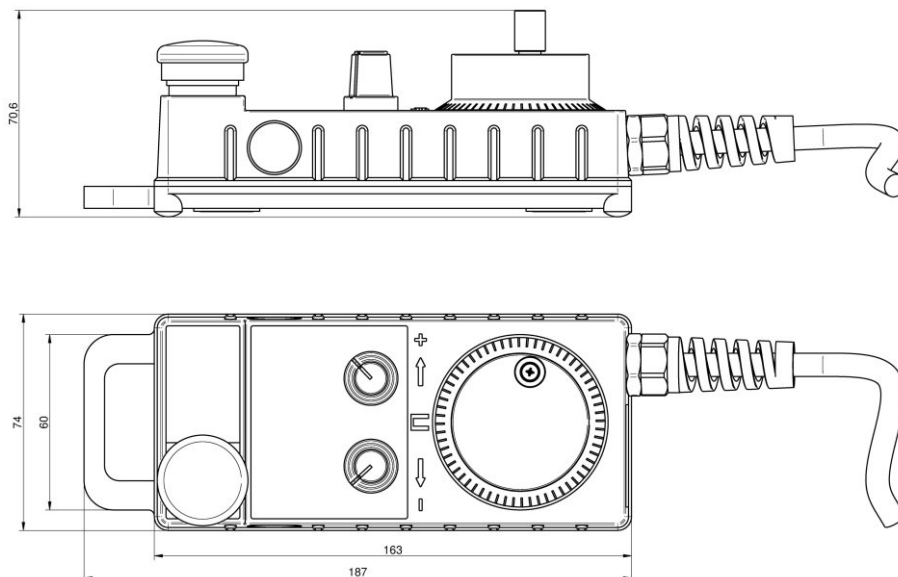
MK150P



HWM handwheel

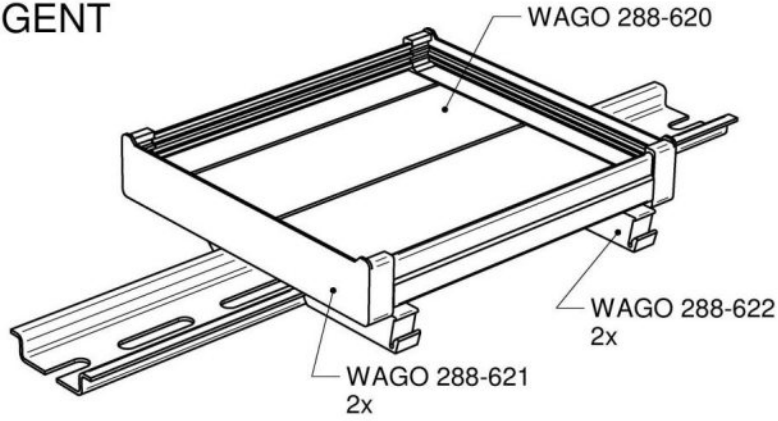


iHDW-B-D-A-6-S-I-M external handwheel

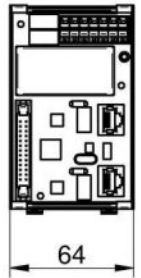


EtherCAT IO modules

EPU
 INPUTS
 OUTPUTS
 INTELLIGENT



EPU



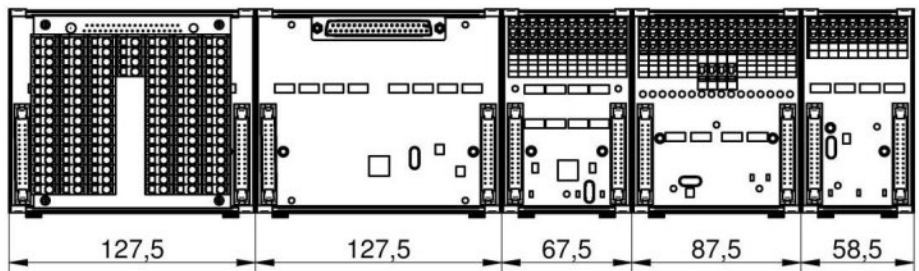
I32C

I32S

I32

I16S

I16



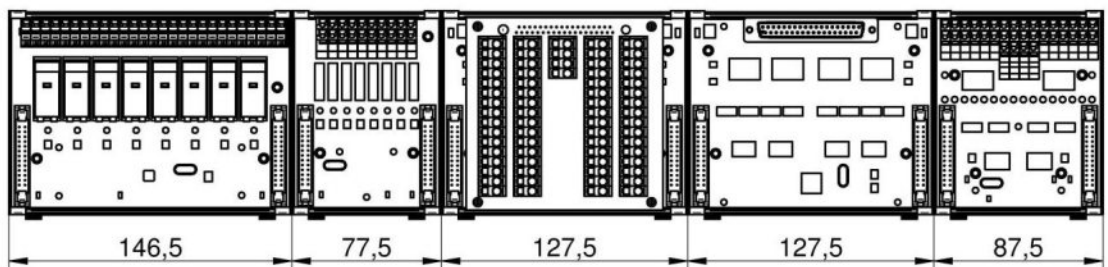
O8RM

O8R

O32C

O32S

O16



ENDAT

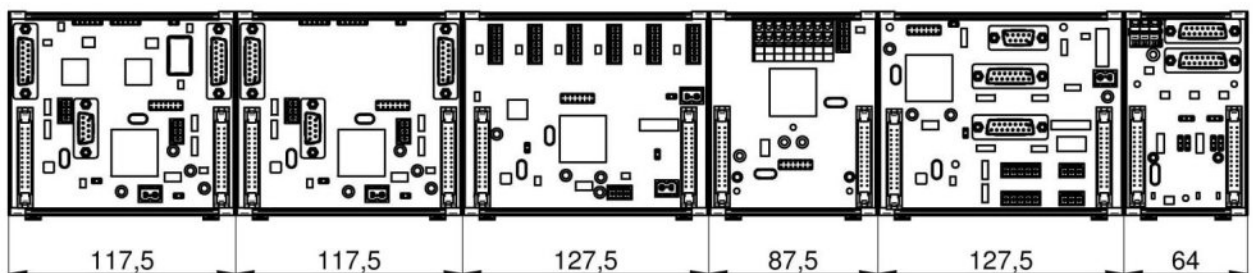
TTLCAN

DANI

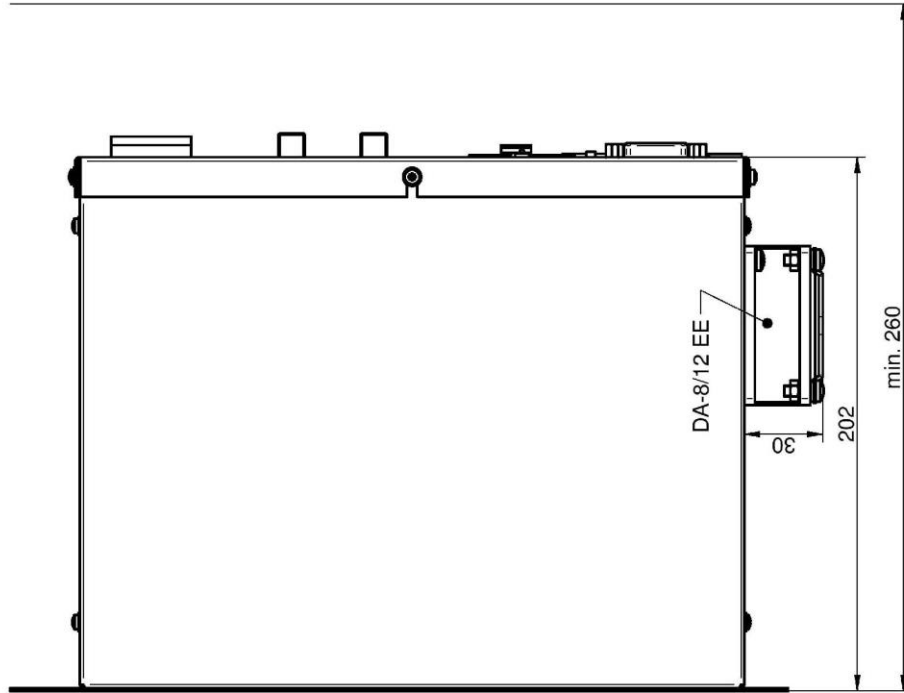
SENS

TTLAI

ETPC

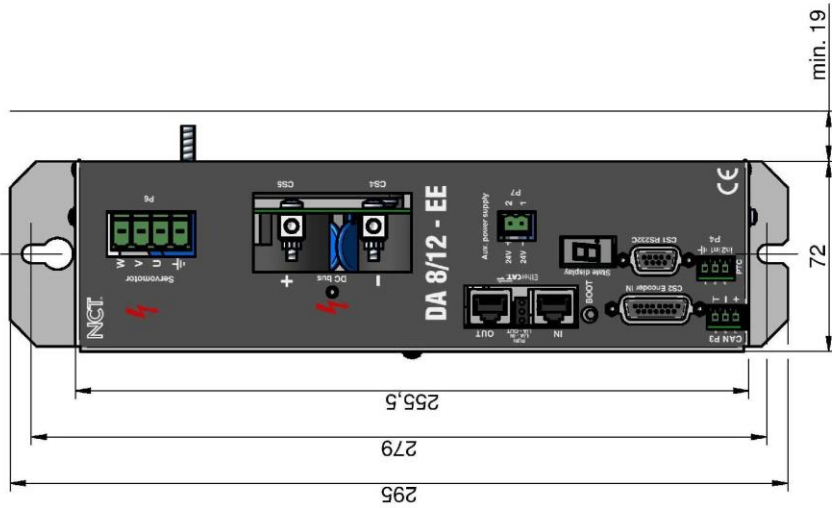


DS-2/4EE, DS-6/12EE and DA-8/12EE drives



NCT servo drive

DS-2/4 EE, DS-6/12 EE, DA-8/12 EE

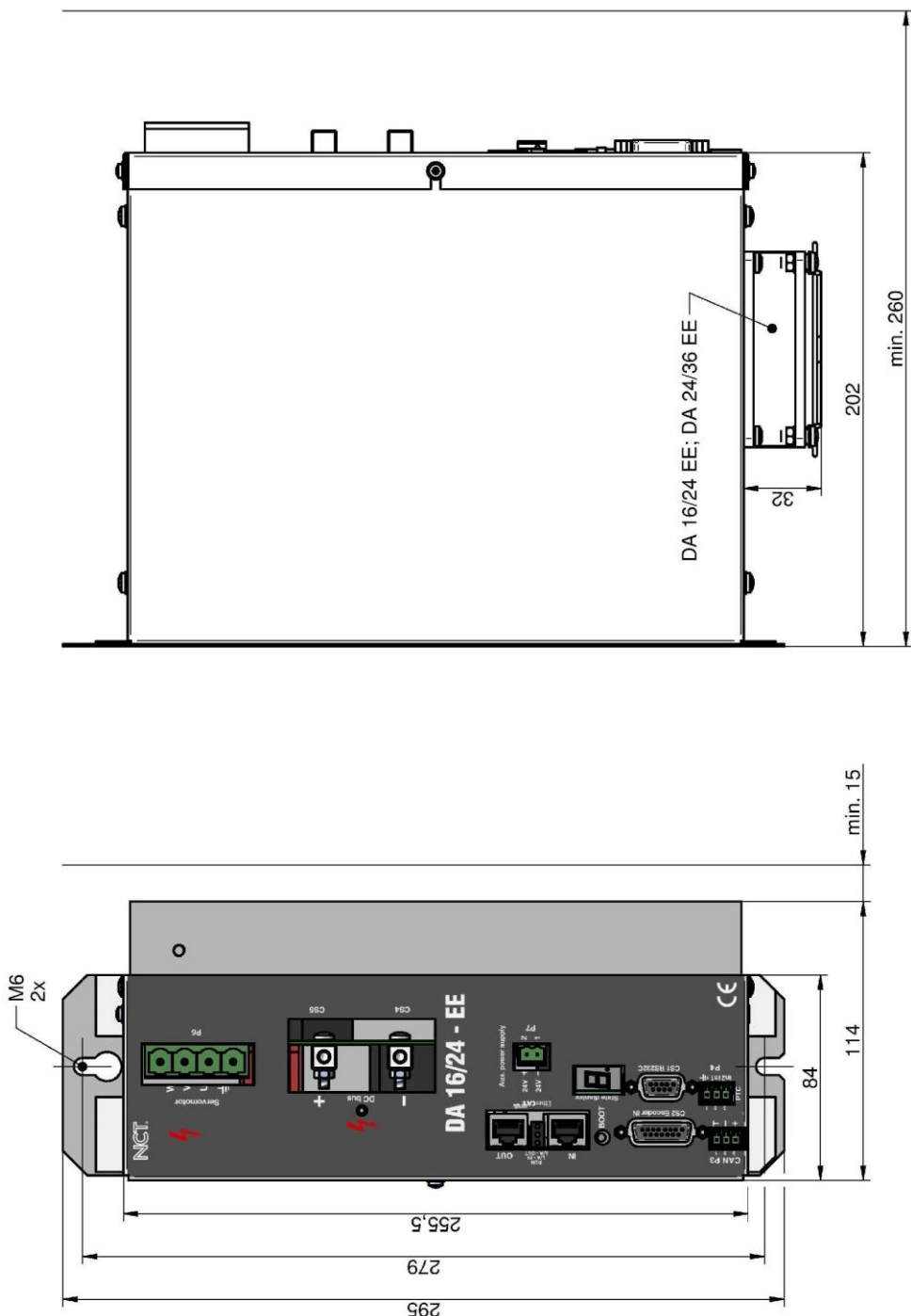


DS-12/24EE, DS-18/36EE, DA-16/24EE and DA-24/36EE drives



NCT servo drive

DS-12/24 EE, DS-18/36 EE, DA-16/24 EE, DA-24/36 EE

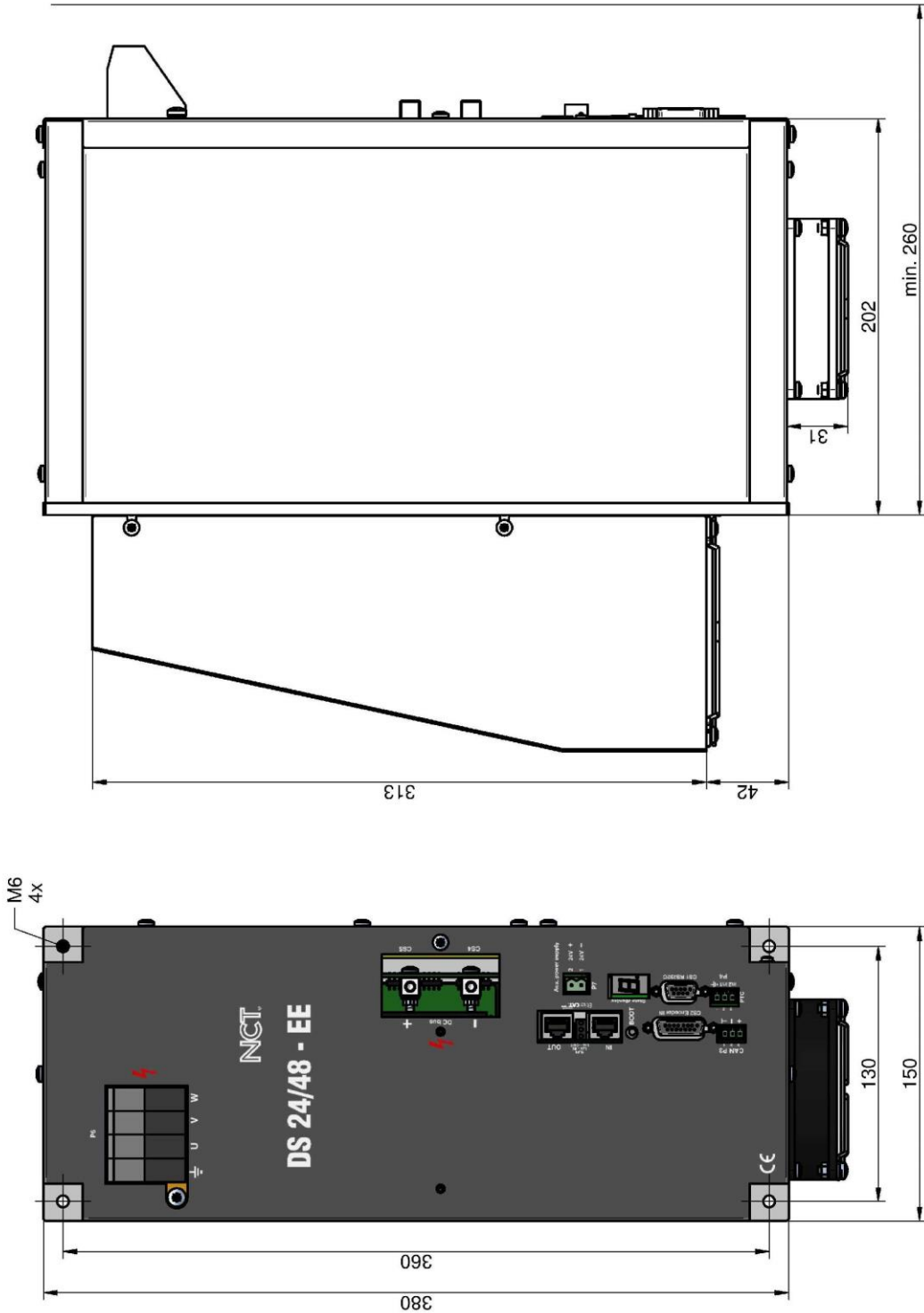


DS-24/48EE, DS-36/72EE, DA-32/48EE and DA-48/72EE drives

NCT[®]

