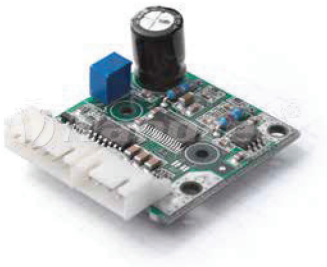
Compact microstep controller SMC11

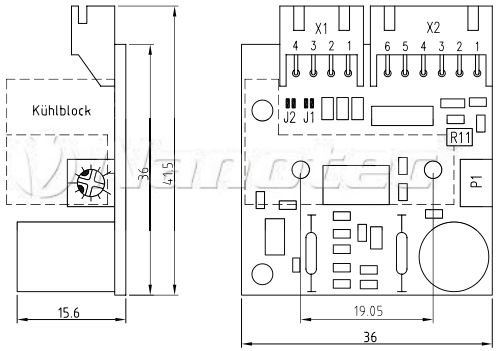


Technical data

Art:	Microstep controller for stepper motors
Operating voltage:	12 to 35 V DC
max. phase current:	1.0 A/full step (1.25 A with cooling block) 1.4 A/microstep (1.8 A with cooling block)
Current setting:	Via potentiometer
Operating type:	Bipolar
Operating mode:	1/1, 1/2, 1/4, 1/8 (preset)
Protection function:	Overvoltage, undervoltage and over-temperature
Step frequency:	0 to 200 kHz
Current reduction:	Switchable to 40%
Input signals:	0 V active (L < 0.8 V; 3.5 V < H < 6 V or open)
Temperature range:	0 to + 40 °C
Connection type:	JST plug connector
Weight:	10 g
Fastening type:	2 boreholes at Ø19.05 mm for M2.5 - installed directly on the stepper motor

! Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Dimension image (mm)



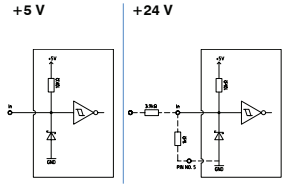
Input configuration, X1:

1=	Phase A
2=	Phase A\
3=	Phase B
4=	Phase B\

Input configuration, X2:

1=	Operating voltage, VSS
2=	Enable (L=active, H or open = disable)
3=	Direction
4=	Clock
5=	Operating voltage (0 V GND)
6=	Current reduction

Input circuit



Order identifier

SMC 11 - 2
1/16 step automatic current reduction

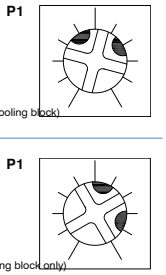
Step switching

Configuration:
The module is configured to 1/8 step in the factory.

Step mode	J1	J2
1/1 step	X	X
1/2 step	X	
1/4 step		X
1/8 or 1/16 step		

Current setting

Max. phase current: (microstep)



Motor controller SMCI12

Software

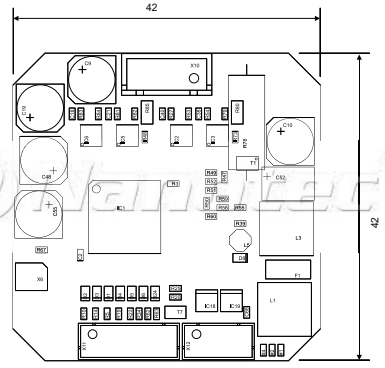
NanoPro
NanoCAN
NanoJ

Technical data

Art:	Motor controller for stepper motor
Operating voltage:	12 to 24 V DC
Phase current:	Nominal current 1.8 A, can be set up to 2.7 A
Interface:	RS485 4-wire or CANopen
Operating type:	RS485: Position, speed, flag position, clock-direction, analog, joystick CANopen: Position, homing mode, velocity mode, CANopen: Position, homing mode, velocity mode, interpolated position mode (in compliance with CAN standard DS402)
Operating mode:	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive, feed rate
Step frequency:	16 kHz in full step; corresponding multiples in microstep (e.g. up to 1 MHz at 1/64)
Inputs:	6 digital inputs (TTL), 1 analog input +10/–10 V
Outputs:	3 open collectors, 24 V/0.5 A max.
Current reduction:	Can be adjusted from 0 to 100%
Protective circuit:	Overvoltage, undervoltage and temperature > 80 °C
Temperature range:	0 to + 40 °C

! Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Dimension image (mm)



