Technical Datasheet DK-NP5-68

Contents

1 Connecting the NP5 control via the *Discovery Board*

The *NP5 Discover Board* helps you during tests and during the evaluation of the *NP5* control.

The connectors necessary for the boards are supplied already installed.

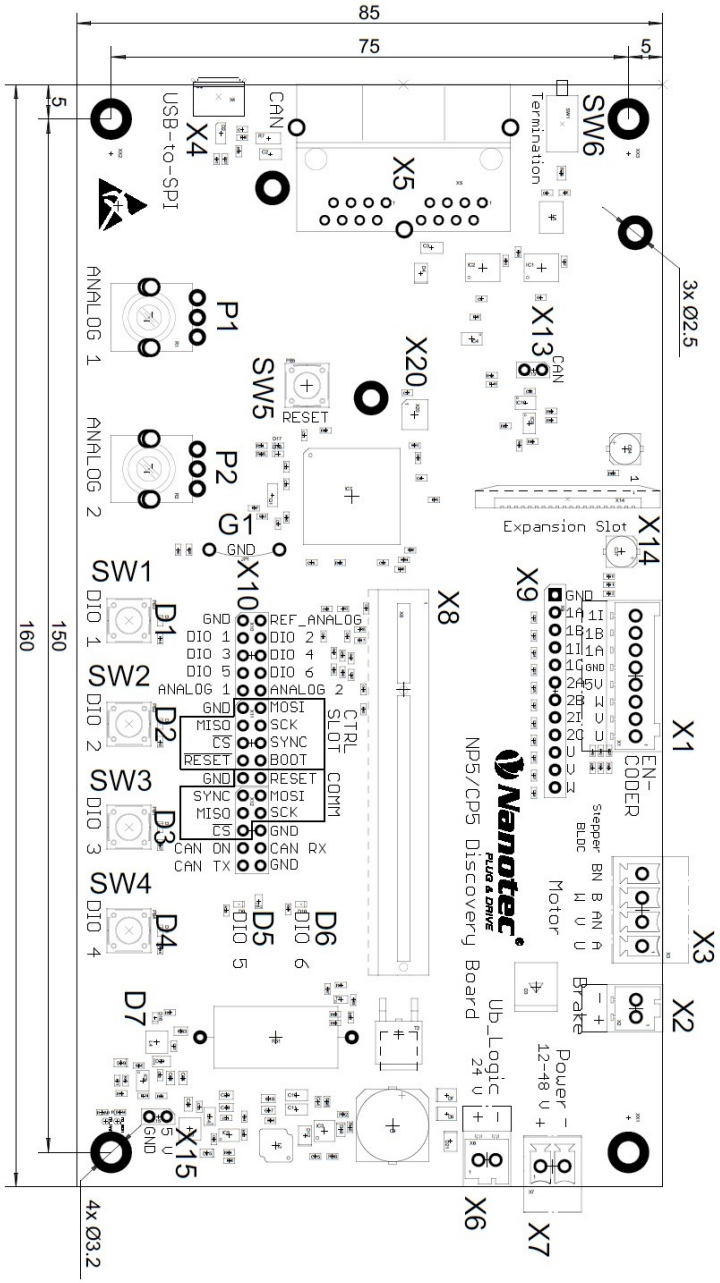
Jumper X13 must be set if CANopen (*NP5-08*) is used; otherwise, you must remove it..

1.1 Technical data – *NP5 Discovery Board*

Property	Description / value
Operating voltage +UB:	12 … 48 V DC ±5%
Logic voltage +UB_Logic:	24 V DC ±5%
Current consumption +UB:	Max. 100 mA (without connected NP5)
Current consumption +UB_Logic:	Max. 100 mA (without connected NP5)
Communication interface:	SPI, CANopen, EtherCAT
Analog reference voltage:	3.3 V DC ±5%, max. 10 mA
Digital input voltage:	Max. 3.3 V DC
DC output voltage:	5 V DC ±3%, max. 300 mA
Status indicator:	4x green LEDs for GPIO 1 to 4
	2x blue LEDs for GPIO 5 and GPIO 6
	1x green LED for Discovery Board (+3.3 V DC)
EtherCAT-EEPROM:	128 Kbit
Ballast resistor:	15 Ω/5 W
Mounting holes:	4× Ø 3.2 mm for Discovery Board
Additional board EtherCAT .	3× Ø 2.5 mm
Weight:	0.12 kg

1.2 Dimensioned drawings – *NP5 Discovery Board*

Dimensions are in [mm].



