# SM4A342P - Controller

ever ELETTRONICA
the clever drive

Installation instructions

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

CE
RoHS COMPLIANT

Bipolar drive integrated with 2 phase step motor

- AC power Supply: 18 ÷ 56Vac;
- DC Logic Supply: 24Vdc (optional);
- Phase current : up to 4,2 ARMS (6 APK);
- Chopper frequency: ultrasonic 40KHz;
- Stepless Control Technology (65536 position per turn);
- Protections: over-current, over-temperature, short circuit phase-phase motor and phase-ground;
- Modbus or Canbus communication interfaces;
- Service SCI interface for programming and real time debugging;
- Digital inputs (opto-coupled);
- Digital outputs (opto-coupled);
- Analog input (opto-coupled);
- Size and mass: Lenght (mm)x124x60mm. Connectors not included(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;
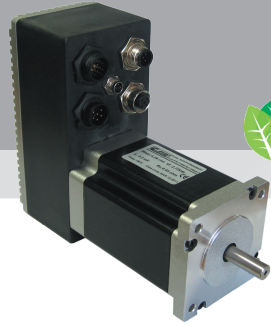
Mechanical data

i Handle systems with care by taking them from the motor side and not from the electronics side.

Shaft axial load = 15 N max
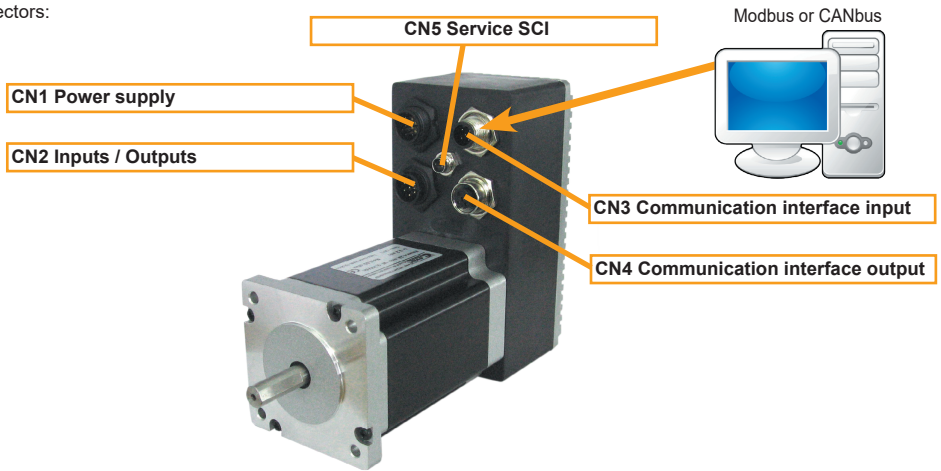Shaft radial load = 75 N max (on front shaft end)

ELECTRONIC SIDE

MOTOR SIDE

124

60

47.14

60

Lenght (mm)

7.5

Ø 38.1

20

Ø 8.0

1.6

24
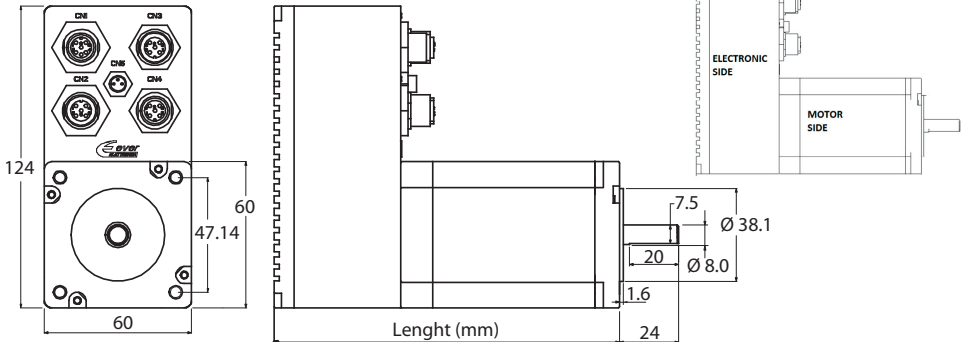
Composition code	SM4A	3	42P	x	2	y	2	z	w	0

