



SPN6

CONTROLLER



- ECU which can handle up to 48 inputs and up to 40 outputs
- Redundant architecture
- 2 units equipped with PIC high-performance microprocessor
- Freely programmable using open-source environment in C language
- Output current measurement
- Integrated dry contact relay
- Implementable in a CAN network as MASTER or SLAVE unit
- Polyurethane resin case

TECHNICAL FEATURES

MASTER CODE	SPN.6.466	
POWER SUPPLY	9-36 VDC / CURRENT ABSORPTION 50 mA AT 24 VDC (STAND BY MODE)	
INPUT	TOTAL No. 48 INPUTS: • UP TO 16 UNIVERSAL INPUTS, SOFTWARE CONFIGURABLE AS ☐ 4 ÷ 20 mA ☐ 0 ÷ 36 V ☐ High side ☐ Low side ☐ Frequency pulse counter • UP TO 32 DIGITAL INPUT ☐ NPN ☐ PNP	
OUTPUT	RELAY VERSION: TOTAL No. 32 OUTPUTS • UP TO 24 PWM HIGH SIDE OUTPUTS ☐ ECU MAX CURRENT: 20 A ☐ SINGLE OUTPUT MAX CURRENT: 5 A • UP TO 8 RELAY NO CONTACT ☐ SINGLE OUTPUT MAX CURRENT: 3 A	MOSFET VERSION: TOTAL No. 16 OUTPUTS • UP TO 24 PWM HIGH SIDE OUTPUTS ☐ ECU MAX CURRENT: 20 A ☐ SINGLE OUTPUT MAX CURRENT: 5 A • UP TO 16 DIGITAL HIGH SIDE OUTPUTS ☐ SINGLE OUTPUT MAX CURRENT: 3 A
CAN BUS	No. 1 PORT: 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S OPTIONAL: + 1 PORT PROTOCOL: CAN OPEN (CIA DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE) ON REQUEST: SAE J1939 - ISO 11783 (ISO BUS) - FMS	
OPTIONAL RTC	Internal buffer battery for real-time clock (time and date) keeping up to 10 year	
CONNECTION	x2 MOLEX 32 PIN x2 MOLEX 48 PIN	
CASE	ENCAPSULATED IN PUR RESIN - SELF-EXTINGUISHING UL94 (V0)	
WORKING TEMPERATURE	-40°C + 80°C	

See «MATING CONNECTORS»
table



(25/06/2025) - 1



SPN6

CONTROLLER

ELECTRONIC FEATURES

SLAVE USAGE

On CPU B or A

EDS FILE

MASTER USAGE

on CPU A

STANDARD C PROGRAM LANGUAGE

PROGRAMMING

FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL

CPU

PIC 16 bit

INTERNAL MEMORY

FLASH: 192 KB (PROGRAM MEMORY: 164 KB)

RAM MEMORY: 28 KB

EEPROM external: 128 KB

On request: F-RAM 128 KB x 8

STANDARDS

DIRECTIVE

2014/30/EU (EMC)

ELECTROMAGNETIC COMPATIBILITY

EN 50498

ELECTROMAGNETIC EMISSIONS

EN 61000-6-4

ELECTROMAGNETIC IMMUNITY

EN 61000-6-2

ROAD VEHICLES

ISO 7637-2: 2011

ISO 11452-1: 2005

PERFORMANCE AND SAFETY INTEGRITY LEVEL

PLd – SIL2 (DUAL-CHANNEL INTERNAL SCHEME)

ENVIRONAMENT

IEC 60529 (IP67)

IEC 60068-2-1:2008-11

IEC 60068-2-2:2008-11

IEC 60068-2-78:2013-11

IEC 60068-2-27:2008

IEC 60068-2-6:2007

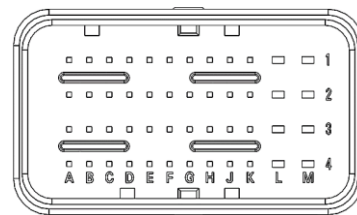
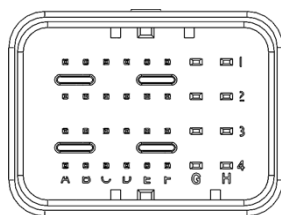
FEATURES





