Overview

PowerBox PBX 90

- 120 A continuous current
- 36 outputs, 80 A high side switches
- Ethernet, CAN and LIN communication
- Software-tool integrated
- Easy programming of complex functions

PowerBox PBX 190

- 250 A continuous current
- 52 outputs, 48 V high side switches
- Ethernet, CAN and LIN communication
- Precision current measurement
- Easy programming of complex functions

PowerBox PBX 90

Features

- 120 A continuous current
- 36 outputs, 80 A high side switches
- Ethernet, CAN and LIN communication
- Software-tool integrated
- Easy programming of complex functions

The PowerBox is an intelligent control and distribution unit for the electric grid in a modern racing car, which is seamlessly integrated into the Bosch Motorsport system architecture. It is capable to replace all conventional relays, fuses and circuit breakers, simplifies wiring harnesses and provides diagnostic capabilities. The integrated PBX-software guarantees an easy programming of complex functions by intuitive handling.

Technical Specifications

Mechanical Data

Size	214 x 159 x 57.5 mm
Weight	830 g
Protection Classification	Protected against ingress of particles > 1 mm, splash water proof
Temp. range (at internal sensors)	-20 to 85°C
Max. vibration	Vibration profile 1 (see Downloads)

Electrical Data

Supply voltage range	5 to 20 V
Current consumption	<1 A
Maximum recommended output current	120 A continuously >180 A peak current (2 s)

Inputs

12 x analog inputs (16 bit resolution) switchable pull-up resistors

4 x digital inputs switchable pull-up/pull-down resistors

Sensor Supplies and Screens

1 x sensor supply 5 V 400 mA with individual ground pin

Outputs

4 x high power channels up to 40 A (parallel up to 80 A)

4 x high power channels up to 25 A

22 x high power channels up to 15 A

6 x multi purpose outputs up to 15 A (low side, high side, push-pull, PWM; two output stages can be combined to form an H-bridge)

Software

Function development and calibration tool	Bosch Motorsport PBX Suite

Connector X1: 38 way (ABS/ESR) Code 1

Pin	Signal	Cont. [A]	Peak [A]
1	HP_OUT3	40	150
2	OUT22	15	100
3	PWM_OUT6	15	75
4	OUT21	15	100
5	ANA_IN07	0 to 5 V, Pull-up	
6	ANA_IN08	0 to 5 V, Pull-up	
7	PWM_OUT4	15	75
8	CAN_3_H	1 Mbaud max.	
9	SENSGND	GND for AIN[x]	
10	SENSPWR_5V	0.4	
11	PWM_OUT2	15	75
12	PWM_OUT1	15	75
13	HP_OUT4	40	150
14	ANA_IN03	0 to 5 V, Pull-up	
15	ANA_IN04	0 to 5 V, Pull-up	
16	DIG_IN3	0 to 12 V, Pull-up, Pull-down	
17	DIG_IN4	0 to 12 V, Pull-up, Pull-down	
18	ANA_IN09	0 to 5 V, Pull-up	
19	ANA_IN10	0 to 5 V, Pull-up	
20	CAN_3_L	1 Mbaud max.	

Connector X1: 38 way (ABS/ESR) Code 1			
21	BAT_GND	15	100
22	BAT_GND	15	100
23	BAT_GND	15	100
24	BAT_GND	15	100
25	HP_OUT7	25	150
26	OUT19	15	100
27	ANA_IN05	0 to 5 V, Pull-up	
28	OUT20	15	100
29	ANA_IN06	0 to 5 V, Pull-up	
30	OUT17	15	100
31	OUT18	15	100
32	ANA_IN11	0 to 5 V, Pull-up	
33	OUT15	15	100
34	OUT16	15	100
35	ANA_IN12	0 to 5 V, Pull-up	
36	PWM_OUT3	15	75
37	PWM_OUT5	15	75
38	HP_OUT8	25	150