Model (z letter)	Lenght (mm)	Shaft Ø (mm)	D-cut on shaft (mm)	Holding Torque (Nm)	Rotor Inertia (g.cm²)
SM4A342P _ 2 _ 2 **B** _ 0	100.5	8.0	7.5 x 20	1.1	275
SM4A342P _ 2 _ 2 **C** _ 0	110.5	8.0	7.5 x 20	1.65	300
SM4A342P _ 2 _ 2 **D** _ 0	120.5	8.0	7.5 x 20	2.1	570
SM4A342P _ 2 _ 2 **E** _ 0	140.5	8.0	7.5 x 20	3.3	840

Model (w letter)	Incremental Encoder (ppr)
SM4A342P _ 2 _ 2 _ **N** 0	Without encoder
SM4A342P _ 2 _ 2 _ **4** 0	400
SM4A342P _ 2 _ 2 _ **5** 0	1000
SM4A342P _ 2 _ 2 _ **6** 0	2000

System connections

Connectors:

CN5 Service SCI

CN1 Power supply

CN2 Inputs / Outputs

Modbus or CANbus

CN3 Communication interface input

CN4 Communication interface output

⚠️ _**Power and Logic supplies are not isolated but they have common reference inside the drive.**_

⚠️ _**Use two separate and isolated supply for logic and digital outputs.**_

⚠️ _**Connect GND of the logic supply and VSS of the output supply to PE near to the origin of the supplies with two different wires.**_

⚠️ _**Do not connect simultaneously PE to the secondary circuit of the power transformer and to GND of the logic supply, otherwise the drive breaks and becomes unusable.**_

Composition code	SM4A	3	42P	x	2	y	2	z	w	0

CN1 Power supply

CN1.1	AC in	PWR_IN	AC power supply **18 ÷ 56 Vac**	
CN1.2	AC in	PWR_IN	AC power supply **18 ÷ 56 Vac**	
CN1.3	PE	EARTH	Protective Earth	**Connector**
CN1.4	n.c.	---	Not connected	**Type: screw, 6 pins, male, IP67**
CN1.5	+ Vlog	PWR_IN	Positive logic supply input **+24 Vdc (optional)**	**Manufacturer: LTW**
CN1.6	- Vlog	PWR_IN	Negative logic supply input **GND (optional)**	**Model: LTWBD-06PMMS-SC7001**
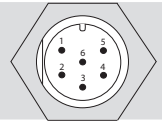
CN2 Inputs and outputs

y = 4 : 4 digital inputs and 2 digital outputs				
CN2.1	+B0_IN0	DIG_IN	Digital input positive side	
CN2.2	-B0_IN0	DIG_IN	Digital input negative side	
CN2.3	+B0_IN1	DIG_IN	Digital input positive side	
CN2.4	-B0_IN1	DIG_IN	Digital input negative side	
CN2.5	+B0_IN2	DIG_IN	Digital input positive side	
CN2.6	-B0_IN2	DIG_IN	Digital input negative side	
CN2.7	+B0_IN3	DIG_IN	Digital input positive side	
CN2.8	-B0_IN3	DIG_IN	Digital input negative side	
CN2.9	B0_OUT0	DIG_OUT	PNP digital output OUT0	
CN2.10	B0_OUT1	DIG_OUT	PNP digital output OUT1	**Connector**
CN2.11	+24 V	PWR_IN	Input positive power supply digital outputs	**Type: 12 pins panle rear mount**
CN2.12	VSS	PWR_IN	Negative reference power supply digital outputs	**screw type, male, IP67**
y = 7 : 4 digital inputs, 2 digital outputs and 1 analog input				**Manufacturer: LTW**
CN2.1	+B0_IN0	DIG_IN	Digital input positive side	**Model: LTWBU-12PMMS-SC7001**
CN2.2	+IN_AN0	AN_IN	Analog input positive side	
CN2.3	+B0_IN1	DIG_IN	Digital input positive side	
CN2.4	-IN_AN0	AN_IN	Analog input negative side	
CN2.5	+B0_IN2	DIG_IN	Digital input positive side	
CN2.6	V_POT	PWR_OUT	Voltage supply for potentiometer	
CN2.7	+B0_IN3	DIG_IN	Digital input positive side	
CN2.8	COM_IN	PWR_IN	Reference digital inputs and outputs	
CN2.9	AGND	PWR_OUT	Output negative reference for potentiometer	
CN2.10	B0_OUT0	DIG_OUT	PNP digital output OUT0	
CN2.11	B0_OUT1	DIG_OUT	PNP digital output OUT1	
CN2.12	+24V	PWR_IN	Input positive power supply digital outputs	

