



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	<p>TOTAL No. 48 INPUTS:</p> <ul style="list-style-type: none"> • UP TO 16 UNIVERSAL INPUTS, SOFTWARE CONFIGURABLE AS <ul style="list-style-type: none"> <input type="checkbox"/> 4 ÷ 20 mA <input type="checkbox"/> 0 ÷ 36 V <input type="checkbox"/> High side <input type="checkbox"/> Low side <input type="checkbox"/> Frequency pulse counter • UP TO 32 DIGITAL INPUT <ul style="list-style-type: none"> <input type="checkbox"/> NPN <input type="checkbox"/> PNP 	
OUTPUT	<p>RELAY VERSION: TOTAL No. 32 OUTPUTS</p> <ul style="list-style-type: none"> • UP TO 24 PWM HIGH SIDE OUTPUTS <ul style="list-style-type: none"> <input type="checkbox"/> ECU MAX CURRENT: 20 A <input type="checkbox"/> SINGLE OUTPUT MAX CURRENT: 5 A • UP TO 8 RELAY NO CONTACT <ul style="list-style-type: none"> <input type="checkbox"/> SINGLE OUTPUT MAX CURRENT: 3 A 	<p>MOSFET VERSION: TOTAL No. 16 OUTPUTS</p> <ul style="list-style-type: none"> • UP TO 24 PWM HIGH SIDE OUTPUTS <ul style="list-style-type: none"> <input type="checkbox"/> ECU MAX CURRENT: 20 A <input type="checkbox"/> SINGLE OUTPUT MAX CURRENT: 5 A • UP TO 16 DIGITAL HIGH SIDE OUTPUTS <ul style="list-style-type: none"> <input type="checkbox"/> SINGLE OUTPUT MAX CURRENT: 3 A
CAN BUS	<p>No. 1 PORT: 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S <i>OPTIONAL: + 1 PORT</i> 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</p>	
OPTIONAL RTC	Internal buffer battery for real-time clock (time and date) keeping up to 10 year	
CONNECTION <i>See «MATING CONNECTORS» table</i>	<p>x2 MOLEX 32 PIN x2 MOLEX 48 PIN</p>	
CASE	ENCAPSULATED IN PUR RESIN - SELF-EXTINGUISHING UL94 (V0)	
WORKING TEMPERATURE	-40°C + 80°C	



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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)

ENVIRONMENT	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
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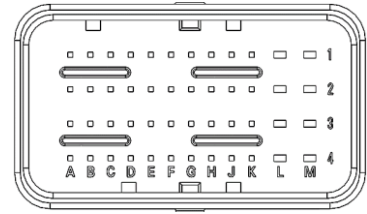
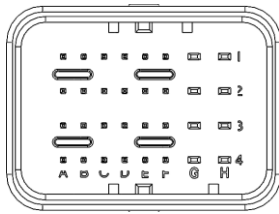
FEATURES





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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
	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
	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
	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
	DIGITAL INPUT 6	DIGITAL INPUT 7	DIGITAL INPUT 8	FREE CONTACT OUTPUT 13	FREE CONTACT OUTPUT 13	NOT USED	FREE CONTACT OUTPUT 14	FREE CONTACT OUTPUT 14

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
	FREE CONTACT OUTPUT 16	FREE CONTACT OUTPUT 15	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
	FREE CONTACT 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	DIGITAL INPUT 12	DIGITAL INPUT 13	DIGITAL INPUT 14	DIGITAL INPUT 15	DIGITAL INPUT 16	CANH	CANL	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	CANH	CANL	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
	FREE CONTACT OUTPUT 15	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
	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
	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
	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
	DIGITAL INPUT 22	DIGITAL INPUT 23	DIGITAL INPUT 24	FREE CONTACT OUTPUT 29	FREE CONTACT OUTPUT 29	NOT USED	FREE CONTACT OUTPUT 30	FREE CONTACT OUTPUT 30

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
	FREE CONTACT OUT 32	FREE CONTACT OUT 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 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
	FREE CONTACT 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	CANH	CANL	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	CANH	CANL	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
	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 OUTPUT 28

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

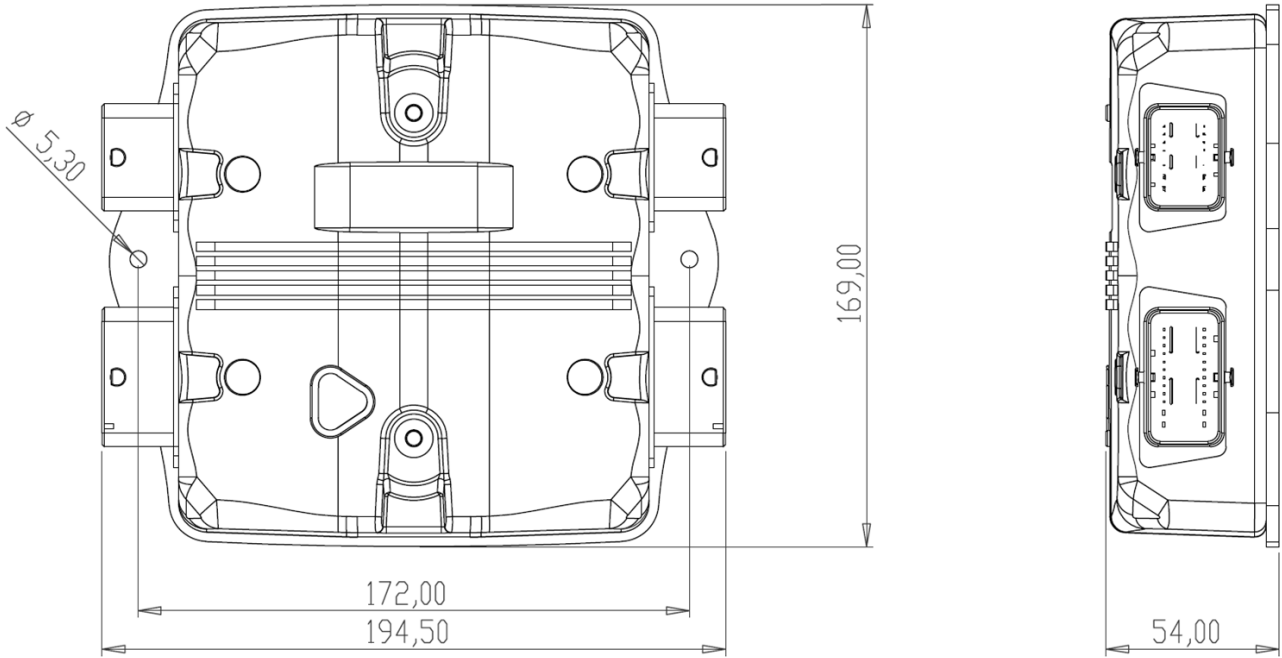
SPN.6.466.3 RELAY VERSION



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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