*The clever drive*

CE

SM2A-Controller bipolar integrated drive for 2 phase step motor :

- AC power Supply: 18 ÷ 100Vac;
- Phase current : up to 8,0 A_{RMS} (11 A_{PK});
- Chopper frequency : ultrasonic 33KHz;
- Step angle: from full step up to 1/128;
- Protections: over-current, over-temperature, short circuit phase-phase motor and phase-ground;
- digital inputs (opto-coupled);
- digital outputs (opto-coupled);
- Size and mass: Lenght (mm)x135x86mm.(L x D x H : refer to picture);
- IP protection: IP65;
- Working temperature 5°C ÷ 40°C ; Storage temperature -25°C ÷ 55°C ;
- Humidity : 5% ÷ 85% not condensing;
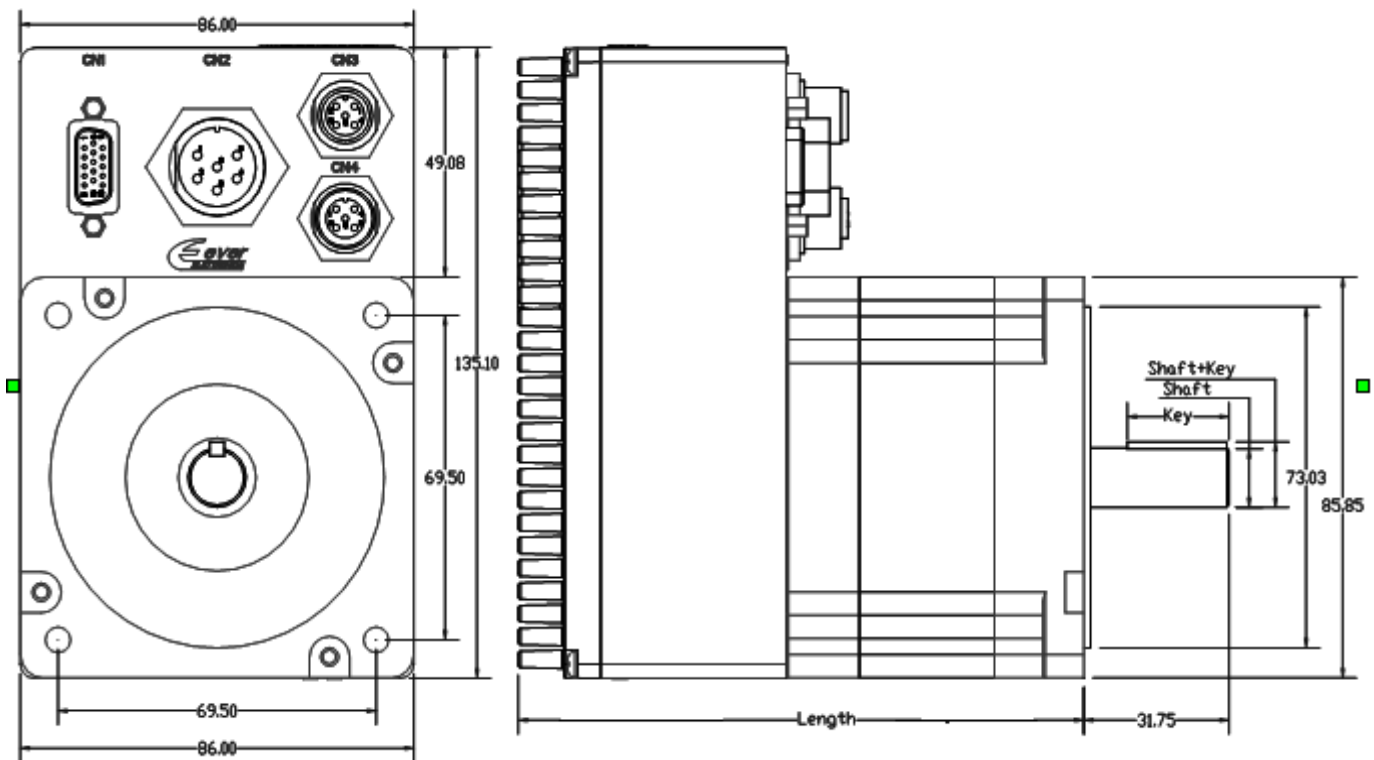
| SM | 2 | A | *X* | 60P | *ZZ* | *K* | 3 | *L* |