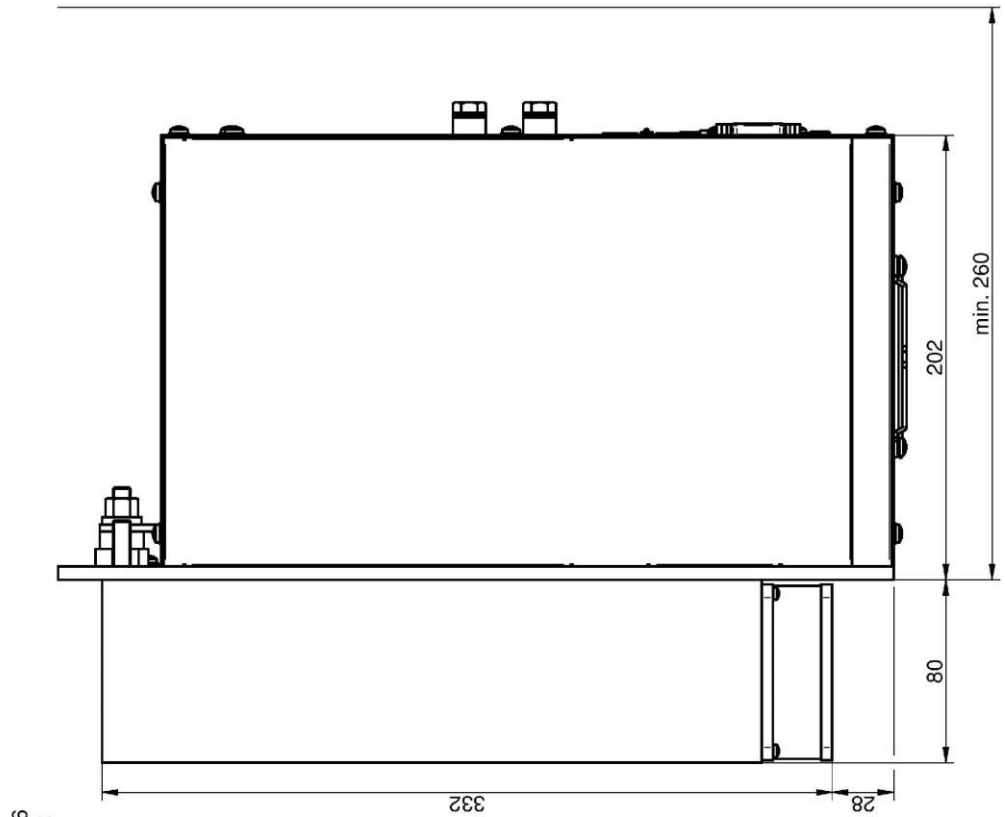
NCT servo drive

DS-24/48 EE, DS-36/72 EE, DA-32/48 EE, DA-48/72 EE



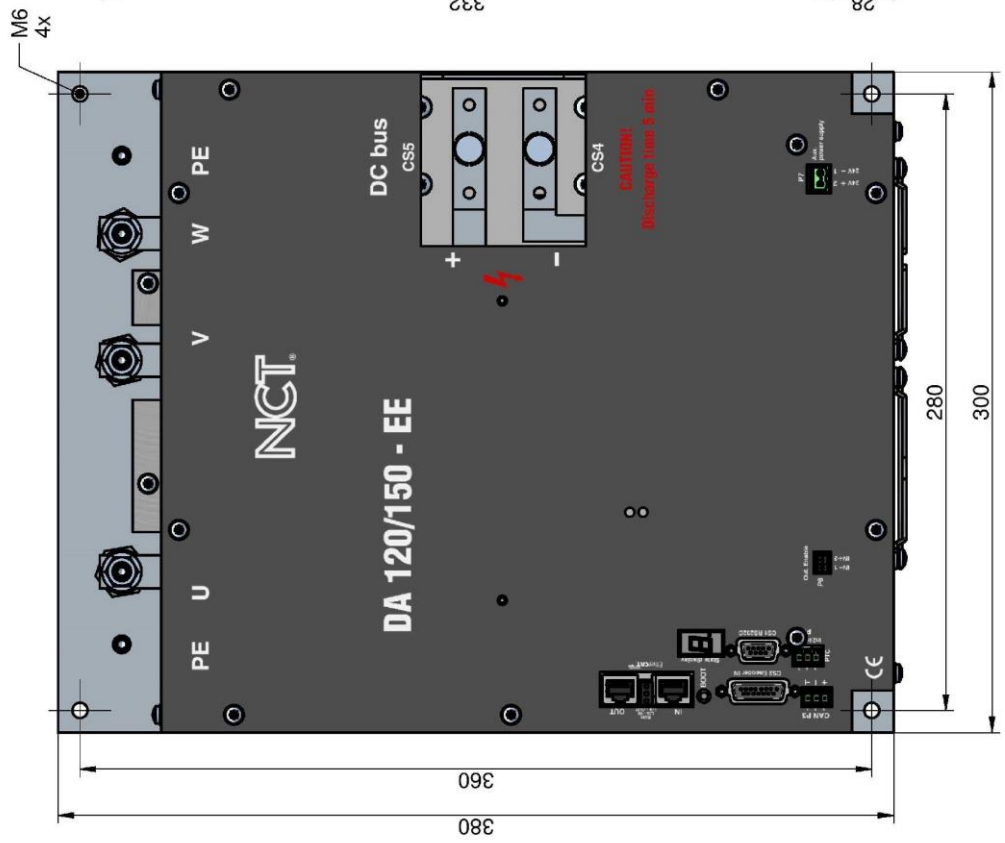
DS-100/150EE, DA-120/150EE and DA-180/225EE drives

NCT



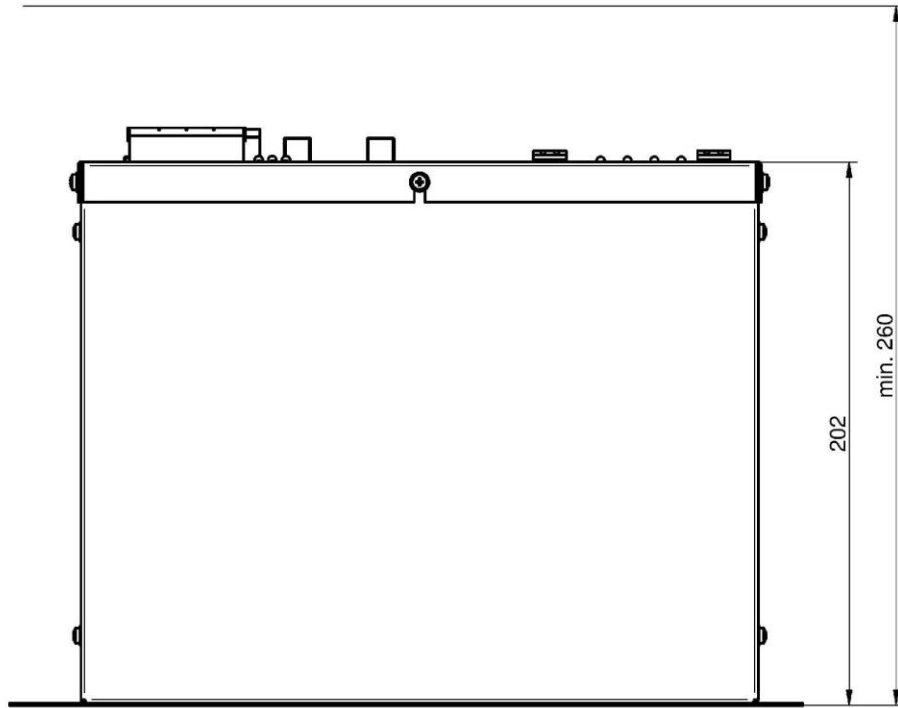
NCT servo drive

DS-100/150 EE, DA-120/150 EE, DA-180/225 EE

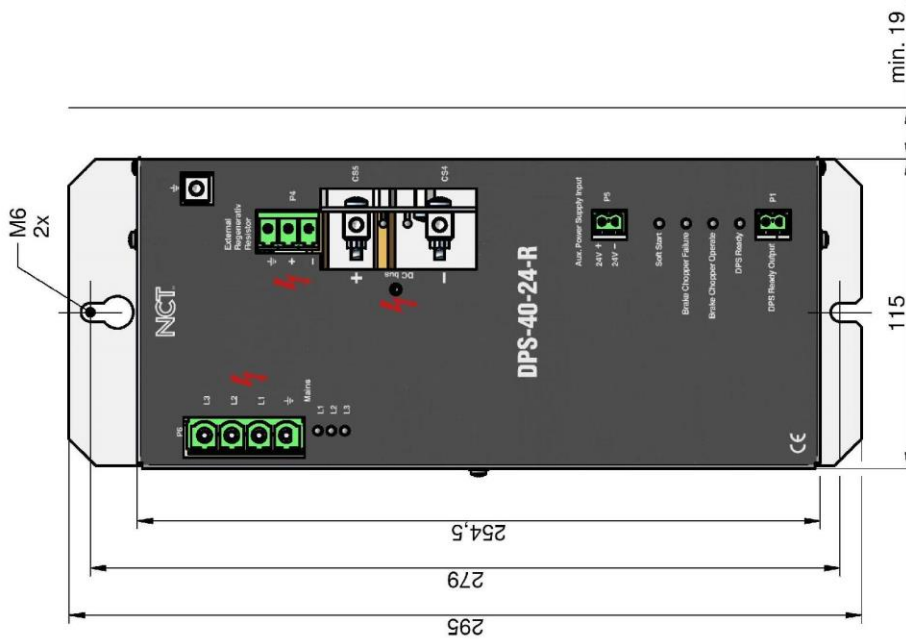


DPS-3-40-24 power supply

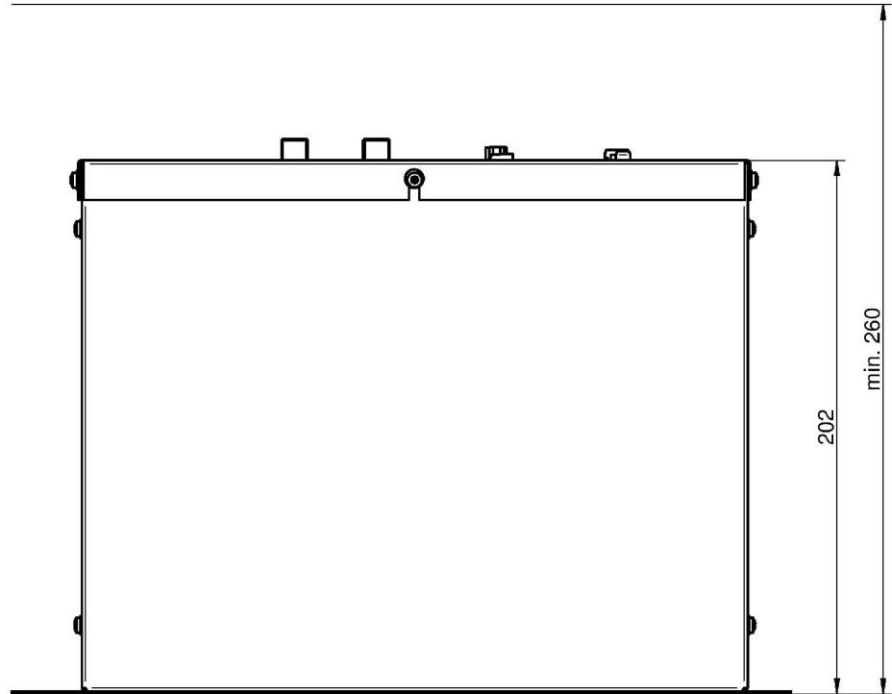
NCT[®]