Connector X2: 38 way (ABS/ESR) Code 2			
Pin	**Used for**	**Cont. [A]**	**Peak [A]**
1	HP_OUT1	40	150
2	OUT14	15	100
3	OUT13	15	100
4	OUT02	15	100
5	OUT01	15	100
6	TIMESTAMP_INOUT	1 kHz open drain	
7	CAN_2_H	1 Mbaud max.	
8	CAN_1_H	1 Mbaud max.	
9	ETH_1_RXN	10/100 Mbps	
10	ETH_1_TXN	10/100 Mbps	
11	ETH_2_RXN	10/100 Mbps	
12	ETH_2_TXN	10/100 Mbps	
13	HP_OUT2	40	150
14	BAT_GND	15	100
15	ANA_IN01	0 to 5 V, Pull-up	
16	ANA_IN02	0 to 5 V, Pull-up	
17	DIG_IN1	0 to 12 V, Pull-up, Pull-down	

Connector X2: 38 way (ABS/ESR) Code 2			
18	DIG_IN2	0 to 12 V, Pull-up, Pull-down	
19	CAN_2_L	1 Mbaud max.	
20	CAN_1_L	1 Mbaud max.	
21	ETH_1_RXP	10/100 Mbps	
22	ETH_1_TXP	10/100 Mbps	
23	ETH_2_RXP	10/100 Mbps	
24	ETH_2_TXP	10/100 Mbps	
25	HP_OUT5	25	150
26	OUT11	15	100
27	OUT09	15	100
28	OUT12	15	100
29	OUT10	15	100
30	OUT07	15	100
31	OUT08	15	100
32	LIN	Control of Bosch Motorsport LIN devices included. Support of other devices on request.	
33	OUT05	15	100
34	SHIELD_GND	shield	
35	OUT06	15	100
36	OUT03	15	100
37	OUT04	15	100
38	HP_OUT6	25	150

Connector X3: Amphenol Radsok Automotive Pinlock Connector 8 mm (35 mm^2, 50 mm^2)			
Pin	**Used for**	**Cont. [A]**	**Peak [A]**
1	BATT_POS	120	180

Communication

3 x CAN

2 x Ethernet

1 x LIN, Control of Bosch Motorsport LIN devices included. Support of other devices on request.

Installation Notes

Inspection services recommended after 220 h or 2 years, no components to replace.

Legal Restrictions

The sale of this product in Mexico is prohibited. Due to embargo restrictions, sale of this product in Russia, Belarus, Iran, Syria, and North Korea is prohibited.

Upgrades

CCA Hardware Upgrade per device

Provides the option to run customer developed software code on Bosch device

Ordering Information

PowerBox PBX 90
Order number **F02U.V01.794-06**

Software Options

CCA Hardware Upgrade per device
Order number **F02U.V02.137-01**

Accessories

Mating Connector X1
Order number **F02U.B00.760-01**

Mating Connector X2
Order number **F02U.B00.761-01**

Mating Connector X3
Order number **F02U.B01.279-01**

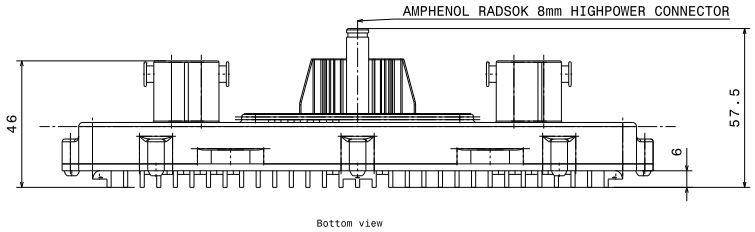
Power Cable 16 mm²
L: 2,000 mm
Order number **F02U.V03.552-01**

