SMD1204
Stepper Motor Drive

RoHS

Modbus RTU · CANopen · PROFIBUS · Modbus TCP · EtherCAT · PROFINET

The SMD1204xxx is a field-oriented vector stepper drive able to control motors with phase currents up to 8A continuous. The drive can work in stand-alone mode, or can be controlled via the most common communication protocols.
The field oriented EVSC algorithm allows to control the motor in stepless mode, eliminating the resonances and noises typical of stepper motors, and permits to optimize the available torque in every operation range.
The drive is also equipped with inputs and outputs, STO safety function and encoder inputs (incremental Push Pull/Line Driver, or SSI absolute).

STO SIL3 ID.N°567124EN01A

General characteristics

Electrical characteristics		U.M.	SMD1204Lxx	SMD1204Hxx
Power Supply (HVdc)	Voltage range	Vdc	+24 .. 85	+24 .. 135
	Nominal voltage	Vdc	+65	+120
	Peak current	A	motor current +10%	
Logic Supply (LVdc)	Voltage range	Vdc	+24Vdc +/- 10%	
	Current	A	1	
Output current	Nominal current (sinusoidal)	A_{RMS}	configurable via software max. 8A	
	Peak current	A	max. 8,5A	
	BOOST current	A	max. 8,5A	
Current control	Type		Bipolar PWM	
	Frequency	KHz	20 (50 µs)	
	PWM outputs		Dual MOSFET H-bridges, 20 KHz center-weighted PWM field oriented space-vector modulation	

Product code

SMD 1204 L I E- J E 0 2 P P P

Power supply range
- L : 24 - 70 V_{DC}
- H : 24 - 135 V_{DC}

Indexer type
- I : programmable
- U: Indexer USB
- S: Step and direction
- A: Parameterizable

Communication protocol
- M : Modbus RTU
- C : CANopen
- P : Profibus
- E : Modbus TCP/IP
- T : EtherCAT
- N : ProfiNET

Encoder 1
- P : Push-Pull/Line-driver
- S : SSI

Options
- E : Non-STO version
- T : STO version

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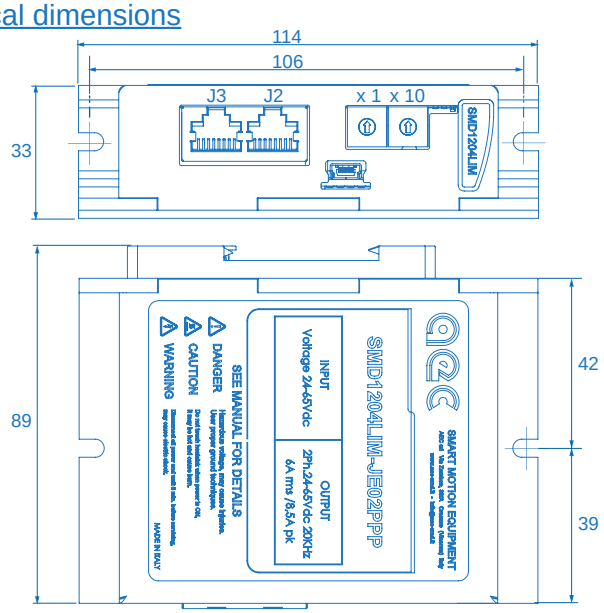
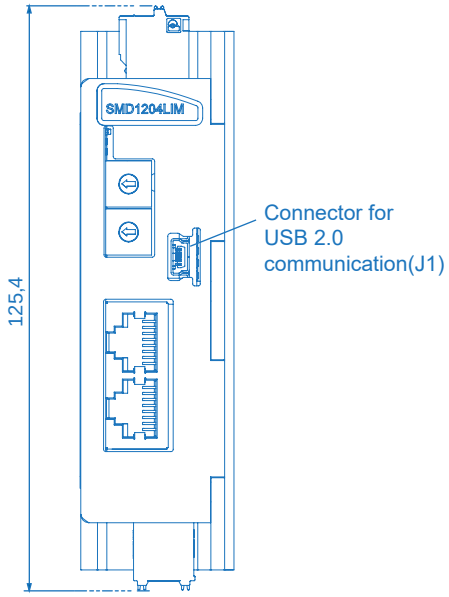
SMD1204
Stepper Motor Drive

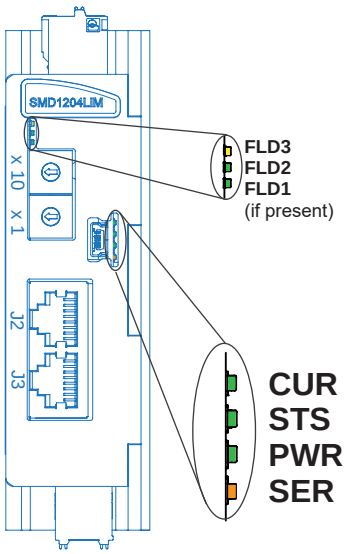
Mechanical dimensions





Dimensions are expressed in mm

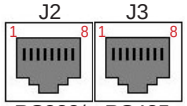
Status LED indicators



LED name	Color	Description
PWR (Power supply)	Off	The drive is not supplied.
	Green	The logic stage of the drive is supplied.
CUR (Current to the motor)	Off	No current to the motor.
	Green	Nominal current to the motor.
	Orange	Reduced current to the motor.
	Red	BOOST current during the ramps.
STS (Drive status)	Off	Logic stage error.
	Green	Drive is OK.
	Orange	Overtemperature alarm.
	Red (fixed)	Active alarm (check the alarm type with StepControl).
	Red (blinking)	Power stage overvoltage or undervoltage alarm.
SER (Communication)	Off	No Modbus serial communication in progress.
	Orange (blinking)	Modbus serial communication in progress through USB port.
FLD (Fieldbus)	See the manual of the protocol.	

