SB4D2030C5F1-30 - Controller

Installation instructions

Refer to installation use and maintenance manual for more information.

Controller bipolar open frame drive for 2 phase step motor

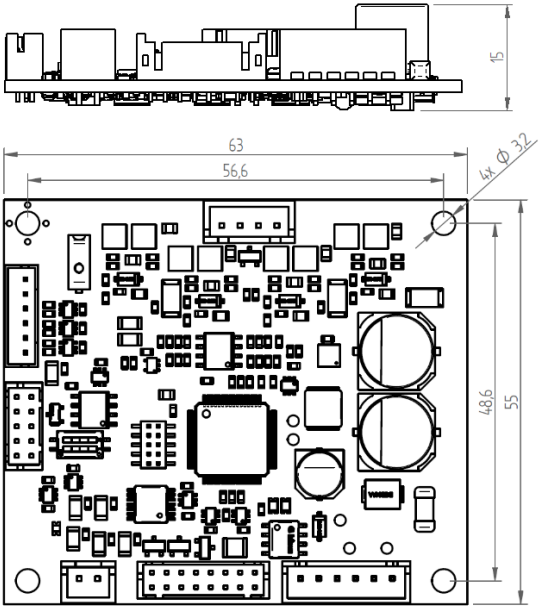
PALLADIO
FIELD-MOUNTED STEPPER DRIVES

- *DC Power Supply : 12÷36 Vdc*
- *DC Logic Supply : 12÷36 Vdc (mandatory)*
- *Phase current: up to 3 Arms (4.2 Apk)*
- *Chopper frequency: ultrasonic 40 kHz*
- *Stepless Control Technology (65536 position per turn)*
- *Protections: over-current, over-temperature, short circuit phase-phase motor and phase-ground*
- *Direct feedback interface: incremental encoder (not isolated) 5 Vdc TTL/CMOS or 24 Vdc Push-Pull*
- *Canbus communication interfaces (not isolated)*
- *RS485 interface for programming and real time debugging (not isolated)*
- *Enable Torque input (not isolated)*
- *5 digital inputs (not isolated)*
- *3 digital outputs (not isolated)*
- *1 analog input*
- *Dimensions: 63 x 55 x 15 mm (without connectors)*
- *Working temperature: 5°C ÷ 40°C; Storage temperature -25°C ÷ 55°C*
- *Humidity: 5% ÷ 85% not condensing*