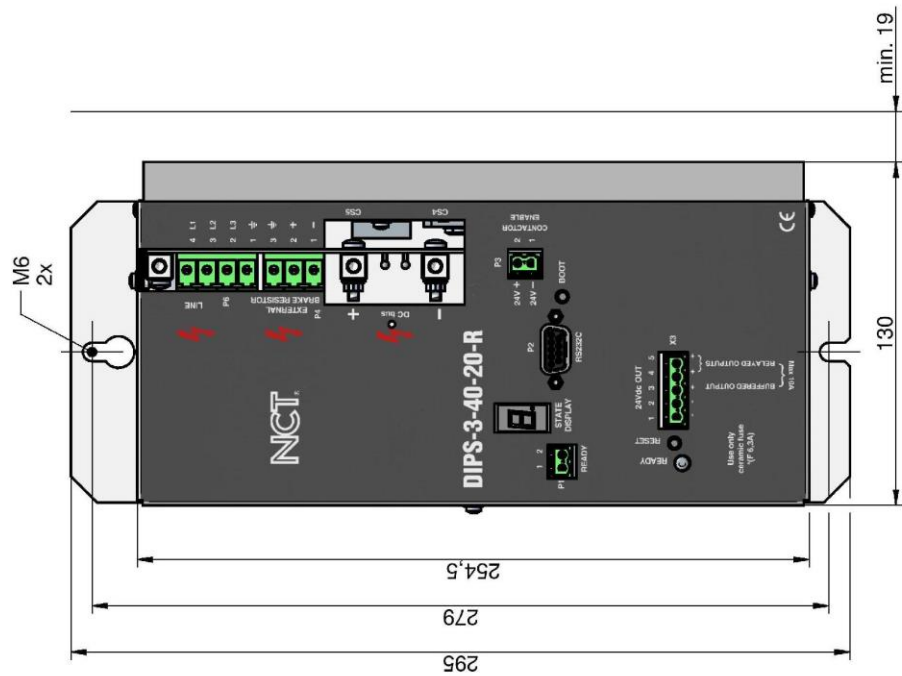
NCT power supply DPS 30-40-24



DiPS-3-40-20 power supply

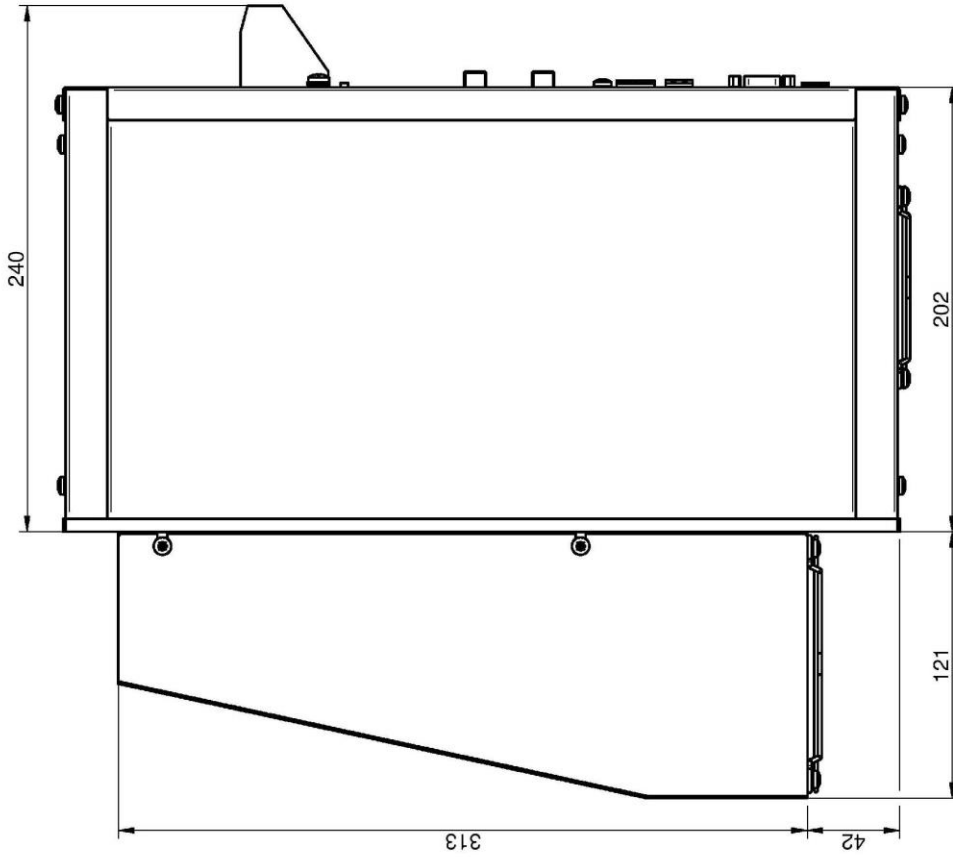


NCT power supply DiPS 30-40-20



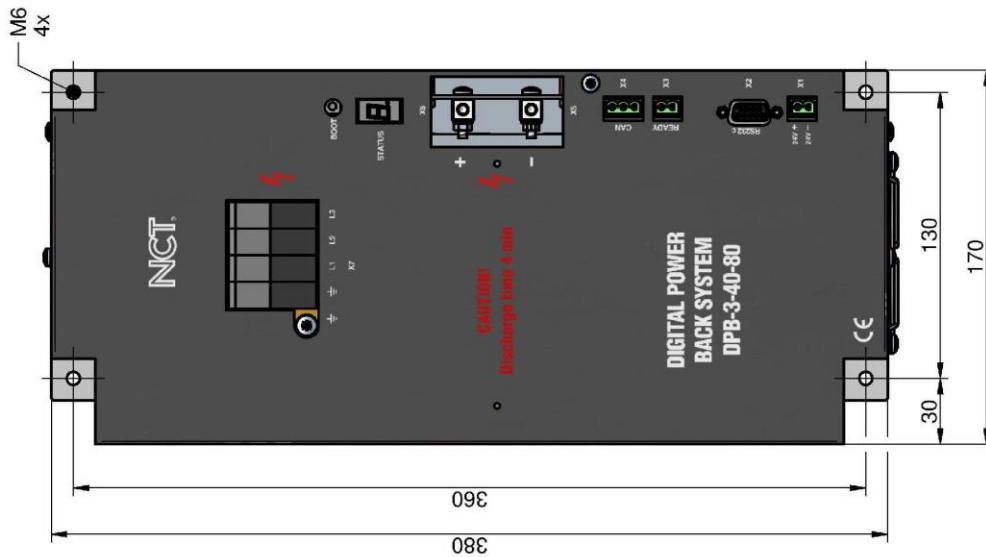
DPB-3-40-80 power supply

NCT[®]



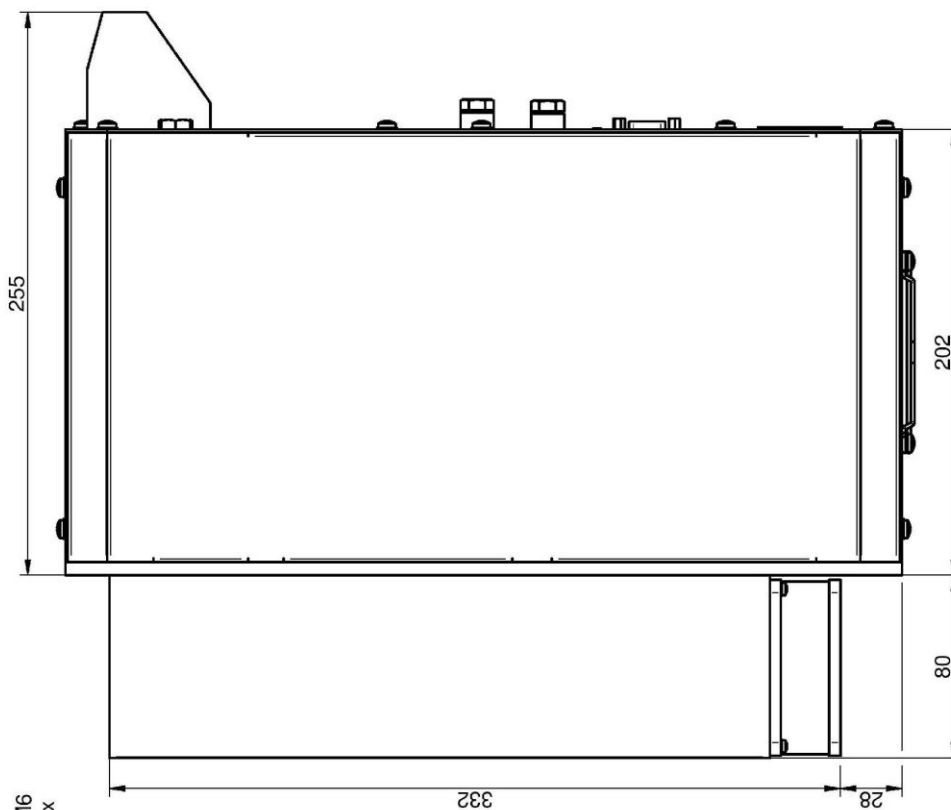
NCT power supply

DPB 30-40-80

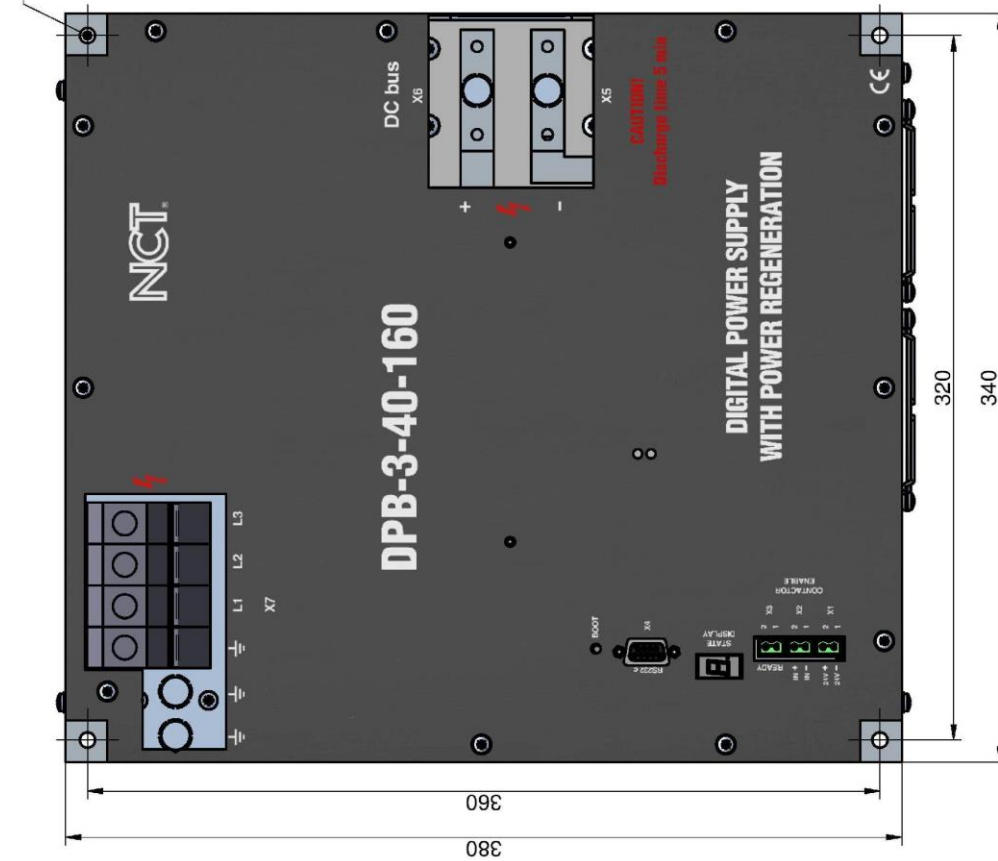


DPB-3-40-160 power supply

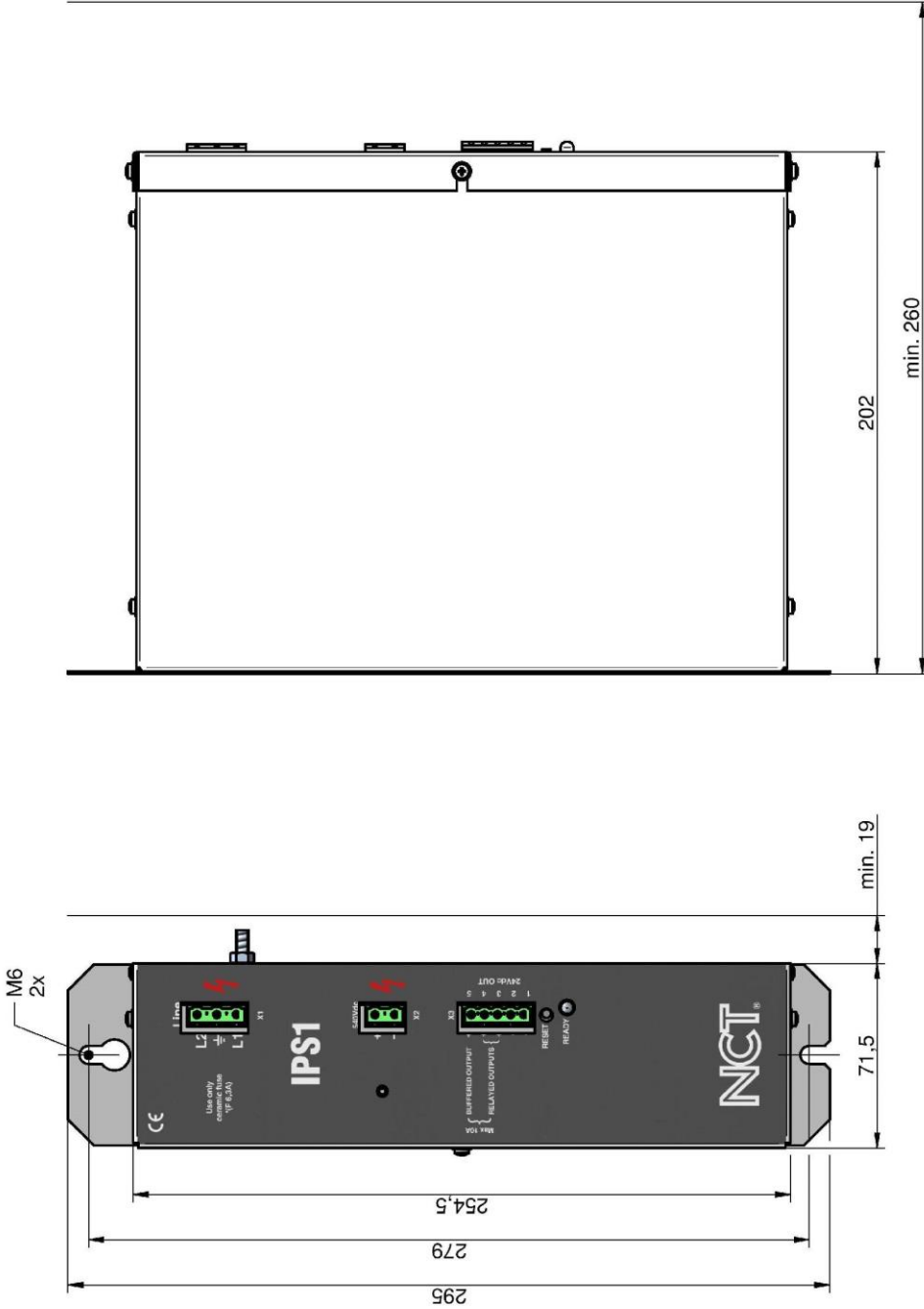
NCT[®]



NCT power supply
DPB 3-40-160



IPS1 power supply

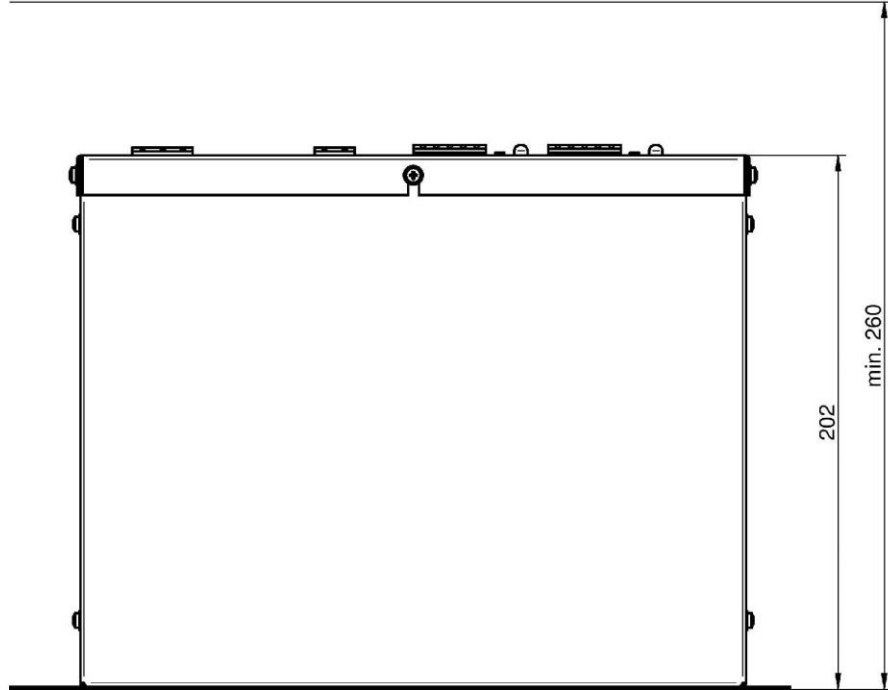


NCT power supply

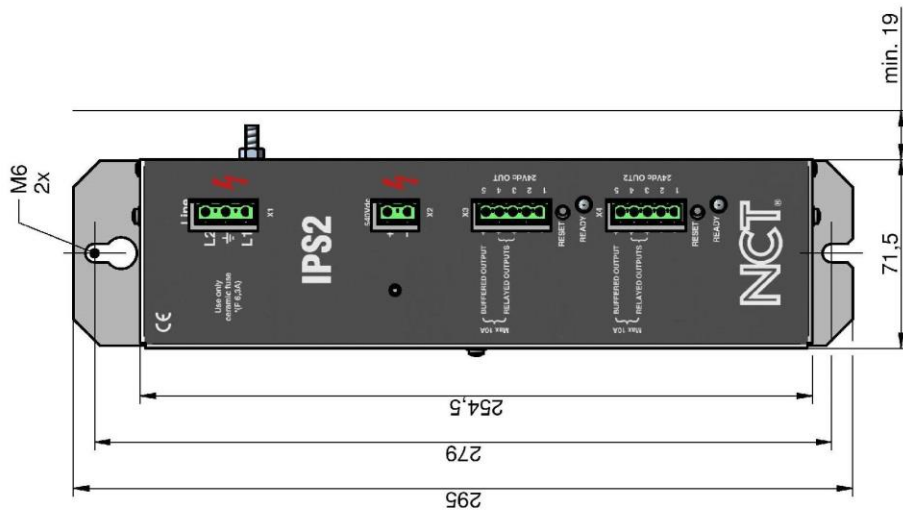
IPS 1

IPS2 power supply

NCT[®]