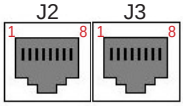
Protocol connector

MODBUS RTU (SMD1204xIM-xxx)



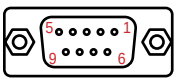
RJ45 Female	Pin	Description
	1	Shield
	2	Data TX (RS-232)
	3	Data RX (RS-232)
	4	Not connected
	5	Common
	6	Not connected
	7	Data + (RS-485)
	8	Data - (RS-485)

CAN-OPEN (SMD1204xIC-xxx)



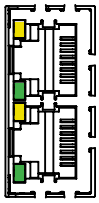
RJ45 Female	Pin	Description
	1	CAN H Line
	2	CAN L Line
	3	CAN_GND
	4	Reserved
	5	Reserved
	6	CAN Shield
	7	CAN_GND
	8	Reserved

PROFIBUS (SMD1204xIP-Dxxx)



Female DB9	Pin	Description
	1	Shield
	2	Reserved
	3	B Line red (positive)
	4	Reserved
	5	DGND (Digital ground)
	6	Out +5V
	7	Reserved
	8	A Line green (negative)
	9	Reserved

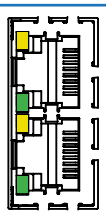
EtherCAT



CAUTION: If the drive is used in mode 8 - CSP (it is possible to check it with StepControl, "Rcanmodeofoperation" register), it is necessary to set the maximum step resolution (1024), in order to obtain a smooth and noiseless movement.

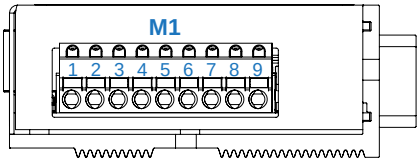
Minimum Sync time 2ms

PROFINET®



For information on slot arrangement, refer to the protocol manual.

Power terminal block



M1		
Pin	Nome segnale	Descrizione
1	Phase B-	Motor phase B-
2	Phase B	Motor phase B
3	Phase A-	Motor phase A-
4	Phase A	Motor phase A
5	Ground	Ground
6	Ground	Ground
7	Common	DC supplies common reference
8	Power supply	Power stage DC supply input
9	Logic supply	**+24Vdc** logic stage DC supply input

CAUTION:
“Logic supply” +24Vdc

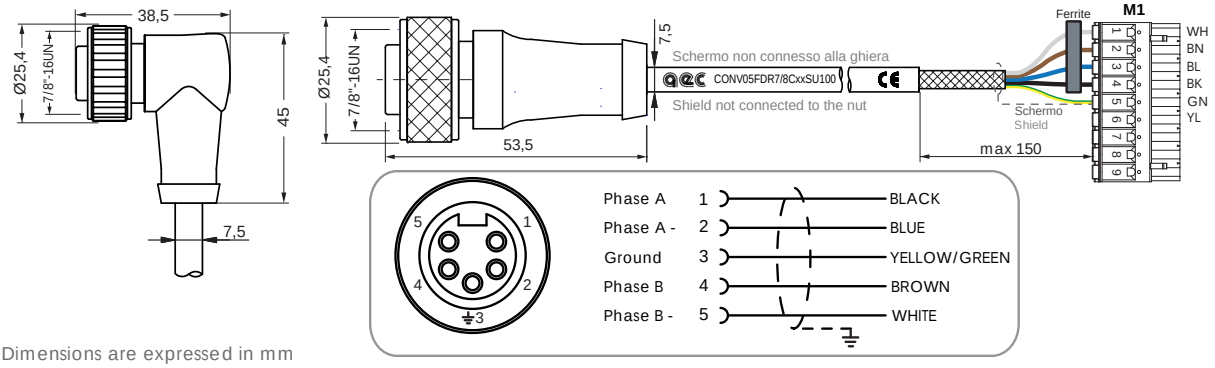
The SMD1204 must be supplied only with DC current, at the voltage specified in the “Electrical characteristics” table.

It is recommended to use a transformer and an AC/DC converter mod. AL1120 or AL2620