CANopen DS402

Modbus

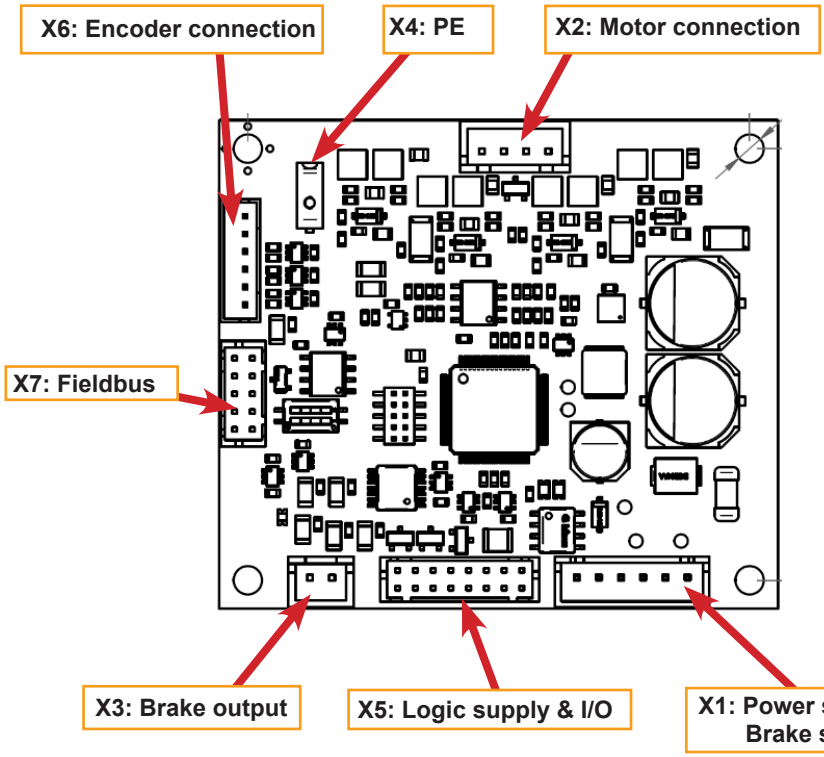
Mechanical data



NOTE: Mounting the board on the mechanical support using only M3 screw and M3 spacer with minimum height of 5 mm in order to prevent every risk of short circuit with components.

System connections

Connectors: position, function and pinout.



X1: Power supply & Brake supply

X1.1	GND_BRK	Negative brake supply
X1.2	+24V_BRK	Positive brake supply 24 Vdc
X1.3	GND_PWR	Negative power supply
X1.4	GND_PWR	Negative power supply
X1.5	V+_PWR	Positive power supply 12 ÷ 36 Vdc
X1.6	V+_PWR	Positive power supply 12 ÷ 36 Vdc

Mating connector: JST XHP-6
Crimp: JST SXH-001T-P0.6
Cable section: Minimum 0.13 mm² (AWG26)
Maximum 0.33 mm² (AWG22) **for 3 Arms**

X2: Motor connection

X2.1	A	Motor output phase A
X2.2	A/	Motor output phase A/
X2.3	B	Motor output phase B
X2.4	B/	Motor output phase B/

Mating connector: JST XHP-4
Crimp: JST SXH-001T-P0.6
Cable section: Minimum 0.13 mm² (AWG26)
Maximum 0.33 mm² (AWG22) **for 3 Arms**

X3: Brake output

X3.1	GND_BRK	Negative brake reference
X3.2	B0_OUT2	PNP 24 V digital output OUT2

Mating connector: JST XHP-2
Crimp: JST SXH-001T-P0.6
Cable section: Minimum 0.13 mm² (AWG26)
Maximum 0.33 mm² (AWG22)_

System connections

X4: PE			
X4.1	PE	Protective earth	

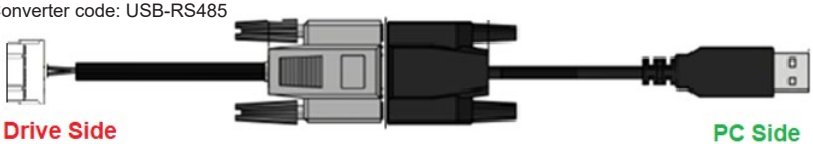
X5: Logic supply & I/O			
X5.1	GND_LOG	Negative logic supply	 **Mating connector:** JST PHDR-16VS **Crimp:** JST SPHD-001T-P0.5 **Cable section:** Minimum 0.13 mm² (AWG26) Maximum 0.33 mm² (AWG22)
X5.2	V_LOG	Positive logic supply 12÷36Vdc (MANDATORY)	
X5.3	GND_DOUT	Negative supply for digital output	
X5.4	+24V_DOUT	Positive supply 24 Vdc for digital output	
X5.5	DIG_OUT0	PNP 24 V digital output OUT0	
X5.6	DIG_OUT1	PNP 24 V digital output OUT1	
X5.7	DIG_IN0	PNP 5÷24 V digital input IN0	
X5.8	DIG_IN1	PNP 5÷24 V digital input IN1	
X5.9	DIG_IN2	PNP 5÷24 V digital input IN2	
X5.10	DIG_IN3	PNP 5÷24 V digital input IN2	
X5.11	DIG_IN4 (Torque enable)	PNP 5÷24 V digital input IN4 **(MANDATORY)**	
X5.12	Reserved	---	
X5.13	Reserved	---	
X5.14	GND_ANLG	Negative output supply for potentiometer	
X5.15	ANLG_IN	Analog input	
X5.16	+5V_ANLG	Positive output supply 5 Vdc for potentiometer	