System connections

Composition code	SM4A	3	42P	x	2	y	2	z	w	0

CN3 Communication interface input

			x = C : 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 High	**Connector** **Type: M12, 5 pins, male, IP68** **Manufacturer: LTW** **Model: LTW1205-05PMMS-SF8001**
CN3.5	CAN_L	Digital I/O	Bus Line Low	
			x = M : Modbus RS485	
CN3.1	n.c.	----	Not connected	
CN3.2	n.c.	----	Not connected	
CN3.3	0V_A	PWR output	Signal ground	
CN3.4	Data +	Digital I/O	Not inverting signal RS485	
CN3.5	Data -	Digital I/O	Inverting signal RS485	
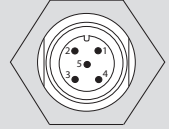
CN4 Communication interface output

			x = C : 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 High	**Connector** **Type: M12, 5 pins, female, IP68** **Manufacturer: LTW** **Model: LTW1205-05PFFS-SF8001**
CN4.5	CAN_L	Digital I/O	Bus Line Low	
			x = M : Modbus RS485	
CN4.1	n.c.	----	Not connected	
CN4.2	n.c.	----	Not connected	
CN4.3	0V_A	PWR output	Signal ground	
CN4.4	Data +	Digital I/O	Not inverting signal RS485	
CN4.5	Data -	Digital I/O	Inverting signal RS485	
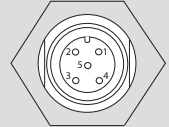
CN5 Service SCI interface

			x = C : CANbus	
CN5.1	GND	PWR_OUT	GND power output	
CN5.2	+5E	PWR_OUT	+5V power output	
CN5.3	DE / RE	DIG_OUT	Drive enable negated / Receive enable	**Connector** **Type: M12, 5 pins, female, IP68** **Manufacturer: LTW** **Model: LTW1205-05PFFS-SF8001**
CN5.4	TX / RX	Digital I/O	Transmit / Receive line	
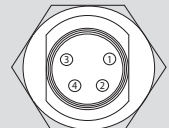
i This connection is possible _**only**_ with hardware and software provided by EVER Co. Kit code: **SM4A_SERV0-KIT**

PC — **SM4A_SERV0-KIT** — SM4A

Digital inputs connection

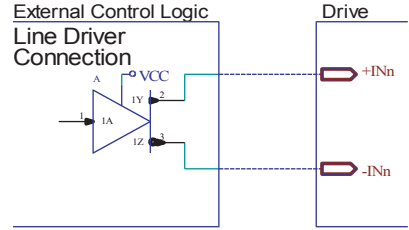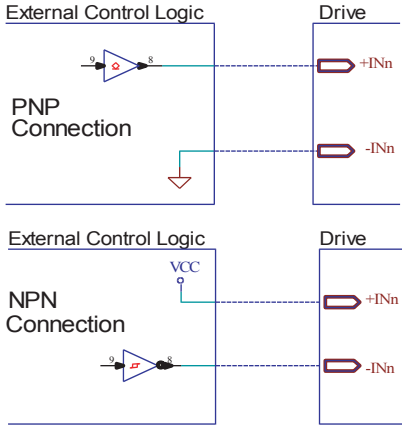| Composition code	SM4A	3	42P	x	2	y	2	z	w	0

ℹ️ Differential PNP, NPN and Line Driver type or single-ended PNP type.