Motor cable connection

7/8” MOTOR CONNECTION CABLE: CONV05FDR7/8Cxxx

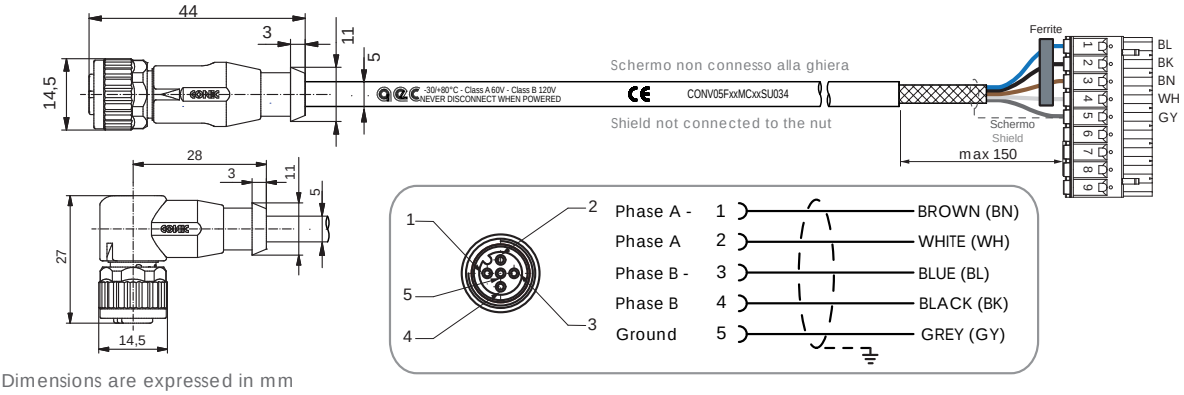
Shielded dynamic laying cables with 7/8” female connector, for stepper motors series M86SHxx and M110SHxx.



Dimensions are expressed in mm

M12 MOTOR CONNECTION CABLE: CONV05FxxM12Cxxx

Shielded dynamic laying cables with M12 female connector, for stepper motors series M42SHxx, M57SHxx and M60SHxx.



Dimensions are expressed in mm

The cables must not exceed the maximum length of 20m

SMD1204

Version with 2 incremental encoder inputs

Code

SMD1204xIx-xx02PPP

E : Non-STO version
T : STO version

P : Encoder 1 incremental, Push-Pull/Line-driver

General purpose digital inputs	Number		10 (see note *a*)
	Type		PNP TTL compatible up to + 30 Vdc
	"High" / "Low" level threshold	Vdc	+12V default Soglia 2,2V threshold configurable via StepControl
General purpose digital outputs	Number		3+5 (see note *a*)
	Type		PNP + 24 VDC
	Current	mA	100 (each channel)
	Protection		Temperature, short-circuit
Incremental encoder inputs	Number		6 (see note *a*)
	Type		PNP TTL compatible up to + 30 Vdc
	Absorbed current	mA	8
	"High" / "Low" level threshold	Vdc	+12V default 2,5V threshold if connected in differential
	Characteristics		High speed inputs (max 70Khz, D.C. 50%)
Analog inputs	Number		1+2 (see note *a*)
	Resolution	bit	12
	Range	Vdc	0 .. +10
Analog output	Number		1
	Resolution	bit	10
	Range	Vdc	0 .. +10
	Current	mA	max 20

Note: [a] Pins shared with encoder inputs, outputs or analog inputs.

M2		
Pin	Signal Name	Description
1	+5 Vdc out (max 100mA)	+5 Vdc output (max 100 mA)
2	Common encoder	Encoder inputs common
3	Motor encoder A-	Motor encoder channel A-
4	Motor encoder B-	Motor encoder channel B-
5	Motor encoder Z-	Motor encoder channel Z-
6	Motor encoder A+ / Inp. 5	Motor enc. Channel A+ / Digital input 5
7	Motor encoder B+ / Inp. 6	Motor enc. Channel B+ / Digital input 6
8	Motor encoder Z+ / TOP / Inp. 7	Motor enc. Channel Z+ / TOP input / Digital input 7
9	External encoder A+ / FLS / Input 8	External enc. Channel A+ / Forward Limit Switch / Digital input 8
10	External encoder B+ / BLS / Input 9	External enc. Channel B+ / Backward Limit Switch / Digital input 9
11	External encoder Z+ / Inp. 0	External enc. Channel Z+ / Digital input 0
12	Digital input 1	Digital input 1
13	Digital Output 0	Digital output 0
14	+5 Vdc out (max 100mA)	+5 Vdc output (max 100 mA)
15	Common ground / STO_OK_IN*	Inputs common / STO OK input*
16	+5 Vdc out (max 100mA)	+5 Vdc output (max 100 mA)
17	Common	Inputs common
18	Digital Output 5 / STO_OK_OUT*	Digital output 5 / STO OK output (max 20mA)*
19	Analog output	Analog output
20	Common	Inputs common
21	Analog input	Analog input
22	Ana. Inp.1 / Digital Output 2	Analog input 1 / Digital Output 2
23	Ana. Inp.2 / Digital Output 3	Analog input 2 / Digital Output 3
24	External encoder A-	External encoder channel A-
25	External encoder B-	External encoder channel B-
26	External encoder Z-	External encoder channel Z-
27	Digital input 2 / Output 6	Digital input 2 / Digital output 6
28	Digital input 3 / Output 7 / STO_IN_1*	Digital input 3 / Digital output 7 / STO 1 input*
29	Digital input 4 / Output 4 / STO_IN_2*	Digital input 4 / Digital output 4 / STO 2 input*
30	Digital output 1	Digital output 1

