

IPS32 Intelligent Power System

Cosworth's IPS32 uses solid state power devices to upgrade and replace traditional DC fuses and circuit breakers, with the benefit of simplified wiring and better control of power consumers.

Designed to drive a wide range of electrical loads, each of the 32 outputs has user-defined trip limits including reset, math based control strategy, and a measurement of the current and voltage.

Enclosed in a high quality anodised aluminium box, sealed to IP65, there are indicator LED's for all 32 outputs, heartbeat, comms and trip status.

IPS32 is configured using Pi Toolset PC software where the user is able to combine any physical input and or CAN channel to form a control strategy for each power output. Features such as auto start, light sequences, pump control and limp home strategies are all now possible.



With the ability to run on 12v or 24v systems with over voltage and load dump protection and combined with a powerful built in diagnostics logger makes the IPS32 a true standalone intelligent power control system.

Specifications

Electrical Data	
Operating voltage	8-25V or 8-33V Set by nominal pin
Nominal voltage	12V or 24V Set by nominal pin
Load dump protection	100A for 1 second
Current consumption	300mA
Power Outputs (peak current)	2 x 75A 2 x 50A (2 x 20KHz PWM) 8 x 25A (2 x 5KHz PWM) 4 x 15A 16 x 7.5A (8 x 400Hz PWM)
Low Side Drive Outputs	4 x 400Hz 0.1A
Digital Inputs	22 x Switch Inputs (8 x switch to VBatt or GND 14 x switch to GND)
Analogue Inputs	4x Analogue Inputs (12 bits)
Internal sensors	32 x Output Current & Voltage 4 x High Power FET Temp 1 x Box CPU Temp 1 x Battery Voltage
CAN ports	2 x Independent CAN ports Max BAUD rate: 1MBit/s Software selectable 120Ω resistor

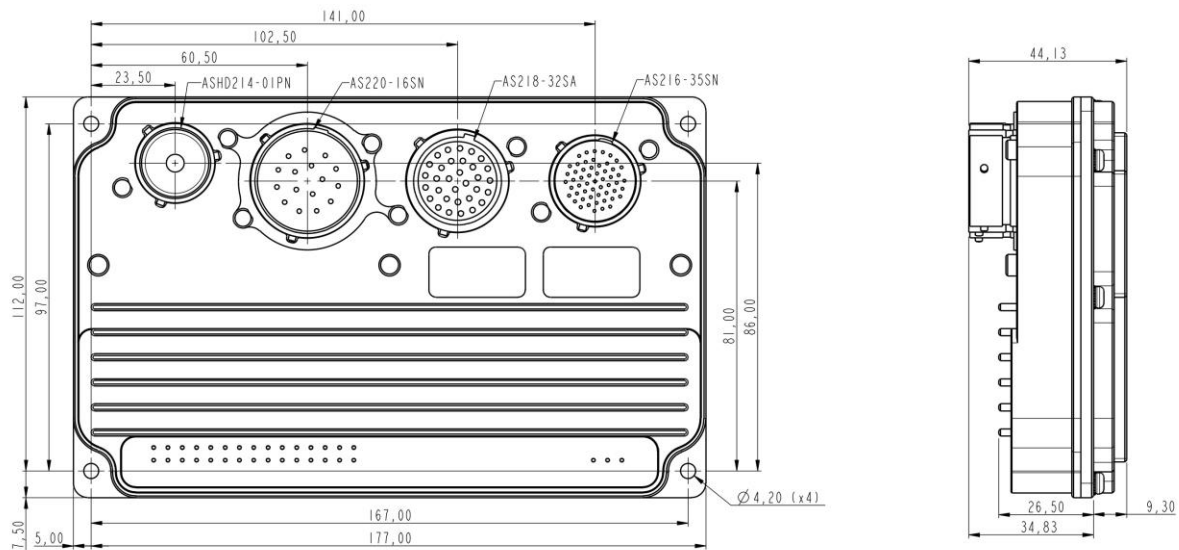
Electrical Data	
Ethernet	1 x 100MB/s - PC comms
LIN Bus	1 x LIN Bus Master with support for Bosch WDA wiper motor

