



SPN5M SMART

CONTROLLER



- ECU equipped with smart high side mosfets
- Up to 16 inputs and up to 16 outputs
- Easily and quickly implemented in a CAN BUS network as SLAVE, with CANopen protocols
- Polyurethane resin case



TECHNICAL FEATURES

MASTER CODE SP.5MS.426

POWER SUPPLY 9-36 VDC – 30mA @ 24 VDC (STANDBY MODE)

INPUT

TOTAL No. 16 INPUTS, SOFTWARE CONFIGURABLE AS:

- UP TO 16 DIGITAL INPUTS (HIGH SIDE)
- UP TO 4 DIGITAL INPUTS (LOW SIDE)
- UP TO 14 ANALOGIC INPUTS (0~40V)
- UP TO 4 ANALOGIC INPUTS (4~20mA)
- UP TO 2 FREQUENCY INPUTS (1~1000Hz)

OUTPUT

TOTAL No. 16 OUTPUTS, SOFTWARE CONFIGURABLE AS:

- UP TO 8 PWM HIGH SIDE OUTPUTS
- UP TO 16 HIGH SIDE OUTPUTS (MAX 2A FOR EACH OUTPUT PIN)
→ MAX TOTAL HIGH SIDE OUTPUTS CURRENT 10 A)
- UP TO 4 DIGITAL LOW SIDE OUTPUT (MAX 500mA FOR EACH OUTPUT PIN)

CAN BUS No. 1 PORT: 2.0B 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)

OPTIONALS RTC (real time clock)
Additional 2nd CAN-BUS PORT

CONNECTION
See «MATING CONNECTORS» table

MOLEX 48 PIN CONNECTOR

CASE ENCAPSULATED IN PUR RESIN - SELF-EXTINGUISHING UL94 (V0)

PROTECTION IP68

WORKING TEMPERATURE -40°C +85°C



(20/02/2026) - 1



SPN5M SMART

CONTROLLER

ELECTRONIC FEATURES

SLAVE USAGE	EDS FILE
PROGRAMMING	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
CYCLE TIME	Less than 0,5 ms
CPU	PIC 16 bit
INTERNAL MEMORY	FLASH: 192 KB (PROGRAM MEMORY: 164 KB) EEPROM: 64 KB

STANDARDS

DIRECTIVE	2014/30/EU (EMC)
ELECTROMAGNETIC COMPATIBILITY	EN 50498
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
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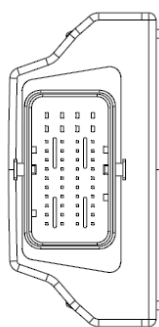
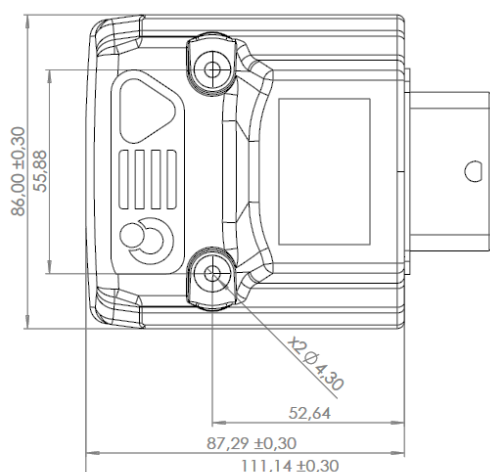
ROAD VEHICLES

COMPONENT TEST METHODS FOR ELECTRICAL DISTURBANCES FROM NARROWBAND RADIATED ELECTROMAGNETIC ENERGY — PART 1	ISO 11452-1: 2005
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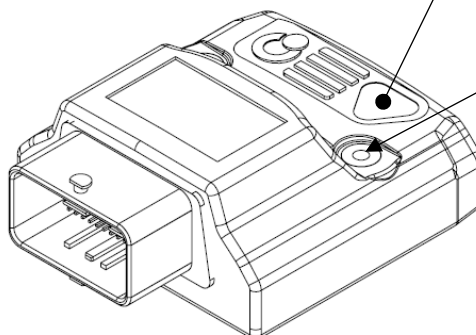
PERFORMANCE AND SAFETY INTEGRITY LEVEL

