

COSWORTH

SYNCHRONOUS JUNCTION UNIT

SJU

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SJU

Overview

The Synchronous Junction Unit (SJU) is a high performance I/O expansion module that works in conjunction with a Cosworth EtherCAT capable device to provide high precision synchronous logging and control.

24 x independent 16bit ADCs each sample simultaneously at 50kHz and incorporate multi-stage FIR filters to provide filtered samples at 1kHz; perfect for advanced chassis and suspension analysis.

Up to 5 x SJU devices can be connected and synchronised together using a single EtherCAT network; so that every SJU in the system samples its high resolution inputs at exactly the same point in time. This is critical when analysing the relationship between signals collected from different sensors around the vehicle.



The SJU supports many different types of sensors, including amplified strain gauges, linear potentiometers, PT100, PT1000, hall effect, VRS and DF11i wheel speed sensors.

High power sensors or low power actuators can also be powered from any of the 6 x HSD outputs, which are capable of pulse width modulation (PWM).

This means SJUs offer the flexibility of locating the acquisition close to sensors, reducing the weight and complexity of wiring, but maintaining precision.

Electrical Data	
Operating Voltage	6 to 32V
Current Consumption	296mA ^{*1} @ 13.8V
Communication	
Serial Debug Port	1x Bi-directional RS232 Fixed at 115200 BAUD rate
EtherCAT	2 x EtherCAT Ports (1x IN 1x OUT)
I/O	
Data Transmission Rate	All channels available at 1Khz
Digital Inputs	4x High Frequency (10kHz) Supports hall effect/VRS/DF11i speed sensor Supports IR lap timing & switches. Selectable 3k3 pull-up to 5V or level shift for passive sensors
Analogue Inputs	24 x Analogue Inputs (AIN1-8, Selectable 330R Pull Up for PT100 Sensors) 0 to 5V 16 bit resolution 2.2MΩ input impedance Synchronous sampling Multi-stage FIR filter
Excitations	8 x 5V±0.25% supply @ 100mA ^{max} 4 x software selectable 5V/12V 5V±0.25% @ 100mA ^{max} 12V±0.5V @ 700mA ^{max} 2.9A total max current for all 4 excitations

I/O Cont	
PWM HSD's	6 x HSD/PWM Battery voltage +0/-0.5V @ 700mA 400Hz Maximum PWM Frequency
LED's	4 x Status LEDs for Power and EtherCAT
Internal Monitoring	Battery Voltage Box Temp HSD Voltage and Current Sensor Excitations Internal PSUs
Mechanical Data	
Material	6082-T6
Dimensions	95 x 102 x 34 mm
Weight	349 grams
Fixings	4 x M4 AV Mounts
Operating Temp	-20 to +70°C
Storage Temp	-30 to +80°C
IP Rating	IP66

Ordering Information

Description	Part Number
SJU	01L-650050
SJU Bench Loom	60L-650060

*1 Supply current based on unit only, with all excitations connected this could be up to 3.1A

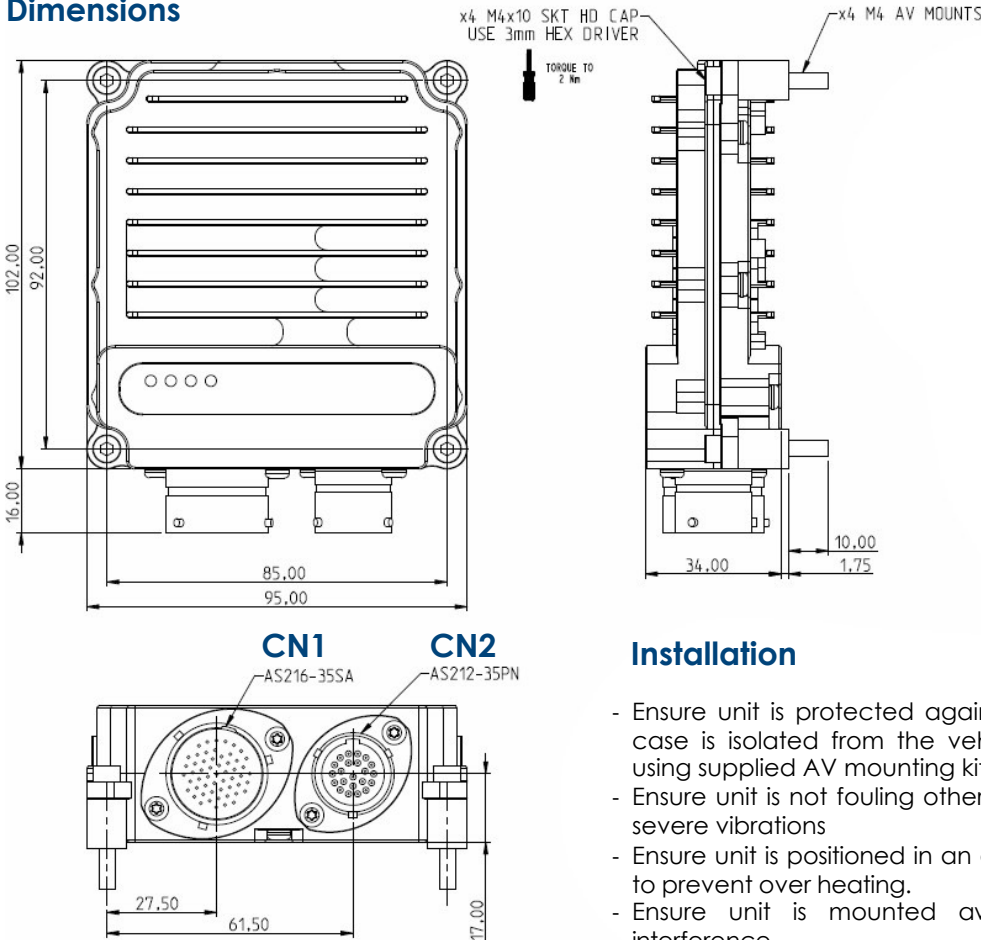
*2 Only analogue inputs 1 to 8 have software selectable 330R pullups for use with PT100 sensors

EtherCAT ® is a registered trademark and patented technology, licenced by Beckhoff Automation GmbH, Germany.

