



The SPN5M ST controller is an ECU (Electronic Control Unit) which can handle up to 16 inputs and up to 16 outputs with an M7 high performance microprocessor.

Easy to program, using the ALMEClab development platform, it can be implemented in a serial line (RS232) or in a CAN network, as MASTER or SLAVE.

The polyurethane resin case makes the controllers suitable for use on machines that operate in harsh work environments.



## TECHNICAL FEATURES

MASTER CODE	SP.5MST
POWER SUPPLY	9-36 VDC / CURRENT CONSUMPTION 30 mA @ 24 VDC (STAND BY MODE)
INPUT	<p><b>TOTAL No. 16 INPUTS</b>, SOFTWARE CONFIGURABLE AS:</p> <ul style="list-style-type: none"> <li>• UP TO 16 DIGITAL INPUTS (HIGH SIDE)</li> <li>• UP TO 4 DIGITAL INPUTS (LOW SIDE)</li> <li>• UP TO 14 ANALOGIC INPUTS (0~40V)</li> <li>• UP TO 4 ANALOGIC INPUTS (4~20mA)</li> <li>• UP TO 2 FREQUENCY INPUTS (1~1000Hz)</li> </ul>
OUTPUT	<p><b>TOTAL No. 16 OUTPUTS</b>, SOFTWARE CONFIGURABLE AS:</p> <ul style="list-style-type: none"> <li>• UP TO 8 PWM HIGH SIDE OUTPUTS</li> <li>• UP TO 16 HIGH SIDE OUTPUTS (MAX 2A FOR EACH OUTPUT PIN) → MAX TOTAL HIGH SIDE OUTPUTS CURRENT 10 A)</li> <li>• UP TO 4 DIGITAL LOW SIDE OUTPUT (MAX 500mA FOR EACH OUTPUT PIN)</li> <li>• UP TO 4 DIGITAL LOW SIDE OUTPUT (MAX 30mA FOR EACH OUTPUT PIN)</li> </ul>
CAN BUS	No. 2 PORTS: 2.OB COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S
CAN BUS PROTOCOLS	CAN OPEN (CIA DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE) ON REQUEST: SAE J1939 - FMS
SERIAL	No. 1 PORT: RS232
RTC	Not installed – see the dedicated hardware version
CONNECTION <i>See «MATING CONNECTORS» table</i>	MOLEX 48 PIN
CASE	PUR - UL94-V0
PROTECTION	IP68
WORKING TEMPERATURE	-40°C +85°C





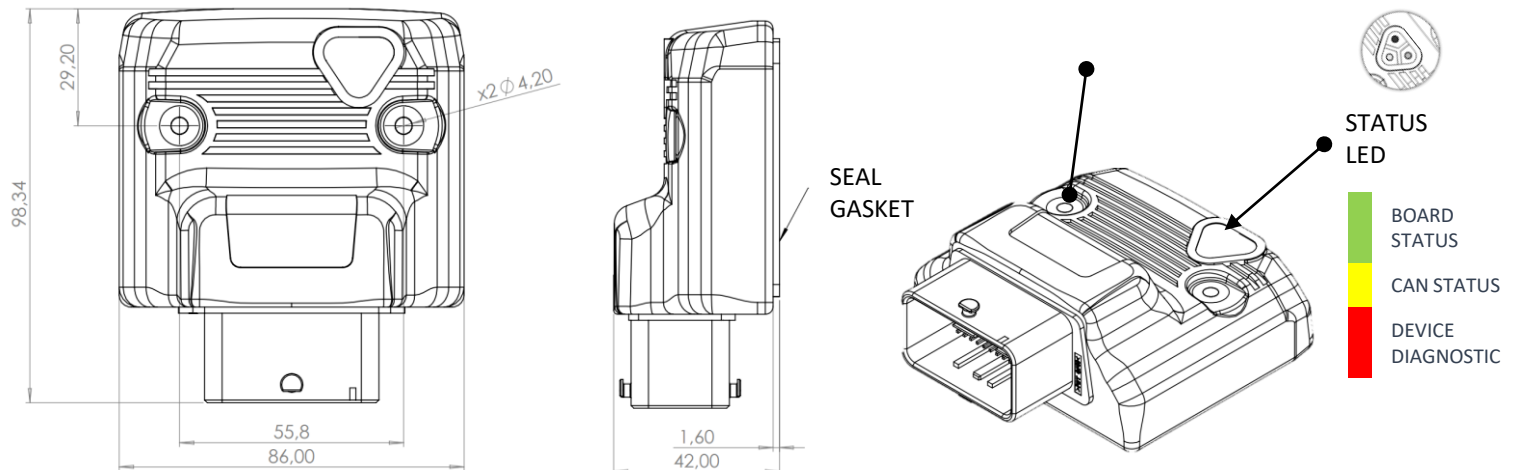
## ELECTRONIC FEATURES

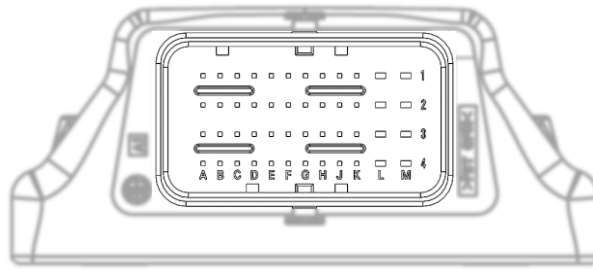
<b>SLAVE USAGE</b>	EDS FILE
<b>MASTER USAGE</b>	ALMEClab
	On request: C PROGRAM OPEN SOURCE SOFTWARE
<b>PROGRAMMING</b>	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
<b>CYCLE TIME</b>	Less than 2 ms
<b>CPU</b>	FAMILY: ARM CORTEX M7, 32BIT CORE
<b>INTERNAL MEMORY</b>	FLASH (PROGRAM MEMORY): 2 MB RAM MEMORY: 1 MB