Model (letter L)	Lenght (mm)	Weight (g)	Shaft Ø (mm)	D-cut (mm)	Holding torque (Nm)	Rotor Inertia (g.cm²)
SM2A_____A__	150,5	2600	9,53	3,0x22	3,4	1000
SM2A_____B__	165,5	3200	12,7	3,175x22,23	4,5	1400
SM2A_____C__	179,5	4100	12,7	3,175x22,23	7	1900
SM2A_____D__	203,5	4700	12,7	3,175x22,23	8,5	2700
SM2A_____E__	242	6200	15,87	4,763x22,23	12,5	4000

Refer to installation use and maintenance manual for more information.
Available user manual at link http://www.everelettronica.it/manhw.html link.

System connectors

Connectors: position and function.

Supply Code		
	"6"	"5"
CN2	PWS	PWS+ELS
1	ACin	ACin
2	ACin	ACin
3	ACin	ACin
4	PE	PE
5	n.c.	+Vlog
6	n.c.	-Vlog
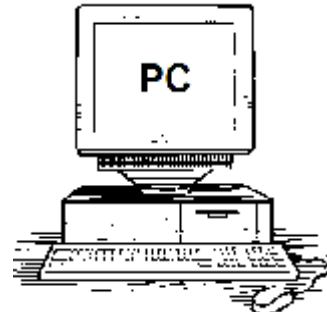
Modbus or Canbus

I/O Code		
	"4"	"6"
CN1	Digital I/O	Digital I/O Analog In
1	+B0_IN0	+B0_IN0
2	-B0_IN0	-IN_AN1
3	+B0_IN1	+B0_IN1
4	-B0_IN1	+IN_AN1
5	+B0_IN2	+B0_IN2
6	-B0_IN2	-IN_AN0
7	+B0_IN3	+B0_IN3
8	-B0_IN3	B0_COM_IN
9	B0_OUT0	B0_OUT0
10	B0_OUT1	B0_OUT1
11	+24V	+24V
12	VSS	VSS
13	n.c.	+IN_AN0
14	n.c.	AGND
15	n.c.	VPOT
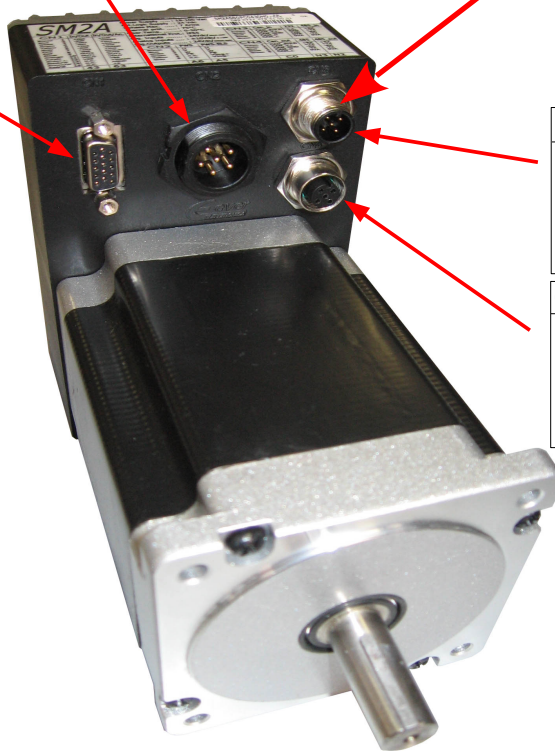
Comunication Interface Code			
	"C0"	"N3"	"N2"
CN3	CANbus	RS232	RS485
1	n.c.	n.c.	+RX
2	n.c.	RXD	+TX
3	CAN_GND	TXD	-RX
4	CAN_H	DTR	-TX
5	CAN_L	0VA	0VA