PLc – SIL1
(SINGLE-CHANNEL INTERNAL SCHEME)

SIZE (mm)



BOARD STATUS
CAN STATUS
DEVICE DIAGNOSTIC

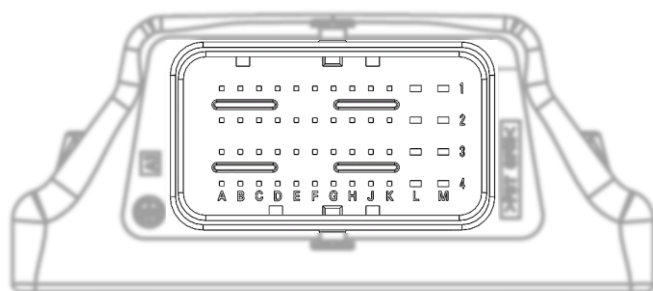


Fix the unit with Hex socket head screws of stainless steel and a sealing washer.



SPN5M SMART

CONTROLLER



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 DIGITAL OUTPUT LOW SIDE 4	INPUT 7 0...40Vdc/ DIGITAL DIGITAL OUTPUT LOW SIDE 3	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 DIGITAL OUTPUT LOW SIDE 2	INPUT 1 0...40Vdc/ DIGITAL DIGITAL OUTPUT LOW SIDE 1	DIGITAL OUTPUT 5	DIGITAL OUTPUT 3
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	CAN2H*	CAN2L*	GND POWER SUPPLY	DIGITAL OUTPUT 2
4	DIGITAL / PWM OUTPUT 16	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	SENSOR POWER SUPPLY	GND	GND	GND	CAN1H	CAN1L	DEVICE POWER SUPPLY (+)	GND	DIGITAL OUTPUT 1

NOTES :

- «FREQ» means «frequency»
- (*) : CAN PORT 2 is an optional available on request
- 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 mm²
- from L1 to M4: 2.0 mm²

MATING CONNECTORS – MOLEX CODES

CONNECTOR	64320-3311
TERMINALS	64323-1029 (x8) 64322-1029 (x40)
WIRE CAP	64320-1301
ALMEC PRE-WIRED CONNECTOR	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

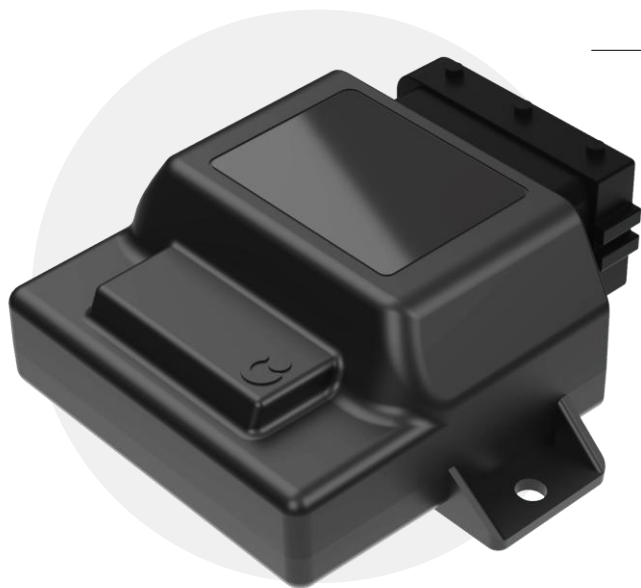


NOTE



ALMEXT

CAN-BUS I/O EXPANDER



- ECU for I/O expansion in a CAN-BUS network systems
- Small form factor
- up to 9 inputs and 8 outputs
- Cortex-M7 high performance CPU
- Designed for Master or slave usage mode
- Internal watchdog for safety architecture systems EN13849 (up to PLd)
- Protected I/O against short-circuit and over-voltage/current
- Rugged and waterproof case



TECHNICAL FEATURES

POWER SUPPLY 9-36 VDC

INPUT **TOTAL No. 9 INPUTS**

- UP TO 5 (4-20 mA/0-40 V/0-5V/DIGITAL LS/DIGITAL HS)
- UP TO 4 ANALOGUE INPUTS (0-40 V)
- 1 IGNITION INPUT

OUTPUT **No. 8 OUTPUTS**
MAX CURRENT EACH: 3 A // DEVICE: 12 A
SOFTWARE CONFIGURABLE AS:

- HIGH-SIDE PWM OPEN-LOOP OUTPUTS WITH CURRENT SENS.
- HIGH-SIDE OUTPUTS

No. 1 SENSOR POWER SUPPLY
VOLTAGE: =V ALIM.
OPTIONAL: STABILIZED +5VDC
CURRENT: MAX 500 mA

CAN BUS **No. 1 PORT**
2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S
PROTOCOLS: CAN OPEN (DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE)

CONNECTION
See «MATING CONNECTORS» table SICMA 24 PIN

ENCLOSURE MATERIAL PC ABS V0

STATUS INDICATION Green and red LED

WORKING TEMPERATURE -40°C +85°C



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ALMEXT

CAN-BUS I/O EXPANDER

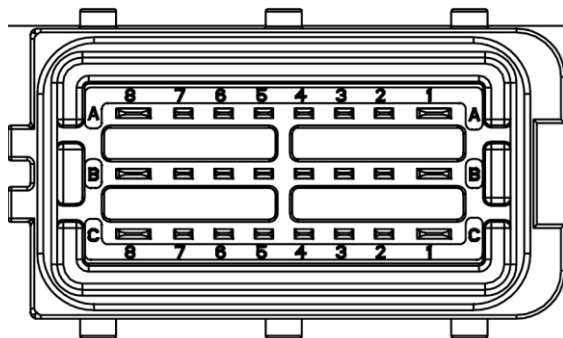
ELECTRONIC FEATURES

SLAVE USAGE	EDS FILE
MASTER USAGE <i>OPTIONAL</i>	C PROGRAM OPEN-SOURCE SOFTWARE <i>OPTIONAL: LOGIClab</i>
PROGRAMMING	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
CPU	Family: 32-bit Arm® Cortex®-M7 With external hardware watchdog
MEMORY	MCU FLASH: 2 MB - RAM: 1 MB External EEPROM: 128 KB <i>OPTIONAL: QSPI 64 MB/128 MB</i>

STANDARDS

APPROVALS	CE: 2014/30/EU UKCA: 2016 No. 1091 The Electromagnetic Compatibility Regulations 2016
ELECTROMAGNETIC COMPATIBILITY	EN 50498
ELECTROMAGNETIC EMISSIONS	EN 61000-6-4
ELECTROMAGNETIC IMMUNITY	EN 61000-6-2
PERFORMANCE AND SAFETY INTEGRITY LEVEL	Up to PL(d)cat.2
ENVIRONMENTAL TESTING	IEC 60068-2-64 IEC 60068-2-27 IEC 60068-2-27 IEC 60068-2-3
PROTECTION	IEC 60529 (IP68)