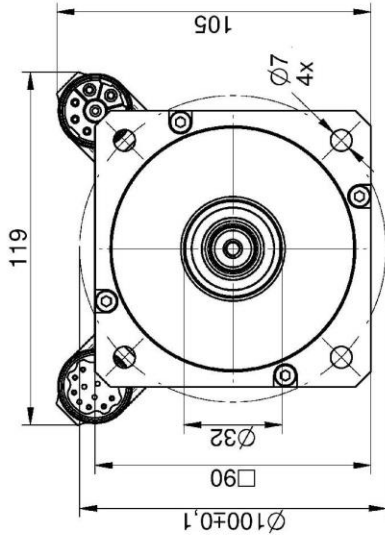
NCT power supply
IPS 2



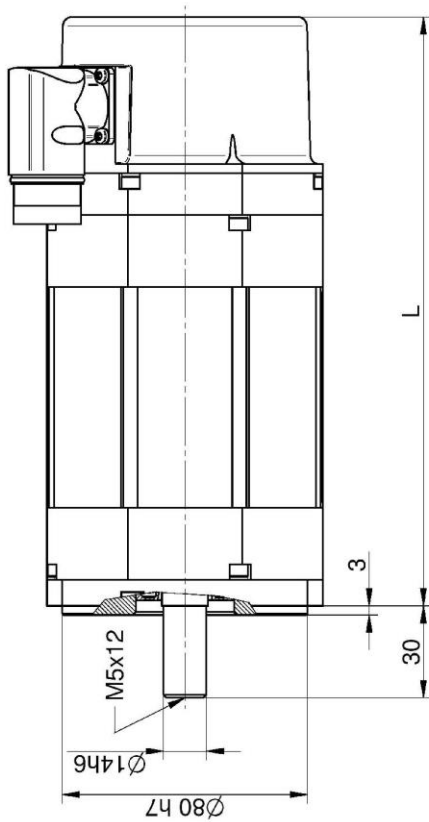
NCT A1, Ai2.5, A2, Ai5 motors

NCT

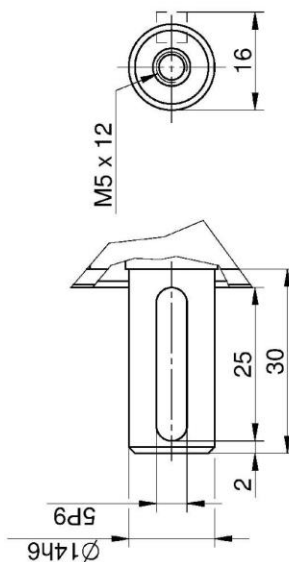
NCT servo
A1 (Ai2.5), A2 (Ai5)



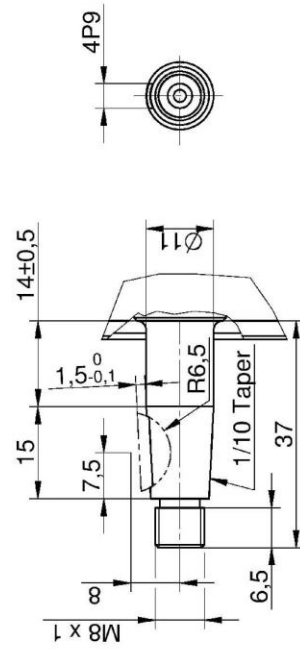
Model	L
A1 / Ai2.5	157
A2 / Ai5	192



Tengelyvég opciók (Shaft options)



hengeres, reteszhorvós tengelyvég
(cylindrical shaft with keyway)



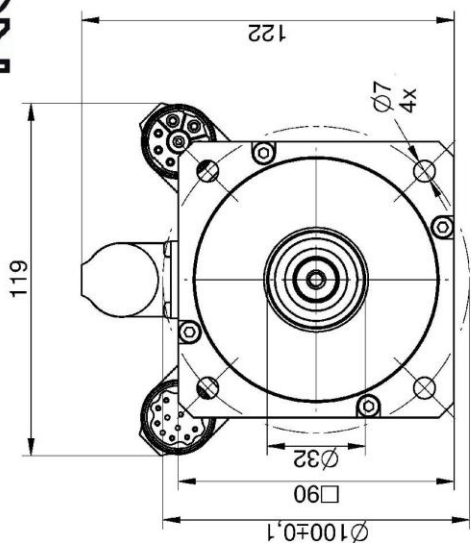
kúpos tengelyvég
(taper shaft)

NCT AB1, AiB2.5, AB2, AiB5 motors

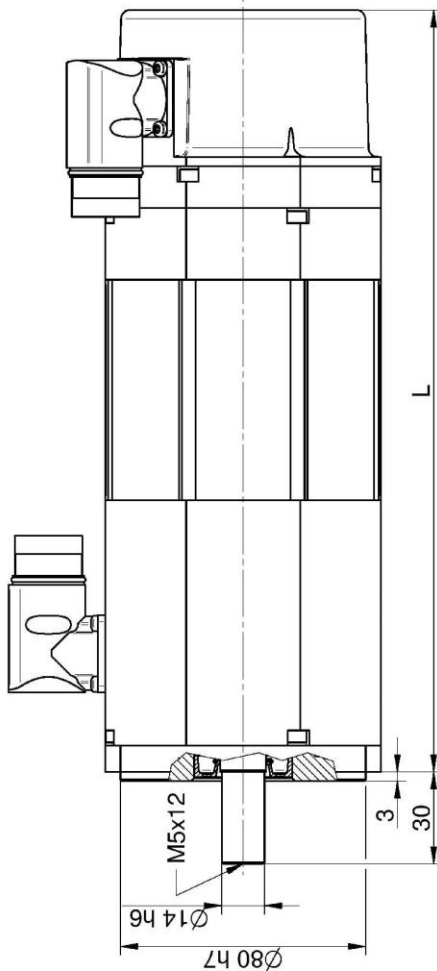
NCT servo

AB1 (AiB2.5), AB2 (AiB5)

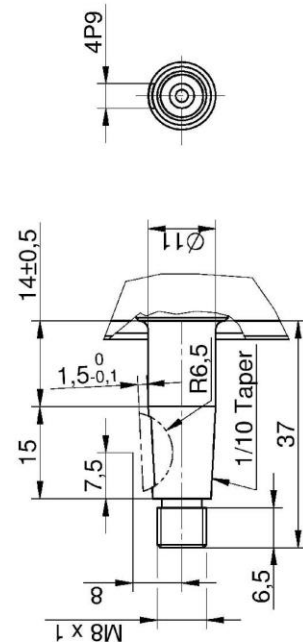
NCT



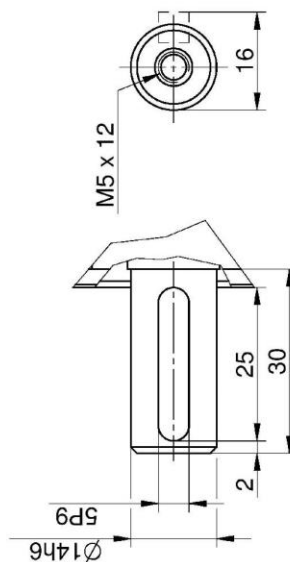
Model	L
AB1 / AiB2.5	213,5
AB2 / AiB5	248,5



Tengelyvég opciók (Shaft options)



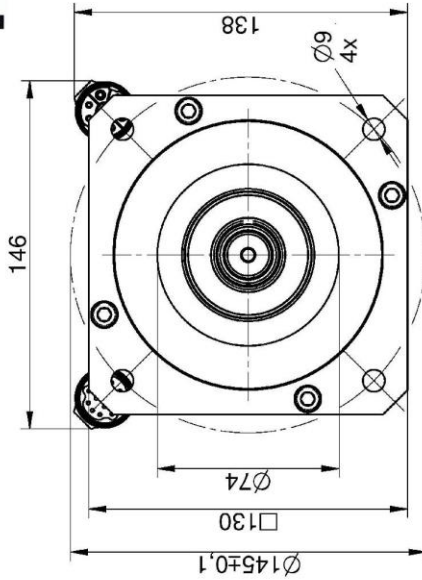
*kúpos tengelyvég
(taper shaft)*



*hengeres, reteshornyos tengelyvég
(cylindrical shaft with keyway)*

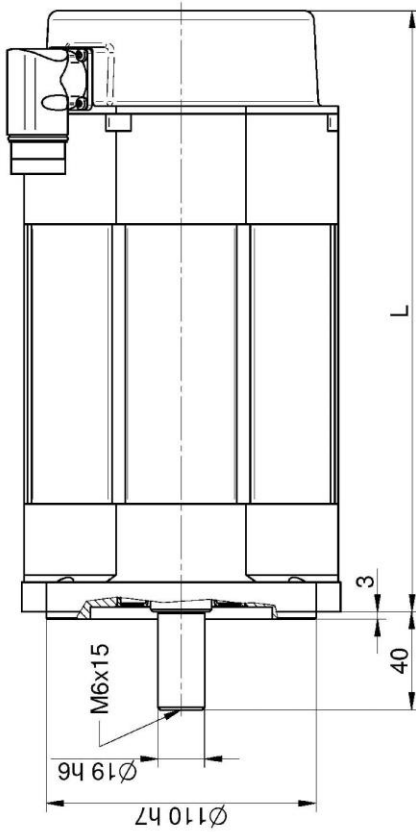
NCT A3, Ai8, A6, Ai15, A9 motors

NCT

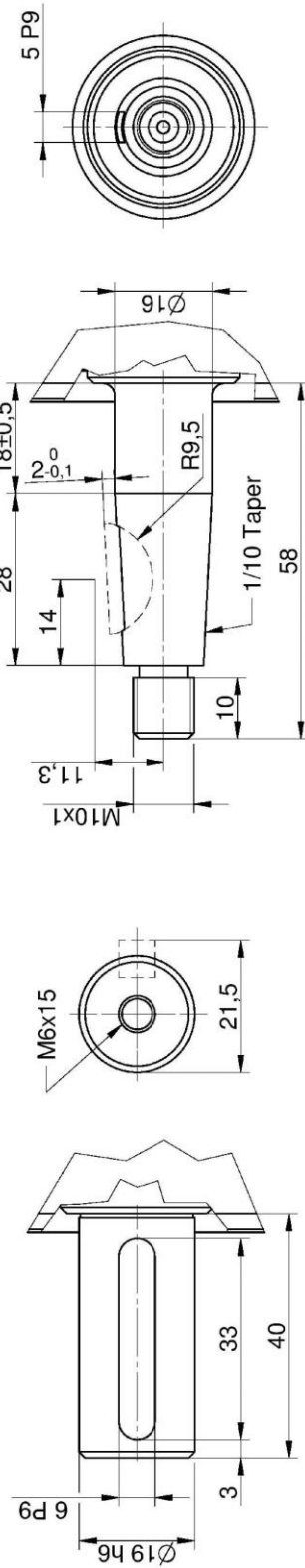


Model	L
A3 / Ai8	188
A6 / Ai15	245
A9	302

NCT servo
A3 (Ai8), A6 (Ai15), A9



Tengelyvég opciók (Shaft options)



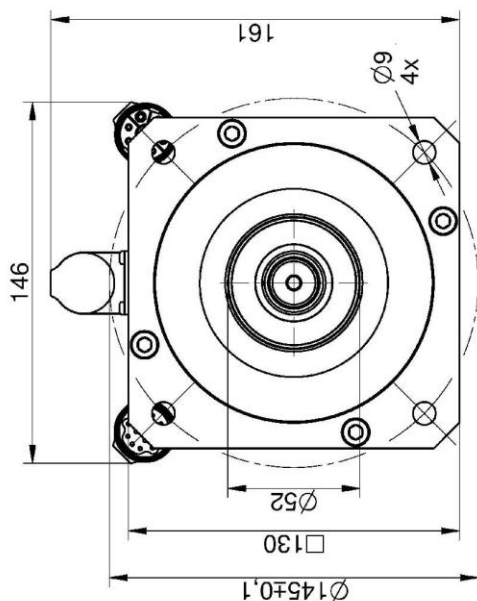
kúpos tengelyvég
(taper shaft)

hengeres, reteszhoromos tengelyvég
(cylindrical shaft with keyway)

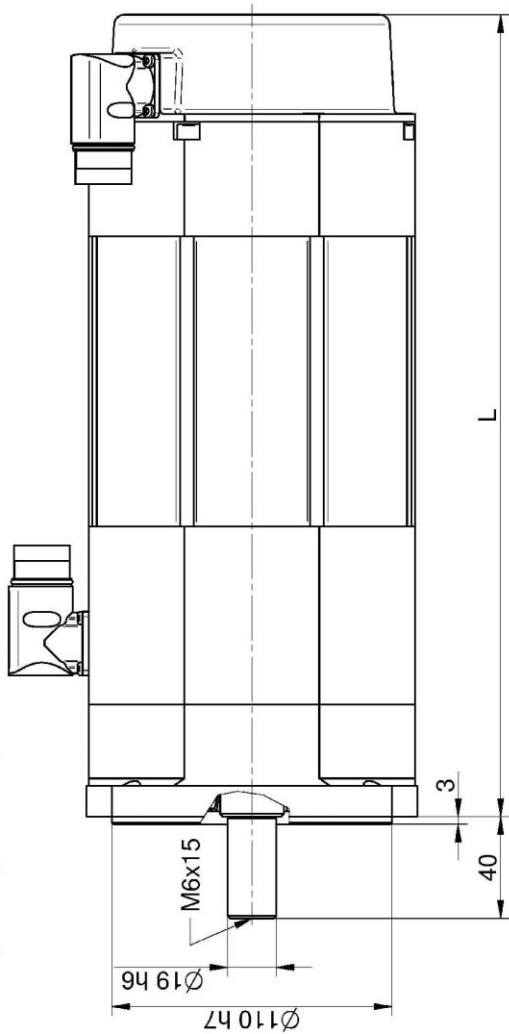
NCT AB3, AiB8, AB6, AiB15, AB9 motors

NCT servo
 AB3 (AiB8), AB6 (AiB15), AB9

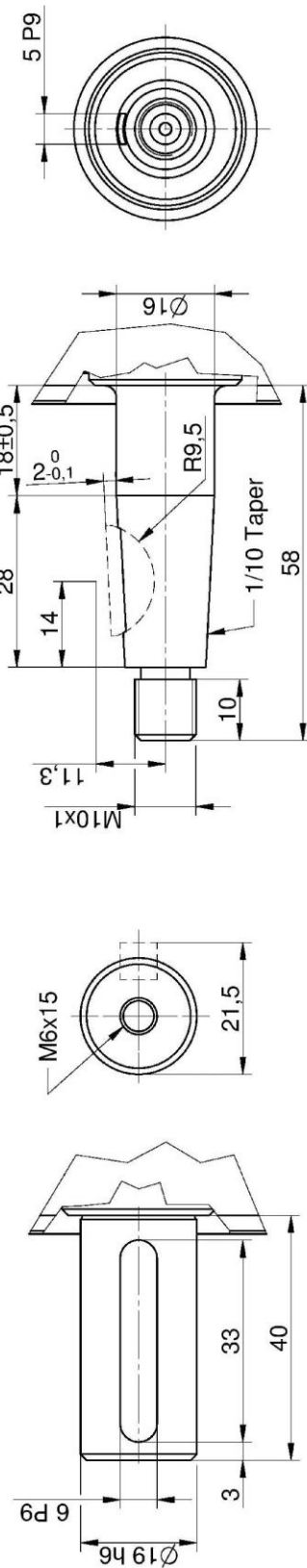
NCT[®]



Model	L
AB3 / AiB8	258
AB6 / AiB15	315
AB9	372



Tengelyvég opciók (Shaft options)



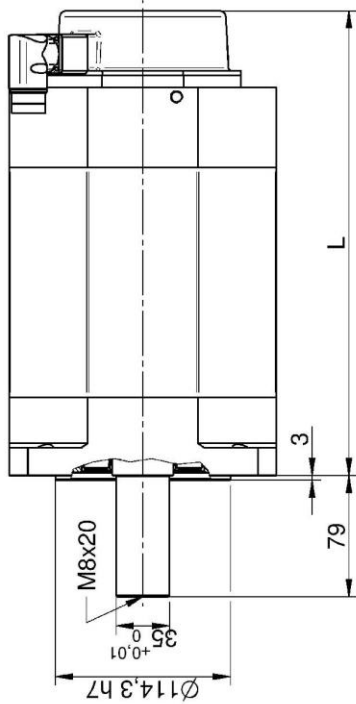
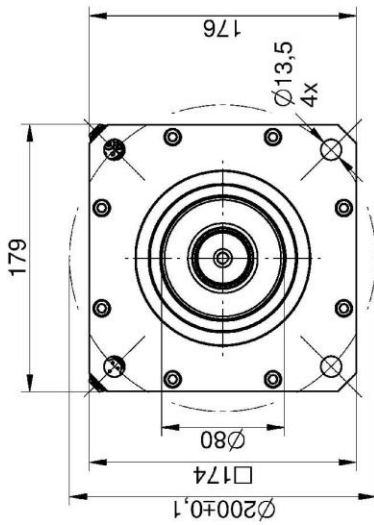
kúpos tengelyvég
 (taper shaft)

hengeres, reteszhornyos tengelyvég
 (cylindrical shaft with keyway)