1.3 Pin assignment – *NP5 Discovery Board*

Connector	Function
X1	Encoder 1 and Hall sensor
X2	Brake
X3	Motor
X5	CAN
X6	Logic voltage
X7	Operating voltage
X8	Slot for NP5 control
X9	Encoder 1/2 and Hall sensor
X10	GPIO and communication interface
X13	Jumper for activating / deactivating the CANopen communication

Connector	Function
X14	Ribbon cable socket for EtherCAT additional board
X15	+5 V DC output
P1	Potentiometer for analog input 1
P2	Potentiometer for analog input 2
SW1 to SW4	Buttons for GPIO 1 to GPIO 4
SW5	Reset button for the *Discovery Board*
SW6	Switch for 120 ohm termination resistor (CANopen)
D1 to D6	Status indicator for GPIO 1 to GPIO 6
D7	Status indicator for the *Discovery Board* (+3.3 V DC)
G1	Earth connection

1.3.1 Connector X1 – encoder 1 and Hall sensor

Connector X1 has the following features:

- Connector type: Phoenix base strip, MCV-0,5/8-G-2,5
- Voltage level: +5 V logic level
- Maximum admissible current: Max. 300 mA (together with +5 V DC output voltage on pin header X15)
- Hall inputs: Internally by means of 2.7 kΩ pull-up resistor connected to +5 V DC

Pin	Name / function
1	Hall_U (H1)
2	Hall_V (H2)
3	Hall_W (H3)
4	+5 V DC
5	GND
6	ENC1_A
7	ENC1_B
8	ENC1_I

1.3.2 Connector X2 – brake

Connector X2 has the following features:

- Connector type: Phoenix base strip, MCV-0,5/2-G-2,5

Pin	Name / function
1	Brake + (connected with +UB)
2	Brake – (PWM-controlled open-drain output, max 1.5 A)

1.3.3 Connector X3 – motor

Connector X3 has the following features:

- Connector type: Phoenix base strip, MCV-1,5/4-G-3,5
- Max. rated current 6 A RMS
- Max. peak current 10 A RMS (for 1 s)

Pin	Stepper motor	BLDC motor
1	A	U
2	A\	V
3	B	W
4	B\	

1.3.4 Connector X5 – CANopen

Connector X5 has the following features:

- Connector type: RJ45 Duo Port, horizontal

Pin	Name / function
1	CAN+
2	CAN-
3	GND
4	N.C
5	N.C
6	CAN_Shield
7	GND
8	+UB_Logic (24 V DC ±5%)

1.3.5 Connector X6 – logic voltage

Connector X6 has the following features:

- Connector type: Phoenix base strip, MCV-0,5/2-G-2,5

Pin	Name / function
1	+UB_Logic (24 V DC ±5%)
2	GND

1.3.6 Connector X7 – operating voltage

Connector X7 has the following features:

- Connector type: Phoenix base strip, MCV-1,5/2-G-3,5

Pin	Name / function
1	+UB (12 … 48 V DC ±5%)
2	GND

1.3.7 Connector X9 – encoder and Hall sensors

Connector X9 has the following features:

- Connector type: Pin header, single row, RM 2.54 mm, 12-pin, vertical
- Voltage level: +3.3 V DC logic level

Pin	Name / function
1	GND
2	ENC1_A
3	ENC1_B
4	ENC1_I
5	ENC1_CAP
6	ENC2_A
7	ENC2_B
8	ENC2_I
9	ENC2_CAP
10	Hall_U (H1)
11	Hall_V (H2)
12	Hall_W (H3)

1.3.8 Connector X10 – I/O and communication interface

Connector X10 has the following features:

- Connector type: Pin header, two rows, RM 2.54 mm, 2x 15-pin, vertical

Pin	Name	Type	Note
1	GND	Earth	
2	U_REF_ANALOG	Out	Analog reference voltage
3	DIO1_IO_CS	I/O	General I/O
4	DIO2_CD_CLK	I/O	General I/O
5	DIO3_CD_DIR	I/O	General I/O
6	DIO4_IO_MOSI	I/O	General I/O
7	DIO5_IO_MISO	I/O	General I/O
8	DIO6_IO_CLK	I/O	General I/O
9	ADC_ANALOG_1	In	AD converter 1
10	ADC_ANALOG_2	In	AD converter 2
11	GND	Earth	
12	SLOT_SPI_MOSI	-	SPI 1
13	SLOT_SPI_MISO	-	SPI 1
14	SLOT_SPI_SCK	-	SPI 1
15	SLOT_SPI_$\overline{CS}$	-	SPI 1
16	SLOT_SYNC	-	System function, reserved
17	SLOT_$\overline{RESET}$	-	System function, reserved
18	SLOT_BOOT	-	System function, reserved
19	GND	Earth	
20	COMM_RESET	-	System function, reserved
21	COMM_SYNC	-	System function, reserved
22	COMM_SPI_MOSI	-	SPI 2
23	COMM_SPI_MISO	-	SPI 2
24	COMM_SPI_SCK	-	SPI 2
25	COMM_SPI_$\overline{CS}$	-	SPI 2