CONNECTOR PINOUT



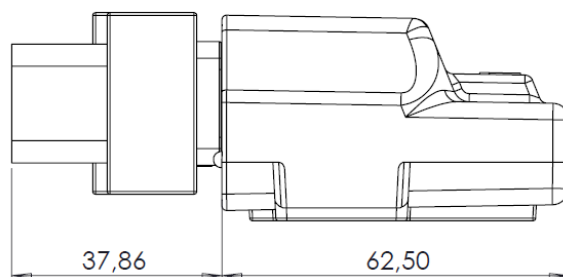
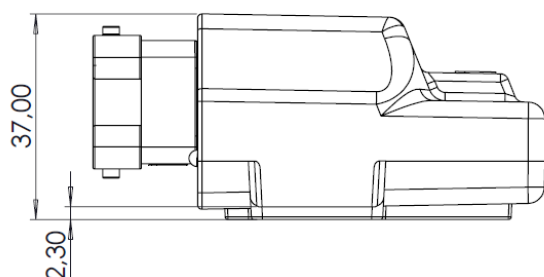
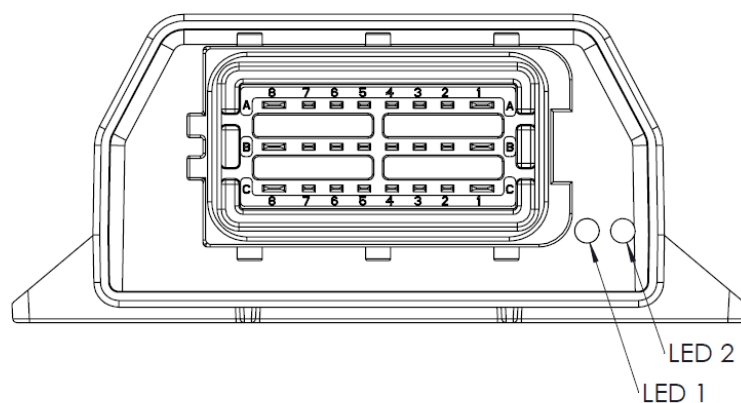
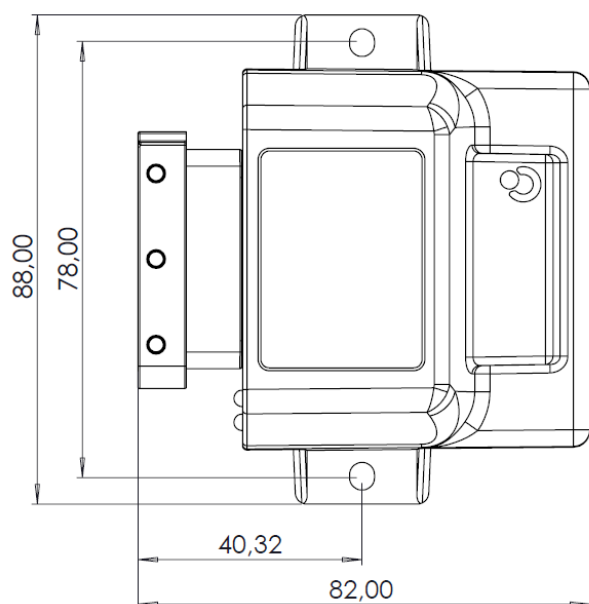
PIN	8	7	6	5	4	3	2	1
A	OUT8	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1	COMMON OUT 1-8
B	OUT7	IN AN 9	IN AN 8	IN AN 7	IN AN 6	CAN H	CAN L	SENSOR P.S. OUT
C	POSITIVE POWER SUPPLY	IGNITION INPUT	IN AN 5	IN AN 4	IN AN 3	IN AN 2	IN AN 1	GND



ALMEXT

CAN-BUS I/O EXPANDER

SIZE (mm)



MATING CONNECTORS – APTIV CODES

COMPONENT	CODE
MATING CONNECTOR BRAND: APTIV	211PC249S0033
TERMINALS BRAND: APTIV	211CC2S2160P
PRE-WIRED CABLES	AVAILAVBLE ON REQUEST





NOTE



ALM-IO

CAN-BUS I/O EXPANDER



- ECU for I/O expansion in a CAN-BUS network systems
- Reverse polarity supply protected
- Small form factor
- Up to 18 inputs
- Up to 4 outputs
- Cortex-M7 high performance CPU
- Protected Output against short-circuit
- Protected Input against over-voltage/current
- Rugged and waterproof case



TECHNICAL FEATURES

POWER SUPPLY	9-36 VDC
CURRENT CONSUMPTION	50mA in STD-BY @24V
INPUT	TOTAL No. 18 INPUTS • UP TO 5 UNIVERSAL INPUT: 4-20mA/0-40V/0-5V/DIGITAL_LS/DIGITAL_HS • UP TO 11 ANALOGUE INPUT: 0-40V/0-5V/DIGITAL_HS • UP TO 4 DIGITAL INPUT: DIGITAL_HS/COUNTER
OUTPUT	No. 4 HIGH SIDE OUTPUTS SINGLE OUTPUT CURRENT: 2A, TOTAL DEVICE CURRENT: 6 A No. 1 SENSOR POWER SUPPLY VOLTAGE = POWER SUPPLY VOLTAGE (OPTIONAL: STABILIZED +5VDC) CURRENT: MAX 500 mA
CAN BUS	No. 1 PORT 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S PROTOCOLS: CAN OPEN (DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE)
CONNECTION	SICMA 24 PIN – Refer to «MATING CONNECTORS» table
ENCLOSURE MATERIAL	PC ABS V0
STATUS INDICATION	Green and red LED
WORKING TEMPERATURE	-40°C +85°C



