



The SPN9 controller is an ECU (Electronic Control Unit) which can handle up to 48 inputs and up to 40 outputs.

Easy to program, using the ALMEClab development platform, it can be implemented 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.

It's E3 certified UNECE regulation 10 automotive.



## TECHNICAL FEATURES

<b>MASTER CODE</b>	SPN.9		
<b>POWER SUPPLY</b>	9-36 VDC / CURRENT CONSUMPTION 60 mA AT 24 VDC (STAND BY MODE)		
<b>INPUT</b>	<b>TOTAL 48</b>	MAX 16 ANALOGIC INPUT WITH 0..40 V and 4..20 mA CAPABILITY	RESOLUTION FOR 0..40V INPUT: 10mV
		MAX 16 ANALOGIC INPUT WITH 0..40 V CAPABILITY	RESOLUTION FOR 4..20mA INPUT: 20uA
		MAX 12 OPTO-COUPLED DIGITAL HIGH/LOW SIDE INPUTS	FREQUENCY RANGE FOR COUNTER (1-1000Hz)
		MAX 4 OPTO-COUPLED DIGITAL HIGH SIDE INPUTS WITH PULSE COUNTER	THRESHOLD FOR DIGITAL IN: SW CONFIGURABLE
<b>OUTPUT</b>	<b>TOTAL 40</b>	MAX 24 DIGITAL / PWM OPEN-LOOP / CURRENT CLOSED LOOP	SINGLE OUTPUT MAX CURRENT : 4A TOTAL CURRENT MAX: 32A
		MAX 8 DIGITAL / PWM OPEN-LOOP / CURRENT CLOSED LOOP SAFETY - REDUNDANT OUTPUT STAGE	
		MAX 8 DIGITAL HIGH SIDE LOW CURRENT OUTPUTS	LOW CURRENT OUTPUT CURRENT: 2A TOTAL CURRENT MAX: 8A
<b>CAN BUS</b>	1 PORT: 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S		
<b>CAN BUS PROTOCOLS</b>	CAN OPEN (CIA DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE)		
<b>OPTIONAL ADDITIONAL PORTS</b>	No.1 SERIAL RS232 PORT No.1 CAN-BUS PORT 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S		
<b>CONNECTION</b> <i>See «COUPLING CONNECTORS» table</i>	2 MOLEX 32 PIN 2 MOLEX 48 PIN		
<b>WORKING TEMPERATURE</b>	-40°C + 85°C		
<b>CASE MATERIAL</b>	ENCAPSULATED IN PUR RESIN - SELF-EXTINGUISHING UL94 (V0)		





## ELECTRONIC FEATURES

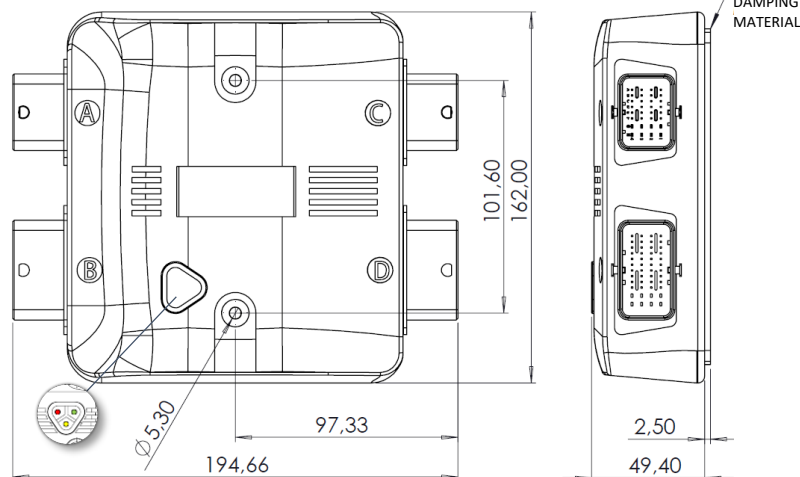
SLAVE USAGE	EDS FILE
MASTER USAGE	ALMEClab
	STANDARD C PROGRAM LANGUAGE
PROGRAMMING	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
CYCLE TIME	1 ms
CPU	FAMILY: ARM CORTEX M4, 32BIT CORE, 120 MHz CLOCK FREQUENCY
INTERNAL MEMORY	FLASH (PROGRAM MEMORY): 1 MB RAM MEMORY: 128 KB

## STANDARDS

ELECTROMAGNETIC EMISSIONS	EN 61000-6-4
ELECTROMAGNETIC IMMUNITY	EN 61000-6-2
ROAD VEHICLES — ELECTRICAL DISTURBANCES FROM CONDUCTION AND COUPLING — PART 2	ISO 7637-2: 2011
ROAD VEHICLES — COMPONENT TEST METHODS FOR ELECTRICAL DISTURBANCES FROM NARROWBAND RADIATED ELECTROMAGNETIC ENERGY — PART 1	ISO 11452-1: 2005
VERIFICATIONS AND TESTS PERFORMED ACCORDING TO THE REQUIREMENTS OF UNECE REGULATION 10 - AMENDMENT 06 - SUPPLEMENT 0	E3 – TYPE APPROVAL
BOX IP	IP68
MTTFd CALCULATED ACCORDING TO THE IEC61709 (SIEMENS SN29500), WITH ENVIRONMENTAL FACTORS 3K7 (IEC60721)	115,34 YEARS
PERFORMANCE AND SAFETY INTEGRITY LEVEL	PLd – SIL2 (DUAL CHANNEL INTERNAL SCHEME)

## SIZE (mm)

- BOARD / APPLICATION STATUS
- CAN STATUS
- BOARD DIAGNOSTIC (256 DISPOSABLE CODE MANAGE FROM PLC)