NCT A12, Ai28, A22, Ai50, A30, Ai70, A38 motors

NCT[®]

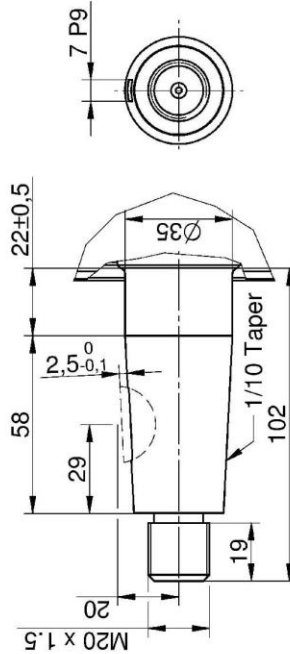
Model	L
A12 / Ai28	229
A22 / Ai50	304
A30 / Ai70	379
A38	454



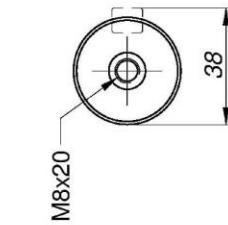
NCT servo

A12 (Ai28), A22 (Ai50), A30 (Ai70), A38

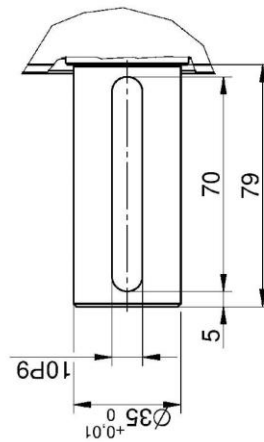
Tengelyvég opciók (Shaft options)



*kúpos tengelyvég
(taper shaft)*



*hengeres, reteszhorvós tengelyvég
(cylindrical shaft with keyway)*



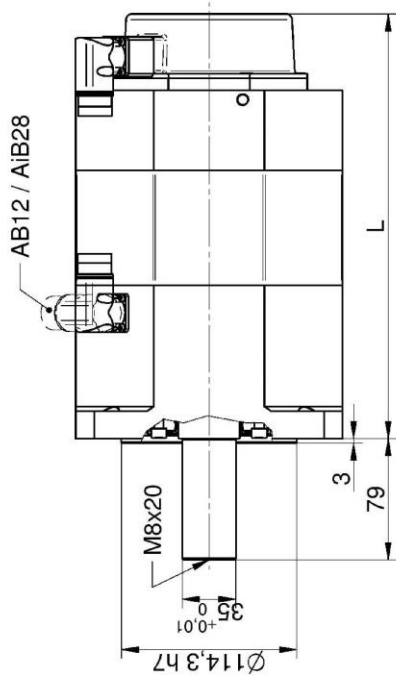
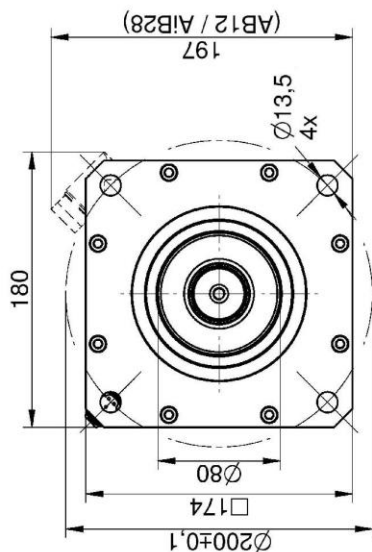
NCT AB12, AiB28, AB22, AiB50, AB30, AiB70, AB38 motors

NCT[®]

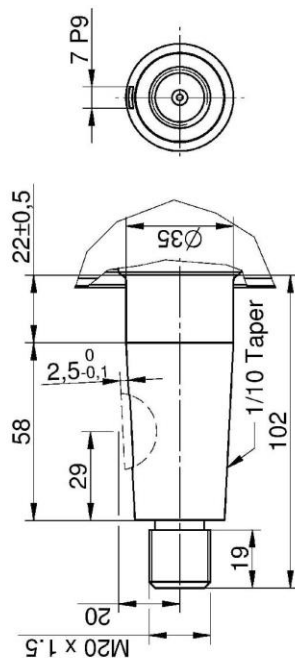
NCT servo

AB12 (AiB28), AB22 (AiB50), AB30 (AiB70), AB38

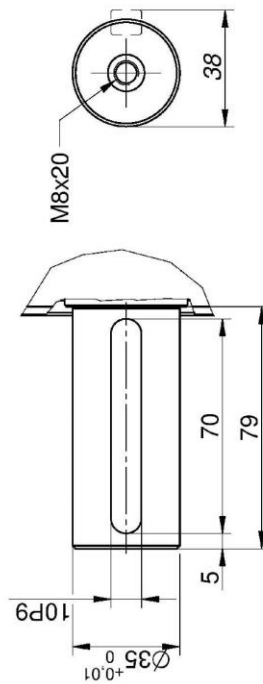
Model	L
AB12 / AiB28	283
AB22 / AiB 50	358
AB30 / AiB70	433
AB38	508



Tengelyvég opciók (Shaft options)



*kúpos tengelyvég
(taper shaft)*

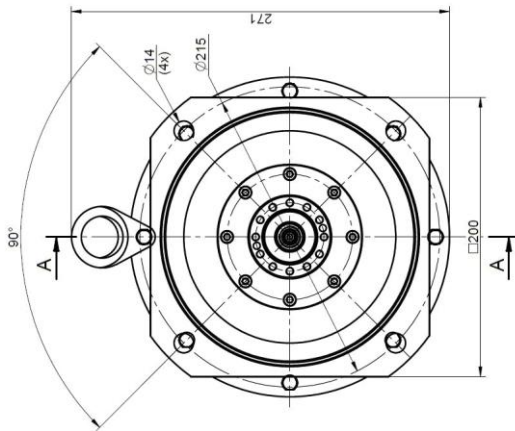
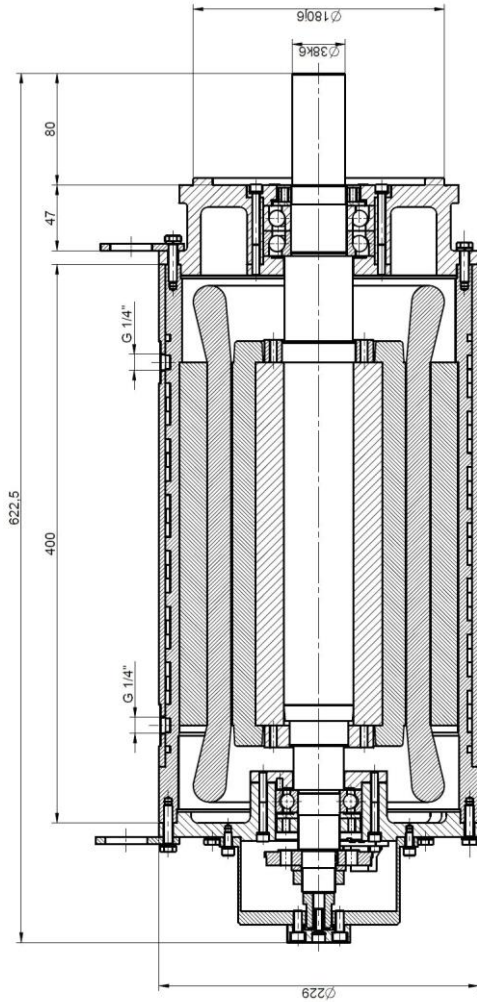


*hengeres, reteszhorvós tengelyvég
(cylindrical shaft with keyway)*

NCT AiS100 and AiS132 motors

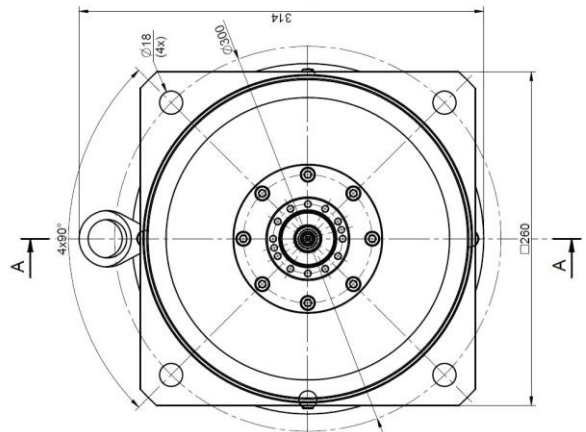
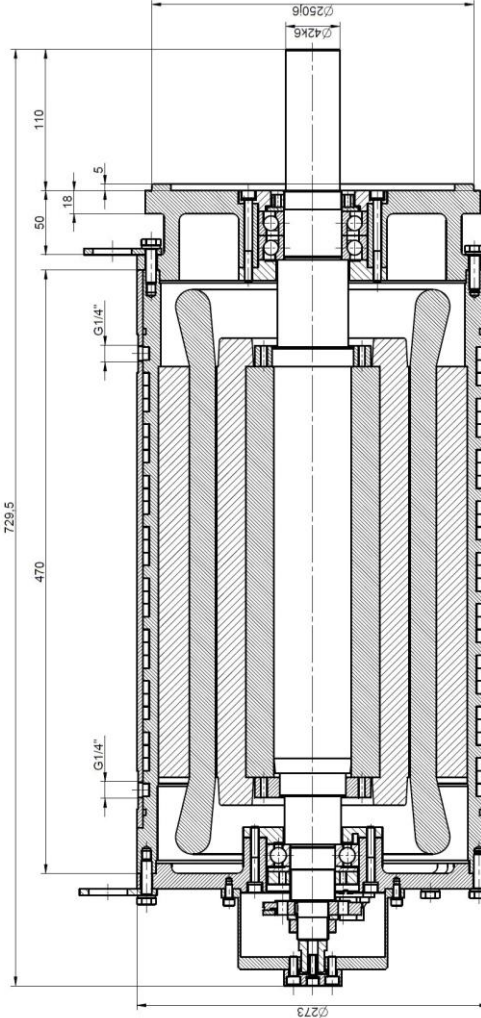
A-A