Inputs/outputs (X11)

Pin	Function*
1	GND
2	Input 1
3	Input 2
4	Input 3
5	Input 4
6	Input 5
7	Input 6
8	Analog In
9	Output 1
10	Output 2
11	Output 3
12	GND

Supply and communication (X12)

Pin	Function*	
	RS485	CANopen
1	GND	GND
2	GND	GND
3	RX-	n.c.
4	RX+	n.c.
5	TX-	CAN low (CAN-)
6	TX+	CAN high (CAN+)
7	GND	GND
8	VB 12-24 V DC	VB 12-24 V DC

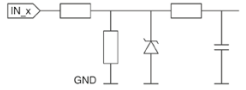
Motor connection (X10)

Pin	Function*
1	Motor coil A
2	Motor coil A\
3	Motor coil B
4	Motor coil B\

*** from the perspective of the connected motor controller**

Connection cable for motors with 6 or 8 connectors: ZK-XHP-4-300

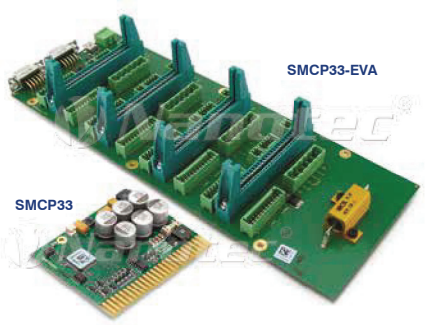
Input circuit



Order identifier

RS-485: SMCI12
CANopen: SMCI12 - 3

Closed loop motor controller with encoder input, SMCP33



Software

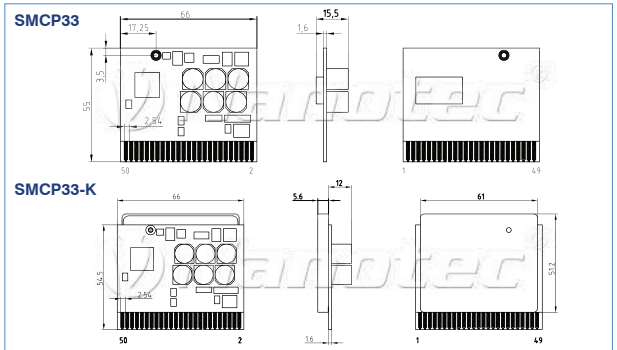
NanoPro
Nanoj

Technical data

Type:	Motor controller for stepper and BLDC motors
Operating voltage:	12 to 48 V DC
Phase current:	Nominal current 2 A (effective), with heat sink 4 A
Interface:	RS485, USB
Operating type:	Position, speed, flag position, clock-direction, analog, joystick, torque
Operating mode:	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency:	0 to 50 kHz in clock/direction mode, 0 to 25 kHz in all other modes
Inputs:	8 inputs (5 V), 2 analog inputs (-10 to +10 V)
Outputs:	8 outputs (5 V, max. 20 mA TTL)
Position monitoring:	Automatic error correction up to 0.9°, only with optical encoder (e.g. series WEDS5541)
Current reduction:	Adjustable between 0 to 100%
Protective circuit:	Overvoltage, undervoltage and temperature >80 °C
Temperature range:	0 to + 40 °C

Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Dimension image (mm)



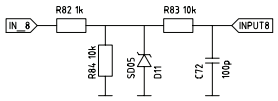
Mating connector/circuit board retainer EDAC types: 345-050-521-202 Mating connector
345-220-088 Inline plug-in unit, short
345-240-318 Encoding element between contact

Inputs/outputs (X1)

Pin	Function
1	GND
2	
3	SUPPLY + VB
4	
5	GND
6	
7	MOTOR PHASE B\
8	
9	MOTOR PHASE B
10	
11	MOTOR PHASE A\
12	
13	MOTOR PHASE A
14	
15	GND
16	
17	ENCODER INDEX
18	ENCODER CHANNEL A
19	ENCODER CHANNEL B
20	ENCODER +5 V
21	TEMP_MOTOR_1
22	OUTPUT BRAKE
23	OUTPUT BALLAST
24	
25	RS485 RX-
26	RS485 RX+
27	RS485 TX-
28	RS485 TX+
29	
30	GND
31	ANALOG INPUT 1
32	ANALOG INPUT 2
33	INPUT 1
34	INPUT 2
35	INPUT 3
36	INPUT 4
37	INPUT 5
38	INPUT 6
39	INPUT 7
40	INPUT 8
41	OUTPUT 1
42	OUTPUT 2
43	OUTPUT 3
44	OUTPUT 4
45	OUTPUT 5
46	OUTPUT 6
47	OUTPUT 7
48	OUTPUT 8
49	GND
50	