Power Cable 35 mm²
L: 2,000 mm
Order number **F02U.V03.553-01**

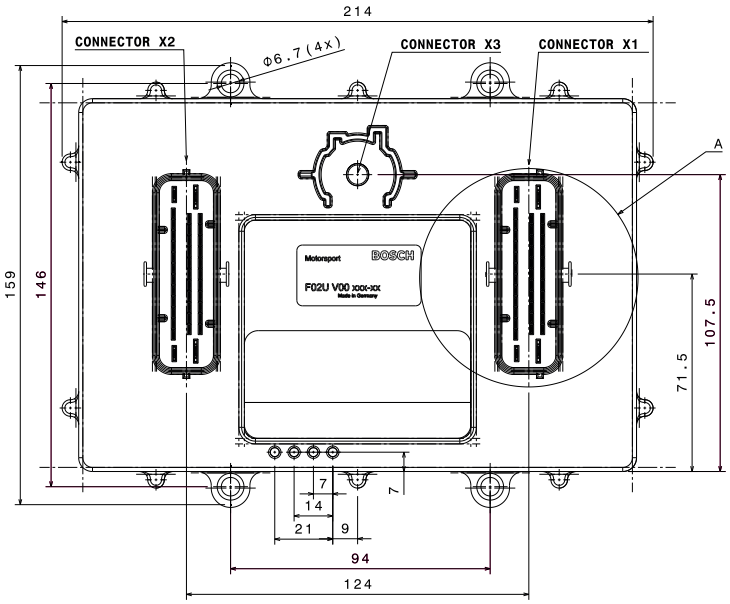
Breakout Box BOB PBX 90
Order number **F02U.V02.292-01**

CAN Keypad CK-M12
Order number **F02U.V0U.328-04**

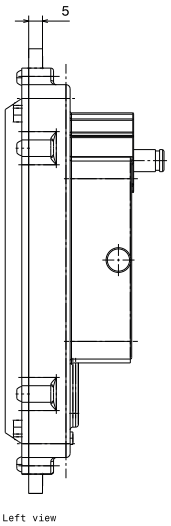
Dimensions



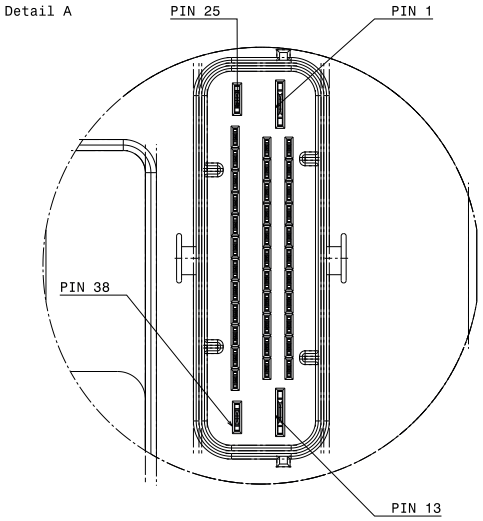
Bottom view



Front view



Left view



PowerBox PBX 190

Features

- 250 A continuous current
- 52 outputs, 48 V high side switches
- Ethernet, CAN and LIN communication
- Precision current measurement
- Easy programming of complex functions

The PowerBox is an intelligent control and distribution unit for the electric grid in a modern racing car, which is seamlessly integrated into the Bosch Motorsport system architecture. It is capable to replace all conventional relays, fuses and circuit breakers, simplifies wiring harnesses and provides diagnostic capabilities. The integrated PBX-software guarantees an easy programming of complex functions by intuitive handling.

Technical Specifications

Mechanical Data

Size	245 x 183 x 37 mm
Weight	1,270 g
Protection Classification	IP67
Internal G-sensors	
Temp. range (at internal sensors)	-20 to 85°C
Max. vibration	Vibration profile 1 (see Downloads)

Electrical Data

Supply voltage range	5 to 16 V
Current consumption	<1 A continuously
Maximum recommended output current	250 A continuously; >310 A peak current (2 s)

Inputs

18 x analog inputs (16 bit resolution) switchable pull-up resistors

10 x digital inputs switchable pull-up/pull-down resistors

Sensor Supplies and Screens

2 x sensor supplies 5 V 400 mA with individual ground pin

Outputs

4 x high power channels up to 40 A (parallel up to 80 A)

10 x high power channels up to 25 A

26 x high power channels up to 15 A

4 x high side channels up to 25 A, up to 48 V

8 x multi-purpose outputs up to 15 A (low side, high side, push-pull, PWM; two output stages can be combined to form an H-bridge)