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ALM-IO

CAN-BUS I/O EXPANDER

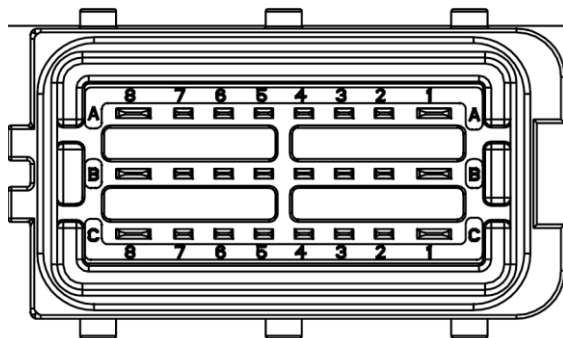
ELECTRONIC FEATURES

SLAVE USAGE	EDS FILE
MASTER USAGE OPTIONAL	C PROGRAM OPEN-SOURCE SOFTWARE
PROGRAMMING	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
CPU	Family: 32-bit Arm® Cortex®-M7 With external hardware watchdog
MEMORY	MCU FLASH: 2 MB - RAM: 1 MB External EEPROM: 1024 KB OPTIONAL: QSPI 64 MB/128 MB

STANDARDS

APPROVALS	CE: 2014/30/EU UKCA: 2016 No. 1091 The Electromagnetic Compatibility Regulations 2016
ELECTROMAGNETIC COMPATIBILITY	EN 50498
ELECTROMAGNETIC EMISSIONS	EN 61000-6-4
ELECTROMAGNETIC IMMUNITY	EN 61000-6-2
ENVIRONMENTAL TESTING	IEC 60068-2-64 IEC 60068-2-27 IEC 60068-2-27 IEC 60068-2-3
PROTECTION	IEC 60529 (IP68)

CONNECTOR PINOUT



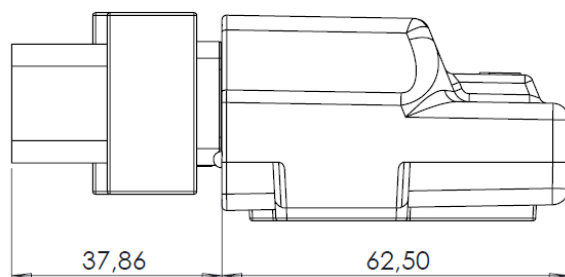
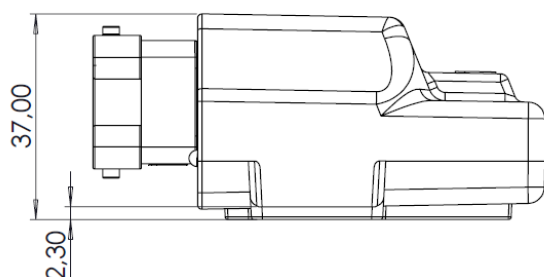
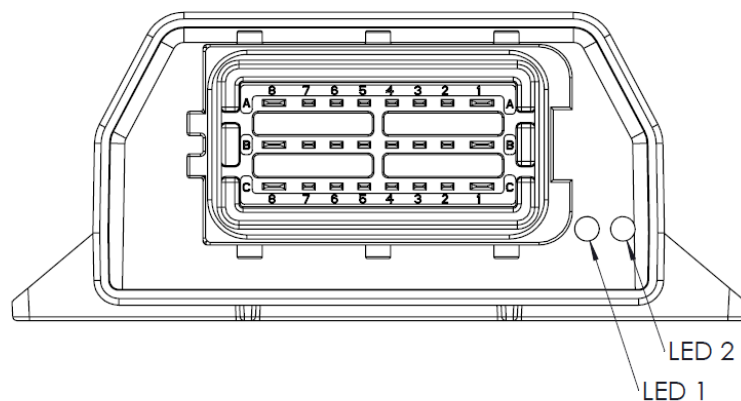
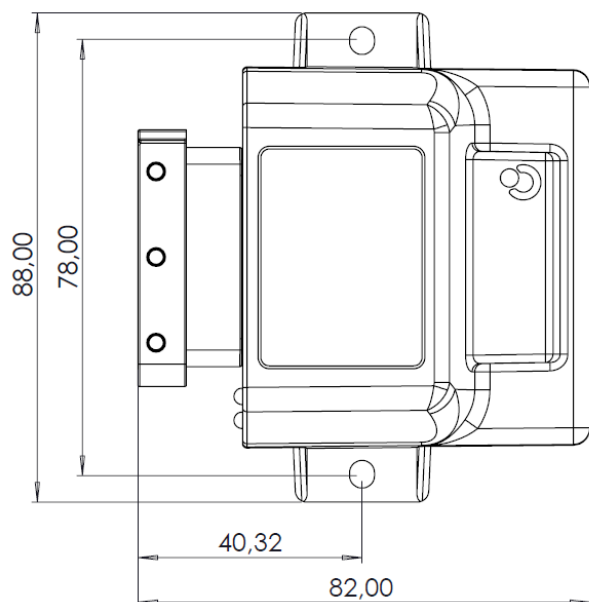
PIN	8	7	6	5	4	3	2	1
A	IN 17 (FAST 3)	IN 16 (FAST 2)	IN 15 (FAST 1)	OUT4 / IN 14	OUT3 / IN 13	OUT2 / IN 12	OUT1 / IN 11	COMMON OUT 1-8
B	IN 18 (FAST 4)	AN IN 9	AN IN 8	AN IN 7	AN IN 6	CAN H	CAN L	SENSOR P.S. OUT
C	POSITIVE POWER SUPPLY	IN 10	AN IN 5	AN IN 4	AN IN 3	AN IN 2	AN IN 1	GND