** STO version inputs (SMD1204xIx-xT02PPP)*

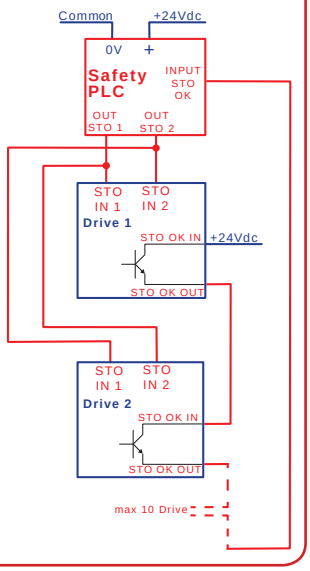
STO function*

CAUTION! Consult the Safety Manual before using the STO function,

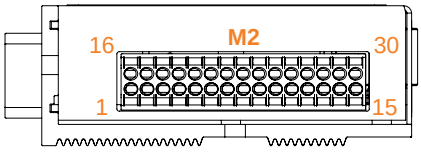
STO management			
STO IN 1	STO IN 2	Motor current	STO_OK_ OUT
0 Vdc	0 Vdc	OFF	24Vdc*
0 Vdc	24Vdc	OFF	0Vdc
24Vdc	0 Vdc	OFF	0Vdc
24Vdc	24Vdc	ON	0Vdc

* The dry contact STO_OK_OUT will not be closed in presence of alarms on the drive.

CAUTION! The stop of the motor in case of STO intervention will occur by inertia.



** STO version inputs (SMD1204xIx-xT02PPP)*



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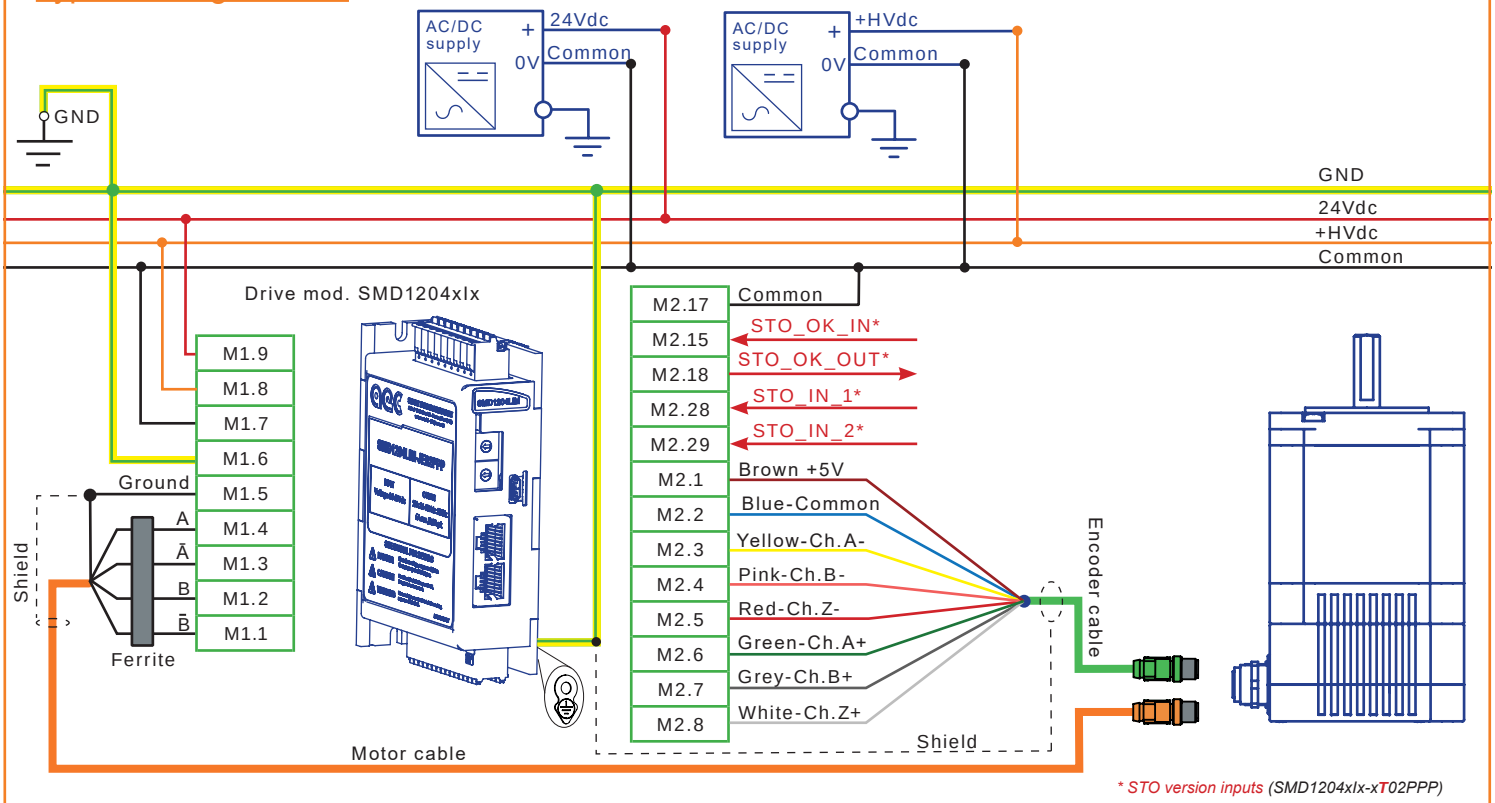
Typical wiring scheme