Pin	Name	Type	Note
26	GND	Earth	
27	CAN ON	-	CAN ON
28	I2CSCL_CANRX	-	I^2C Clock or CANopen RX
29	I2CSDA_CANTX	-	I^2C Data or CANopen TX
30	GND	Earth	

1.3.9 Connector X13 – jumper for activating / deactivating the CANopen communication

Connector X13 has the following features:

- Connector type: Pin header, RM 2.54 mm, 2-pin, vertical
- Bridged with jumper: CANopen activated
- Not bridged with jumper: CANopen deactivated

Pin	Name / function
1	+3.3V
2	CAN ON

1.3.10 Connector X15 – +5 V DC output

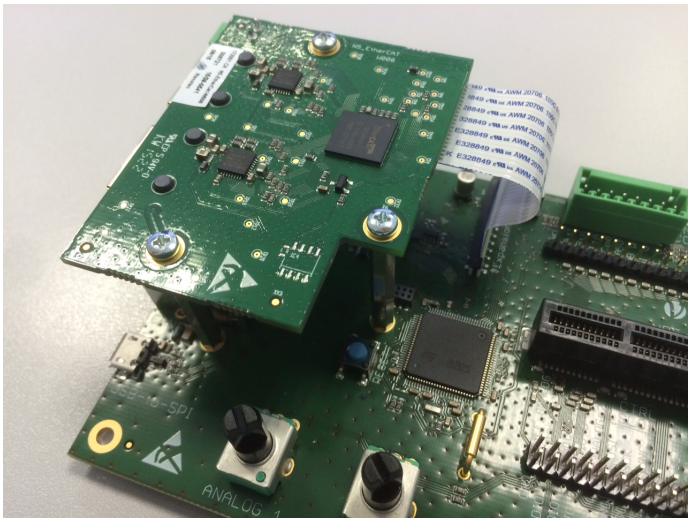
Connector X15 has the following features:

- Connector type: Pin header, RM 2.54 mm, 2-pin, vertical
- Maximum admissible current: Max. 300 mA (together with +5 V DC output voltage on pin header X1)

Pin	Name / function
1	+5 V DC
2	GND

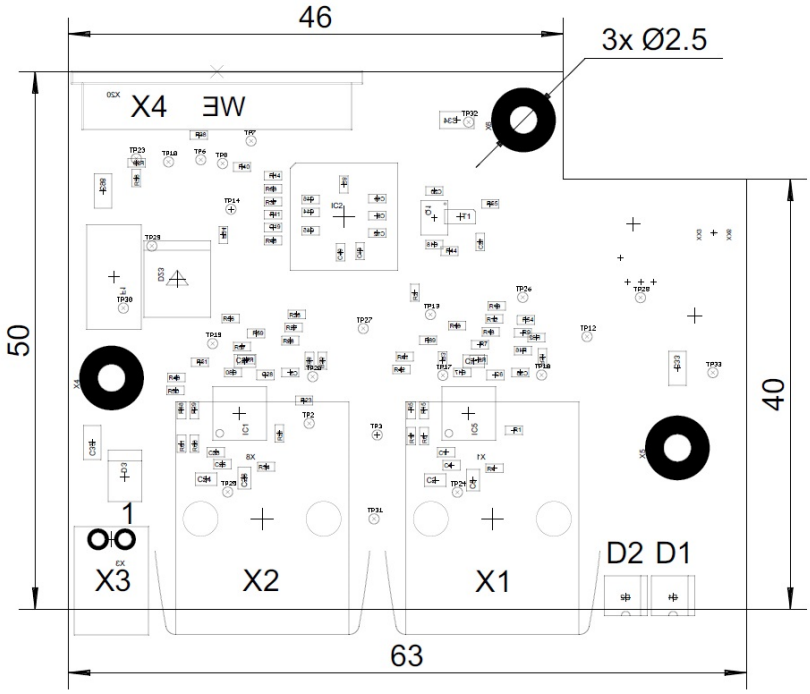
1.4 Extension for EtherCAT (additional board)

Discovery Board DK-NP5-68 is equipped with an additional board for communication via EtherCAT .



1.4.1 Dimensioned drawings – EtherCAT additional board

Dimensions are in [mm].



1.4.2 Hardware overview – EtherCAT additional board

Name	Function	Note
X1	EtherCAT IN	
X2	EtherCAT OUT	
X4	Connection to *Discovery Board NP5*	
D1	*ERROR* status indicator for EtherCAT	
D2	*RUN* status indicator for EtherCAT	

2 Commissioning EtherCAT via the *Discovery Board*

To establish a connection with the *NP5-20*, proceed as follows:

1. Plug in the *NP5-20* at X8.
2. Unplug jumper X13.
3. Connect your EtherCAT cable to X1 of the EtherCAT board.
4. Connect your supply voltage to X7.