ALM-IO

CAN-BUS I/O EXPANDER

SIZE (mm)



MATING CONNECTORS – APTIV CODES

COMPONENT	CODE
MATING CONNECTOR BRAND: APTIV	211PC249S0033
TERMINALS BRAND: APTIV	211CC2S2160P
PRE-WIRED CABLES	AVAILAVBLE ON REQUEST





NOTE



SPLIFT-NEXT

DC MOTOR CONTROLLER



- Rugged motor controller for up to 500W dual DC motor drive and vehicle management systems.
- two proportional power channels for traction and steering control.
- Microcontroller with watchdog, to ensure the failsafe operation
- Designed for machines and equipment equipped with a CAN BUS network.



TECHNICAL DATA

MASTER CODE	SPL.485
POWER SUPPLY	20-30 VDC
INPUTS	No. 2 HIGH FREQUENCY DIGITAL INPUTS (HIGH SIDE) No. 4 ANALOGUE INPUTS (4-20mA / 0-5 VDC / 0-30 VDC software selectable) No. 3 ANALOGUE INPUTS (0-30 VDC)*
OUTPUTS	No. 4 DIGITAL HIGH SIDE OUTPUT (MAX 2 A) – SELF PROTECTED DRIVER No. 2 H-BRIDGE (MAX 4 A)
POWER OUTPUTS	No. 2 POWER OUTPUTS for traction motor controller • NOMINAL POWER PER CHANNEL: 500W • MAX CURRENT PER CHANNEL: 50 A • MAX FREQUENCY: 20 KHz MOTOR CONTROL: Indirect magnetic field orientated vector control with sensor
POWER SUPPLY OUTPUT	VSNS: =V ALIM (MAX 1,10 A with PTC)
NETWORK FEATURES	CAN BUS PORT 2.0B COMPLIANT - (11, 29 BIT) - ISO 11898 - UP TO 1MBIT/S PROTOCOLS: CAN OPEN (CiA DS401 DEVICE PROFILE FOR GENERIC I/O MODULE, WITH DS306 EDS FILE) TERMINATOR LINE: integrated (software selectable)
CONNECTIONS	SYSTEM CONNECTOR: 23 PIN AMPSEAL CONNECTOR POWER CONNECTORS: THREAD M6X1 - LENGTH MAX: 16 mm
SIGNALATION	No. 3 device status leds (green, yellow, red)
CASE	ABS - UL94-V0 PLATE: ALLUMINIUM PWR CONNECTORS: ZINCKED STEEL
WORKING TEMPERATURE	-20 +60°C - STORAGE: -40 +85°C