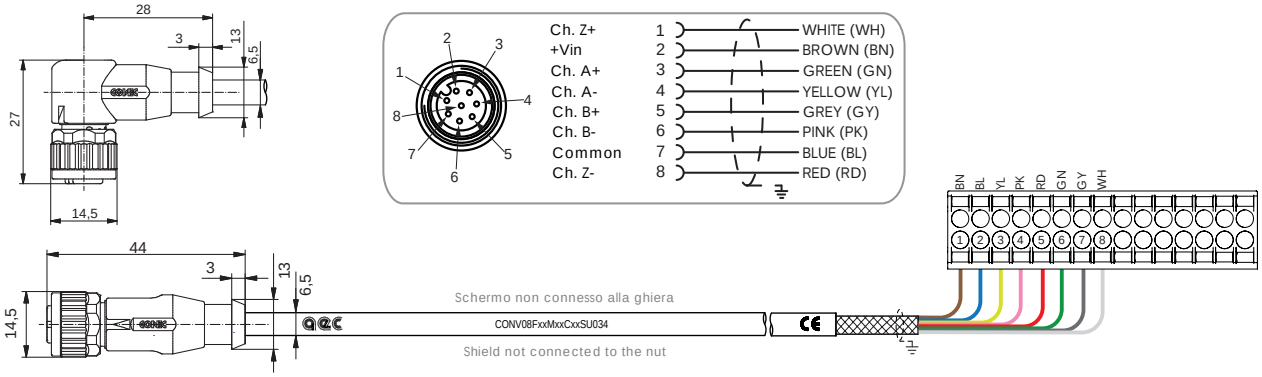
** STO version inputs (SMD1204xIx-xT02PPP)*

Connect toghether the common of the 24Vdc supply and the common of the HVdc power stage.
Do not section the commons present in the terminal block.

Encoder cables connection

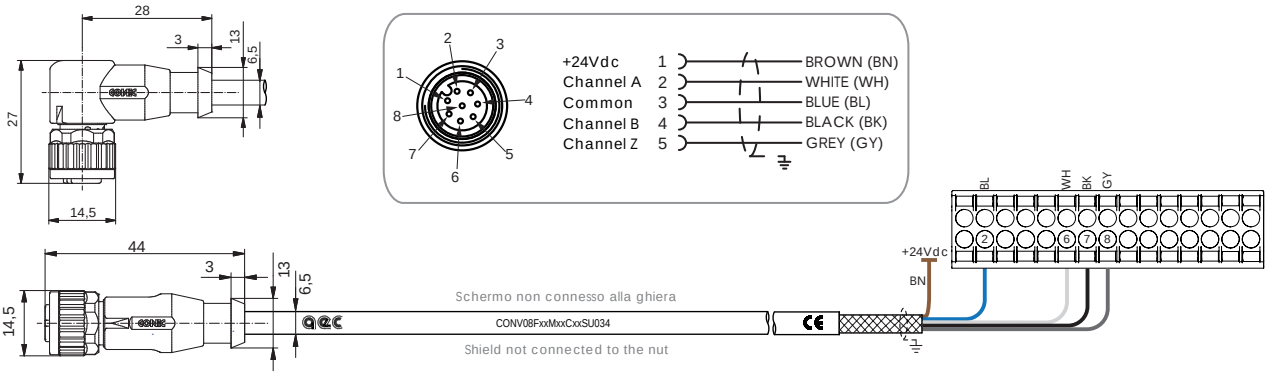
M12 LINE DRIVER ENCODER CONNECTION CABLE: CONV08FxxM12Cxxx

Shielded dynamic laying cables with M12 8 poles, female connector, for AEC integrated Line Driver encoders.



M12 PUSH PULL ENCODER CONNECTION CABLE: CONV05MxxM12Cxxx

Shielded dynamic laying cables with M12 5 poles male connector, for AEC integrated Push Pull encoders.



The cables must not exceed the maximum length of 20m

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SMD1204
Version with SSI absolute encoder input

Code

SMD1204xIx-xx02SPP

E : Non-STO version
T : STO version
S : Encoder 1, SSI absolute

General purpose digital inputs	Number		10 (see note *a*)
	Type		PNP TTL compatible up to + 30 Vdc
	"High" / "Low" level threshold	Vdc	+12V default Soglia 2,2V threshold configurable via StepControl
General purpose digital outputs	Number		3+5 (see note *a*)
	Type		PNP + 24 VDC
	Current	mA	100 (each channel)
	Protection		Temperature, short-circuit
Incremental encoder inputs	Number		6 (see note *a*)
	Type		PNP TTL compatible up to + 30 Vdc
	Absorbed current	mA	8
	"High" / "Low" level threshold	Vdc	+12V default 2,5V threshold if connected in differential
	Characteristics		High speed inputs (max 70Khz, D.C. 50%)
Analog inputs	Number		1+2 (see note *a*)
	Resolution	bit	12
	Range	VDC	0 .. +10
Analog output	Number		1
	Resolution	bit	10
	Range	Vdc	0 .. +10
	Current	mA	max 20
SSI absolute encoder input	Position on the turn resolution	bit	16 max
	Turns counter resolution	bit	16 max

Note: [a] Pins shared with encoder inputs, outputs or analog inputs.