X6: Encoder			
X6.1	+5V_ENC	Positive output supply 5 Vdc for encoder	**Mating connector:** JST PHR-6 **Crimp:** JST SPH-002T-P0.5S **Cable section:** Minimum 0.05 mm² (AWG30) Maximum 0.22 mm² (AWG24) 
X6.2	ENC_PHA	Phase A of the encoder	
X6.3	ENC_PHB	Phase B of the encoder	
X6.4	ENC_ZERO	Zero of the encoder	
X6.5	GND_ENC	Negative output supply for encoder	
X6.6	PE	Protective earth	

X7: Fieldbus			
X7.1	DIG_IN5	PNP 5÷24 V digital input IN5	**Mating connector:** JST PHDR-16VS **Crimp:** JST SPHD-001T-P0.5 **Cable section:** Minimum 0.13 mm² (AWG26) Maximum 0.33 mm² (AWG22) 
X7.2	RS485L_IN	RS485 signal low input	
X7.3	RS485L_OUT	RS485 signal low output	
X7.4	RS485H_IN	RS485 signal high input	
X7.5	RS485H_OUT	RS485 signal high output	
X7.6	GND	Negative fieldbus supply	
X7.7	CANL_IN	Canbus signal low input	
X7.8	CANL_OUT	Canbus signal low output	
X7.9	CANH_IN	Canbus signal high input	
X7.10	CANH_OUT	Canbus signal high output	

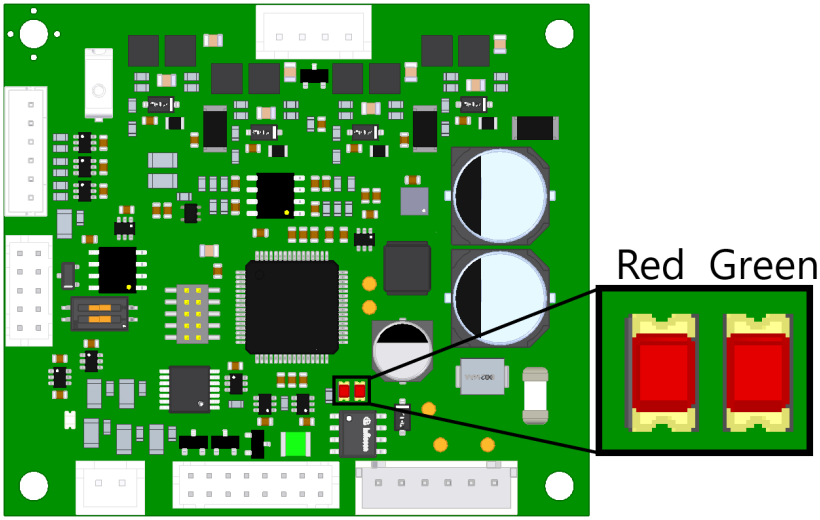
Service SCI connection

This connection is only possible with hardware and software provided by Ever.
Cable code: CBL/0302-050
Converter code: USB-RS485



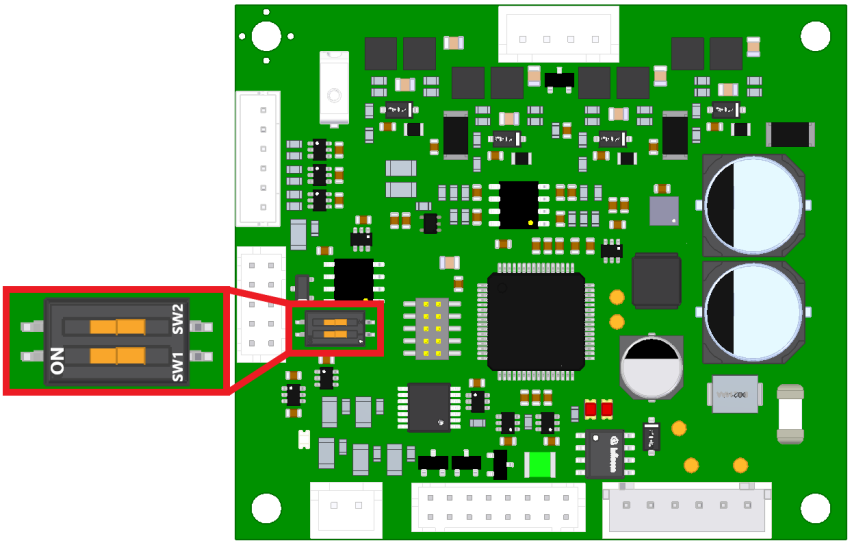
Working Status (Leds)