VERSION ------> y = 4

3.3 - 24V Differential

External Control Logic — Drive

PNP Connection
+INn
-INn

NPN Connection
VCC
+INn
-INn

2 - 24V Differential

External Control Logic — Drive

Line Driver Connection
VCC
A
1Y
1A
1Z
+INn
-INn

VERSION ------> y = 7

3.3 - 24V Single Ended

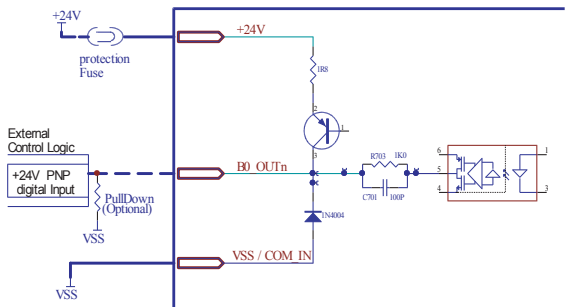External Control Logic — Drive

PNP Connection
+INn
COM_IN
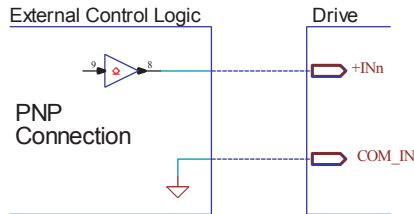
⚠️ *With single-ended configuration, digital inputs have common ground (COM_IN) with digital outputs.*
Take this in consideration in the final installation.

N.B. It's recommended to use 2Vdc digital inputs only in Differential Line-Driver configuration to have more noise immunity.

Digital outputs connection

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

+24V
protection Fuse
+24V
IR8

External Control Logic
+24V PNP digital Input
PullDown (Optional)
VSS

B0 OUTn
R703 1K0
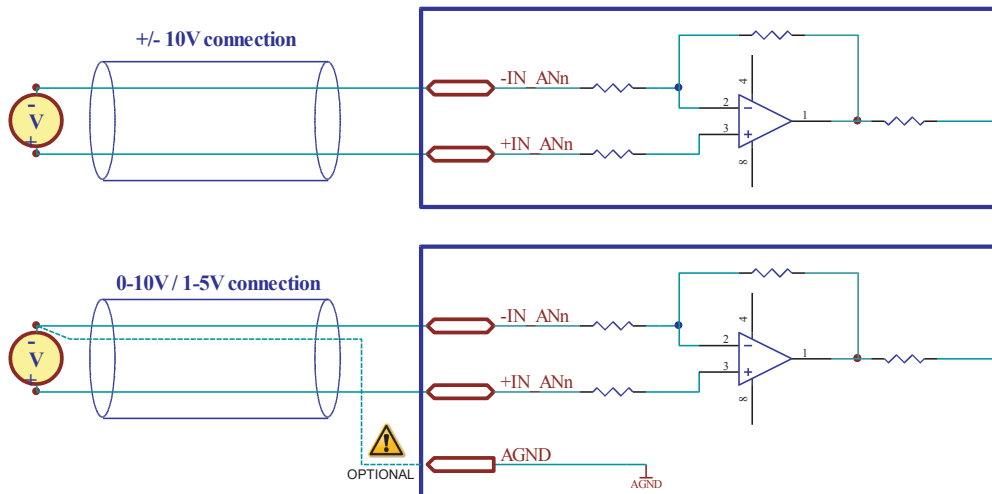C701 100P
1N4004

VSS / COM_IN
VSS

Analog input connection

i The resolution of the analog input depends from the type of the connection which could be defined by software: differential or potentiometer.