ALL GNDS INTERNALLY CONNECTED

Input circuit



Order identifier

SMCP33
SMCP33-K (with heat sink)

Fitting evaluation/motherboard:
SMCP33-EVA

Closed loop motor controller with encoder input, SMCI33

Software

NanoPro
Nanoj

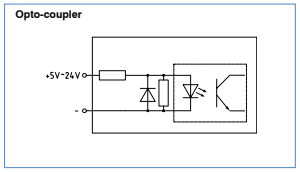
Technical data

Type:	Motor controller for stepper motors
Operating voltage:	12 to 48 V DC
Phase current:	Nominal current 2 A, can be set up to a max. 3 A/phase
Interface:	RS485 or USB
Operating type:	Position, speed, flag position, clock-direction, analog, joystick
Operating mode:	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency:	0 to 50 kHz in clock/direction mode, 0 to 25 kHz in all other modes
Inputs:	6 opto-coupler inputs (5 to 24 V)
Outputs:	3 open collectors, 30 V/30 mA max.
Position monitoring:	Automatic error correction up to 0.9°
Current reduction:	Adjustable from 0- 100%
Protective circuit:	Overvoltage, undervoltage and heat sink temperature >80 °C
Temperature range:	0 to +40 °C

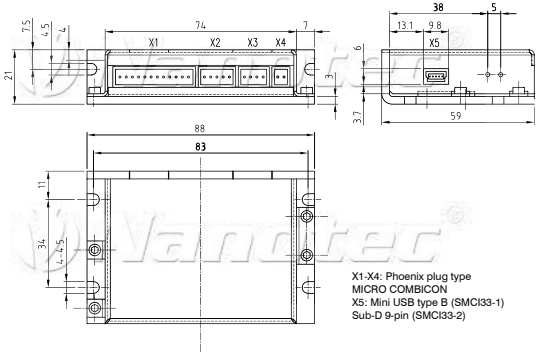
* Connectors are included in the delivery.

Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Input circuit



Dimension image (mm)



X1-X4: Phoenix plug type
MICRO COMBICON
X5: Mini USB type B (SMCI33-1)
Sub-D 9-pin (SMCI33-2)

Inputs/outputs (X1)

Pin	Function
1	Input1
2	Input2
3	Input3
4	Input4
5	Input5
6	Input6
7	Com
8	Output 1
9	Output 2
10	Output 3
11	Analog In
12	GND

Encoder (X2)

Pin	Function
1	+5 V
2	CH-B
3	CH-A
4	INDEX
5	GND

Motor connection (X3)

Pin	Function
1	Motor coil A
2	Motor coil A\
3	Motor coil B\
4	Motor coil B

Supply (X4)

Pin	Function
1	VB 24-48 V
2	GND

SMCI33-2: RS485 (X5)

Pin	Function
1	n.c.
2	RX+
3	+5 V
4	TX+
5	n.c.
6	n.c.
7	RX-
8	GND
9	TX-

SMCI33-1: USB (X5)
USB standard

Order identifier

SMCI33 -
1= USB
2= RS485

Closed loop motor controller with encoder input, SMCI35

Software

NanoPro

NanoJ

Communication (X1)

Pin	Function*	Wire color (ZK-RS232-USB-3.3V)
1	GND	Black
2	TX	Yellow
3	RX	Orange

Encoder (X2) JST-ZHR 5

Pin	Function*
1	GND
2	CH-B
3	INDEX
4	CH-A
5	+5 V

Technical data

Type: Motor controller for stepper motors
Operating voltage: 12 to 48 V DC
Phase current: Max. 6 A
Interface: TTL-RS232 (3.3 V
Operating type: Position, speed, flag position, clock-direction, analog, joystick
Operating mode: 1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency: 16 kHz in full step; corresponding multiples in microstep (e.g. up to 1 MHz at 1/64)
Inputs: 6 digital inputs (TTL), 1 analog input +10/- 10 V
Outputs: 3 digital outputs (TTL)
Position monitoring: Yes, depending on rotary encoder
Current reduction: Adjustable from 0 to 100%
Protective circuit: Overvoltage, undervoltage and heat sink temperature >80 °C
Temperature range: 0 to + 40 °C