	Visualization status		Description
1	●	Green ON	Logic supply present
2	○	Green OFF	Logic supply NOT present
3	●	Red ON or BLINK	Error (See software Manual for details)



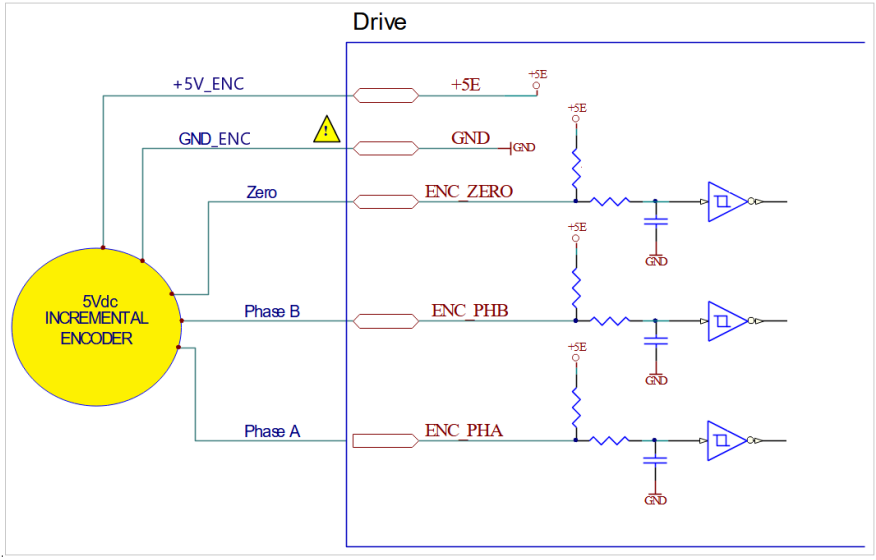
Dip switches

Fieldbus		OFF	ON
SW1	CANbus	120 ohm termination resistor NOT inserted	120 ohm termination resistor inserted
SW2	RS485	120 ohm termination resistor NOT inserted	120 ohm termination resistor inserted



Feedback connection (not isolated)

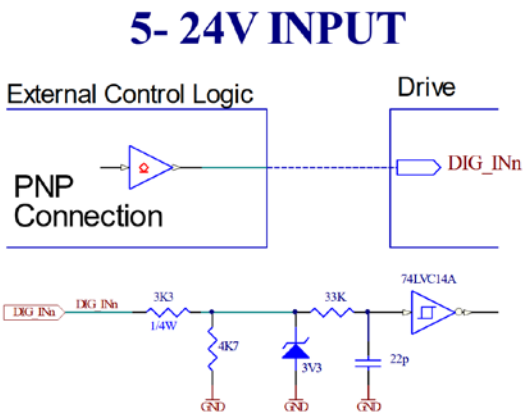
5 Vdc TTL/CMOS incremental encoder.



GND is internally in common with power ground, this is potentially dangerous. Take all necessary measures to avoid possible contacts in the final installation.