Software

Function development and calibration tool	Bosch Motorsport PBX Suite

Pin Configuration

Connector X1: 37 Pins / 8STA62437SA

Pin	Signal	Cont. [A]	Peak [A]
A	HS_15A X1_A	15	100
B	HS_15A X1_B	15	100
C	HS_15A X1_C	15	100
D	HS_15A X1_D	15	100
E	HS_15A X1_E	15	100
F	HS_15A X1_F	15	100
G	HS_15A X1_G	15	100
H	HS_15A X1_H	15	100
J	HS_15A X1_J	15	100
K	HS_15A X1_K	15	100
L	HS_15A X1_L	15	100
M	HS_15A X1_M	15	100
N	HS_15A X1_N	15	100
P	PWM_15A X1_P	15	60
R	PWM_15A X1_R	15	60
S	PWM_15A X1_S	15	60
T	PWM_15A X1_T	15	60
U	HS_15A X1_U	15	100
V	HS_15A X1_V	15	100
W	HS_15A X1_W	15	100
X	HS_15A X1_X	15	100
Y	HS_15A X1_Y	15	100
Z	HS_15A X1_Z	15	100
a	HS_15A X1_a	15	100
b	HS_15A X1_b	15	100
c	PWM_15A X1_c	15	60
d	PWM_15A X1_d	15	60

Connector X1: 37 Pins / 8STA62437SA			
e	PWM_15A X1_e	15	60
f	PWM_15A X1_f	15	60
g	HS_15A X1_g	15	100
h	HS_15A X1_h	15	100
k	HS_15A X1_k	15	100
m	HS_15A X1_m	15	100
n	HS_15A X1_n	15	100
p	Power KL31	15	-
q	Power KL31	15	-
r	Power KL31	15	-

Connector X2: 1 Pin / 8STA61201BN261			
Pin	**Signal**	**Cont. [A]**	**Peak [A]**
1	Power Supply 12 V	200	240

Connector X3: 19 Pins / 8STA62419SN			
Pin	**Signal**	**Cont. [A]**	**Peak [A]**
A	HS_25A X3_A	25	150
B	HS_25A X3_B	25	150
C	HS_25A X3_C	25	150
D	HS_25A X3_D	25	150
E	HS_25A X3_E	25	150
F	HS_25A X3_F	25	150
G + H	HS_40A X3_G_H	40	150
J + T	HS_40A X3_J_T	40	150
K + U	HS_40A X3_K_U	40	150
L + N	HS_40A X3_L_N	40	150
M	HS_25A X3_M	25	150
P	HS_25A X3_P	25	150
R	HS_25A X3_R	25	150
S	HS_25A X3_S	25	150
V	Power KL31	25	-

Connector X4: 6 Pins / 8STA61606SA			
Pin	**Signal**	**Cont. [A]**	**Peak [A]**
A	HS48V_25A X4_A	25	50
B	HS48V_25A X4_B	25	50
C	HS48V_25A X4_C	25	50
D	HS48V_25A X4_D	25	50
E	Supply up to 48 V for X4	25	35
F	Supply up to 48 V for X4	25	35

Connector X5: 66 Pins / 8STA6-18-35SN		
Pin	**Signal**	
1	Analog Input X5_01	0 to 5 V, Pull-up
2	Analog Input X5_02	0 to 5 V, Pull-up
3	Analog Input X5_03	0 to 5 V, Pull-up
4	Analog Input X5_04	0 to 5 V, Pull-up