Motor and supply (X3)

Pin	Function*
1	Motor coil A
2	Motor coil A\
3	Motor coil B
4	Motor coil B\
5	VB 24-48 V
6	GND

Inputs/outputs (X4)

Pin	Function*	Function on delivery
1	Output 1	
2	Input 6	CLOCK
3	Input 5	DIRECTION
4	Input 4	ENABLE
5	Analog in 1	
6	GND	

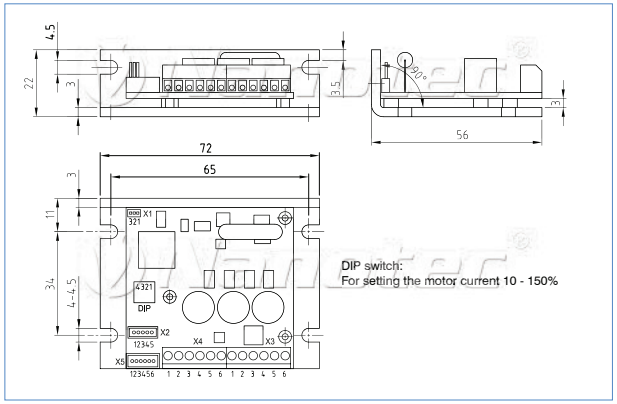
Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Inputs/outputs (X5) JST-ZHR 6

Pin	Function*
1	GND
2	Output 3
3	Output 2
4	Input 3
5	Input 2
6	Input 1

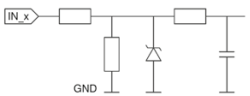
* from the perspective of the connected motor controller

Dimension image (mm)



DIP switch:
For setting the motor current 10 - 150%

Input circuit



Order identifier

SMCI35

Closed loop motor controller with encoder input, SMCI36

Software

NanoPro

NanoCAN

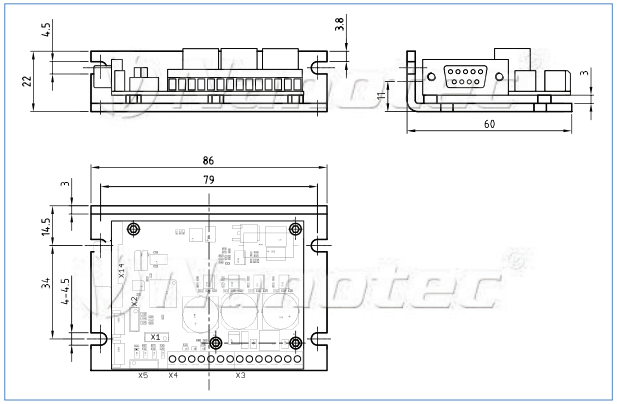
NanoJ

Technical data

Type: Motor controller for stepper and BLDC motors
Operating voltage: 12 to 72 V DC
Phase current: Nominal current 6 A, max. 9 A (eff)
Interface: RS485 4-wire or CANopen
Operating type: RS485: Position, speed, flag position, clock-direction, analog, Joystick CANopen: Position, homing mode, velocity mode, interpolated position mode (in compliance with CAN standard DS402)
Operating mode: 1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive microstep, Feed rate
Step frequency: 16 kHz in full step, corresponding multiples in microstep (e.g. up to 1 MHz at 1/64)
Inputs: 6 digital inputs (TTL), 1 analog input +10/- 10 V
Outputs: 3 digital outputs (open drain)
Position monitoring: Yes, depending on rotary encoder
Current reduction: Adjustable from 0 to 100%
Protective circuit: Overvoltage, undervoltage and heat sink temperature >75 °C
Temperature range: 0 to + 40 °C

Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Othewise, there is a danger of destruction of the motor controller.

