



## PDU - X3

**High power motorsport Power Distribution Unit (PDU). Combines a robust billet aluminium case and the very latest power driving technology with the highest efficiency in the industry. A total of 34 output channels with a max current capacity of 350A**

**Clear and Powerful Fully Graphical Logic Programming Software** - Easy to read and follow with full logic simulation ability, complete operational logic schematics can be physically printed giving quick and easy reference material for engineers working on building or maintaining the vehicle wiring.

**Inputs** - 16 flexible input channels capable of support 0-5v, Thermistor, Bi-polar and Frequency type signals

**Slave Link** - enables Syvecs ECU units to directly claim access to the PDUx3's input and output channels in order to receive data from or else control those channels with ultra-low latency

**Flexible outputs** - 10x extremely flexible output drivers configurable to operate as high power High side power switching, as Half-bridge or paired into 5x Full-bridges, these 10 outputs can also be configured to operate as low-side PWM drivers.

The PDUx3's combined flexibility allows racing vehicle system designers the freedom to use these robust PDU output channels to perform high speed control tasks managed by our S7, S8 and S12 ECU. Some examples of are, direct closed loop power control of electric engine coolant pumps, fuel and oil pump power, VVT position actuators (both motors and solenoids), direct control of DBW systems.

The PDUx3 is capable of configurable soft starting of electrical loads as well as closed loop current limitation, this can be used to reduce large, short duration inrush current which can be generated when switching on large electrical loads such as high power radiator cooling fans.

**Powerful Networking** - 3x CAN 2.0b, 1x LIN as well as a two port Ethernet switch

**Advanced Power Management** - the PDUx3 can be user configured with options for simple on/off operation with the units main supply voltage. But is also capable of automatic wake/sleep operation which can be set to be triggered either by switching dedicated "wake" pin, or can be configured to wake on activation of inputs channels 13 to 16.

The wake and sleep operation of the unit can also be controlled by CAN bus operation, wake on bus activity or upon receipt of a specific CAN message, all with fully user configurable address's and operational parameters as well as timeout settings for auto sleep.

**Features:**

- Schematic based calibration including logic simulation tool
- Low power state woken on physical input, CAN activity, or specific CAN frame

**Outputs:**

- 34 Main Power - High Side Outputs, Outputs 1-20 rated to 30A, Outputs 21-34 rated to 15A
  - Outputs 1-10 are multifunction high side, low side, PWM, H-Bridge, soft start outputs (peak current 100A)
  - Outputs 10-34 High Side outputs (peak current 125A)
  - Output teaming to support very high current devices possible
- 4 Additional Low Side Outputs (PWM capable – 8amps)
- All outputs short circuit and thermally protected with multi-stage in-rush control
- Combined diagnostic output with reset input
- Up to 64 soft outputs via CAN

**Inputs:**

- 16 physical switch inputs or, when slaved, general purpose analogue sensor inputs including:
  - 8x frequency measurement inputs (4 optionally bi-polar)
  - software selectable 3k ohm pull-up resistors
  - 4x inputs capable of programmable “wake up” functionality
- Dedicated wake pin
- Up to 64 soft inputs via CAN with configurable validation and debounce time

**Interfaces:**

- x2 100Mbit/s full duplex Ethernet (can be used as Ethernet switch)
- x3 CAN 2.0B
- RS232C serial interface
- LIN Bus

**Physical**

- 2 Leavy-seal connectors with a total of 113 pins
- Amphenol SurLok Power Stud
- Machined Aluminium enclosure
- 200x130x54mm (including connectors)
- 850grams
- Operating Temperature up to +85C