#### 32 PINS CONNECTOR A

PIN	A	B	C	D	E	F	G	H
1	DIGITAL / PWM OUTPUT 2	DIGITAL / PWM OUTPUT 3	SUPPLY OUTPUTS 3/4	DIGITAL / PWM OUTPUT 4	DIGITAL INPUT 9	GND	DIGITAL / PWM OUTPUT 5	SUPPLY OUTPUTS 5/6
2	SUPPLY OUTPUTS 1/2	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
3	DIGITAL / PWM OUTPUT 1	DIGITAL INPUT 5	DIGITAL INPUT 4	DIGITAL INPUT 3	DIGITAL INPUT 2	DIGITAL INPUT 1	GND	DIGITAL / PWM OUTPUT 6
4	DIGITAL INPUT 6	DIGITAL INPUT 7	DIGITAL INPUT 8	DIGITAL HIGH SIDE OUTPUT 13A	DIGITAL HIGH SIDE OUTPUT 13	DIGITAL HIGH SIDE OUTPUT 14A	DIGITAL HIGH SIDE OUTPUT 14	SUPPLY OUTPUTS 13/13A/14/14A

#### 48 PINS CONNECTOR B

PIN	A	B	C	D	E	F	G	H	J	K	L	M
1	DIGITAL HIGH SIDE OUTPUT 16A	SUPPLY OUTPUTS 15/15A/16/16A	SENSOR POWER SUPPLY	DIGITAL / PWM OUTPUT 7	SUPPLY OUTPUTS 7/8	DIGITAL / PWM OUTPUT 8	GND	DIGITAL / PWM OUTPUT 9	GND	SUPPLY OUTPUTS 9/10	GND	DIGITAL / PWM OUTPUT 10
2	DIGITAL HIGH SIDE OUTPUT 16	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT 11
3	DIGITAL HIGH SIDE OUTPUT 15	DIGITAL INPUT 10	DIGITAL INPUT 11 / SERIAL TX*	DIGITAL INPUT 12 / SERIAL RX*	DIGITAL INPUT 13	DIGITAL INPUT 14	DIGITAL INPUT 15 / CAN2H*	DIGITAL INPUT 16 / CAN2L*	CAN1H	CAN1L	GND	SUPPLY OUTPUTS 11/12
4	DIGITAL HIGH SIDE OUTPUT 15A	ANALOG INPUT 1	LOGIC POWER SUPPLY	ANALOG INPUT 2	ANALOG INPUT 3	ANALOG INPUT 4	ANALOG INPUT 5	ANALOG INPUT 6	ANALOG INPUT 7	ANALOG INPUT 8	GND	DIGITAL / PWM OUTPUT 12

#### 32 PINS CONNECTOR C

PIN	A	B	C	D	E	F	G	H
1	DIGITAL / PWM OUTPUT 18	DIGITAL / PWM OUTPUT 19	SUPPLY OUTPUTS 19/20	DIGITAL / PWM OUTPUT 20	DIGITAL INPUT 25	GND	DIGITAL / PWM OUTPUT 21	SUPPLY OUTPUTS 21/22
2	SUPPLY OUTPUTS 17/18	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
3	DIGITAL / PWM OUTPUT 17	DIGITAL INPUT 21	DIGITAL INPUT 20	DIGITAL INPUT 19	DIGITAL INPUT 18	DIGITAL INPUT 17	GND	DIGITAL / PWM OUTPUT 22
4	DIGITAL INPUT 22	DIGITAL INPUT 23	DIGITAL INPUT 24	DIGITAL HIGH SIDE OUTPUT 29A	DIGITAL HIGH SIDE OUTPUT 29	DIGITAL HIGH SIDE OUTPUT 30A	DIGITAL HIGH SIDE OUTPUT 30	SUPPLY OUTPUTS 29/29A/30/30A

#### 48 PINS CONNECTOR D

PIN	A	B	C	D	E	F	G	H	J	K	L	M
1	DIGITAL HIGH SIDE OUT 32A	SUPPLY OUTPUTS 31/31A/32/32A	SENSOR POWER SUPPLY	DIGITAL / PWM OUTPUT 23	SUPPLY OUTPUTS 23/24	DIGITAL / PWM OUTPUT 24	GND	DIGITAL / PWM OUTPUT 25	GND	SUPPLY OUTPUTS 25/26	GND	DIGITAL / PWM OUTPUT 26
2	DIGITAL HIGH SIDE OUT 32	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT 27
3	DIGITAL HIGH SIDE OUTPUT 31	DIGITAL INPUT 26	DIGITAL INPUT 27	DIGITAL INPUT 28	DIGITAL INPUT 29	DIGITAL INPUT 30	DIGITAL INPUT 31	DIGITAL INPUT 32	CAN1H	CAN1L	GND	SUPPLY OUTPUTS 27/28
4	DIGITAL HIGH SIDE OUTPUT 31A	ANALOG INPUT 9	LOGIC POWER SUPPLY	ANALOG INPUT 10	ANALOG INPUT 11	ANALOG INPUT 12	ANALOG INPUT 13	ANALOG INPUT 14	ANALOG INPUT 15	ANALOG INPUT 16	GND	DIGITAL / PWM OUTPUT 28

#### COUPLING CONNECTORS

	32 PIN	48 PIN
CONNECTOR	64319-3211	64320-3311
TERMINAL	64323-1029 (x8)	64323-1029 (x8)
	64322-1029 (x24)	64322-1029 (x40)
WIRE CAP	64319-1201	64320-1301



\*PIN CONFIGURATION BASED ON THE DEVICE VERSION



**ALMEC**  
MECHATRONICS

NOTE