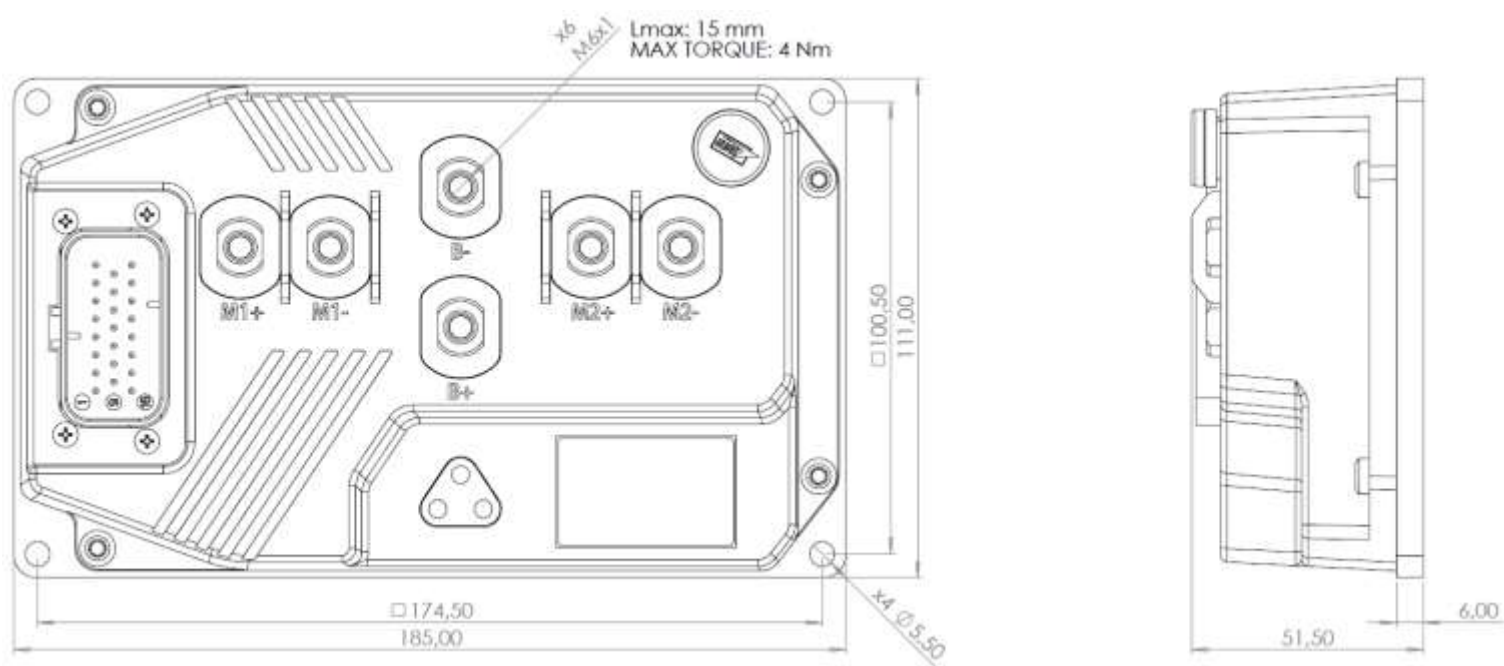
SPLIFT-NEXT

DC MOTOR CONTROLLER

ELECTRONIC FEATURES

SLAVE USAGE	EDS FILE
PROGRAMMING	FIRMWARE UPLOAD BY CAN BUS WITH ALOADER SOFTWARE TOOL
CYBER SECURITY	Secure Update and secure boot ready compliant with CRA
CPU	CPU 1: MAIN CONTROLLER CPU 2: CPU1 WATCHDOG AND POWER MANAGEMENT

SIZE (mm)



STANDARDS

ELECTROMAGNETIC (EMC)	ACCORDING TO DIRECTIVE 2014/30/EU: EN 61000-6-4 EN 61000-6-2 EN 50498
ENVIRONMENTAL TESTING Mechanical shock	IEC 60068-2-64 IEC 60068-2-27 IEC 60068-2-27 IEC 60068-2-30
PERFORMANCE LEVEL	ISO 13849-1:2015 Up to PLd with appropriate system layout
PROTECTION	IEC 60529 (IP65)