## Wiring Information:

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### Power Stud

*Mating connector: Surlok SLPPCxxBSR0  
(xx=size: 50 200A, 70 250A 85 300/350A)*

Pin	Gauge	Signal Name	Signal Notes
1	-	+12V Supply	Positive battery supply

### Connector 1

*Mating connector: 1-1534127- , Hood: 9-1394050-1*

Pin	Gauge	Signal Name	Signal Notes
1	20-12AWG	Power Ground	Negative battery supply
2	20-12AWG	Output 20	High Side - 30Amps
3	20-12AWG	Output 19	High Side - 30Amps
4	20-12AWG	Output 18	High Side - 30Amps
5	20-12AWG	Output 17	High Side - 30Amps
6	20-12AWG	Output 16	High Side - 30Amps
7	20-12AWG	Output 15	High Side - 30Amps
8	20-12AWG	Output 14	High Side - 30Amps
9	20-12AWG	Output 13	High Side - 30Amps
10	20-12AWG	Output 12	High Side - 30Amps
11	20-12AWG	Output 11	High Side - 30Amps
12	20-12AWG	Output 10	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
13	20-12AWG	Output 9	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
14	20-12AWG	Output 8	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
15	20-12AWG	Output 7	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
16	20-12AWG	Output 6	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
17	20-12AWG	Output 5	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
18	20-12AWG	Output 4	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
19	20-12AWG	Output 3	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
20	20-12AWG	Output 2	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps
21	20-12AWG	Output 1	High Side, Low Side, Low Side PWM, Half Bridge, Full Bridge, Soft start <sup>(1)(2)</sup> - 30Amps

**Wiring Information:****Connector 2***Mating Connector: 1703998-1, Hood 1703997-1*

Pin	Gauge	Signal Name	Signal Notes
1	-	DO NOT CONNECT	
2	-	DO NOT CONNECT	
3	-	DO NOT CONNECT	
4	-	DO NOT CONNECT	
5	-	DO NOT CONNECT	
6	-	DO NOT CONNECT	
7	-	DO NOT CONNECT	
8	-	DO NOT CONNECT	
9	-	DO NOT CONNECT	
10	-	DO NOT CONNECT	
11	-	DO NOT CONNECT	
12	-	DO NOT CONNECT	
13	-	DO NOT CONNECT	
14	-	DO NOT CONNECT	
15	-	DO NOT CONNECT	
16	24-16AWG	Output 34	High Side - 15Amps
17	24-16AWG	Output 32	High Side - 15Amps
18	24-16AWG	Output 30	High Side - 15Amps
19	24-16AWG	Output 28	High Side - 15Amps
20	24-16AWG	Output 26	High Side - 15Amps
21	24-16AWG	Output 24	High Side - 15Amps
22	24-16AWG	Output 22	High Side - 15Amps
23	24-16AWG	Low Output 11	Low Side, Low Side PWM - 8 Amps
24	-	DO NOT CONNECT	
25	-	DO NOT CONNECT	
26	-	DO NOT CONNECT	
27	-	DO NOT CONNECT	
28	-	DO NOT CONNECT	
29	-	DO NOT CONNECT	
30	-	DO NOT CONNECT	
31	-	DO NOT CONNECT	
32	-	DO NOT CONNECT	
33	-	DO NOT CONNECT	
34	-	DO NOT CONNECT	
35	-	DO NOT CONNECT	
36	-	DO NOT CONNECT	
37	-	DO NOT CONNECT	
38	-	DO NOT CONNECT	
39	24-16AWG	Output 33	High Side - 15Amps
40	24-16AWG	Output 31	High Side - 15Amps
41	24-16AWG	Output 29	High Side - 15Amps
42	24-16AWG	Output 27	High Side - 15Amps
43	24-16AWG	Output 25	High Side - 15Amps
44	24-16AWG	Output 23	High Side - 15Amps
45	24-16AWG	Output 21	High Side - 15Amps
46	24-16AWG	Low Output 12	Low Side, Low Side PWM - Amps

## Connector 2

Continued...