Dimension image (mm)



Hall sensor (X1)

Pin	Function*
1	GND
2	Hall 1
3	Hall 2
4	Hall 3
5	+5 V

Encoder (X2)

Pin	Function*
1	GND
2	CH-B
3	INDEX
4	CH-A
5	+5 V

Motor and supply (X3)

Pin	Function* Stepper motor	BLDC
1	GND	GND
2	Motor coil A	V
3	Motor coil A\	U
4	Motor coil B	W
5	Motor coil B\	n.c.
6	72 V	72 V
7	GND	GND

Inputs/outputs (X4)

Pin	Function*
1	GND
2	Output 1
3	Input 6
4	Input 5
5	Input 4
6	Analog in 1
7	GND

Inputs/outputs (X5)

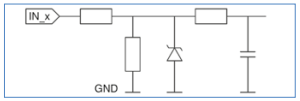
Pin	Function*
1	GND
2	Output 3
3	Output 2
4	Input 3
5	Input 2
6	Input 1

Communication (X14)

Pin	Function*
1	n.c.
2	Rx+/CAN-
3	GND
4	Tx+
5	n.c.
6	GND
7	Rx-/CAN+
8	GND
9	Tx-

* from the perspective of the connected motor controller

Input circuit



Order identifier

SMCI36

Closed loop motor controller with encoder input, SMCI47-S

Software

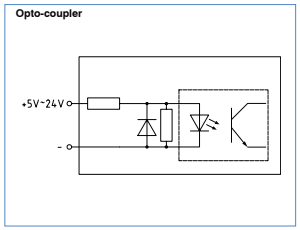
NanoPro
NanoCAN
NanoJ

Technical data

Type:	Motor controller for stepper motors
Operating voltage:	24 to 48 V DC
Phase current:	Nominal current 7.0 A, can be set up to a max. 10.5 A/phase
Interface:	RS485, CANopen
Operating type:	Position, speed, flag position, clock-direction, analog, joystick CANopen: Position, homing mode, velocity mode, interpolated position mode
Operating mode:	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/32, 1/64, adaptive
Step frequency:	0 to 50 kHz in clock/direction mode, 0 to 25 kHz in all other modes
Inputs:	6 opto-coupler inputs (5 to 24 V)
Outputs:	3 open collectors, 30 V/2 A max. 1 output for brake, max. 1.5 A
Position monitoring:	Automatic error correction up to 0.9°
Current reduction:	Adjustable from 0 - 100%
Protective circuit:	Overvoltage, undervoltage and heat sink temperature >80 °C
Temperature range:	0 to + 40 °C

* Connectors are included in the delivery.

Input circuit

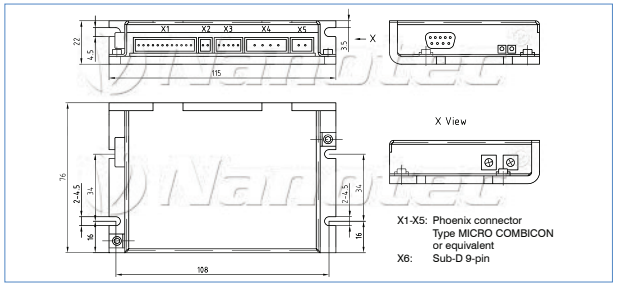


Caution: Always use a back-up capacitor for the operating voltage of the motor controller. This is to be placed as close as possible to the motor controller. Motor controllers up to 4 A require a 4700 µF capacitor, and motor controllers up to 10 A require a 10,000 µF capacitor. Otherwise, there is a danger of destruction of the motor controller.

Order identifier

SMCI47-S-
2= RS485
3= CANopen

Dimension image (mm)



Inputs/outputs (X1)

Pin	Function
1	Input1
2	Input2
3	Input3
4	Input4
5	Input5
6	Input6
7	Signal GND
8	Output 1
9	Output 2
10	Output 3
11	Analog In
12	GND

Brake (X2)

Pin	Function
1	Brake
2	GND

Encoder (X3)

Pin	Function
1	+5 V
2	CH-B
3	CH-A
4	INDEX
5	GND

Motor connection (X4)

Pin	Function
1	Motor coil A
2	Motor coil A\
3	Motor coil B\
4	Motor coil B

Supply (X5)

Pin	Function
1	VB 24-48 V
2	GND

SMCI47-S-2: RS485 (X6)

Pin	Function
1	n.c.
2	Rx+
3	+5 V
4	Tx+
5	n.c.
6	n.c.
7	Rx-
8	GND
9	Tx-

SMCI47-S-3: CAN (X6)

