SMD30.06x Stepping Motor Drive

Member of
PROFIBUS · PROFINET

Modes of operation

Open Loop (Stepless)

- Stand Alone (Indexer)
- Camming
- Gearing
- Speed
- Position
- Step & direction

Closed Loop (Servomode)

- Stand Alone (Indexer)
- Gearing
- Speed
- Position
- Torque
- Step & direction

Command Interface

- Direct (fieldbus)
- Mixed (Indexer + fieldbus)
- Stand-Alone (indexer)
- Inputs/Outputs
- Step & direction
- Encoder master

Communications

- Modbus RTU RS-232 / RS485
- CANopen
- Profibus DP

Feedback

- Quadrature digital encoder A,B,Z

Inputs & Outputs

- 8 general purpose digital inputs/outputs
- 5 service inputs
- 1 analogue input
- 1 analogue output

Dimensions: mm [in]

- 135 x 80,6 x 33 [5,3 x 3,2 x 1,3]

Modbus RTU

CAN connected

PROFI ® PROCESS FIELD BUS **BUS**

Model	Command interface (*)	Fieldbus	Nom./peak Current (A)	Nominal Voltage (VDC)
SMD30.06LS	SD	-	5 / 7	65
SMD30.06LIM	SD / D / SA / M	Modbus RTU	5 / 7	65
SMD30.06LIC	SD / D / SA / M	CANopen	5 / 7	65
SMD30.06LIP	SD / D / SA / M	Profibus DP	5 / 7	65
SMD30.06HS	SD	-	5 / 7	120
SMD30.06HIM	SD / D / SA / M	Modbus RTU	5 / 7	120
SMD30.06HIC	SD / D / SA / M	CANopen	5 / 7	120
SMD30.06HIP	SD / D / SA / M	Profibus DP	5 / 7	120

* SD = Step/Dir; D = Direct; SA = Stand-Alone; M = Mixed

The SMD30.06xxx series is a new family of high performance full-digital drive/controllers for stepping motor.

They can operate in classical stepper-mode or, also, in closed-loop servo-mode.

In stepper mode, the drive use a new generation advanced control technique (EVSC Stepless) in order to obtain a smooth and robust motor control without resonance.

In servo-mode, with encoder feedback, the stepping motor can be controlled as a DC brushless motor working in torque mode, velocity mode or in position mode.

Both in open and in closed loop,SMD30.06xxx can work in stand-alone mode, or connected to a Modbus RTU, CANopen o Profibus DP V0/V1(Profidrive) communication network.

In stand-alone mode it can generates complex profile controlled by the internal user program, it can handles inputs and outputs, encoders and can receives new data or commands by an host (PC, PLC, HMI) through a communication link or simply works in STEP & DIR mode.

If connected to a communication network it can be totally controlled by an host or it can works in mixed mode: with an internal user program and host commands.

StepControl is a simple GUI Windows® interface to adjusting and programming the SMD30.06xxx series. The node ID can be defined by Rotary switche or by software.

The SMD30.06xIC (CANopen) models use DS-402 V.1.1 application layer DS-301 V.4.01 (EN 50325-4) protocol directives for Motion Control Device.

The SMD30.06xIP (Profibus DP) models use PROFIdrive version 4.1, May 2006 (IEC 61800-7) protocol directives for Drive Object.

SMD30.06xxx is the solution to many motion control problem due to its flexibility and easily interface with functiona assigned-inputs and outputs.

A specific function can be assigned to every IN/OUT to let it works as In position OUT, Motor moving OUT, Alarm OUT, Drive Enable IN or many others).

Power and logic stages can be supplied separately also with different voltage levels.

It can be useful to keep "alive" the axis controller even if the motor stage isn't supplied (safety status).

SMD30.06xxx drives can be powered by DC voltage or AC mono or three-phase voltage.

SMD30.06x Stepping Motor Drive

Electric Characteristics		U.M.	SMD30.06Lxx	SMD30.06Hxx
Output current	Nominal current (sinusoidal)	A_{RMS}	5	
	Peak current	A_{RMS}	7	
	Boost current	A_{RMS}	10	
Power & Logic supply	AC Voltage range (three-phase)	V_{AC}	+20 .. 50	+20 .. 90
	AC Voltage range (single-phase)	V_{AC}	+20 .. 60	+20 .. 115
	DC Voltage range	V_{DC}	+24 .. 85	+24 .. 160
	RMS current	A_{RMS}	4	
	Peak current	A_{RMS}	10	
Current Control	Type		Field Oriented Space-Vector PWM	
	Frequency	KHz	20 (50 µs)	
	PWM Outputs		Dual MOSFET H-bridges, 20 KHz center-weighted PWM field oriented space-vector modulation	
General purpose digital inputs	Number		8^a (see note a)	
	Type		PNP (TTL consistent up to + 30 V_{DC})	
	Threshold "High" / "Low"	V_{DC}	> + 2,2 / < + 0,8	
Out. digitali general purpose	Number		8^a (see note a)	
	Type		PNP + 24 VDC	
	Current	mA	100 each	
	Protection		Over-temperature, short-circuit	
Ing. digitali di servizio	Number		5^a (see note a)	
	Type		PNP (TTL consistent up to + 30 V_{DC})	
	Current	mA	8	
	Threshold "High" / "Low"	V_{DC}	> + 2,2 / < + 0,8	
	Notes		High Speed Inputs	
Ingresso analogico	Number		1	
	Resolution	bit	12	
	Range	V_{DC}	0 .. +10	
Uscita analogica	Number		1	
	Resolution	bit	10	
	Range	V_{DC}	0 .. +10	