AiS100



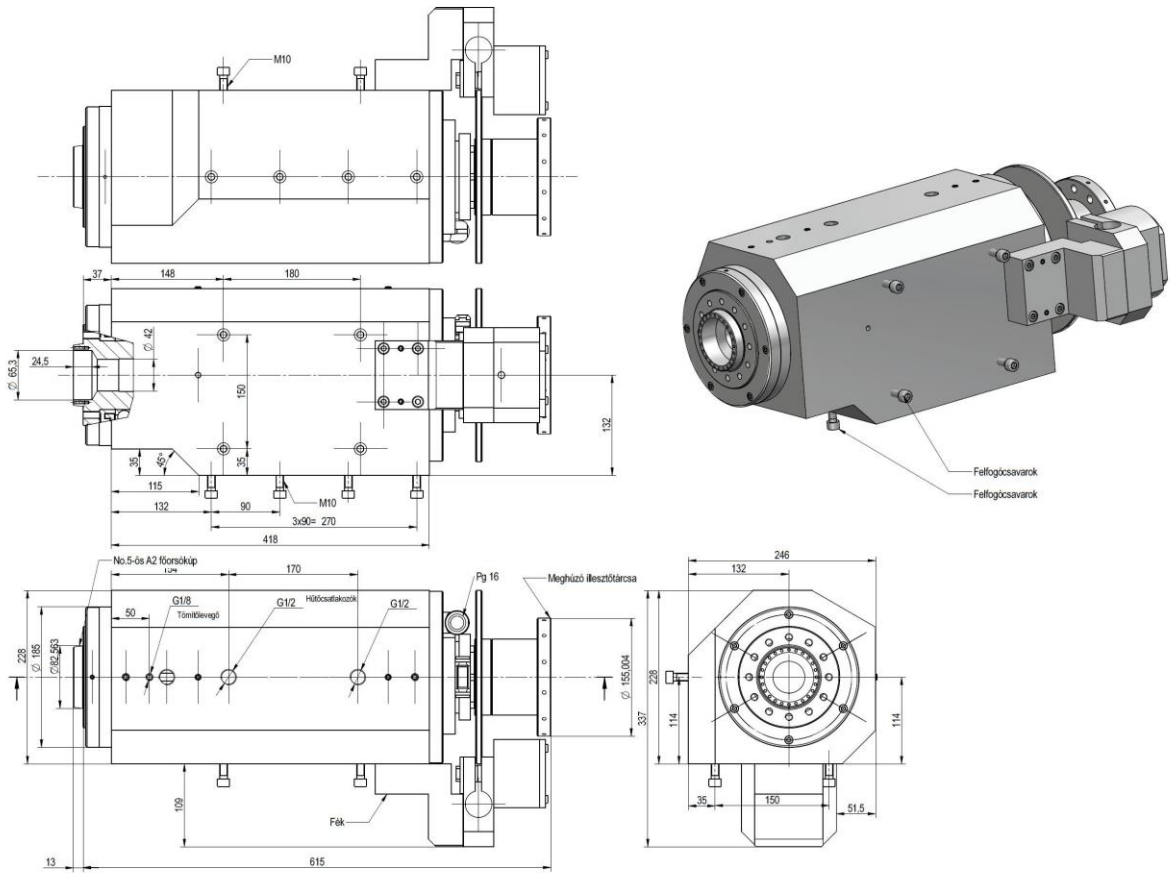
A-A

AiS132

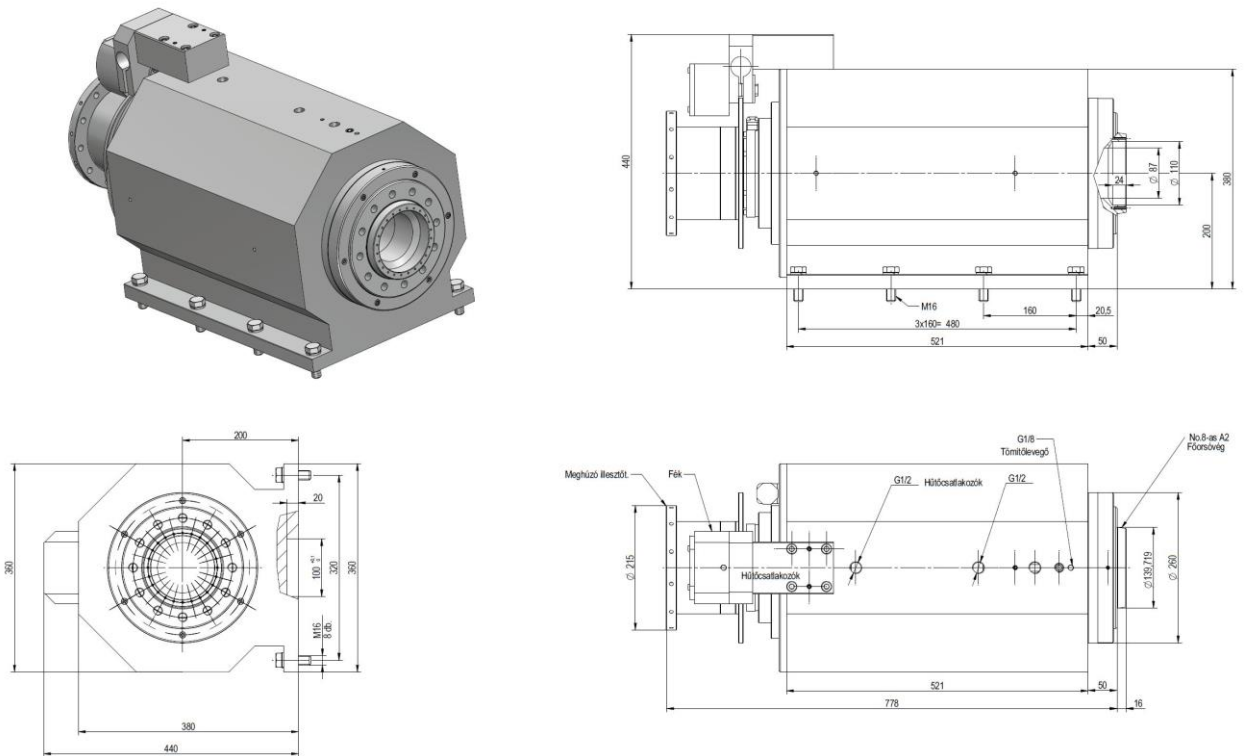


NCT AMS112 and AMS180 motoros

AMS112

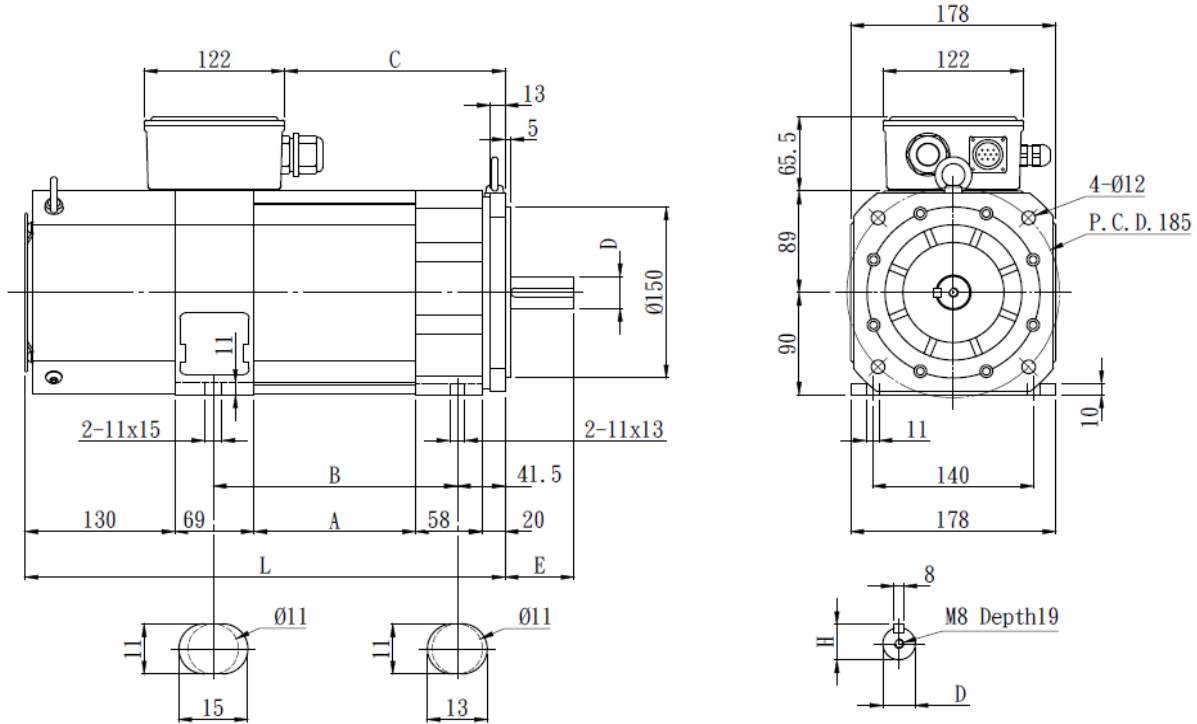


AMS180



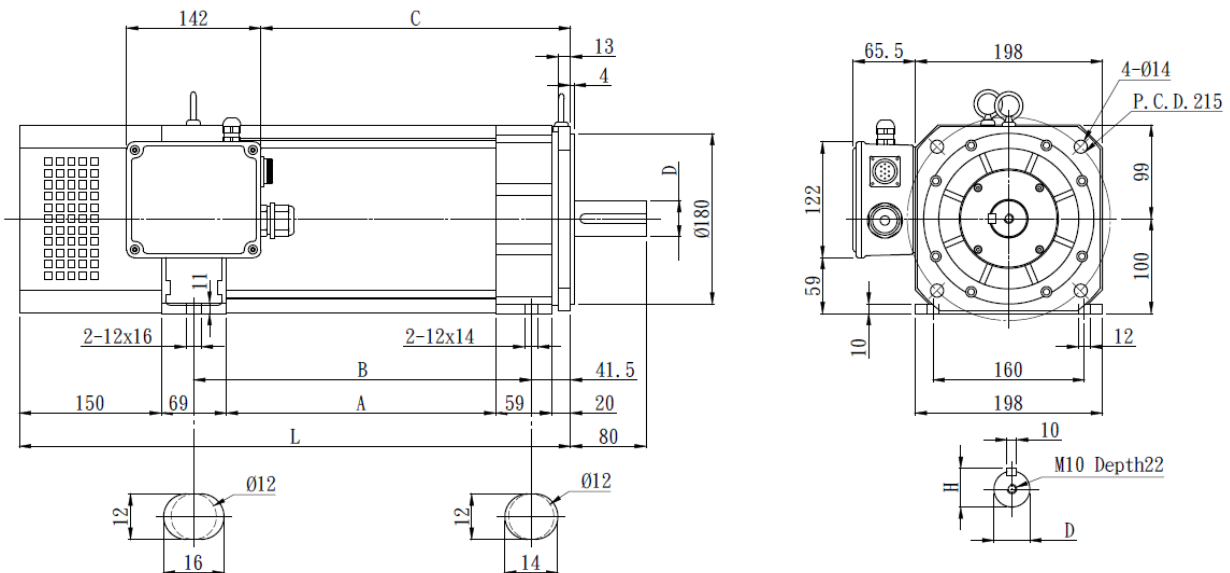
VM90 and VM100 motors

VM-90 IP54



	A	B	C	D	E	H	L
90M	100	172	151.5	Ø28	60	31	377
90L	140	212	191.5	Ø28	60	31	417

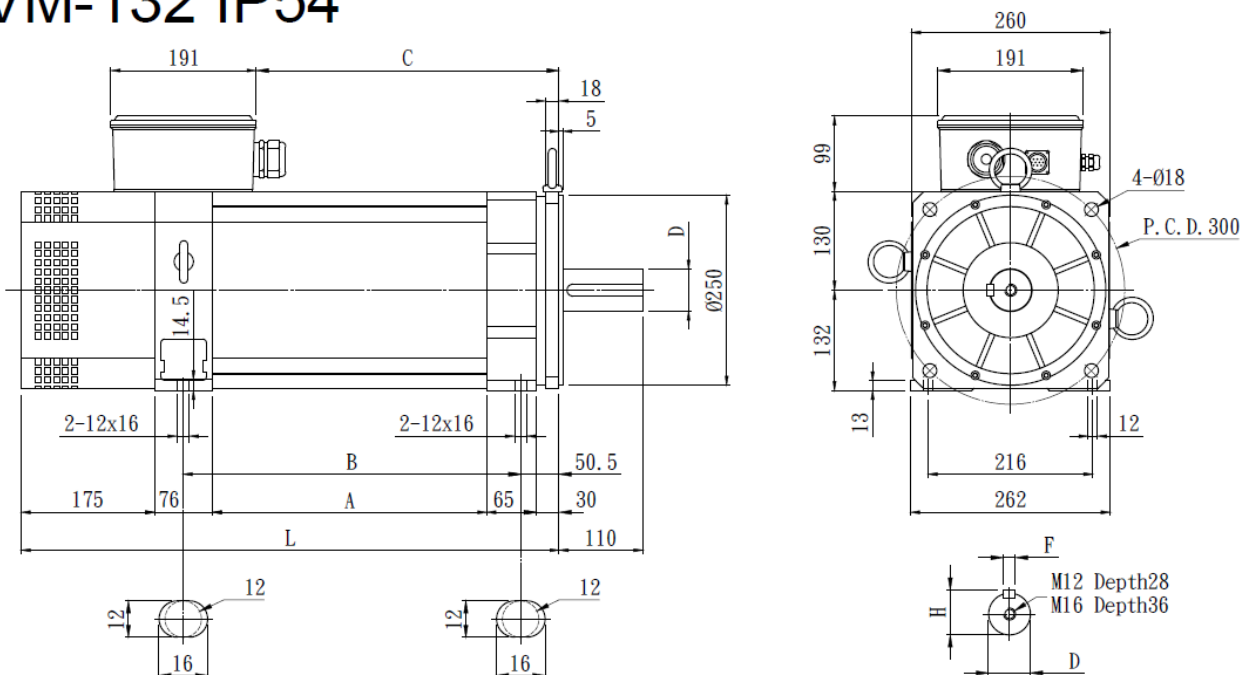
VM-100 IP54



	A	B	C	D	H	L
100S	140	212	182.5	Ø32	35	438
100M	215	287	257.5	Ø32	35	513
100L	285	357	327.5	Ø38	41	583

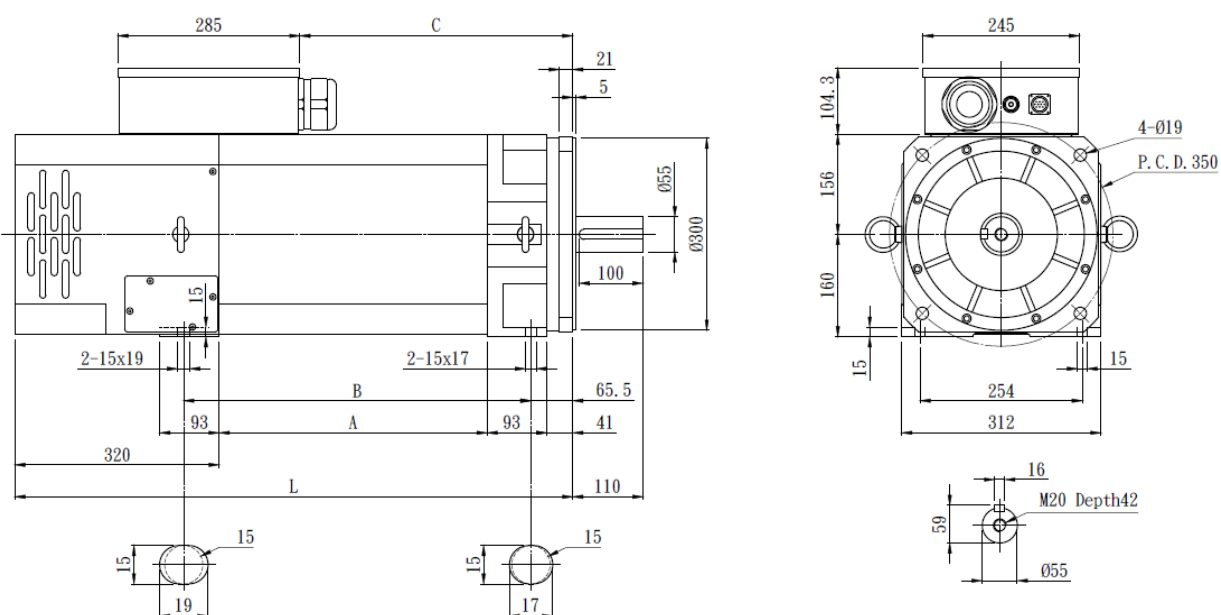
VM132 and VM160 motors

VM-132 IP54



	A	B	C	D	F	H	L
132S	180	263	217.5	Ø42	12	45	526
132M	220	303	257.5	Ø42	12	45	566
132L	290	373	327.5	Ø42	12	45	636
132X	360	443	397.5	Ø55	16	59	706