Pin	Function
1	n.c.
2	CAN low (CAN-)
3	CAN Ground (internally connected with pin 6)
4	n.c.
5	n.c.
6	CAN Ground (internally connected with pin 3)
7	CAN high (CAN+)
8	n.c.
9	Supply Vcc to 30 V (used for safety feature)

Motor controller NP5

Software

NanoJ V2

Technical data

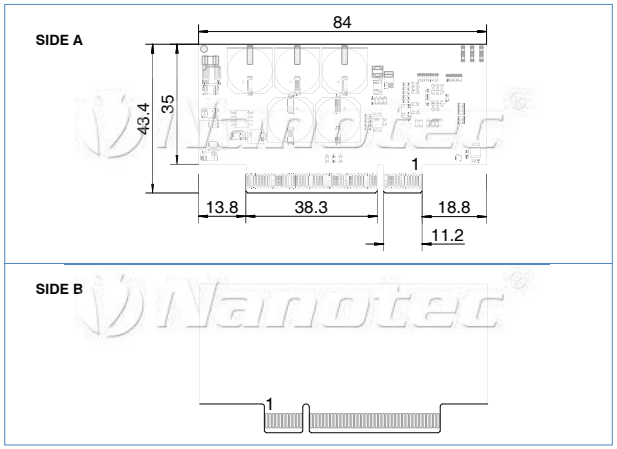
Type:	Motor controller for stepper and BLDC motors
Operating voltage:	12-48 V DC +/-4%
Max. continuous current:	6 A (effective value)
Peak current:	10 A (effective value, for 1 s)
Commutation:	Open loop stepper motor, closed loop stepper motor with encoder, BLDC with sinusoidal commutation via hall sensor, BLDC with sinusoidal commutation via encoder
Operating mode:	Profile position mode, profile velocity mode, profile torque mode, velocity mode, homing mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode, application program (NanoJ)
Interfaces:	2x SPI, 1x I²C or CAN*
Encoder/hall:	2x encoder interface and 1x hall sensor interface*
I/O:	7x general I/O, 2x AD converter, 1x output for the external brake (open drain), 1x output for the external ballast circuit*
Connector:	PCI Express 8x, 1.0 mm RM, 2x49 contacts
Current reduction:	Adjustable from 0 to 100%
Protective circuit:	Overtemperature protection at temperatures >70 °C, polarity reversal protection through PIN diode (short circuit between +VB and GND)

(*External circuit required!)

Order identifier

NP5

Dimension image (mm)



Pin assignment: side A

Pin	Name	Type	Observations
A1	GND	-	
A2	ENC1_A	I	Encoder 1, A-track
A3	ENC1_B	I	Encoder 1, B-track
A4	ENC1_I	I	Encoder 1, index track
A5	ENC1_CAP	I	Encoder 1, capture
A6	HALL_U	I	Hall sensor U
A7	HALL_V	I	Hall sensor V
A8	HALL_W	I	Hall sensor W
A9	ENC2_A	I	Encoder 2, A-track
A10	ENC2_B	I	Encoder 2, B-track
A11	GND	-	
A12	GND	-	
A13	ADC_Analog_2	I	AD converter 2
A14	GND	-	
A15	SLOT_SPI_MOSI	-	SPI 1
A16	SLOT_SPI_MISO	-	SPI 1
A17	SLOT_SPI_SCK	-	SPI 1
A18	SLOT_SPI_!CS!	-	SPI 1
A19	COMM_SPI_MOSI	-	SPI 2
A20	COMM_SPI_MISO	-	SPI 2
A21	COMM_SPI_SCK	-	SPI 2
A22	COMM_SPI_!CS!	-	SPI 2
A23	I²CSCL_CANRX	-	I²C Clock or CAN RX
A24	I²CSDA_CANTX	-	I²C Data or CAN TX
A25	n.c.	-	Reserved
A26	GND	-	
A27	+3,3 V	I	External supply voltage, reserved
A28	+14 V	I	External supply voltage, reserved
A29	GND	-	
A30-32	B\	O	Motor phase B\
A33-35	B	O	Motor phase B
A36-38	A\	O	Motor phase A\
A39-41	A	O	Motor phase A
A42-44	GND	-	
A45-47	+VB	I	12-48 V DC +/-4%
A48	Brake	O	Control of the external brake, open drain
A49	GND	-	