Fieldbus			30.06LIM	30.06LIC	30.06LIP	30.06HIM	30.06HIC	30.06HIP
RS - 232C	Signals	TXD, RXD, GND	●	●	●	●	●	●
	Insulation	High Speed Digital (25Mbps)						
	Protocollo	Modbus RTU						
	Nodes nr.	1						
	Baudrate	9,6 .. 115,2 Kbps						
RS - 485	Signals	D+, D-, GND	●	●	●	●	●	●
	Insulation	High Speed Digital (25Mbps)						
	Protocollo	Modbus RTU						
	Nodes nr.	128						
	Baudrate	9,6 .. 115,2 Kbps						
CAN	Signals	CAN_H, CAN_L, CAN_GND	○	●	○	○	●	○
	Insulation	High Speed Digital (5Mbps)						
	Protocollo	CANopen DS-402 v1.1, DS-301 v.4.01						
	Nodes nr.	125						
	Baudrate	10, 20, 50, 125, 250, 500, 800, 1000 Kbps						
Profibus DP	Signals	A, B, +5Vs DP, 0 V DP	○	○	●	○	○	●
	Insulation	High Speed Digital (25Mbps)						
	Protocollo	PROFIdrive version 4.1, May 2006						
	Nodes nr.	125						
	Baudrate	Autobirate, 9,6k fino a 12 Mbits/s						

● = Supported / ○ = Not supported

a) Inputs and outputs share the same pinout.
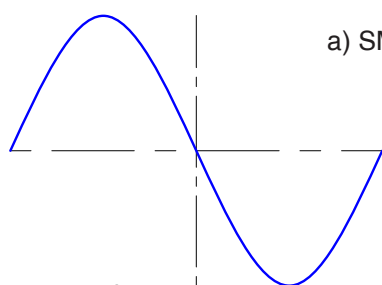
General Characteristics

Microstepping

The SMD30.06xxx drive works in microstep mode with a resolution of 204800 steps per turn (1/1024 step).
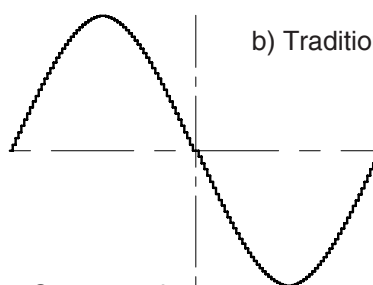It can be defined as a "Stepless" drive which guarantees a very low noise and high smooth functionality even on slow speeds.
The step resolution adjustment is useful only as frequency input multiplier for indexeres, PLCs, CNCs or other in order to decrease the input frequency bandwidth and increase positioning resolution.
Even if the drive is setting to work in full step mode, it displaces itself from a step to the nearest one with a 1024 points interpolated movement.

a) SMD50.06 Stepless

b) Traditional microstep drive

Stepper-mode

The drive works in open loop mode with an high performance field oriented vector-space stepless current control.
The SMD30.06xxx fits any kind of load, drastically reduces the thermal dissipation and mechanical resonances and allows smooth and silent movements thanks to an accurate sinusoidal current handling free of parasitic harmonics.
The EVSC (Enhanced Vector Step Control) algorithm permits to change current levels, step resolution, velocity or position setpoint on the fly during a movement.
The advanced diagnostic interface allows to know what happens in the drive which alarms occurs or are being to.

Servo-mode

In servo-mode, the stepper motor works as a real servo-motor controlled in closed loop.
With the feedback encoder the SMD30.06xxx can follow the setpoint in any load condition without losing synchronism or steps even if the motor cannot turn.
A following error will be created which moves the motor towards the setpoint when load condition permits it.
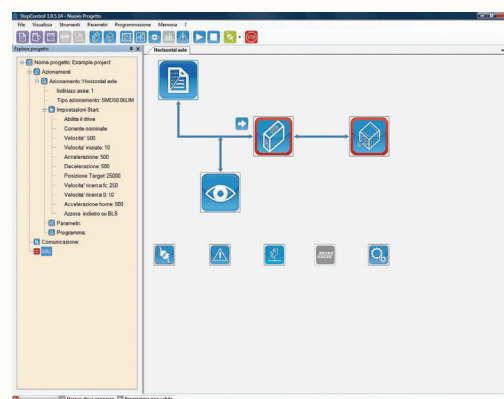Current output level is modulated in accordance with the following error and torque demand in order to reduce thermal dissipation and power consumption
The drive can works in current loop, velocity loop or in torque loop.