M2		
Pin	Signal name	Description
1	+5 VDC out (max 100mA)	+5 VDC output (max 100 mA)
2	Common encoder	Encoder inputs common
3	CLK +	SSI Clock OUT +
4	CLK -	SSI Clock OUT -
5	D+	SSI Data IN +
6	D-	SSI Data IN -
7	Preset	Preset (+5Vdc)
8	Complement	Complement (+5Vdc)
9	External encoder 2 A+ / FLS / Input 8	External enc. 2 Channel A+ / Forward Limit Switch / Digital input 8
10	External encoder 2 B+ / BLS / Input 9	External enc. 2 Channel B+ / Backward Limit Switch / Digital input 9
11	External encoder 2 Z+ / Inp. 0	External enc. 2 Channel Z+ / Digital input 0
12	Digital input 1	Digital input 1
13	Digital Output 0	Digital output 0
14	+5 VDC out (max 100mA)	+5 VDC output (max 100 mA)
15	Common ground / STO_OK_IN*	Inputs common / STO OK input*
16	+5 VDC out (max 100mA)	+5 VDC output (max 100 mA)
17	Common	Inputs common
18	Digital Output 5 / STO_OK_OUT*	Digital Output 5 / STO OK output (max 20mA)*
19	Analog output	Analog output
20	Common	Inputs common
21	Analog input	Analog input
22	Ana. Inp.1 / Digital Output 2	Analog input 1 / Digital Output 2
23	Ana. Inp.2 / Digital Output 3	Analog input 2 / Digital Output 3
24	External encoder 2 A-	External encoder 2 channel A-
25	External encoder 2 B-	External encoder 2 channel B-
26	External encoder 2 Z-	External encoder 2 channel Z-
27	Digital input 2 / Output 6	Digital input 2 / Digital output 6
28	Digital input 3 / Output 7 / STO_IN_1*	Digital input 3 / Output 7 / STO 1 input*
29	Digital input 4 / Output 4 / STO_IN_2*	Digital input 4 / Output 4 / STO 2 input*
30	Digital output 1	Digital output 1

** STO version inputs (SMD1204xIx-xT02PPP)*

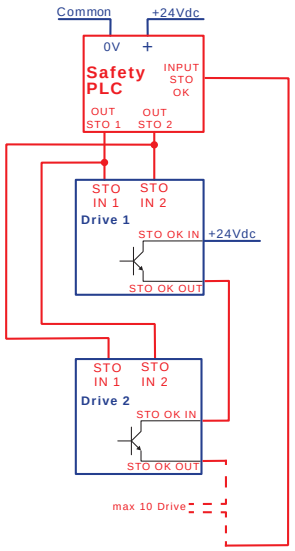
STO function*

CAUTION! Consult the Safety Manual before using the STO function,

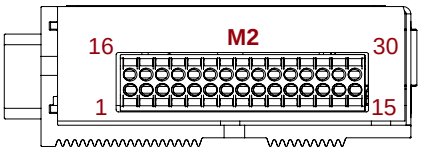
STO management			
STO IN 1	STO IN 2	Motor current	STO_OK_ OUT
0 Vdc	0 Vdc	OFF	24Vdc*
0 Vdc	24Vdc	OFF	0Vdc
24Vdc	0 Vdc	OFF	0Vdc
24Vdc	24Vdc	ON	0Vdc

* The dry contact STO_OK_OUT will not be closed in presence of alarms on the drive.

CAUTION! The stop of the motor in case of STO inter-vention will occur by inertia.



** STO version inputs (SMD1204xIx-xT02PPP)*



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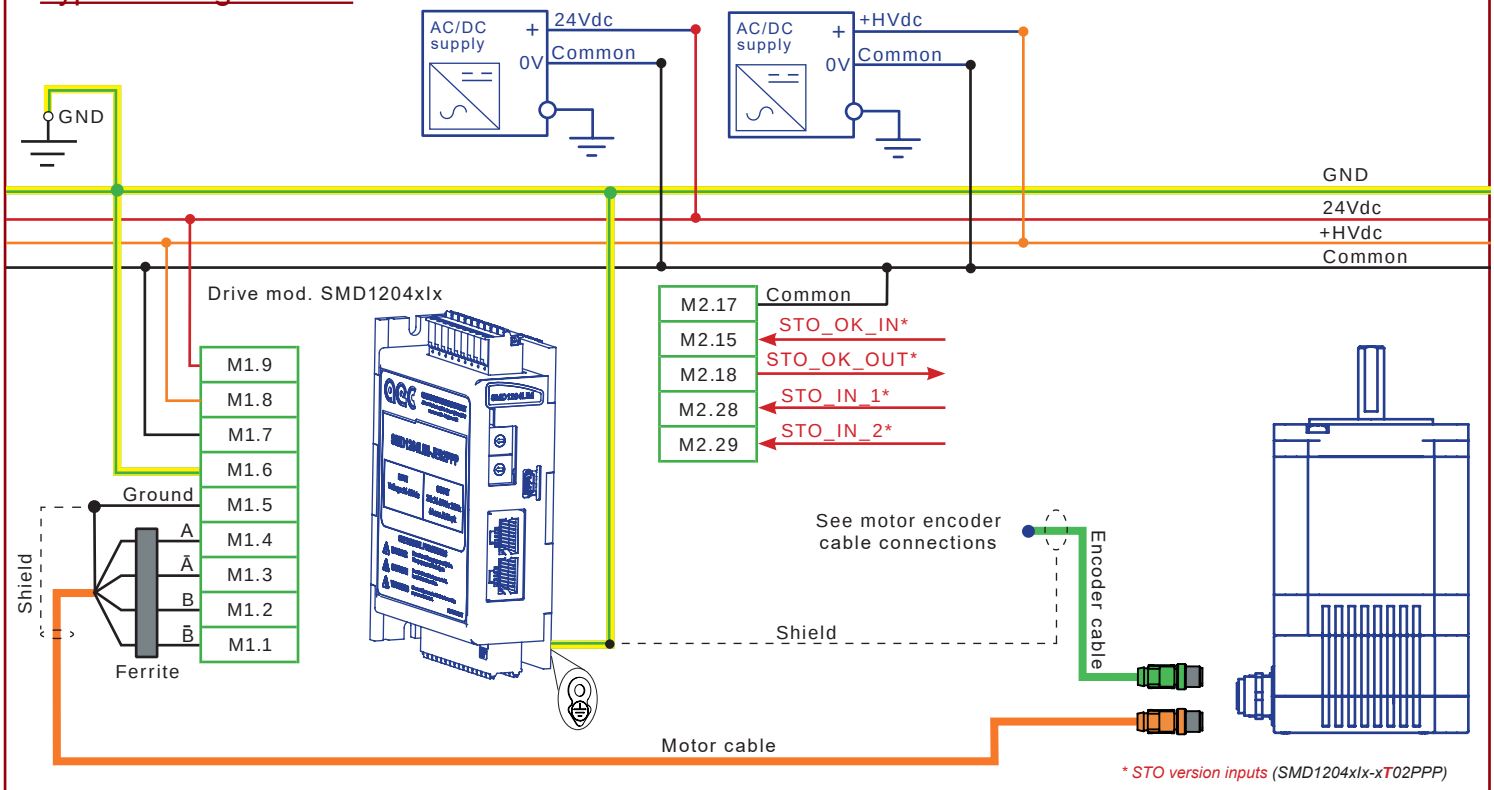
Typical wiring scheme