Pin assignment: side B

Pin	Name	Type	Observations
B1	GND	-	
B2	DIO0	IO	General IO
B3	DIO1	IO	General IO
B4	DIO2	IO	General IO
B5	DIO3	IO	General IO
B6	DIO4	IO	General IO
B7	DIO5	IO	General IO
B8	DIO6	IO	General IO
B9	ENC2_I	I	Encoder 2, index track
B10	ENC2_CAP	I	Encoder 2, capture
B11	GND	-	
B12	GND	-	
B13	ADC_Analog_1	I	AD converter 1
B14	GND	-	
B15	SPARE_PH_TX+	-	Reserved
B16	SPARE_PH_TX-	-	Reserved
B17	SPARE_PH_RX+	-	Reserved
B18	SPARE_PH_RX-	-	Reserved
B19	SLOT_!RESET	-	System function, reserved
B20	SLOT_BOOT	-	System function, reserved
B21	SLOT_SYNC	-	System function, reserved
B22	COMM_RESET	-	System function, reserved
B23	COMM_SYNC	-	System function, reserved
B24	GND	-	Slot ID, reserved
B25	n.c.	-	Reserved
B26	GND	-	
B27	Ballast	O	Control of the external ballast circuit
B28	n.c.	-	Reserved
B29	GND	-	
B30-32	B\	O	Motor phase B\
B33-35	B	O	Motor phase B
B36-38	A\	O	Motor phase A\
B39-41	A	O	Motor phase A
B42-44	GND	-	
B45-47	+VB	I	12-48 V DC +/-4%
B48	+VB_LOGIC	I	External logic supply 24 V
B49	GND	-	

Motor controller N5 for EtherCAT or CANopen

Software

NanoJ V2

NanoIP

Technical data

Type:	Motor controller for stepper and BLDC motors
Operating voltage:	12-70 V DC (low current version), or 12-48 V DC (high current version)
Continuous current:	10 A effective (low current version), or 18 A effective (high current version)
Peak current:	10 A effective (low current version), or 54 A effective (high current version)
Commutation:	Open loop stepper motor, closed loop stepper motor with encoder, BLDC with sinusoidal commutation via hall sensor, BLDC with sinusoidal commutation via encoder
Operating mode:	Profile position mode, velocity mode, homing mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, clock/direction mode, application program (NanoJ)
Parameterization:	Browser-based via Ethernet with the NanoIP interface
Field bus interfaces:	EtherCAT or CANopen
Encoder input:	5-V or 24-V signal, differential or single-ended, max. resolution 65536 CPR (16 bit), UVW connection for hall sensor
Inputs:	4 inputs 5 V/24 V switchable in software (inputs 1 to 4); 2 inputs, wide range, 5-24 V (inputs 5 and 6); 2 analog inputs -10 to +10 V or 0-20 mA (switchable in software)
Outputs:	2 transistor outputs, (open drain, 0 switching, max. 24 V/0.5 A)
Brake:	1 open drain output, max. 1.5 A
Protective circuit:	Overvoltage and undervoltage: protective circuit at voltage >77.5 V or <9 V (low current version); protective circuit at voltage >52.4 V or <9 V (high current version) Overtemperature: protective circuit at temperature >70 °C Polarity reversal protection: in case of polarity reversal, short circuit between supply voltage and GND via PIN diode, therefore cable protection device (fuse) required in supply cable.

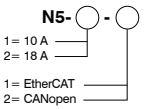
Connections (EtherCAT version)

Connector	Function
X1	Ethernet
X2	Encoder
X3	Input and output
X4	Brake
X5	Motor connection
X6	Supply voltage
X7	EtherCAT IN
X8	EtherCAT OUT
X9	External logic supply, input voltage +24 V DC Supply voltage for encoder Input voltage +24 V DC

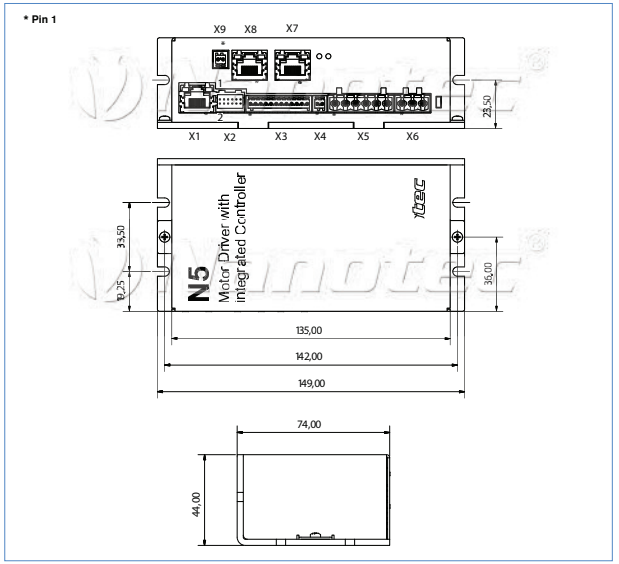
Connections (CANopen version)