Connector X5: 66 Pins / 8STA6-18-35SN		
5	Analog Input X5_05	0 to 5 V, Pull-up
6	Analog Input X5_06	0 to 5 V, Pull-up
7	Analog Input X5_07	0 to 5 V, Pull-up
8	Analog Input X5_08	0 to 5 V, Pull-up
9	CAN 3 Interface Low-Level	Max. 1 Mbaud
10	Analog Input X5_10	0 to 5 V, Pull-up
11	Analog Input X5_11	0 to 5 V, Pull-up
12	Analog Input X5_12	0 to 5 V, Pull-up
13	Digital Input X5_13	0 to 12 V, Pull-up, Pull-down
14	Digital Input X5_14	0 to 12 V, Pull-up, Pull-down
15	CAN 3 Interface High-Level	Max. 1 Mbaud
16	LIN	Control of Bosch Motorsport LIN devices included. Support of other devices on request.
17	Analog Input X5_17	0 to 5 V, Pull-up
18	Analog Input X5_18	0 to 5 V, Pull-up
19	DGND-fused	5 A
20	DGND-fused	5 A
21	Digital Input X5_21	0 to 12 V, Pull-up, Pull-down
22	Digital Input X5_22	0 to 12 V, Pull-up, Pull-down
23	SERCOS1 TXP	
24	SERCOS1 TXN	
25	do not connect (use for internal debugging)	
26	do not connect (use for internal debugging)	
27	Analog Input X5_27	0 to 5 V, Pull-up
28	Digital Input X5_28	0 to 12 V, Pull-up, Pull-down
29	Digital Input X5_29	0 to 12 V, Pull-up, Pull-down
30	Analog Input X5_30	0 to 5 V, Pull-up
31	KL31-fused	
32	SERCOS1 RXP	
33	SERCOS1 RXN	
34	do not connect (use for internal debugging)	
35	do not connect (use for internal debugging)	
36	Digital Input X5_36	0 to 12 V, Pull-up, Pull-down
37	Digital Input X5_37	0 to 12 V, Pull-up, Pull-down
38	Analog_Screen	
39	Analog Input X5_39	0 to 5 V, Pull-up

Connector X5: 66 Pins / 8STA6-18-35SN		
40	KL31-fused	
41	SERCOS2 RXP	
42	SERCOS2 RXN	
43	Digital Input X5_43	0 to 12 V, Pull-up, Pull-down
44	Digital Input X5_44	0 to 12 V, Pull-up, Pull-down
45	Sensor GND for X5_51	5 A
46	Timesync	
47	COM_Screen	
48	CAN 1 Interface High-Level	Max. 1 Mbaud
49	SERCOS2 TXP	
50	SERCOS2_TXN	
51	Powersupply_5V X5_51	400 mA
52	Sensor GND for X5_58	5 A
53	ETHERNET1 RXN	10/100 Mbps
54	ETHERNET0 RXN	10/100 Mbps
55	CAN 2 Interface Low-Level	Max. 1 Mbaud
56	CAN 1 Interface Low-Level	Max. 1 Mbaud
57	Analog Input X5_57	0 to 5 V, Pull-up
58	Powersupply_5V X5_58	400 mA
59	ETHERNET1 RXP	10/100 Mbps
60	ETHERNET1 TXN	10/100 Mbps
61	ETHERNET0 TXN	10/100 Mbps
62	CAN 2 Interface High-Level	Max. 1 Mbaud
63	Analog Input X5_63	0 to 5 V, Pull-up
64	ETHERNET1 TXP	10/100 Mbps
65	ETHERNET0 RXP	10/100 Mbps
66	ETHERNET0 TXP	10/100 Mbps

Communication

3 x CAN

2 x Ethernet

1 x LIN, Control of Bosch Motorsport LIN devices included. Support of other devices on request.

Installation Notes

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Upgrades

CCA Hardware Upgrade per device

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Ordering Information

PowerBox PBX 190
Order number **F02U.V02.626-04**

Software Options

CCA Hardware Upgrade per device
Order number **F02U.V02.137-01**

Accessories

Mating Connector X1
Order number **F02U.004.387-01**

Mating Connector X2
Socket 25 mm^2
Order number **F02U.B01.044-01**

Mating Connector X2
Socket 35 mm^2
Order number **F02U.B01.045-01**

Mating Connector X3
Order number **F02U.004.386-01**

Mating Connector X4
Order number **F02U.004.388-01**

Mating Connector X5
Order number **F02U.000.472-02**

Connector Opening Tool for Shellsize 24
Order number **F02U.V02.434-01**

Breakout Box
Order number **F02U.V02.523-01**

CAN Keypad CK-M12
Order number **F02U.V0U.328-04**

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Dimensions