Drive setting with StepControl LT©

Set-up of the SMD30.06xxx is very simple using StepControl LT© software. All the parameters and internal registers can be adjusted by software through a RS-232C/RS485 link .
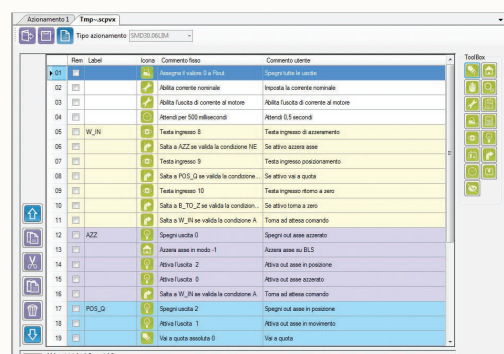The drive configuration can be saved in a file in order to store or load it in other drives for multi-axis configuration.
StepControl LT© can show internal register and variable values, alarm or warning and control the axis with the manual consolle.

Drive setting and programming with StepControl©

In addition to all the StepControl LT© functions, StepControl© GUI interface permits to write down, develop and test custom user program or set-up profile tasks.
The program can be download to the drive and let it works in stand-alone mode.
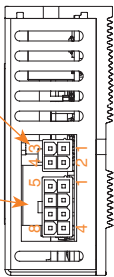
SMD30.06x Stepping Motor Drive

Component identification

Pin	Name	Description
1	Phase A	Motor phase A
2	Phase A-	Motor phase A-
3	Phase B	Motor phase B
4	Phase B-	Motor phase B-

Pin	Name	Description
1	Power supply	HV$_{DC}$ Motor Power supply input
2	Logic supply	HV$_{DC}$ Logic Power supply input
3	R AC Phase	Phase R AC input
4	S AC Phase	Phase S AC input
5	Power supply	HV$_{DC}$ Motor Power supply input
6	Logic supply	HV$_{DC}$ Logic Power supply input
7	T AC Phase	Phase T AC input
8	Common Ground	DC supply common ground reference

Pin	Name		Description	
	Profibus	CAN	Profibus-DP	CAN
1	Shield		Shield	
2	Out +5V		+5VDC @100mA output	
3	Reserved		Reserved	
4	Line A	CAN_L	Green Line	CAN dom. line
5	TX Common		Signal communication common	
6	Line B	CAN_H	Red line	CAN rec. line
7	Line B	CAN_H	Red line	CAN rec. line
8	Line A	CAN_L	Green Line	CAN dom. line

Bottom view

Top view

Led indicatori di stato (PWR,CUR,STS,SER,FLD)

x10 - Decine   x1 - Unità

Rotary switch per impostazione dell'indirizzo di comunicazione.

Front view

Address settings

SW1 and SW2 switches define the node-ID address for all communication protocols (Modbus RTU, CANopen, Profibus DP). To set a new address, adjust the switches value, power off and then power on the drive.

Pin	Name	Description
1	Input/Output 6	General purpose I/O nr. 6
2	Input/Output 4	I/O4 / Forward Limit switch
3	Input/Output 2	I/O2 / Backward Limit switch
4	Input/Output 0	I/O0 / TOP
5	Common	Digital common ground
6	Input/Output 7	General purpose I/O nr. 7
7	Input/Output 5	General purpose I/O nr. 5
8	Input/Output 3	I/O3 / Encoder channel B
9	Input/Output 1	I/O1 / Encoder channel A
10[a]	Power input	+24V$_{DC}$ auxiliary power input

Pin	Name	Description
1	Shield	Shield
2	Data TX	Transmission RS-232C data
3	Data RX	Reception RS-232C data
4	D -	Data - RS-485
5	Common TX	Common ground
6	D +	Data + RS-485
7	D +	Data + RS-485
8	D -	Data - RS-485

Pin	Name	Description
1	AN_Input	Analog input (0-10V$_{DC}$ @12bits)
2	AN_Output	Analog output (0-10V$_{DC}$ @10bits)
3	Out +10V	+10V$_{DC}$ @50mA
4	Analog common	Analog I/O common ground

Mechanical dimensions

135,00 (5.31)

33.00(1.30)

19.00(0.75)

127,00 (5.00)

42.15(1.66)

Ø4.50(0.18)

80.60(3.17)

REMOVING THIS LABEL AVOID WARRANTY

Manufacturer: MADE IN ITALY
Model: SMD30.06LIM
Barcode/Serial number: 30.064209000125

INPUT: 3Ph. 24 - 110V~ 50/60Hz — 3Arms max.
OUTPUT: 2Ph. 36 - 160V ⎓ 20KHz — 6Arms / 8.4Apk

Thermal Protection 80°C
Humidity Range 5 - 95% NOT CONDENSING
Operating temperature 0 - 50 °C
Pollution degree 2 or better

SEE MANUAL FOR DETAILS

DANGER! Hot surface! Hazardous Voltage!

Dimensions are in mm (inch).