Digital inputs connection (DIG_IN0, DIG_IN1, DIG_IN2, DIG_IN3 and DIG_IN5)

5 ÷ 24 V Single-ended PNP (TTL/CMOS compatible) digital inputs (not isolated)



DIG_IN0, DIG_IN1, DIG_IN2, DIG_IN3 and DIG_IN5			
Characteristics	MIN.	MAX	Unit
Supply voltage	5	24	Vdc
Inputs frequency	---	500	kHz
Thresold switching voltage	3.3	---	Vdc

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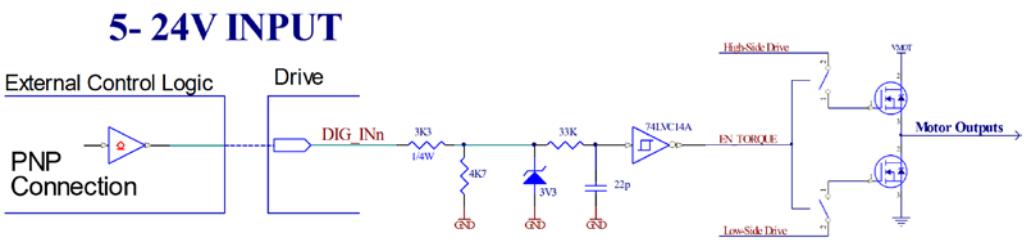
EN_TORQUE inputs connection (DIG_IN4)

5 ÷ 24 V Single-ended PNP (TTL/CMOS compatible) digital inputs (not isolated).



DIG_IN4			
Characteristics	MIN.	MAX	Unit
Supply voltage	5	24	Vdc
Thresold switching voltage	3.3	---	Vdc

This is the enable signal for H-bridges that cannot be overidden by the control firmware:

- *Input floating or connected to GND* = H-bridges are open (Safe state) and the High&Low Side drive outputs cannot be activated to drive the motor (motor not powered and without torque).
- *Input connected to High Voltage (5 ÷ 24 Vdc)* = the microcontroller is able to control the outputs of the High&Low side drive and also to drive the motor.

If EN_TORQUE input is not used, it must be connected externally to 24 V

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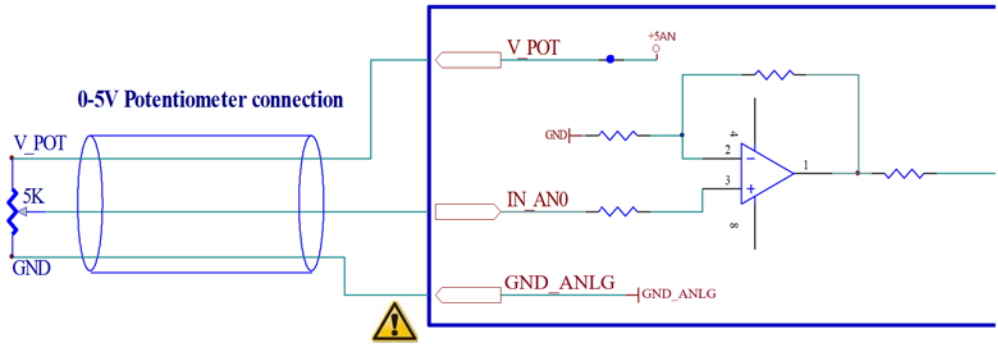
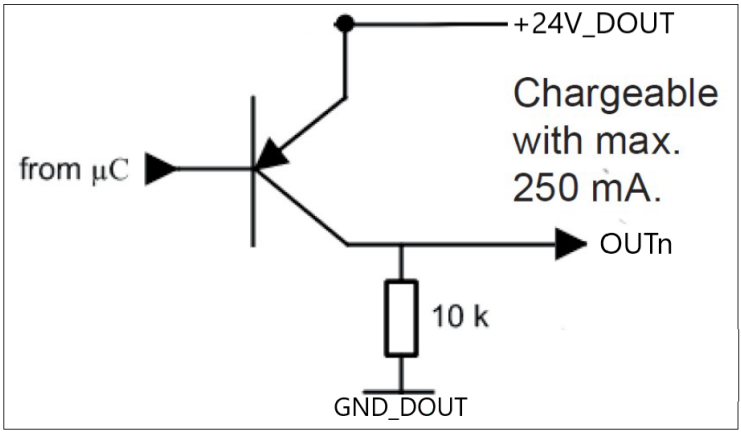
Analog input connection



GND_ANLG is internally in common with power ground, this is potentially dangerous. Take all necessary measures to avoid possible contacts in the final installation.