## STANDARDS

<b>DIRECTIVE</b>	2014/30/EU (EMC)
<b>ELECTROMAGNETIC COMPATIBILITY</b>	EN 50498
<b>ELECTROMAGNETIC EMISSIONS</b>	EN 61000-6-4
<b>ELECTROMAGNETIC IMMUNITY</b>	EN 61000-6-2
<b>ROAD VEHICLES</b> ELECTRICAL DISTURBANCES FROM CONDUCTION AND COUPLING — PART 2	ISO 7637-2: 2011
<b>ROAD VEHICLES</b> COMPONENT TEST METHODS FOR ELECTRICAL DISTURBANCES FROM NARROWBAND RADIATED ELECTROMAGNETIC ENERGY — PART 1	ISO 11452-1: 2005
<b>PERFORMANCE AND SAFETY INTEGRITY LEVEL</b>	PLc – SIL1 (SINGLE-CHANNEL INTERNAL SCHEME)

## SIZE (mm)





48 PINS CONNECTOR PINOUT TABLE

PIN	A	B	C	D	E	F	G	H	J	K	L	M
1	DIGITAL / PWM OUTPUT 13	SUPPLY OUTPUTS 9...16	DIGITAL / PWM OUTPUT 12	DIGITAL / PWM OUTPUT 11	DIGITAL / PWM OUTPUT 10	DIGITAL / PWM OUTPUT 9	GND POWER SUPPLY	DIGITAL OUTPUT 8	DIGITAL OUTPUT 7	DIGITAL OUTPUT 6	SUPPLY OUTPUTS 1...8	DIGITAL OUTPUT 4
2	DIGITAL / PWM OUTPUT 14	INPUT 9 0...40Vdc/ DIGITAL	INPUT 8 0...40Vdc/ DIGITAL	INPUT 7 0...40Vdc/ DIGITAL	INPUT 6 4...20mA / 0...40Vdc/ DIGITAL	INPUT 5 4...20mA / 0...40Vdc/ DIGITAL	INPUT 4 4...20mA / 0...40Vdc/ DIGITAL	INPUT 3 4...20mA / 0...40Vdc/ DIGITAL	INPUT 2 0...40Vdc/ DIGITAL	INPUT 1 0...40Vdc/ DIGITAL	DIGITAL OUTPUT 5	DIGITAL OUTPUT 3
			DIGITAL LS OUTPUT 8 500 mA	DIGITAL LS OUTPUT 7 500 mA	DIGITAL LS OUTPUT 6 30 mA	DIGITAL LS OUTPUT 5 30 mA	DIGITAL LS OUTPUT 4 30 mA	DIGITAL LS OUTPUT 3 30 mA	DIGITAL LS OUTPUT 2 500 mA	DIGITAL LS OUTPUT 1 500 mA		
3	DIGITAL / PWM OUTPUT 15	INPUT 10 0...40Vdc/ DIGITAL	FREQ / DIGITAL INPUT 11	FREQ / DIGITAL INPUT 12	INPUT 13 0...40Vdc/ DIGITAL	INPUT 14 0...40Vdc/ DIGITAL	INPUT 15 0...40Vdc/ DIGITAL	INPUT 16 0...40Vdc/ DIGITAL	RS232 RX / CAN2 H *	RS232 TX / CAN2 L *	GND POWER SUPPLY	DIGITAL OUTPUT2
4	DIGITAL / PWM OUTPUT 16	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	CAN H	CAN L	MODULE POWER SUPPLY	GND	DIGITAL OUTPUT1

NOTES:

- «FREQ» means «frequency» - «LS» MEANS «LOW SIDE»
- For digital low side outputs : **low side can't be used if the relative input is used**
- (\*) : pin shared with different functions, see the pin configuration based on hardware configuration table
- Sensor power pins have the reference power supply voltage, MAX 200mA
- GND pins are connected together

TERMINAL WIRE SIZE: follow the manufacturer's mating connector specification

- from A1 to J4: 0.75 mm<sup>2</sup>
- from L1 to M4: 2.0 mm<sup>2</sup>

HARDWARE CONFIGURATION

<b>S01</b>	Nr. 2 CAN PORTS (2° on pins: J3 – K3)
<b>S02</b>	Nr. 1 CAN PORT Nr. 1 RS232 PORT (on pins: J3 – K3)

MATING CONNECTORS – MOLEX CODES

<b>CONNECTOR</b>	64320-3311
<b>TERMINALS</b>	64323-1029 (x8) 64322-1029 (x40)
<b>WIRE CAP</b>	64320-1301
<b>ALMEC PRE-WIRED CONNECTOR</b>	CNN.ML.48P.R.VD.CB (red cable) CNN.ML.48P.B.VD.CB (blue cable)



64320-3311



64323-1029



64322-1029



64320-1301



CNN.ML.48P.R.VD.CB  
CNN.ML.48P.B.VD.CB



**ALMEC**  
MECHATRONICS

NOTE