Mechanical Data	
Size without connectors	177 x 112 x 36 mm
Weight	760 grams
Environmental	IP65
Operating temperature	-20°C to +70°C
Storage temperature	-40°C to +80°C
Construction	6082-T6 Aluminium Anodized
Vibration	Cosworth DV-V(c)

Ordering Information

Part Number	
Cosworth IPS32	011-610040
Anti Vibration Mounting Kit (4X Male/Male M4)	13A-609001
Anti Vibration Mounting Kit (4X Male/Female M4)	13A-609002

Dimensions



All Dimensions shown in mm

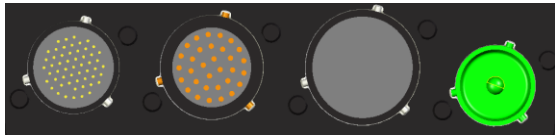
Installation

When installing the IPS32 Power Control Module:

- Ensure unit is protected against severe vibrations by mounting using M4 anti vibration mounts such as those in the Cosworth AV mounting kits (see "Ordering Information"). Also ensure unit is not fouling other structures which may experience severe vibrations.
- Ensure unit is positioned in an area with an ambient temperature of less than 50°C or with sufficient cooling air flow to prevent over heating.
- Ensure unit is mounted away from sources of electrical interference.
- Ensure unit is mounted in position where unit will not come into contact with water.
- Return power grounds separately back to battery.
- Do not ground case.
- Do not exceed pin rating of main power pin connector A.
- Calculate the power consumption accurately, it is possible to overload connector A.
- Some high capacitance loads require a much higher surge rating.
- Some cooling fans demonstrate a high initial starting current.
- Continually resetting an output may lead to overheating of the remote device.
- Install so the output LED's can be observed for operation.
- De-rate input capacity if used in high ambient temperatures.
- Monitor main FET temperature channels to ensure the FET's are not above operational temperature.
- Do not continuously use the load dump feature.

Connector Information

A – Main Power In

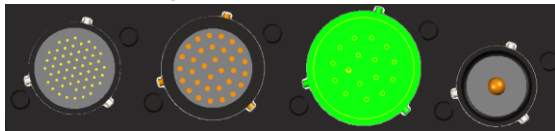


Box Connector	Mating Connector
ASHD214-1PN	ASHD614-1SN

Connector Pinout

Pin	Function	Signal Description	Notes
1.	Batt+	Main Battery +	125A long term; 200A for 2 minutes

B – Output (High Power)



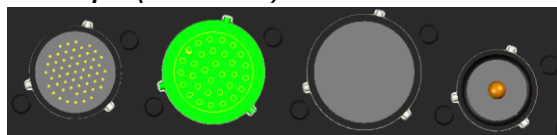
Box Connector	Mating Connector
AS220-16SN	AS620-16PN

Connector Pinout

Pin	Channel	Channel Current	Pin Current	Surge Current		Notes
				10us	1ms	
L	Output 23	25A	25A	400A	35A	5kHz PWM and High Surge ¹
K	Output 24	25A	25A	120A	35A	5kHz PWM
J	Output 25	25A	25A	120A	35A	
H	Output 26	25A	25A	120A	35A	
G	Output 27	25A	25A	120A	35A	
F	Output 28	25A	25A	120A	35A	
C	Output 29	50A	25A	200A	100A	20kHz PWM
D			25A			
B	Output 30	50A	25A	200A	100A	20kHz PWM
N			25A			
A	Output 31	75A	25A	400A	120A	
M			25A			
S			25A			
E	Output 32	75A	25A	400A	120A	
P			25A			
R			25A			

¹ High surge to cope with high capacitance loads, e.g. 10000uF

C – Output (Low Power)