	"C0"	"N3"	"N2"
CN4	CANbus	RS485	RS485
1	n.c.	+RX	+RX
2	n.c.	+TX	+TX
3	CAN_GND	-RX	-RX
4	CAN_H	-TX	-TX
5	CAN_L	0VA	0VA

SM	2	A	*X*	60P	*ZZ*	*K*	3	*L*

| **CN2 : Power Supply**				
	X = "5"	**X = "6"**		
CN1.1	ACin	ACin	PWR_IN	AC input single power supply for Power and Logic **18-100 Vac**
CN1.2	ACin	ACin	PWR_IN	AC input single power supply for Power and Logic **18-100 Vac**
CN1.3	ACin	ACin	PWR_IN	AC input single power supply for Power and Logic **18-100 Vac**
CN1.4	PE	PE	EARTH	Environmental Protective Earthing (PE)
CN1.5	+Vlog	Not connected	--	Positive power supply Logic **+24 Vdc**
CN1.6	-Vlog	Not connected	--	Reference negative power supply Logic **Gnd**
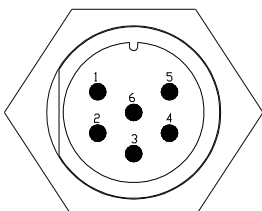
Type: screw, 6 pins, Male, IP67
Manufacturer: LTW
Model: LTWCB-06PMMS-SC7001

SM	2	A	*X*	60P	ZZ	**K**	3	*L*

CN1 : Digital Input/Output

K = "4" : 4 digital Inputs (differential), 2 digital outputs

|			
CN1.1	+B0_IN0	DIG_IN	Positive digital input terminal B0_IN0
CN1.2	-B0_IN0	DIG_IN	Negative digital input terminal B0_IN0
CN1.3	+B0_IN1	DIG_IN	Positive digital input terminal B0_IN1
CN1.4	-B0_IN1	DIG_IN	Negative digital input terminal B0_IN1
CN1.5	+B0_IN2	DIG_IN	Positive digital input terminal B0_IN2
CN1.6	-B0_IN2	DIG_IN	Negative digital input terminal B0_IN2
CN1.7	+B0_IN3	DIG_IN	Positive digital input terminal B0_IN3
CN1.8	-B0_IN3	DIG_IN	Negative digital input terminal B0_IN3
CN1.9	B0_OUT0	DIG_OUT	PNP Output (Source Current) B0_OUT0
CN1.10	B0_OUT1	DIG_OUT	PNP Output (Source Current) B0_OUT1
CN1.11	+24V	PWR_IN	Input positive power supply digital outputs
CN1.12	VSS	PWR_IN	Negative reference power supply digital outputs
CN1.13	n.c.		Not connected
CN1.14	n.c.		Not connected
CN1.15	n.c.		Not connected

CN1
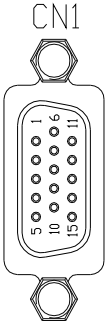
Type: SubD 15 pins, Female, High Density, IP68
Manufacturer: LTW
Model: LTWHDB-15PFFS-SL8001

CN1 : Digital Input/Output and Analog Input

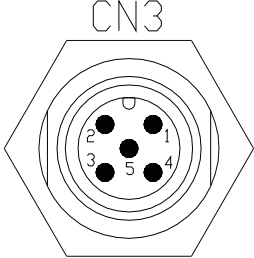**K = "6"** : 4 digital Input (common pin), 2 digital outputs, and 2 analog inputs.