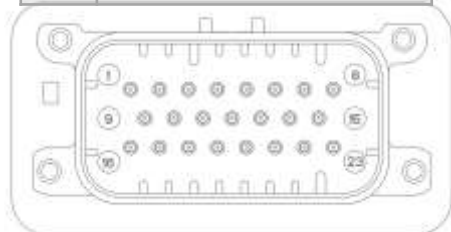


SPLIFT-NEXT

DC MOTOR CONTROLLER

CONNECTIONS

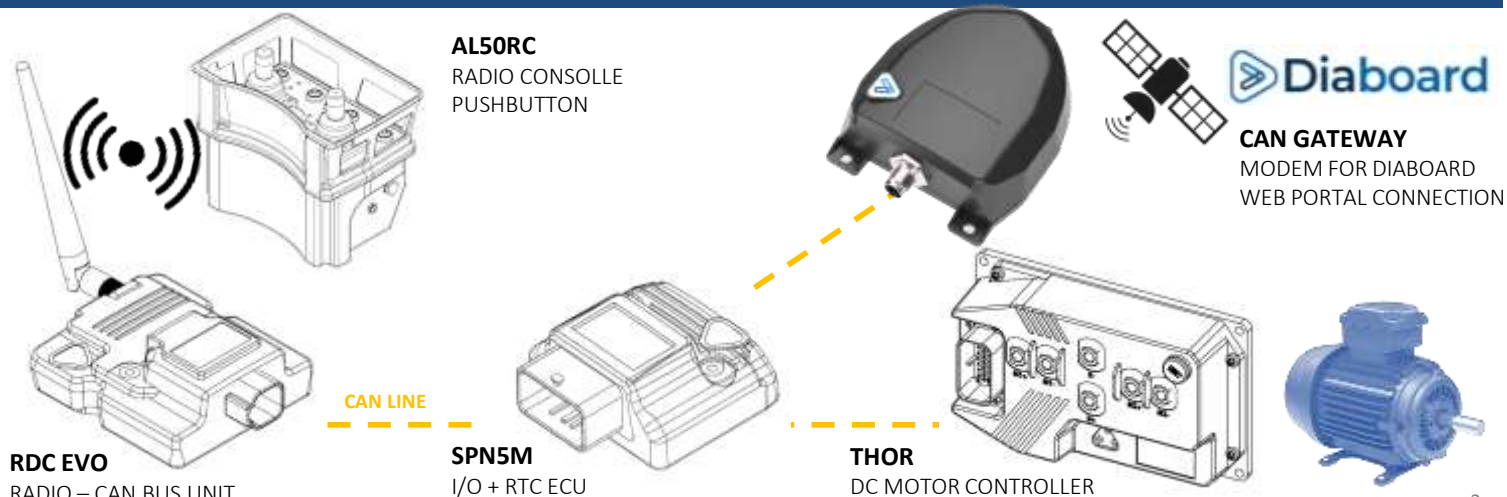
PIN	FUNCTION
1	POWER SUPPLY
2	KEY IGNITION POWER ON
3	AN IN 4
4	AN IN 3
5	AN IN 2*
6	AN IN 1*
7	FAST DIG IN 2
8	FAST DIG IN 1
9	CAN LINE LOW
10	CAN LINE HIGH
11	AN IN 7*
12	AN IN 6
13	AN IN 5
14	H BRIDGE 1
15	H BRIDGE 1
16	V SENS
17	DIG OUT HS 1
18	DIG OUT HS 2
19	DIG OUT HS 3
20	DIG OUT HS 4
21	H BRIDGE 2
22	H BRIDGE 2
23	GND



DES.	PIN	FUNCTION
B	+	POSITIVE power output ps
	-	GND power output ps
M1	+	POSITIVE DC MOTOR power output 1
	-	GND DC MOTOR power output 1
M2	+	POSITIVE DC MOTOR power output 2
	-	GND DC MOTOR power output 2



SYSTEM INTEGRATION example





NOTE