Box Connector	Mating Connector
AS218-32SA	AS618-32PA

Connector Pinout

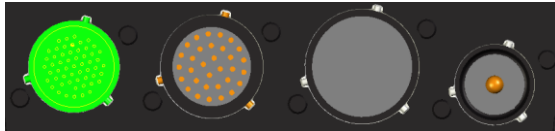
Pin	Channel	Channel Current	Pin Current	Surge Current		Notes
				10us	1ms	
B	Output 1	7.5A	7.5A	75A	35A	Slow Wiper with Freewheel ² and Park ³
T	Output 2	7.5A	7.5A	75A	35A	Fast Wiper with Freewheel ²
C	Output 3	7.5A	7.5A	75A	35A	400Hz PWM
D	Output 4	7.5A	7.5A	75A	35A	400Hz PWM
E	Output 5	7.5A	7.5A	75A	35A	400Hz PWM
F	Output 6	7.5A	7.5A	75A	35A	400Hz PWM
G	Output 7	7.5A	7.5A	75A	35A	400Hz PWM
H	Output 8	7.5A	7.5A	75A	35A	400Hz PWM
J	Output 9	7.5A	7.5A	75A	35A	400Hz PWM
K	Output 10	7.5A	7.5A	75A	35A	400Hz PWM
L	Output 11	7.5A	7.5A	75A	35A	
M	Output 12	7.5A	7.5A	75A	35A	
N	Output 13	7.5A	7.5A	75A	35A	
P	Output 14	7.5A	7.5A	75A	35A	
R	Output 15	7.5A	7.5A	75A	35A	
S	Output 16	7.5A	7.5A	75A	35A	
X	Output 17	15A	7.5A	120A	35A	Slow Wiper with Freewheel ² and Park ³
Y			7.5A			
(a)	Output 18	15A	7.5A	120A	35A	Fast Wiper with Freewheel ²
(b)			7.5A			
Z	Output 19	15A	7.5A	120A	35A	
(h)			7.5A			
(c)	Output 20	15A	7.5A	120A	35A	
(j)			7.5A			
(d)	Output 21	25A	7.5A	120A	35A	
(e)			7.5A			

² When using this output for direct connection wiper motors this output will disconnect or Freewheel the output when the paired winding is being driven.

³ When using this output for direct connection wiper motors this output will connect the output temporarily to ground to park the wiper motor.

Pin	Channel	Channel Current	Pin Current	Surge Current		Notes
				10us	1ms	
(f)			7.5A			
(g)			7.5A			
A	Output 22	25A	7.5A	120A	35A	
U			7.5A			
V			7.5A			
W			7.5A			

D – System



Box Connector	Mating Connector
AS216-35SN	AS616-35PN

Connector Pinout

Pin	Name	Function	Pin Current	Notes
1	VBatt	Fused Batt+ ⁴	2A ⁴	For Switch and Bench use only
2	Gnd	Ground ⁵		For switch use
3	Switch 1	Switch input		Switch to GND or VBATT
4	Switch 2	Switch input		Switch to GND or VBATT
5	Switch 3	Switch input		Switch to GND or VBATT
6	Switch 4	Switch input		Switch to GND or VBATT
7	Switch 5	Switch input		Switch to GND or VBATT
8	Switch 6	Switch input		Switch to GND or VBATT
9	Switch 7	Switch input		Switch to GND or VBATT
10	Switch 8	Switch input		Switch to GND or VBATT
11	Switch 9	Switch input		Switch to GND
12	Switch 10	Switch input		Switch to GND
13	Switch 11	Switch input		Switch to GND
14	Switch 12	Switch input		Switch to GND
15	Switch 13	Switch input		Switch to GND
16	Switch 14	Switch input		Switch to GND
17	Switch 15	Switch input		Switch to GND
18	Switch 16	Switch input		Switch to GND
19	Switch 17	Switch input		Switch to GND
20	Switch 18	Switch input		Switch to GND
21	Switch 19	Switch input		Switch to GND

⁴ Pins 1 and 25 connected together and share 2 Amps total. This is a low power connection to allow bench use only and should not be used to power the main outputs.

⁵ All Grounds are common and connected to the case.