CN1.1	+B0_IN0	DIG_IN	Positive terminal digital input B0_IN0
CN1.2	-IN_AN1	AN_IN	Negative terminal analog input IN_AN_1
CN1.3	+B0_IN1	DIG_IN	Positive terminal digital input B0_IN1
CN1.4	+IN_AN1	AN_IN	Positive terminal analog input IN_AN_1
CN1.5	+B0_IN2	DIG_IN	Positive terminal digital input B0_IN2
CN1.6	-IN_AN0	AN_IN	Negative terminal analog input IN_AN_0
CN1.7	+B0_IN3	DIG_IN	Positive terminal digital input B0_IN3
CN1.8	B0_COM_IN		Reference common inputs
CN1.9	B0_OUT0	DIG_OUT	Output PNP (Source Current) B0_OUT0
CN1.10	B0_OUT1	DIG_OUT	Output PNP (Source Current) B0_OUT1
CN1.11	+24V	PWR_IN	Input positive power supply digital outputs
CN1.12	VSS	PWR_IN	Reference negative power supply digital outputs
CN1.13	+IN_AN0	AN_IN	Positive terminal analog input IN_AN_0
CN1.14	AGND	PWR_OUT	Output negative reference for potentiometers.
CN1.15	V_POT	PWR_OUT	Output positive power supply for potentiometers.

CN1
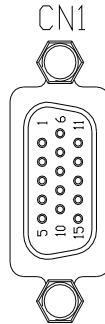
Type: SubD 15 pins, Female, High Density, IP68
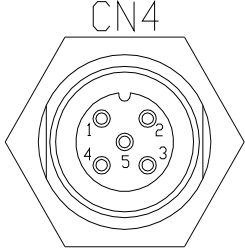Manufacturer: LTW
Model: LTWHDB-15PFFS-SL8001

SM	2	A	*X*	60P	**ZZ**	*K*	3	*L*

CN3 : Comunication interface

ZZ = "*C0*" type - CANbus

CN3.1	n.c.		Not connected
CN3.2	n.c.		Not connected
CN3.3	CAN_GND	PWR Output	Signal Ground
CN3.4	CAN_H	Digital I/O	Bus Line Dominant HIGH
CN3.5	CAN_L	Digital I/O	Bus Line Dominant LOW

ZZ ="*N3*" type - RS232

CN3.1	n.c.		Not connected
CN3.2	RXD	Digital Input	Input receiver RS232
CN3.3	TXD	Digital Output	Transmitter output RS232
CN3.4	DTR	Digital Output	Output Data Transmission Ready RS232
CN3.5	0V_A	PWR Output	Reference (ground) communication interface

ZZ = "*N2*" type - R485

CN3.1	+RX	Digital Input	Non-inverting input receiver RS485
CN3.2	+TX	Digital Output	Non-inverting output transmitter RS485
CN3.3	-RX	Digital Input	Inverting input receiver RS485
CN3.4	-TX	Digital Output	Inverting output transmitter RS485
CN3.5	0V_A	PWR Output	Reference (ground) communication interface

CN3

Type: M12 , 5 pins, Male, IP68
Manufacturer: LTW
Model: LTW1205-05PMMS-SF8001

CN4 : Comunication interface

ZZ = "*C0*" type - CANbus

CN4.1	n.c.		Not connected
CN4.2	n.c.		Not connected
CN4.3	CAN_GND	PWR Output	Signal Ground
CN4.4	CAN_H	Digital I/O	Bus Line Dominant HIGH
CN4.5	CAN_L	Digital I/O	Bus Line Dominant LOW

ZZ ="*N3*" type – RS485

CN4.1	+RX	Digital Input	Non-inverting input receiver RS485
CN4.2	+TX	Digital Output	Non-inverting output transmitter RS485
CN4.3	-RX	Digital Input	Inverting input receiver RS485
CN4.4	-TX	Digital Output	Output inverting transmitter RS485
CN4.5	0V_A	PWR Output	Reference (ground) communication interface