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32 PINS CONNECTOR

A

PIN	A	B	C	D	E	F	G	H
1	DIGITAL / PWM OUTPUT2	DIGITAL / PWM OUTPUT3	SUPPLY OUTPUTS 3/4	DIGITAL / PWM OUTPUT4	DIGITAL INPUT 9	GND	DIGITAL / PWM OUTPUT5	SUPPLY OUTPUTS 5/6
	DIGITAL / PWM OUTPUT2	DIGITAL / PWM OUTPUT3	SUPPLY OUTPUTS 3/4	DIGITAL / PWM OUTPUT4	DIGITAL INPUT 9	GND	DIGITAL / PWM OUTPUT5	SUPPLY OUTPUTS 5/6
2	SUPPLY OUTPUTS 1/2	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
	SUPPLY OUTPUTS 1/2	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
3	DIGITAL / PWM OUTPUT1	DIGITAL INPUT 5	DIGITAL INPUT 4	DIGITAL INPUT 3	DIGITAL INPUT 2	DIGITAL INPUT 1	GND	DIGITAL / PWM OUTPUT6
	DIGITAL / PWM OUTPUT1	DIGITAL INPUT 5	DIGITAL INPUT 4	DIGITAL INPUT 3	DIGITAL INPUT 2	DIGITAL INPUT 1	GND	DIGITAL / PWM OUTPUT6
4	DIGITAL INPUT 6	DIGITAL INPUT 7	DIGITAL INPUT 8	DIGITAL HIGH SIDE OUTPUT13A	DIGITAL HIGH SIDE OUTPUT13	DIGITAL HIGH SIDE OUTPUT14A	DIGITAL HIGH SIDE OUTPUT14	SUPPLY OUTPUTS 13/13A/14/14A
	DIGITAL INPUT 6	DIGITAL INPUT 7	DIGITAL INPUT 8	FREE CONTACT OUTPUT13	FREE CONTACT OUTPUT13	NOT USED	FREE CONTACT OUTPUT14	FREE CONTACT OUTPUT14

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 OUTPUT7	SUPPLY OUTPUTS 7/8	DIGITAL / PWM OUTPUT8	GND	DIGITAL / PWM OUTPUT 9	GND	SUPPLY OUTPUTS 9/10	GND	DIGITAL / PWM OUTPUT10
	FREE CONTACT OUTPUT16	FREE CONTACT OUTPUT 15	SENSOR POWER SUPPLY	DIGITAL / PWM OUTPUT7	SUPPLY OUTPUTS 7/8	DIGITAL / PWM OUTPUT8	GND	DIGITAL / PWM OUTPUT 9	GND	SUPPLY OUTPUTS 9/10	GND	DIGITAL / PWM OUTPUT10
2	DIGITAL HIGH SIDE OUTPUT16	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT11
	FREE CONTACT OUTPUT16	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT11
3	DIGITAL HIGH SIDE OUTPUT15	DIGITAL INPUT 10	DIGITAL INPUT 11	DIGITAL INPUT 12	DIGITAL INPUT 13	DIGITAL INPUT 14	DIGITAL INPUT 15	DIGITAL INPUT 16	CAN H	CAN L	GND	SUPPLY OUTPUTS 11/12
	NOT USED	DIGITAL INPUT 10	DIGITAL INPUT 11	DIGITAL INPUT 12	DIGITAL INPUT 13	DIGITAL INPUT 14	DIGITAL INPUT 15	DIGITAL INPUT 16	CAN H	CAN L	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 OUTPUT12
	FREE CONTACT OUTPUT15	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 OUTPUT12

32 PINS CONNECTOR

C

PIN	A	B	C	D	E	F	G	H
1	DIGITAL / PWM OUTPUT18	DIGITAL / PWM OUTPUT19	SUPPLY OUTPUTS 19/20	DIGITAL / PWM OUTPUT20	DIGITAL INPUT 25	GND	DIGITAL / PWM OUTPUT21	SUPPLY OUTPUTS 21/22
	DIGITAL / PWM OUTPUT18	DIGITAL / PWM OUTPUT19	SUPPLY OUTPUTS 19/20	DIGITAL / PWM OUTPUT20	DIGITAL INPUT 25	GND	DIGITAL / PWM OUTPUT21	SUPPLY OUTPUTS 21/22
2	SUPPLY OUTPUTS 17/18	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
	SUPPLY OUTPUTS 17/18	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND
3	DIGITAL / PWM OUTPUT17	DIGITAL INPUT 21	DIGITAL INPUT 20	DIGITAL INPUT 19	DIGITAL INPUT 18	DIGITAL INPUT 17	GND	DIGITAL / PWM OUTPUT22
	DIGITAL / PWM OUTPUT17	DIGITAL INPUT 21	DIGITAL INPUT 20	DIGITAL INPUT 19	DIGITAL INPUT 18	DIGITAL INPUT 17	GND	DIGITAL / PWM OUTPUT22
4	DIGITAL INPUT 22	DIGITAL INPUT 23	DIGITAL INPUT 24	DIGITAL HIGH SIDE OUTPUT29A	DIGITAL HIGH SIDE OUTPUT29	DIGITAL HIGH SIDE OUTPUT30A	DIGITAL HIGH SIDE OUTPUT30	SUPPLY OUTPUTS 29/29A/30/30A
	DIGITAL INPUT 22	DIGITAL INPUT 23	DIGITAL INPUT 24	FREE CONTACT OUTPUT29	FREE CONTACT OUTPUT29	NOT USED	FREE CONTACT OUTPUT30	FREE CONTACT OUTPUT30