Pin	Name	Function	Pin Current	Notes
22	Switch 20	Switch input		Switch to GND
23	Switch 21	Switch input		Switch to GND
24	Switch 22	Switch input		Switch to GND
25	VBatt	Fused Batt+ ⁴	2A ⁴	For Switch and Bench use only
26	Gnd	Ground ⁵		For switch or analogue input use
27	AN1	Analogue input		0 to 5V
28	AN2	Analogue input		0 to 5V
29	AN3	Analogue input		0 to 5V
30	AN4	Analogue input		0 to 5V
31	PWMout1	PWM LSD control	100mA	Low side drive 400Hz PWM output
32	CAN1-L	CAN 1 Low		1MB/s CAN Bus
33	CAN1-H	CAN 1 High		1MB/s CAN Bus
34	+5V	5V sensor supply	100mA	
35	+5V	5V sensor supply	100mA	
36	Normal Pin	Select the normal 12V or 24V operation ⁶		Unconnected = 12V Connected to GND = 24V Systems
37	GND	Ground ⁵		Ground
38	PWMout2	PWM LSD output	100mA	Low side drive 400Hz PWM output
39	PWMout3	PWM LSD control	100mA	Low side drive 400Hz PWM output
40	CAN2-L	CAN 2 Low		1MB/s CAN Bus
41	CAN2-H	CAN 2 High		1MB/s CAN Bus
42	LIN	LIN bus		19k2 LIN bus, Bosch WDA ready
43	GND	Ground ⁵		LIN ground
44	N/C	Reserved for future use		
45	N/C	Reserved for future use		
46	PWMout4	PWM LSD control	100mA	Low side drive 400Hz PWM output
47	GND	Ground ⁵		IPS32 main ground
48	100T Rx+	Ethernet Comms Rx+		Ethernet White + Green ⁷
49	100T Rx-	Ethernet Comms Rx-		Ethernet Green ⁷
50	GND	Ground ⁵		Comms ground ⁷
51	100T Tx+	Ethernet Comms Tx+		Ethernet White + Orange ⁷
52	100T Tx-	Ethernet Comms Tx-		Ethernet Orange ⁷
53	USB-D+	Programming Comms		USB data +ve
54	USB-VBUS	Programming Comms		USB supply
55	USB-D-	Programming Comms		USB data -ve

⁶ This pin selects the voltage at which the system determines an over-voltage condition nominally 25V or 33V, whereupon the unit shuts down and enters Load Dump by connecting a high power low ohm resistor across the battery supply. Only supported on Issue 1/0 and later.

⁷ Note that all Ethernet wiring must use **Category 5 cable (Cat 5)** suitable for 100BASE-Tx. Cosworth recommend TE CEC-RWC-20116 cable. See installation instructions for more details.

Recycling and Environmental Protection

Cosworth Electronics is committed to conducting its business in an environmentally responsible manner and to strive for high environmental standards.

Manufacture

Cosworth products comply with the appropriate requirements of the Restriction of Hazardous Substances (RoHS) directive (where applicable).

Disposal

Electronic equipment should be disposed of in accordance with regulations in force and in particular in accordance with the Waste in Electrical and Electronic Equipment directive (WEEE).

Battery

This equipment contains a rechargeable battery. (Lithium Vanadium Pentoxide).

The equipment may be returned to Cosworth Electronics for a replacement battery. (A charge will be made for this service).


Removal of the battery by the user may void any warranty on the equipment.

To remove the battery for recycling:

- Remove the case cover(s).
- Remove the printed circuit boards from the case.
- Remove the battery from the printed circuit board.

Dispose of the battery in accordance with regulations in force.

Declaration of Conformity

<p>9. Declaration of Conformity</p> <p>We, the undersigned,</p> <p>Cosworth Electronics Limited Brookfield Technology Centre, Cottenham, Cambridgeshire, CB24 8PS United Kingdom</p> <p>Certify and declare under our sole responsibility that the following equipment:</p> <p>IPS32 – part numbers 011-610040; 011-610040-P; 011-610040-P-R – part numbers 011-610040-R; 011-610040-24V</p> <p>A Power Control Module for use only in motorsport applications</p> <p>Conforms to the following EC directives including applicable amendments:</p> <p>EMC Directive 89/336/EEC, 72/245/EEC (last amended 2004/104/EC)</p> <p>The following standards have been applied:</p> <p>2004/104/EC</p> <p>Cottenham, 12 November 2013</p> <p></p> <hr/> <p>Thomas Buckler : Business Unit Leader</p>