ZZ = "*N2*" type - R485

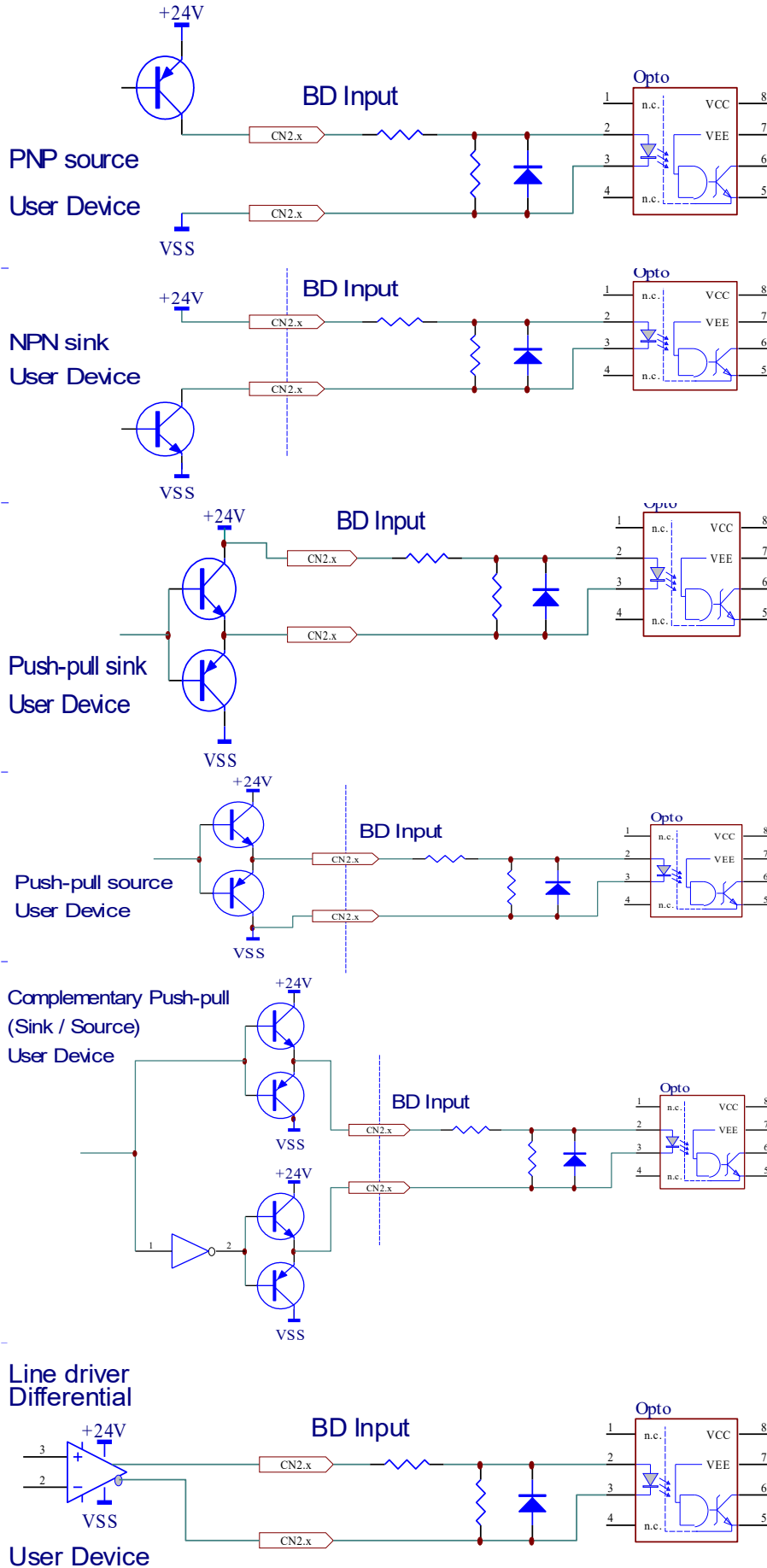| CN4.1	+RX	Digital Input	Non-inverting input receiver RS485
CN4.2	+TX	Digital Output	Non-inverting output transmitter RS485
CN4.3	-RX	Digital Input	Inverting input receiver RS485
CN4.4	-TX	Digital Output	Inverting output transmitter RS485
CN4.5	0V_A	PWR Output	Reference (ground) communication interface