Differential connection

+/- 10V connection

0-10V / 1-5V connection

OPTIONAL

⚠ *The connection from an external reference and AGND should be preceded by a thorough risk analysis on the machine/circuit in which the drive will be installed.*

Potentiometer connection

Potentiometer connection

V_POT
5K
AGND

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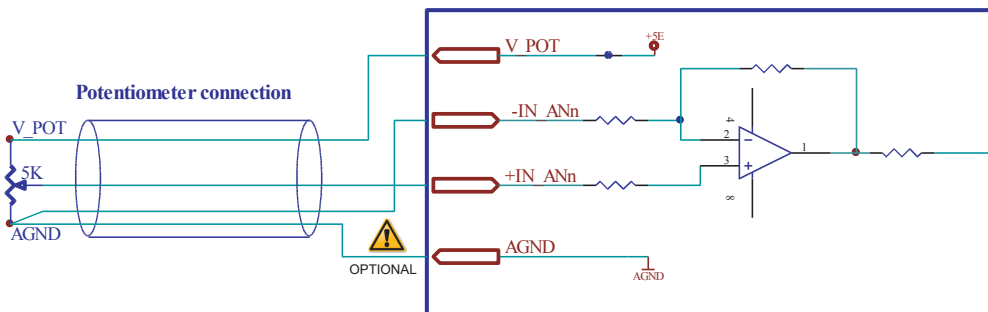
⚠ *AGND is internally in common with power ground, this is potentially dangerous. Take all necessary measures to avoid possible contacts in the final installation.*

Mating cable kit

Connection	Connector kit information		Kit order code
CN1	Pin: Pinout: Conductors: Cable: Waterproof rate:	6 position 1 - Blue, 2 - Green, 3 - Yellow, 4 - Orange, 5 - Red, 6 - White. UL2464 - Black PVC Jacket (UV resistant) ext. Ø 6.5mm IP67	CA/LTWBD06BFnn nn = 01 (1 mt.) 05 (5 mt.) 10 (10 mt.)
CN2	Pin: Pinout: Conductors: Cable: Waterproof rate:	12 position 1 - Brown, 2 - Blue, 3 - White, 4 - Green, 5 - Yellow, 6 - Grey, 7 - Pink, 8 - Red, 9 - Black, 10 - Orange, 11 - Purple, 12 - Green/White. UL2464 - Black PVC Jacket (UV resistant) ext. Ø 6.5mm IP67	CA/LTWBU12BFnn nn = 01 (1 mt.) 05 (5 mt.) 10 (10 mt.)
CN3	Pin: Pinout: Conductors: Cable: Waterproof rate:	5 position 1 - Brown, 2 - White, 3 - Blue, 4 - Black, 5 - Green or Gray. UL2464 - Black PVC Jacket (UV resistant) ext. Ø 6.0mm IP68	CA/LTW1205BFnn nn = 01 (1 mt.) 05 (5 mt.) 10 (10 mt.)
CN4	Pin: Pinout: Conductors: Cable: Waterproof rate:	5 position 1 - Brown, 2 - White, 3 - Blue, 4 - Black, 5 - Green or Gray. UL2464 - Black PVC Jacket (UV resistant) ext. Ø 6.0mm IP68	CA/LTW1205BMnn nn = 01 (1 mt.) 05 (5 mt.) 10 (10 mt.)
CN5	Pin: Pinout: Conductors: Cable: Waterproof rate:	4 position 1 - Brown, 2 - White, 3 - Blue, 4 - Black. UL2464 - Black PVC Jacket (UV resistant) ext. Ø 6.0mm IP68	CA/LTW0804BFnn nn = 01 (1 mt.) 05 (5 mt.) 10 (10 mt.)

Section of the cables

Function	Cable	
	Minimum	Maximum
Power supply	0.5 mm² (AWG20)	2.5 mm² (AWG12)
Communication interface	0.25 mm² (AWG23) CANbus CIA-CANopen	--
Digital inputs	0.14 mm² (AWG25)	0.5 mm² (AWG20)
Digital outputs	0.14 mm² (AWG25)	0.5 mm² (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.

Analysis of malfunctions

⚠️ **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.