Con-nector	Function
X1	Ethernet
X2	Encoder
X3	Input and output
X4	Brake
X5	Motor connection
X6	Supply voltage
X7	External logic supply, input voltage +24 V DC Supply voltage for encoder, input voltage +24 V DC
X8	CANopen IN, pin configuration as per CiA 303 part 1
X9	CANopen OUT, pin configuration as per CiA 303 part 1
S1	Hex coding switch for node ID, 16's place (e.g. 0xF0)
S2	Hex coding switch for node ID, 1's place (e.g. 0x0F)
X10	DIP switch for the 120-ohm termination resistance (switch 1)

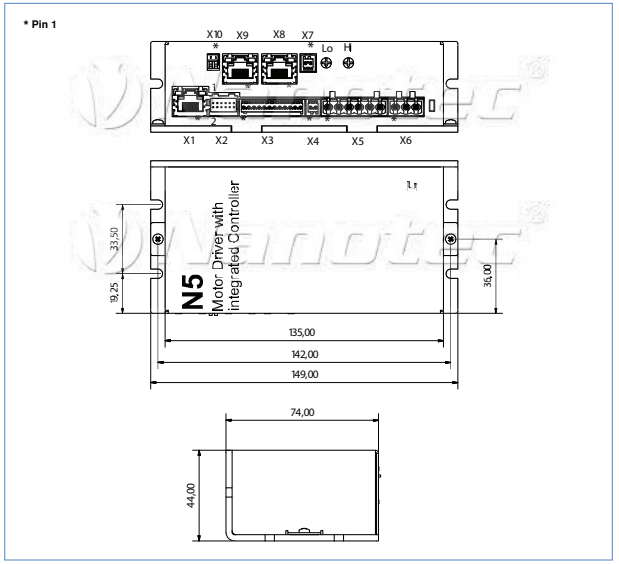
Order identifier



Dimension image (mm) N5 for EtherCAT



Dimension image (mm) N5 for CANopen



Input configuration, X2:

Pin	Function	Observations
1	GND	
2	Vcc	+5 V DV (standard) or +24 V DC, output voltage switchable in software
3	A	
4	B	
5	A\	
6	B\	
7	I	
8	I\	
9	Hall 1	
10	Hall 2	
11	Hall 3	
12	Shielding	Shielding

Input configuration, X3:

Pin	Function	Observations
1	GND	
2	Input 1	Digital input, 5 V/24 V switchable
3	Input 2	Digital input, 5 V/24 V switchable
4	Input 3	Digital input, 5 V/24 V switchable
5	Input 4	Digital input, 5 V/24 V switchable
6	Input 5	Digital input, 5 V to 24 V
7	Input 6	Digital input, 5 V to 24 V
8	An. input 1	-10 V...+10 V or 0...20 mA
9	An. input 2	-10 V...+10 V or 0...20 mA
10	Output 1	Digital outp. open drain, max. 24 V/0.5 A
11	Output 2	Digital outp. open drain, max. 24 V/0.5 A
12	Shielding	Shielding

Input configuration, X4:

Pin	Function	Observations
1	Brake +	Internally connected with +VB
2	Brake -	PWM-controlled open drain output, max. 1.5 A

Input configuration, X5:

Pin	Function (stepper)	Function (BLDC)	Observations
1	Shielding	Shielding	Shielding
2	A	U	
3	A\	V	
4	B	W	
5	B\	n.c.	
6	Shielding	Shielding	Shielding

Input configuration, X6:

Pin	Function	Observations
1	Shielding	Shielding
2	+VB	12-70 V DC (low current version) 12-48 V DC (high current version)
3	GND	

X9 in EtherCAT version
X7 in CANopen version

Pin	Function	Observations
1	+VB logic/ encoder	+24 V DC, supply voltage for logic and encoder
2	GND	