48 PINS CONNECTOR

D

PIN	A	B	C	D	E	F	G	H	J	K	L	M
1	DIGITAL HIGH SIDE OUTPUT32A	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 OUTPUT26
	FREE CONTACT OUTPUT32	FREE CONTACT OUTPUT 31	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 OUTPUT26
2	DIGITAL HIGH SIDE OUTPUT32	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT27
	FREE CONTACT OUTPUT32	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	GND	GND	GND	DIGITAL / PWM OUTPUT27
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	CAN H	CAN L	GND	SUPPLY OUTPUTS 27/28
	NOT USED	DIGITAL INPUT 26	DIGITAL INPUT 27	DIGITAL INPUT 28	DIGITAL INPUT 29	DIGITAL INPUT 30	DIGITAL INPUT 31	DIGITAL INPUT 32	CAN H	CAN L	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 OUTPUT28
	FREE CONTACT OUTPUT 31	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 OUTPUT28

NOTES:

- Sensor power pins have the reference power supply voltage, MAX 500mA
- GND pins are connected together

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

- All pins: 0.75 mm²
- Pins indicated on the last two columns: 2.0 mm²

OUTPUT CONFIGURATION

SPN.6.466.2 MOSFET VERSION

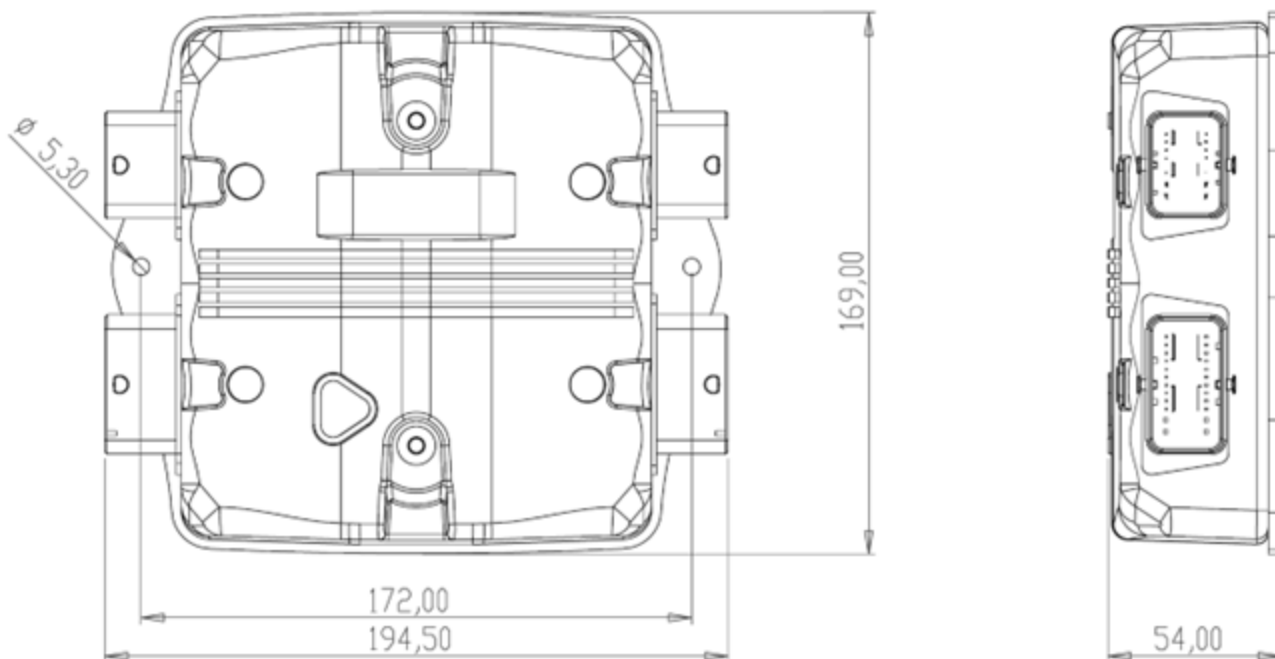
SPN.6.466.3 RELAY VERSION



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CONTROLLER

SIZE (mm)



MATING CONNECTORS – MOLEX CODES

CONNECTOR	64320-3311 64319-3211
TERMINALS	64323-1029 (x8) 64322-1029 (x24)
WIRE CAP	64320-1301 64320-1201
ALMEC PRE-WIRED CONNECTOR	CNN.ML.48P (yellow/blue cable) CNN.ML.32P (red/green cable)



64320-3311
64319-3211



64323-1029



64322-1029



64320-1301



PWM HS OUTPUT FEATURES

PWM FREQUENCY 10 ÷ 500 Hz

INTEGRATED CURRENT MEASURE

I < 200mA	Error = 20%
200mA < I < 300mA	Error = 10%
300mA < I < 500mA	Error = 5%
500mA < I < 5000mA	Error = 1%

SET

DIGITAL ON OFF
OPEN LOOP (PWM VOLTAGE)
CLOSED LOOP (CURRENT CONTROL)



NOTE