Pin	Gauge	Signal Name	Signal Notes
47	24-16AWG	INPUT 01	Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
48	24-16AWG	INPUT #03	Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
49	24-16AWG	INPUT #05	Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
50	24-16AWG	INPUT #07	Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
51	24-16AWG	INPUT #09	Analogue 0-5V, 3kΩ programmable pullup to 5V
52	24-16AWG	INPUT #11	Analogue 0-5V, 3kΩ programmable pullup to 5V
53	24-16AWG	INPUT 13	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake <sup>(5)</sup>
54	24-16AWG	INPUT 15	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake <sup>(5)</sup>
55	24-16AWG	SENSOR GND	Protected sensor ground
56	24-16AWG	5V OUT	Regulated 5V sensor supply rail
57	24-16AWG	LOGIC POWER IN	See Notes Below
58	24-16AWG	WARNING AND RESET SW	Warning output for an LED to ground. Short to ground for manual reset.
59	24-16AWG	RS232 RX	RS232 receive
60	24-16AWG	CAN #03 HI	NOT CURRENTLY IN USE
61	24-16AWG	CAN #02 HI	ECU Slave (terminated)
62	24-16AWG	CAN #01 HI	CA communication port 120Ω software selectable termination <sup>(3)</sup>
63	24-16AWG	ETHERNET2 RX+	Ethernet communication port 2
64	24-16AWG	ETHERNET2 TX+	Ethernet communication port 2
65	24-16AWG	ETHERNET1 RX+	Ethernet communication port 1
66	24-16AWG	ETHERNET1 TX+	Ethernet communication port 1
67	24-16AWG	Power Ground	Negative battery supply
68	24-16AWG	Low Output 13	Low Side, Low Side PWM – 8 Amps
69	24-16AWG	Low Output 14	Low Side, Low Side PWM – 8
70	24-16AWG	INPUT #02	Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
71	24-16AWG	INPUT #04	Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
72	24-16AWG	INPUT #06	Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
73	24-16AWG	INPUT #08	Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V <sup>(4)</sup>
74	24-16AWG	INPUT 10	Analogue 0-5V, 3kΩ programmable pullup to 5V
75	24-16AWG	INPUT 12	Analogue 0-5V, 3kΩ programmable pullup to 5V
76	24-16AWG	INPUT 14	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake <sup>(5)</sup>
77	24-16AWG	INPUT 16	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake <sup>(5)</sup>
78	24-16AWG	SENSOR GND	Protected sensor ground
79	24-16AWG	Power Ground	Negative battery supply
80	24-16AWG	WAKE P	See notes below
81	24-16AWG	LIN	NOT CURRENTLY IN USE
82	24-16AWG	RS232 TX	RS232 transmit
83	24-16AWG	CAN #03 LO	NOT CURRENTLY IN USE
84	24-16AWG	CAN #02 LO	ECU Slave (terminated)
85	24-16AWG	CAN #01 LO	CA communication port 120Ω software selectable termination <sup>(3)</sup>
86	24-16AWG	ETHERNET2 RX-	Ethernet communication port 2
87	24-16AWG	ETHERNET2 TX-	Ethernet communication port 2
88	24-16AWG	ETHERNET1 RX-	Ethernet communication port 1
89	24-16AWG	ETHERNET1 TX-	Ethernet communication port 1
90	24-16AWG	Power Ground	Negative battery supply
91	24-16AWG	Power Ground	Negative battery supply
92	24-16AWG	Output 21D	High Side with Diode

### Logic Power In

Logic power in exists to allow the PDU electronics supply to be protected from voltage drops due to large current demand at the positive power connector. The idea is to run a small (~0.5A) wire back to the master or the battery separately from the main power connection. The logic will not see the voltage drop caused on the main power line by big current spikes and will therefore be less likely to be reset by them. This also allows the PDU logic to be alive (for communications and programming) while the main power connection is disconnected, which can be useful in-car and also for bench power-up looms.

### WakeUP Pin

Wake pin is active-high, will always turn the device on (unlike wake on inputs 13..16 which are optional wake). Does not need to be connected if 'always on' is set in the power config in PduSetup; should not be connected if other wake source is used like wake-on-Can