CN4

Type: M12 , 5 pins, Female, IP68
Manufacturer: LTW
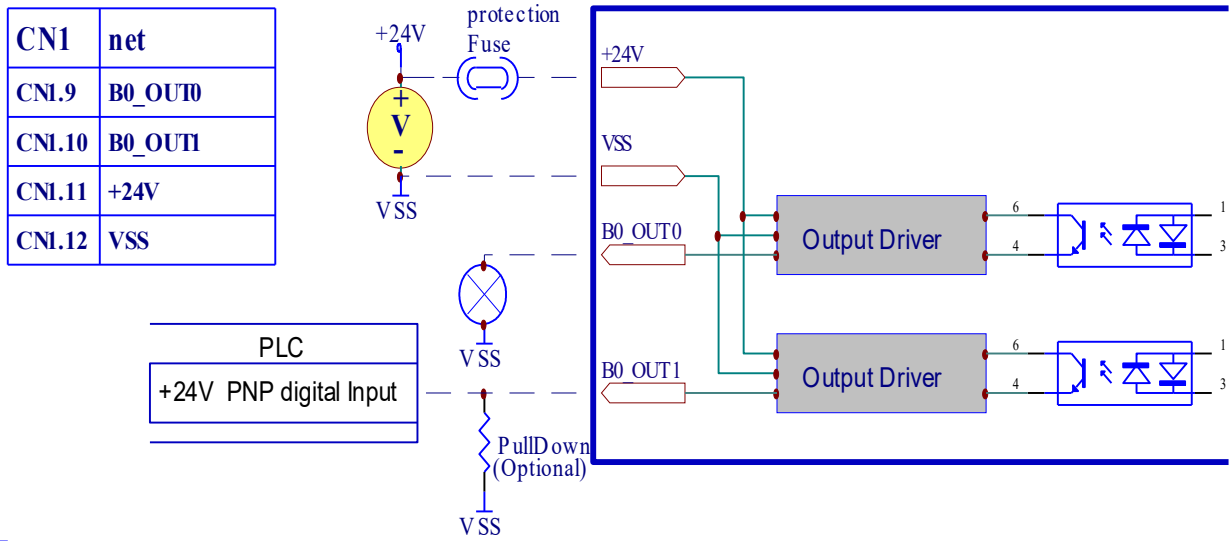 Model: LTW1205-05PFFS-SF8001

Digital input connection:

⚠️ *24Vdc differential digital inputs PNP, NPN, Push-Pull and Line Driver type*

PNP source
User Device

NPN sink
User Device

Push-pull sink
User Device

Push-pull source
User Device

Complementary Push-pull
(Sink / Source)
User Device

Line driver
Differential

User Device

Digital output connection :

Digital outputs $V_{OUTmax}=24Vdc$, $I_{OUTmax}=100mA$

CN1	net
CN1.9	B0_OUT0
CN1.10	B0_OUT1
CN1.11	+24V
CN1.12	VSS

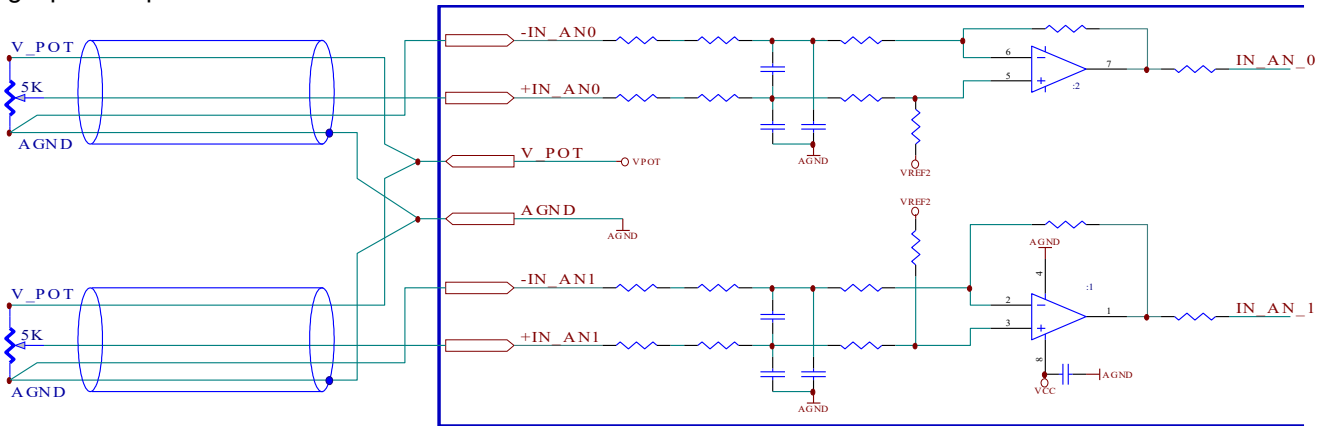# Analog input connection :