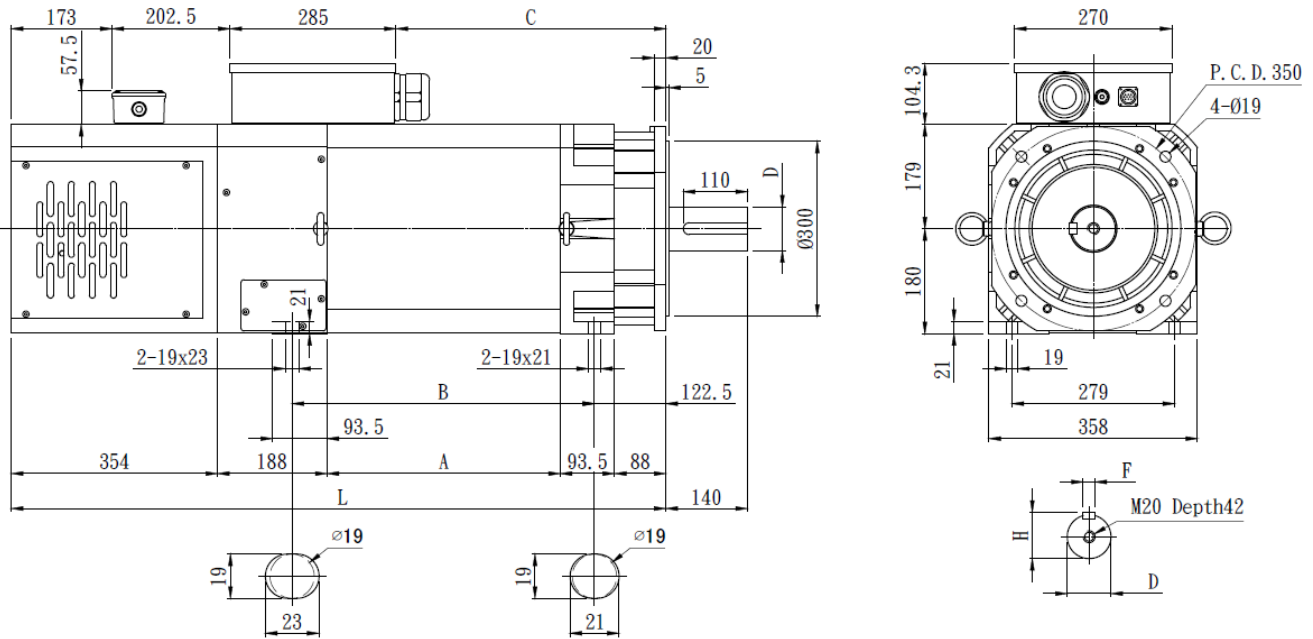
VM-160 IP54



	A	B	C	L
160S	320	444	327.5	774
160M	380	504	387.5	834
160L	420	544	427.5	874

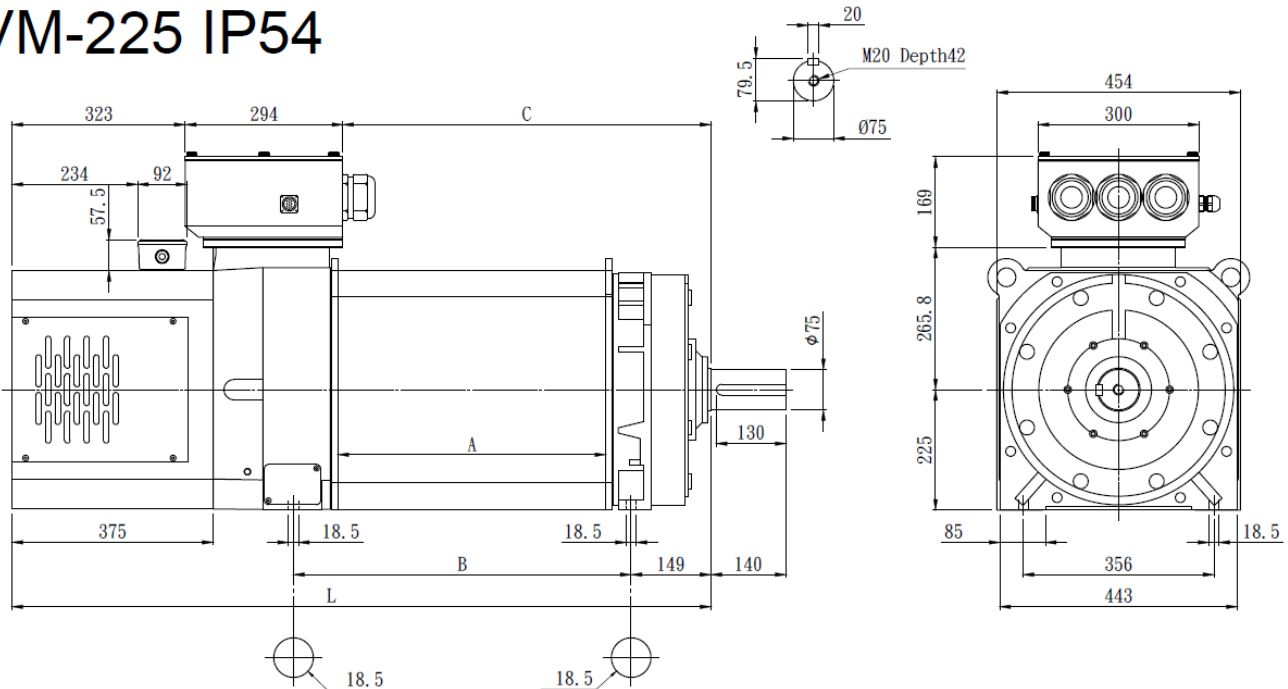
VM180 and VM225 motors

VM-180 IP54



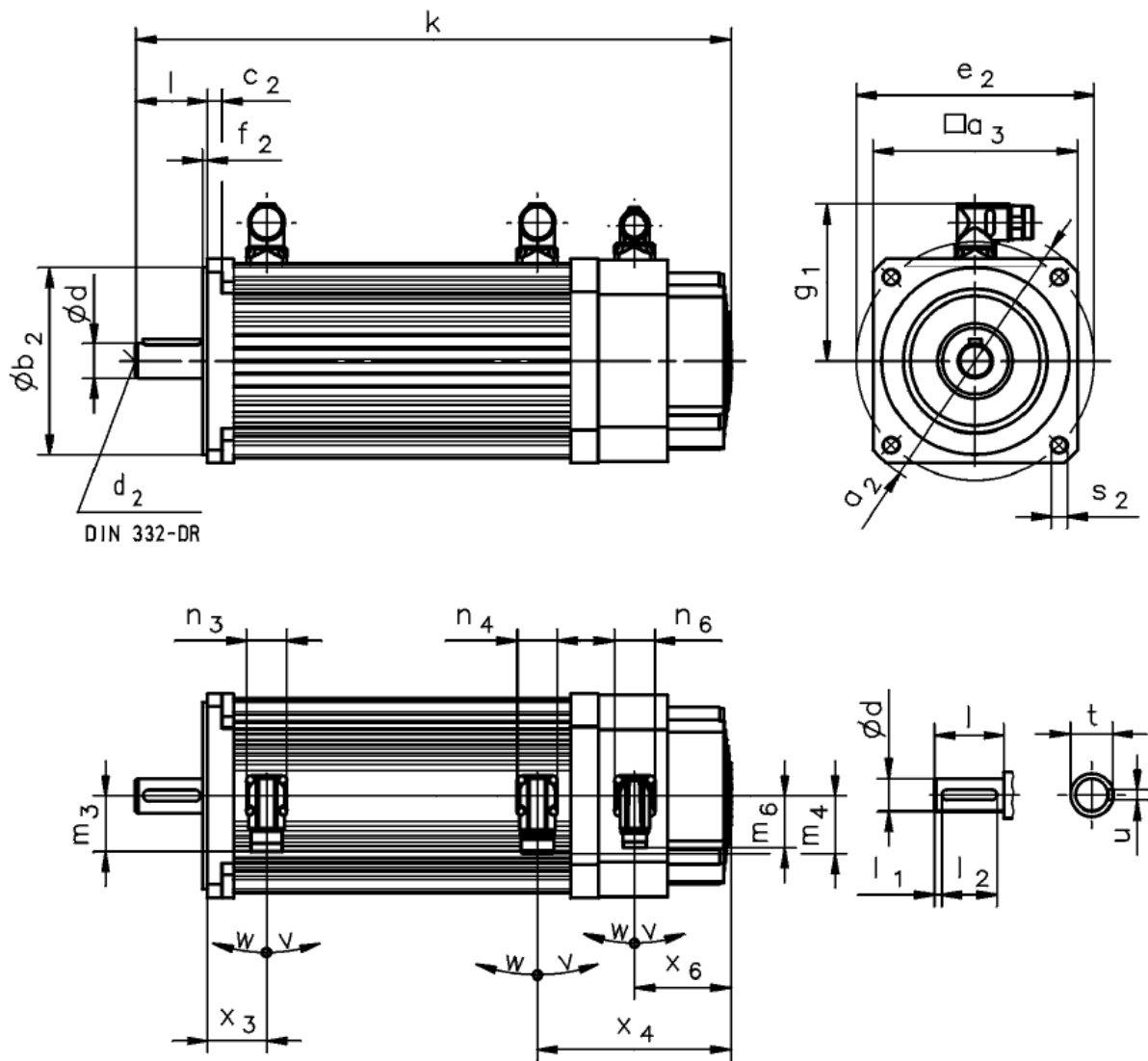
	A	B	C	D	F	H	L
180S	265	384	328	Ø60	18	64	988.5
180M	355	474	418	Ø75	20	79.5	1078.5
180L	400	519	463	Ø75	20	79.5	1123.5

VM-225 IP54



	A	B	C	L
225S	315	445	502	1119
225M	410	540	597	1214
225L	500	630	687	1304

MCA 13I34 and MCA 14L35 motors

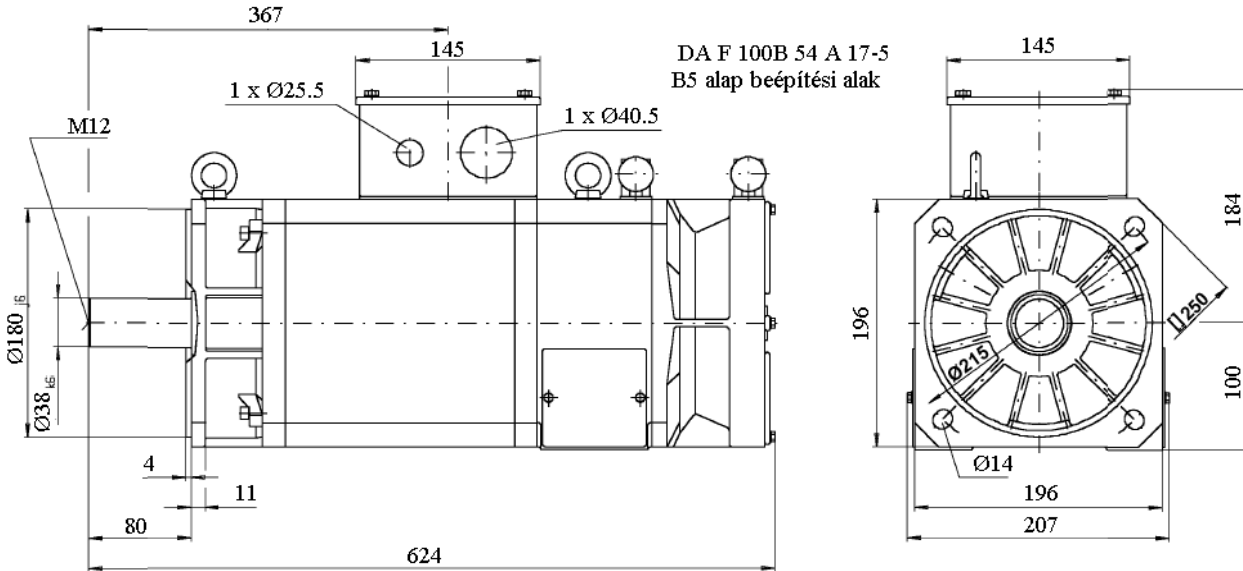


	k	x ₃	x ₄	g ₁	n ₃	n ₄	n ₆	m ₃	m ₄	m ₆	v	w		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
MCA 13I34	379	45	133	102	28	28	28	40	40	37	195	80		
MCA 14L35	414	41	135	109	28	28	28	40	40	37	195	80		

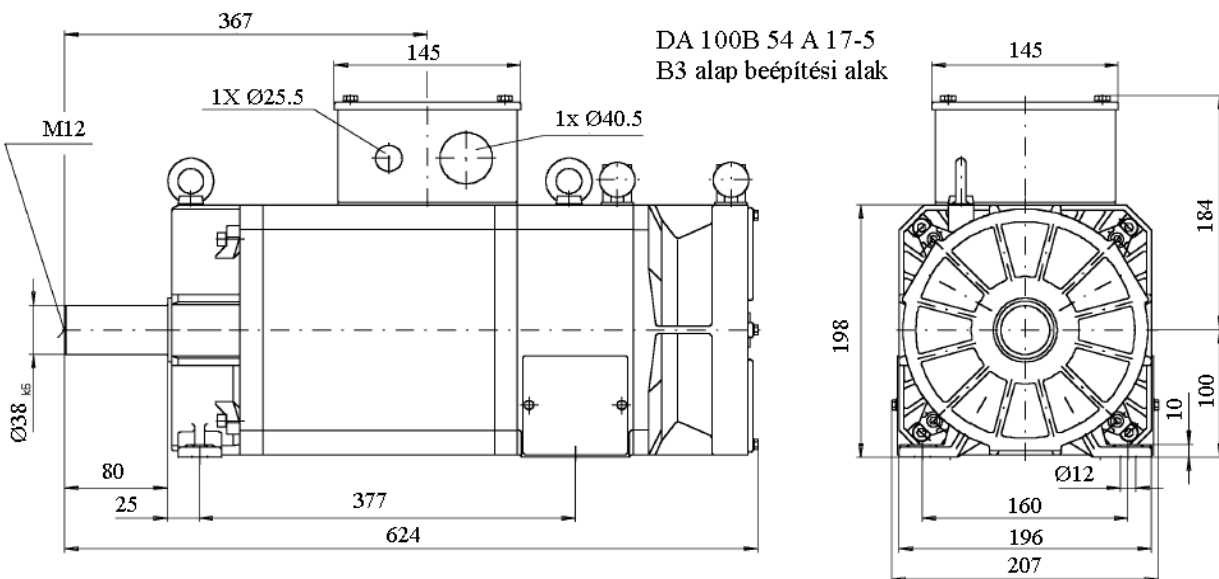
	d	d ₂	l	l ₁	l ₂	u	t	a ₂	a ₃	b ₂	c ₂	e ₂	f ₂	s ₂
	k6[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	j6[mm]	[mm]	[mm]	[mm]	[mm]
MCA 13I34	19	M6	40	2.0	36	6.0	21.5	160	130	110	9	130	3.5	9
MCA 14L35	24	M8	50	5.0	40	8.0	27.0	180	142	130	10	165	3.5	11

DA100B 54 and DAF100B 54 motors

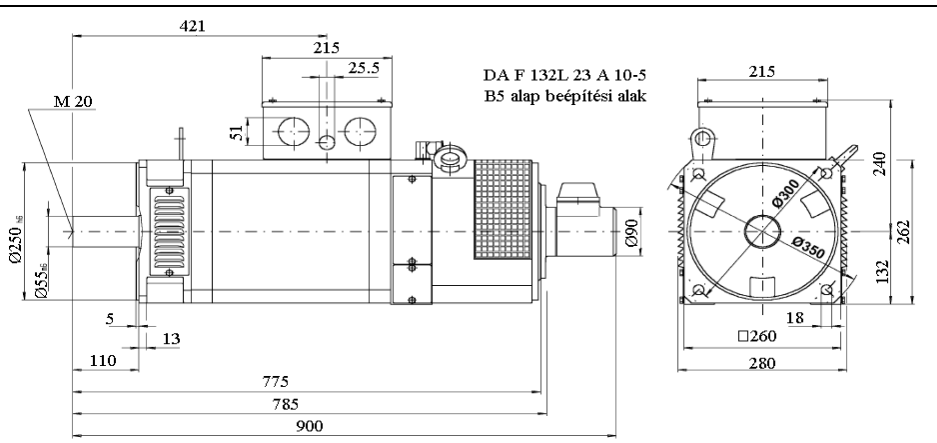
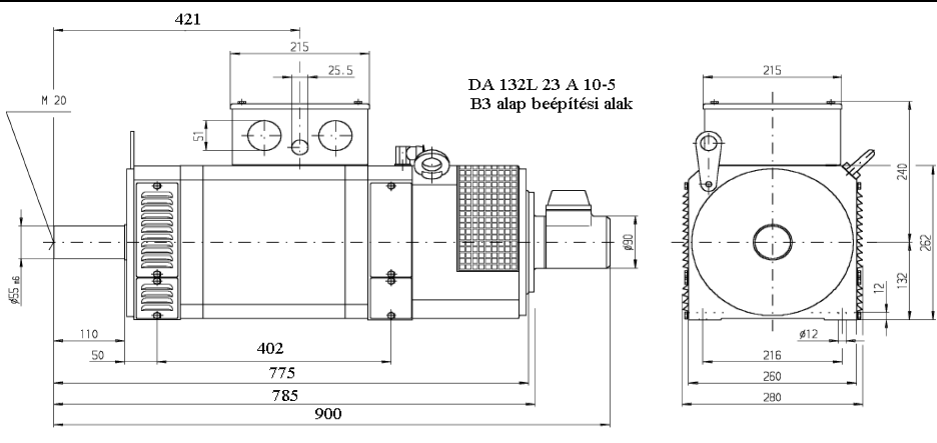
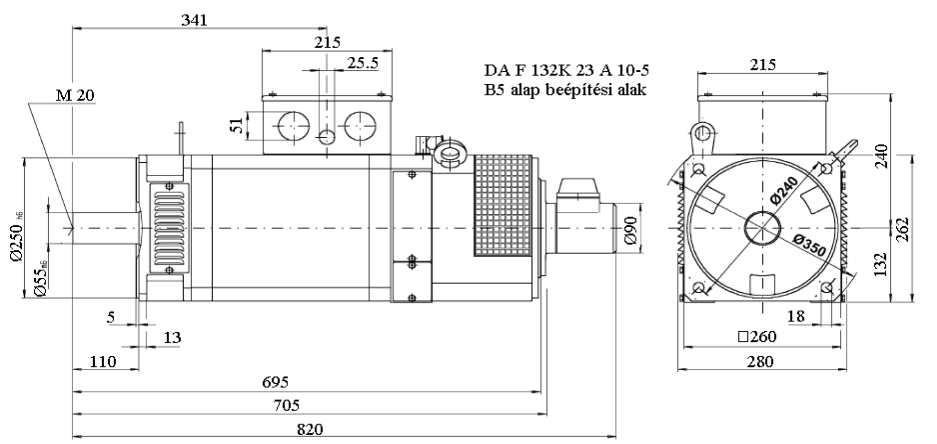
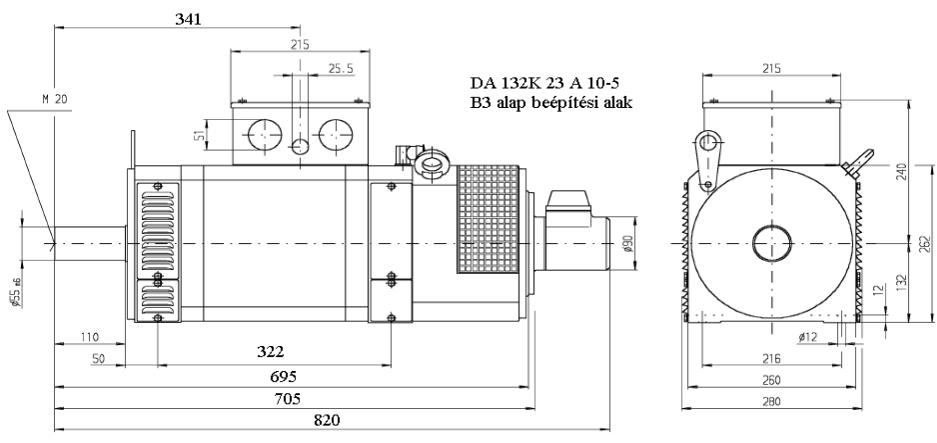
DA F 100B 54