### Footnotes:

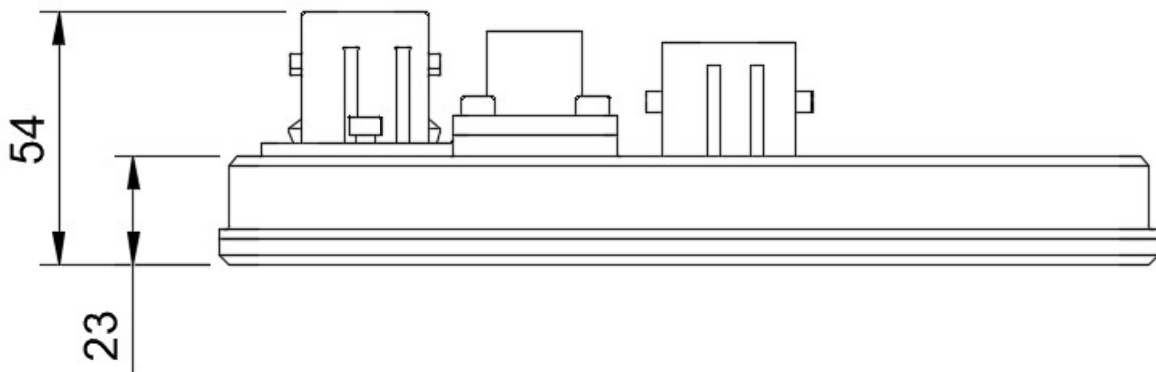
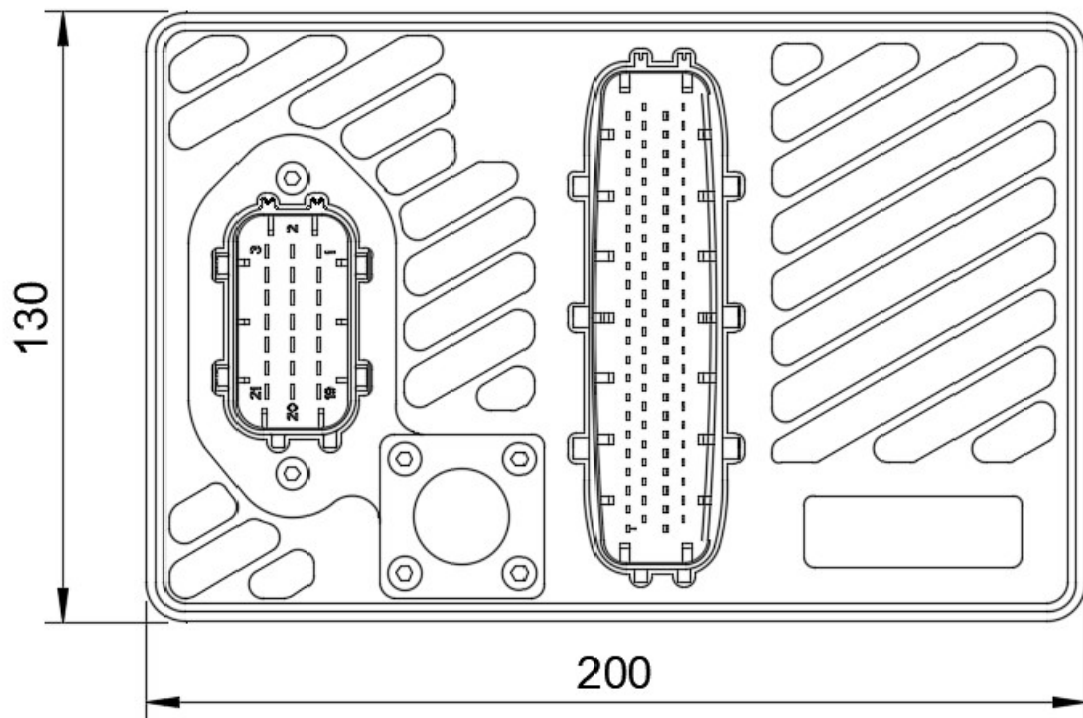
<sup>(1)</sup>PWM, Half Bridge and Full Bridge via ECU slaving only.

<sup>(2)</sup>Full Bridge control is on adjacent pairs only (1+2, 3+4, 5+6, 7+8, 9+10).

<sup>(3)</sup>Only active when not in sleep mode. If waking on CAN external termination will be required.

<sup>(4)</sup>Bipolar and Frequency inputs via ECU slaving only.

<sup>(5)</sup>Can be calibrated to bring unit out of sleep mode when driven high. Dedicated wake pin always active.



### **Warranty and Servicing:**

- This equipment comes with a 1 year warranty against manufacturing defects and failures however misuse or damage will not be covered under warranty.
- This PDU contains a battery which can be returned to Syvecs for a replacement, a charge may be made for this service.