Digital outputs connection (DIG_OUT0 and DIG_IUT1)

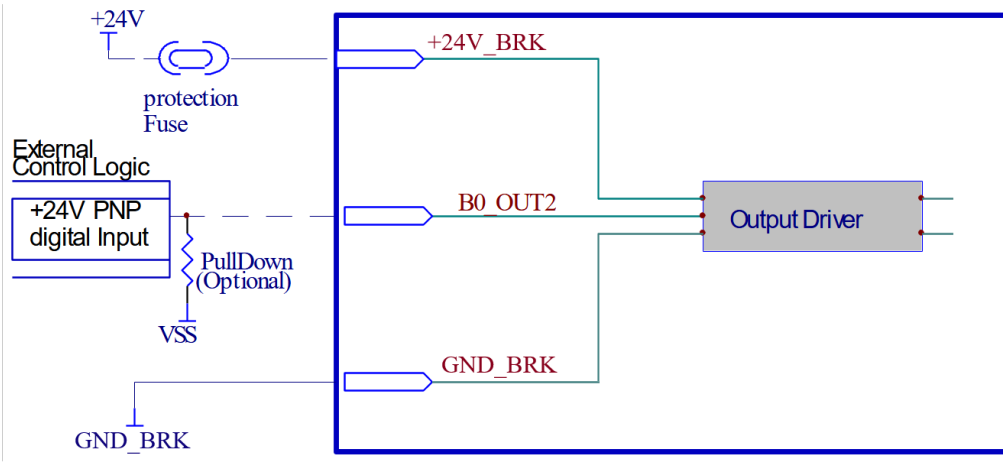
PNP wiht V_{outMAX} = 24 Vdc, I_{outMAX} = 250 mA (not isolated), Frequency = 250 kHz.



GND is internally in common with power ground, this is potentially dangerous.
Take all necessary measures to avoid possible contacts in the final installation.

Digital outputs connection (DIG_OUT2)

PNP wiht V_{outMAX} = 24 Vdc, I_{outMAX} = 1.30 A (not isolated), F_{MAX} = 1 kHz (not isolated).



GND_BRK is internally in common with power ground, this is potentially dangerous.
Take all necessary measures to avoid possible contacts in the final installation.

Verify the installation

- Check all connection: power supply, logic supply and inputs/outputs.
- Make sure all settings right for the application.
- Make sure the power and logic supplies are suitable for the drive.
- If possible, remove the load from the motor shaft to avoid that wrong movements cause damage.
- Enable the current to the motor and verify the applied torque.
- Enable a movement of some steps and verify if the rotation direction is the desired one.
- Disconnect the power supply, connect the load on the motor and check the full functionality.

Check the detected fail fuction

When one of the following situations occur, the drive doesn't fuction correctly and it is reported an error.

DEFECT	CAUSE	ACTION
The external fuse to the drive burns.	May be due to a wrong connection of the power supply.	Adjust the connection and recover the fuse. Use a fuse suitable for the application.
Over temperature protection.	May be due to a duty cycle.	Increase the air flux and if it is possible chose a motor with higher torque at same current value.
Over current protection.	May be due to a short circuit on the motor power stage.	Shut down the power supply and check if the motor is damaged.
Noisy motor movement with vibrations.	May be caused due to a state of resonance.	Increase the resolution of the step angle and/or change the motor velocity to avoid resonance area.
The motor produce torque but doesn't rotate.	May be caused due to a wrong connection of the I/O's.	Check the connection of the I/O's.

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