

# 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

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               |
| Temp. range (at internal sensors) | -20 to 85°C         |

### Electrical Data

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

### Inputs

- 12 analog inputs (16 bit resolution) switchable pull-up resistors
- 4 digital inputs switchable pull-up/pull-down resistors

### Outputs

- 4 high power channels up to 40 A (parallel up to 80 A)
- 4 high power channels up to 25 A
- 22 high power channels up to 15 A

6 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)

1 sensor supply 5 V with individual ground pin

### 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 |          |

| Connector X1: 38 way (ABS/ESR) Code 1 |          |                               |     |
|---------------------------------------|----------|-------------------------------|-----|
| 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.                  |     |
| 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_I<br>NOUT | 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      |          |

| Connector X2: 38 way (ABS/ESR) Code 2 |            |  |     |
|---------------------------------------|------------|--|-----|
| 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  |     |
| 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<sup>2</sup>, 50 mm<sup>2</sup>)

| 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

#### Hardware Upgrade for CCA per device

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

### 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.003.574-01**

##### Power Cable 16 mm<sup>2</sup>

L: 2,000 mm

Order number **F02U.V02.047-01**

##### Power Cable 35 mm<sup>2</sup>

L: 2,000 mm

Order number **F02U.V02.048-01**

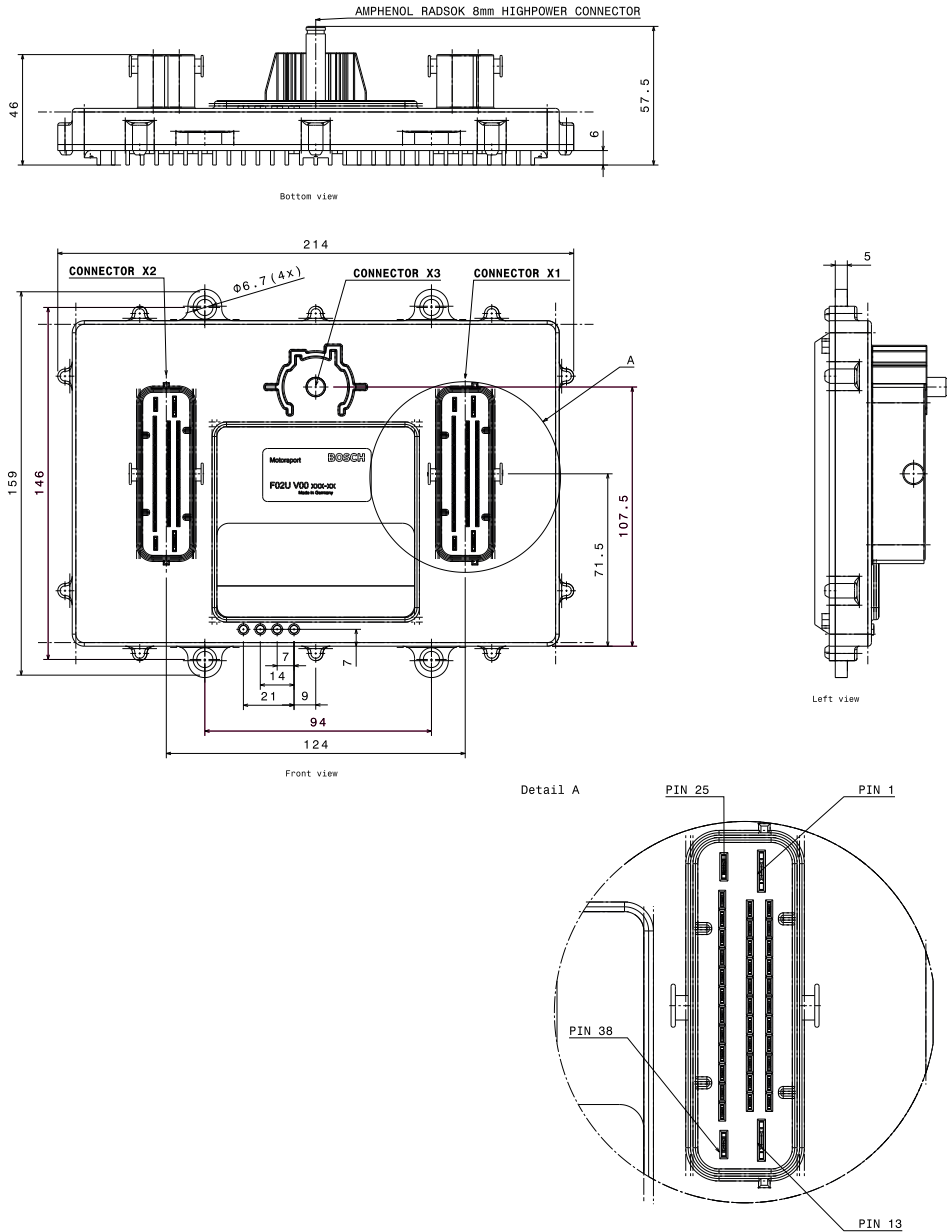
##### Breakout Box BOB PBX 90

Order number **F02U.V02.292-01**

##### CAN Keypad CK-M12

Order number **F02U.V0U.328-04**

Dimensions



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