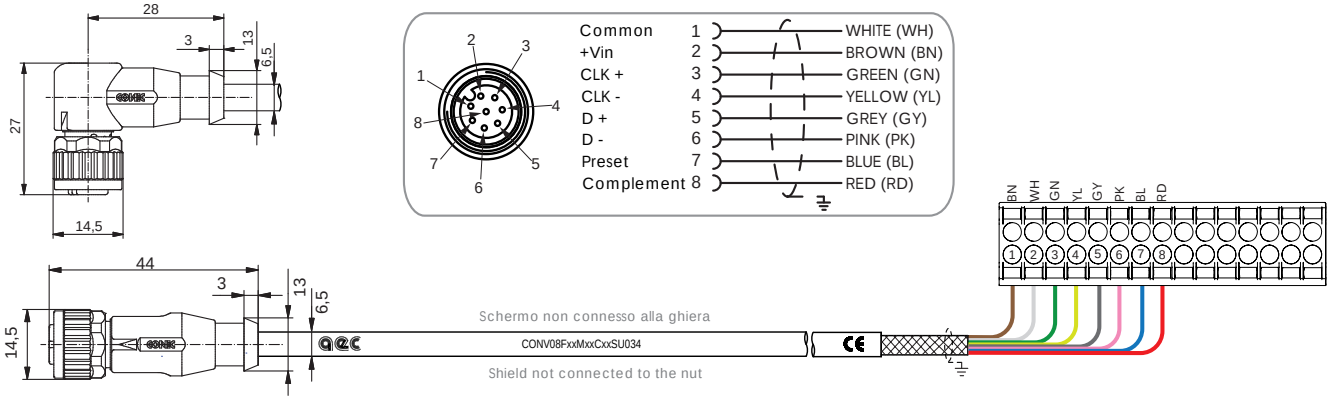
** STO version inputs (SMD1204xIx-xT02PPP)*

Connect toghether the common of the 24Vdc supply and the common of the HVdc power stage.
Do not section the commons present in the terminal block.

Encoder cables connection

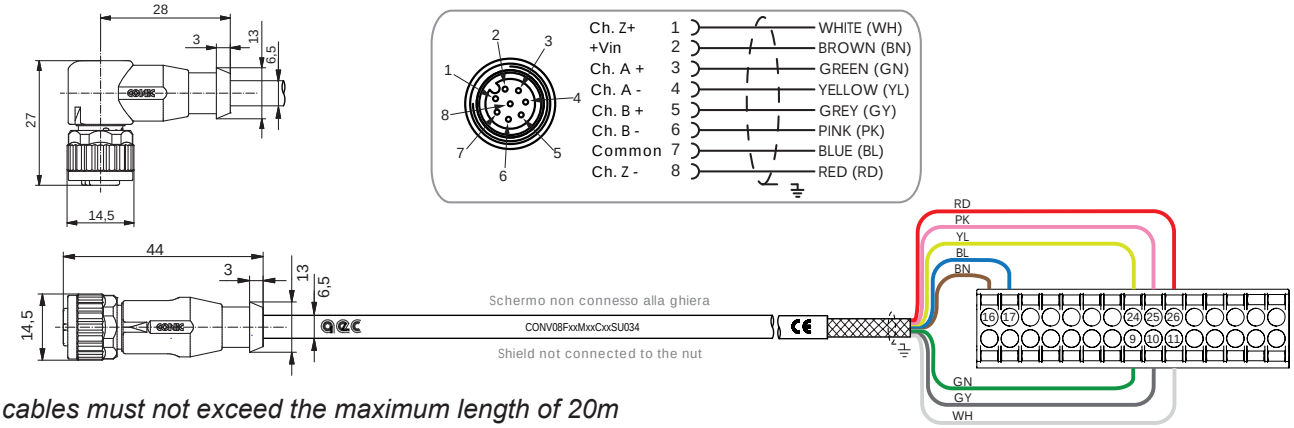
M12 AEC ABSOLUTE SSI ENCODER CONNECTION CABLE: CONV08FxxM12Cxxx

Shielded dynamic laying cables with M12 8 poles female connector, for **AEC motor absolute SSI encoder**.