LED Indicator Definitions

Legend	Colour	LED Modes	LED Definition
⏻	Red	Off	No Power to the Unit
		Single Flash	1Hz 250ms On 750ms Off
RN	Green	Blinking	1Hz 500ms On 500ms Off
		Off	Initialising and looking for clock sync Sync achieved unit operational
		Blinking	2.5Hz 200ms ON 200ms Off
		Single Flash	2.5Hz 200ms On 1000ms Off
		Flickering	10Hz 50ms On 50ms Off
L/A I	Green	On	EtherCAT Initialisation or Bootstrap
		Off	EtherCAT Operational
		Flickering	10Hz 50ms On 50ms Off
LA/ O	Green	On	EtherCAT No connection to the preceding module
		Off	EtherCAT LINK: Connection to the preceding module
		Flickering	10Hz 50ms On 50ms Off
			EtherCAT ACT: Communication with preceding module
			No connection to the following module
			LINK: Connection to the following module
			ACT: Communication with following module

Dimensions



Installation

- Ensure unit is protected against severe vibrations and that the case is isolated from the vehicle chassis ground by mounting using supplied AV mounting kit.
- Ensure unit is not fouling other structures which may experience severe vibrations
- Ensure unit is positioned in an area 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 liquid.

Connector Information

Please note, pin allocation is in functional order not pin number order.

C1 – Expansion Connector

Connector	Mating Connector
AS216-35SA	AS616-35PA

Pinout

Pin	Signal	Description
33	AIN1	8 x Analogue Input with software selectable 330R pull-up to +5V Input filter 234kHz ADC filter response 22.5kHz Adaptive digital filtering dependent upon sample frequency 0 to 5V input with 16 bit resolution
47	AIN2	
34	AIN3	
41	AIN4	
42	AIN5	
48	AIN6	
53	AIN7	
27	AIN8	
43	AIN9	16 x Analogue Input with fixed 2M2 pull-down resistor Input filter 234kHz ADC filter response 22.5kHz Adaptive digital filtering dependent upon sample frequency 0 to 5V input with 16 bit resolution
35	AIN10	
44	AIN11	
36	AIN12	
38	AIN13	
37	AIN14	
29	AIN15	
23	AIN16	
15	AIN17	
14	AIN18	
13	AIN19	
7	AIN20	
20	AIN21	
12	AIN22	
11	AIN23	
4	AIN24	
19	DIGIN1	4x Digital Inputs Selectable 3k3 pull-up to 5V or level shift for passive sensors.
18	DIGIN2	
10	DIGIN3	
17	DIGIN4	

C1 – Expansion connector continued

Pin	Signal	Description
16	EXT5/12VPSU1	4 x 5V or 12V software selectable excitation 5V @ 100mA, 12V @ 700mA 2.9A total max current for all 4 excitations
9	EXT5/12VPSU2	
8	EXT5/12VPSU3	
3	EXT5/12VPSU4	
54	EXT5VPSU1	8 x 5V Excitation @100mA
55	EXT5VPSU2	
51	EXT5VPSU3	
52	EXT5VPSU4	
46	EXT5VPSU5	
39	EXT5VPSU6	
31	EXT5VPSU7	
24	EXT5VPSU8	
5	PWM4	400Hz maximum PWM frequency
1	PWM5	
2	PWM6	
6	GND	12 x Grounds These are all common connections which can be used for any ground connection
21	GND	
22	GND	
25	GND	
26	GND	
28	GND	
30	GND	
32	GND	
40	GND	
45	GND	
49	GND	
50	GND	

Connector Information

Please note, pin allocation is in functional order not pin number order.

C2 – System Connector

Connector	Mating Connector
AS212-35PN	AS612-35SN

Pinout

Pin	Signal	Description
8	BATT+	Battery Supply +VE
9	BATT+	
4	BATT-	Battery Supply -VE
5	BATT-	
19	PWM1	400Hz maximum PWM frequency Switches between ground and battery voltage @ 700mA
10	PWM2	
20	PWM3	
7	ECATINTX+	EtherCAT 100BaseT IN
18	ECATINTX-	
17	ECATINRX+	
6	ECATINRX-	
3	ECATOUTTX+	EtherCAT 100BaseT OUT
16	ECATOUTTX-	
15	ECATOUTRX+	
2	ECATOUTRX-	
14	RS232DEBTX	RS232 Debug
21	RS232DEBRX	
22	RS232DEBGND	
1	Unused	Unused pins
11	Unused	
12	Unused	
13	Unused	

Recycling and Environmental Protection

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

Manufacture

Cosworth products comply with the appropriate requirements of the Restriction of Hazardous Substance (RoHS)

Disposal

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



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