DA F 100B 54

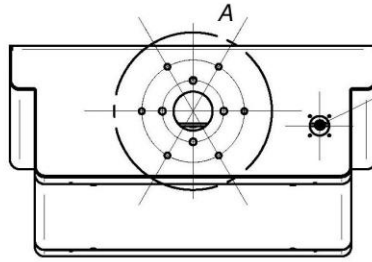


DA132K23, DA132L23 and DAF132K23, DAF132L23 motors



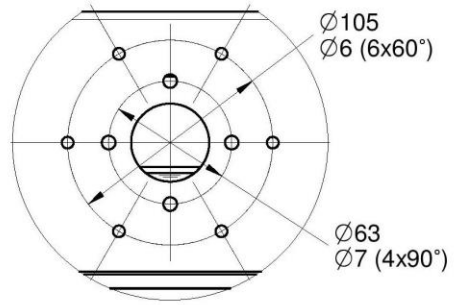
Operating boxes

MKB15
MKB15OP
MKB19

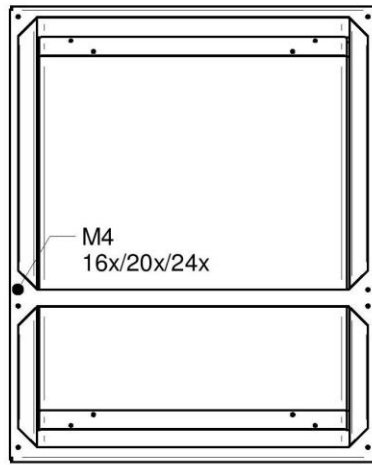
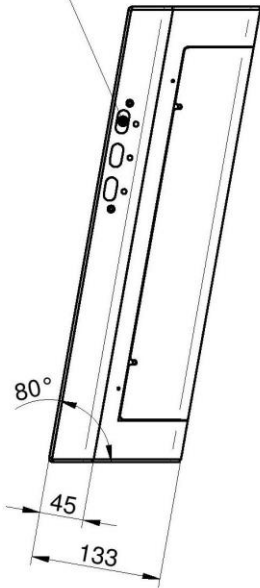


for "iHDW" connector

"A"

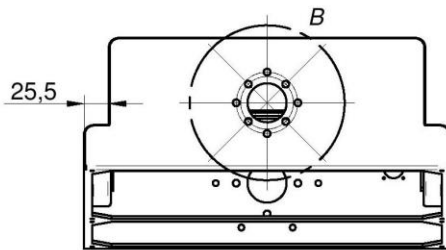
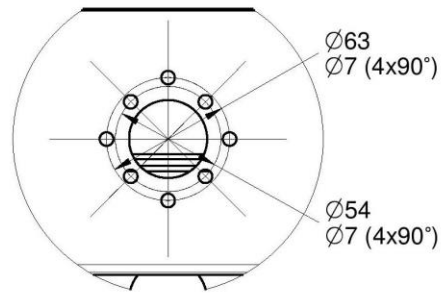


for "USB panel"



M4
16x/20x/24x

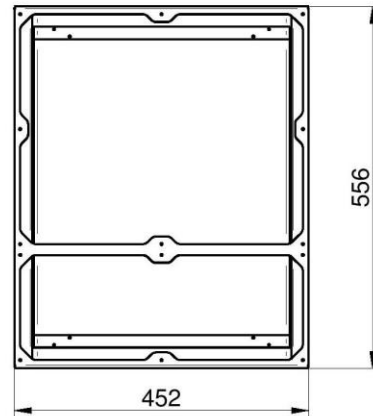
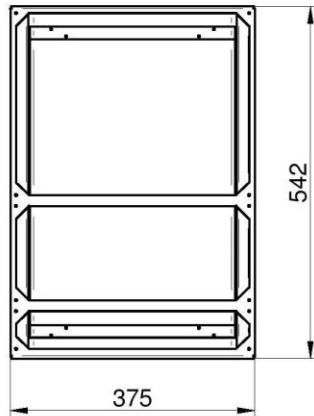
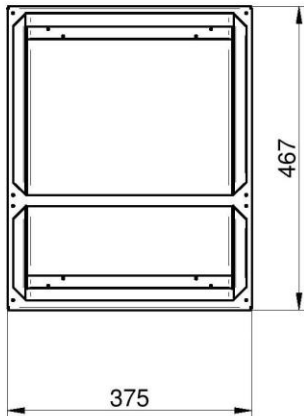
"B"



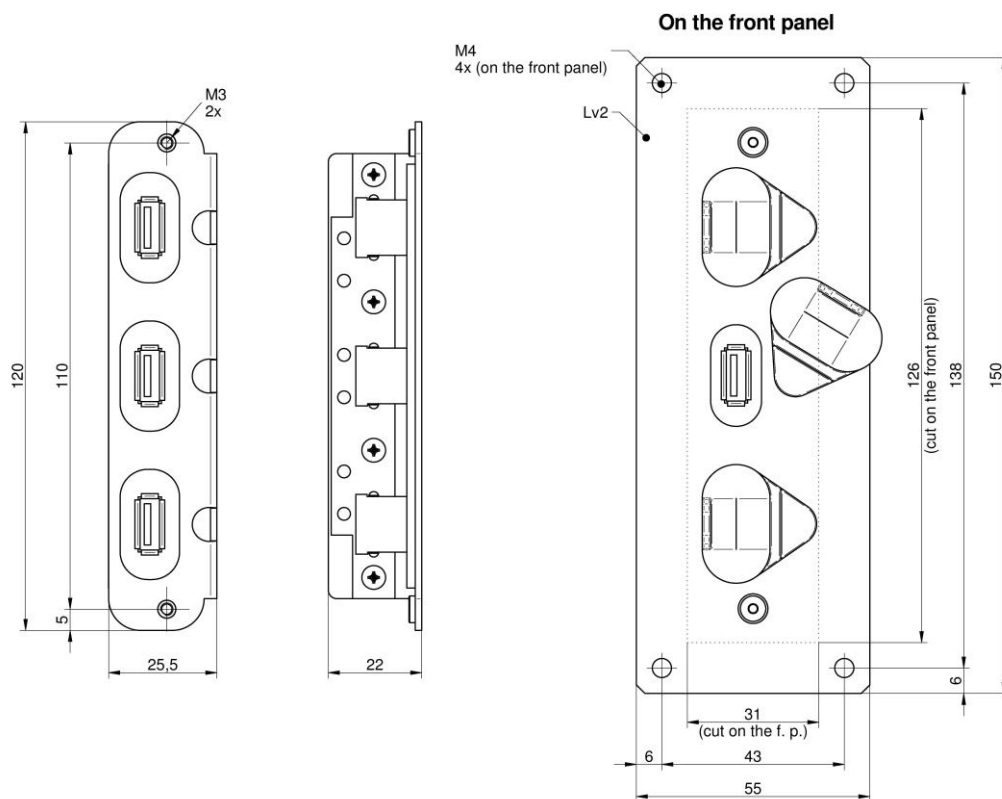
MKB15

MKB15OP

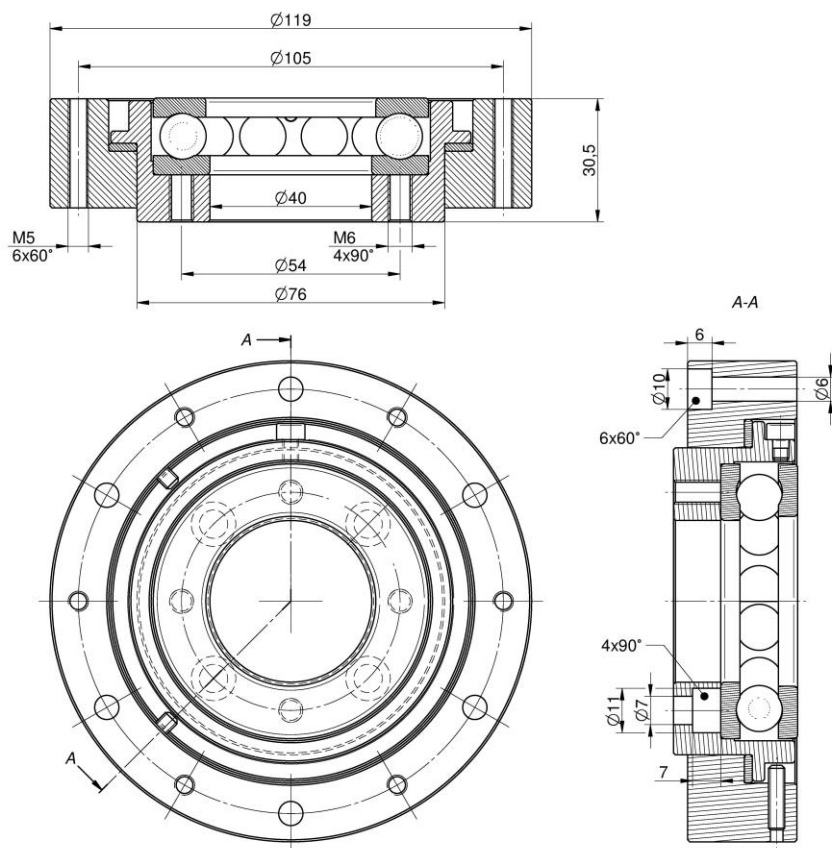
MKB19



USB panel

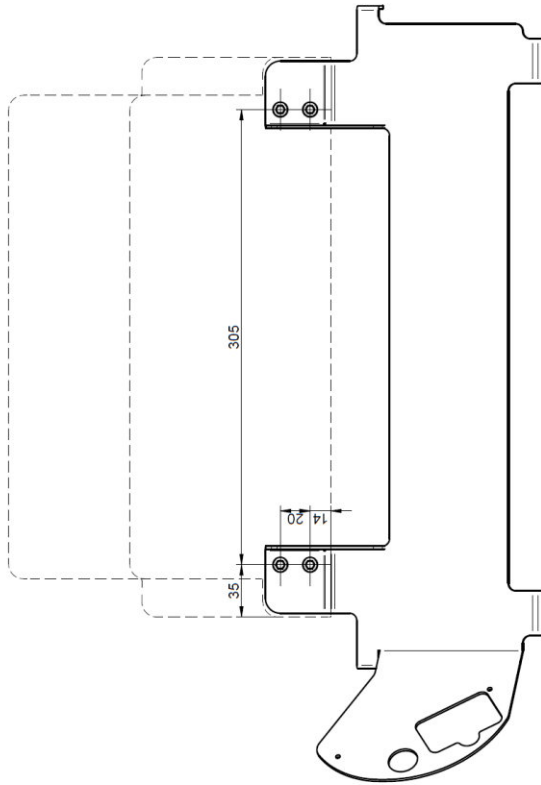


Rotating joint for operating boxes

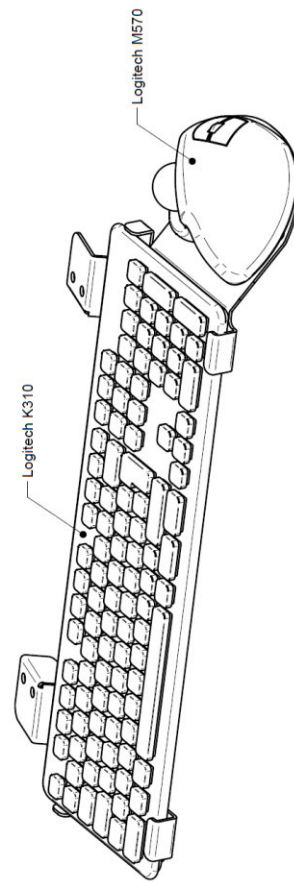
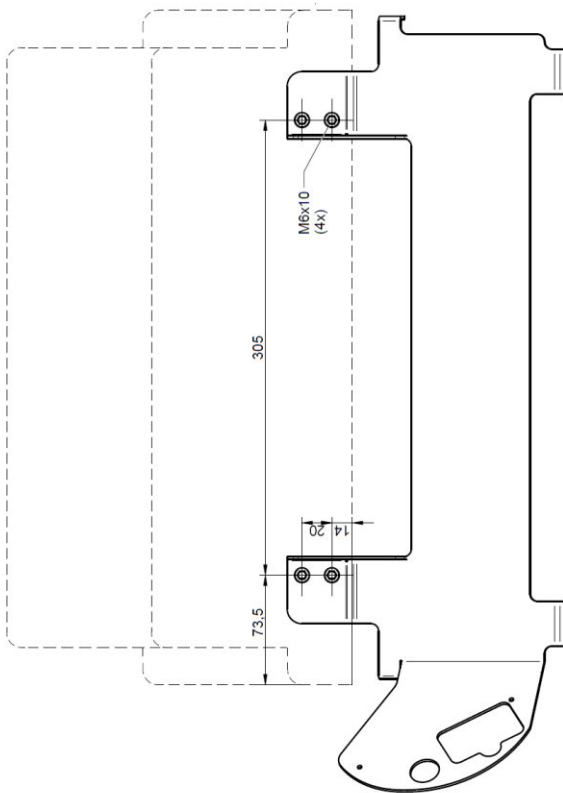


MKS Keyboard and mouse tray

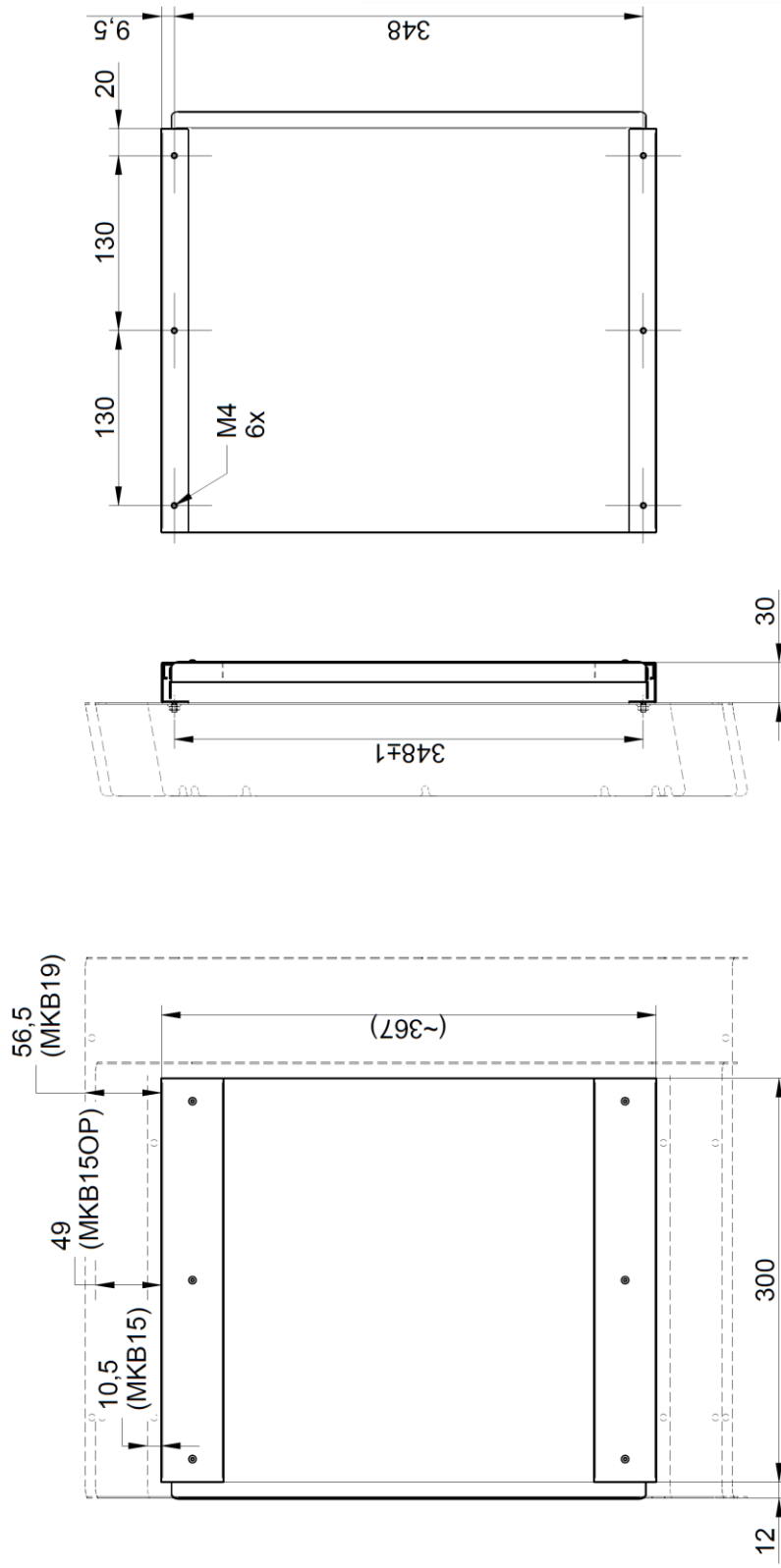
MKB15 / 150P



MKB19



Document holder



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