Analog inputs +/-10Vdc CEI EN 61131-2 type, not isolated.
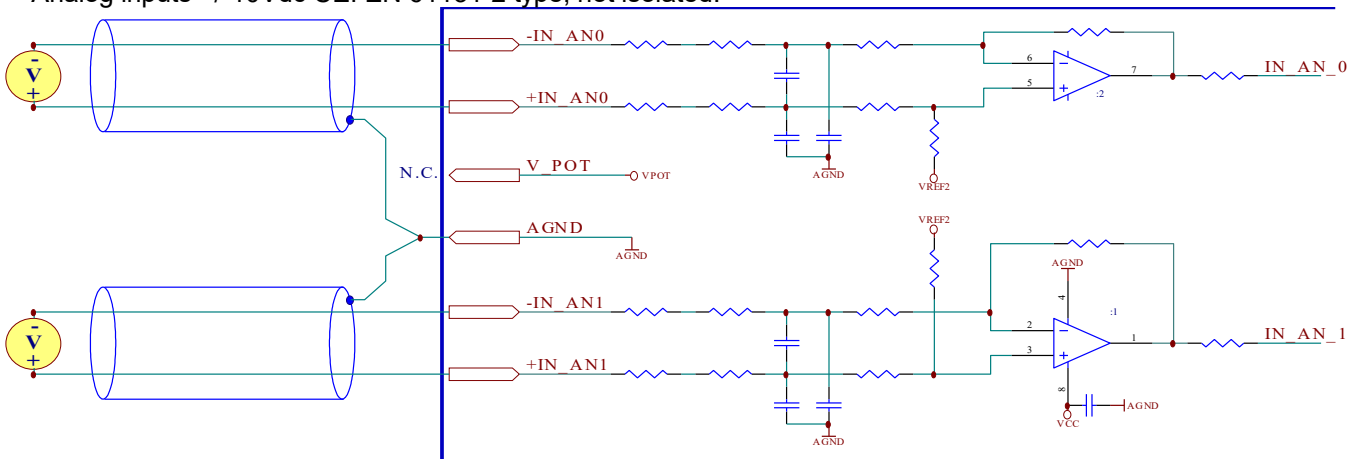
Analog inputs for potentiometer connection.

Mating cable kit

CN1 15 position, CA/LTWHDB15AF01

CN2 6 position, CA/LTWCB06BF01

CN3 5 position, CA/LTW1205BF01

CN4 5 position, CA/LTW1205BM01

Section of the cables

Power supply	Min 0.5mm² (AWG20) Max 1.5mm² (AWG15)	**Communication** **interface**	Min 0.25mm² (AWG23) CANbus CIA-CANOpen
		Analog input	Min 0.14mm² (AWG25)
		Digital input	Min 0.14mm² (AWG25)
		Digital output	Max 0.5mm² (AWG20)

Verify the installation

− Check all connection : power supply and inputs/outputs.
− Make sure all settings right for the application.
− Make sure the power supply is 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 function

When one of the following situations occur, the drive doesn't function 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 demaged
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