M12 LINE DRIVER ENCODER CONNECTION CABLE: CONV08FxxM12Cxxx

Shielded dynamic laying cables with M12 8 poles, female connector, for **AEC integrated Line Driver encoders.**



The cables must not exceed the maximum length of 20m

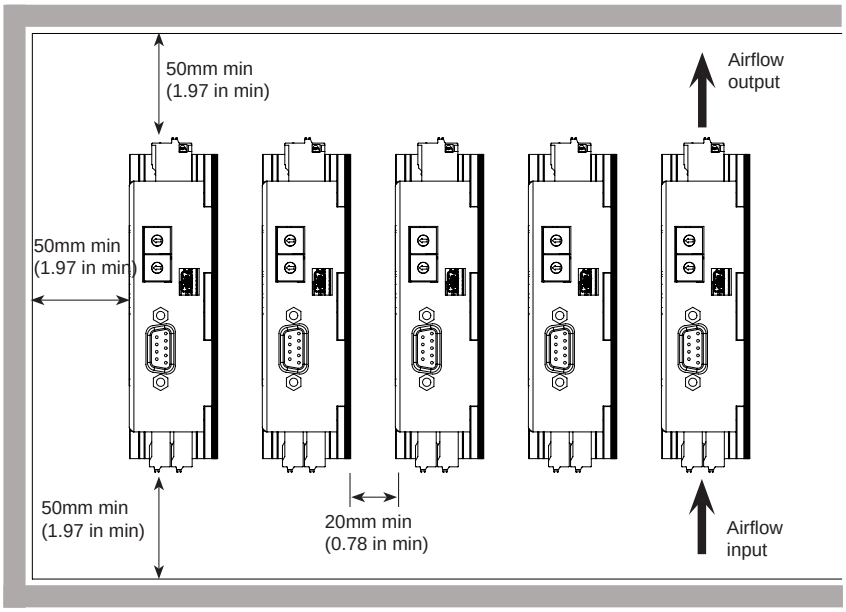
Installation conditions

Install vertically, securely fix the drive using M4x8 screws or the DIN rail mounting clip.

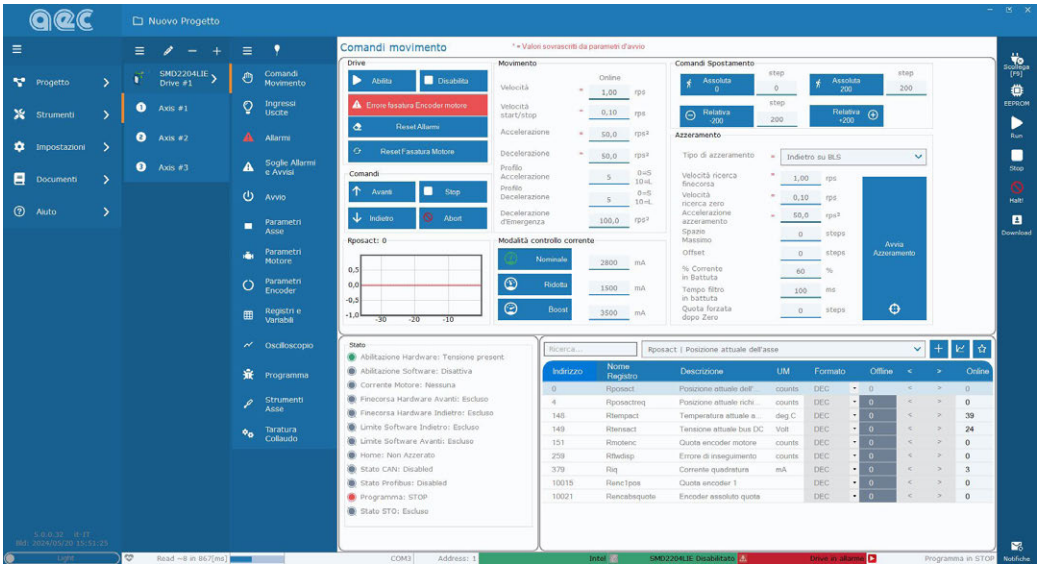
If installed inside an electric cabinet, leave a free space of at least 50 mm around the module in case of a single drive installation.

In case of installation of more than one drive, leave free spaces between contiguous drives, as it can be seen in the following picture, in order to ensure airflow and modules cooling.

Operating temperature	0°C … +45°C
Cooling	Ventilate the drive in case of continuous operation
Operating humidity	from 5% to 85% RH or less (no condensation)
Installation location	Design the electric cabinet with a proper cooling system, in order to keep the temperature in proximity the drive below 45°C.



Programming and configuration



For the communication between the drive and the PC, AEC provides the software StepControl.
The application, in addition to the configuration of the drive, permits to performs tests, to build programs and to simulate movements and homings.