



ENGINE MANAGER PRO

This short manual explains how to prepare the Cube flight computer for operation with the **Engine Manager Pro**. It describes the required parameter settings in ArduPilot Mission Planner to enable communication between the Cube flight computer and the **Engine Manager Pro**.

1. Connect the **Engine Manager Pro** with a CAN-Bus wire (4-poles) to the flight computer carrier board.
2. Connect a USB cable between the Cube flight controller (FC) and your computer, then click **CONNECT** in Mission Planner.
3. Open the **Full Parameter List** and change the settings in the recommended sequence:

a) CAN Parameter

Command: **CAN_P1_DRIVER** – Option: **First driver**

| | | | | |
|---------------|---|---|--|---------------|
| CAN_P1_DRIVER | 1 | 0 | | First driver |
| | | | | Disabled |
| CAN_P2_DRIVER | 0 | 0 | | First driver |
| | | | | Second driver |
| | | | | Third driver |

b) BRD_SAFETY_DEFLT

To activate the CAN-Bus Servo output you have to set the **BRD_SAFETY_DEFLT** to 0.
You will need to adjust this setting in your application.

| | | | | |
|------------------|---|---|--|----------|
| BRD_SAFETY_DEFLT | 0 | 1 | | Disabled |
|------------------|---|---|--|----------|

c) Activate the EFI Data support

| | | | |
|----------|---|---|----------|
| EFI_TYPE | 5 | 0 | DroneCAN |
|----------|---|---|----------|

Save the parameters and restart the flight computer before you proceed.

d) Activate the Servo outputs at the CAN-Bus

Select the channels you want to use for:

- Switching the ignition (Standard Ch15)
- Servo outputs A / B / C
- Resetting the capacity counter

| | | | |
|------------------|---------|---------|----|
| CAN_D1_UC_SRV_BM | 51440 | 0 | |
| CAN_D1_UC_SRV_RT | 50 | 50 | Hz |
| CAN_D2_PROTOCOL | 1 | 1 | |
| CAN_D2_PROTOCOL2 | 0 | 0 | |
| CAN_LOGLEVEL | 0 | 0 | |
| CAN_P1_BITRATE | 1000000 | 1000000 | |
| CAN_P1_DRIVER | 1 | 0 | |

Output channels to be transmitted as servo over DroneCAN

Bitmask with one set for channel to be transmitted as a servo command over DroneCAN

☐ Servo 1 ☐ Servo 2 ☐ Servo 3 ☐ Servo 4 ☐ Servo 5 ☐ Servo 6 ☐ Servo 7 ☐ Servo 8
☐ Servo 9 ☐ Servo 10 ☐ Servo 11 ☐ Servo 12 ☒ Servo 13 ☒ Servo 14 ☒ Servo 15
☒ Servo 16 ☐ Servo 17 ☐ Servo 18 ☐ Servo 19 ☐ Servo 20 ☐ Servo 21 ☐ Servo 22
☐ Servo 23 ☐ Servo 24 ☐ Servo 25 ☐ Servo 26 ☐ Servo 27 ☐ Servo 28 ☐ Servo 29
☐ Servo 30 ☐ Servo 31 ☐ Servo 32

e) Telemetry

You will find the **Engine Manager Pro** in the CAN-Inspector with following messages:

```
⊞ ID 13 - com.powerbox-systems.Engine_Manager ~570Bps
  ⊞ uavcan_equipment_device_Temperature (2,7 Hz, #1110) ~13Bps
  ⊞ uavcan_equipment_esc_Status (5,3 Hz, #1034) ~75Bps
  ⊞ uavcan_equipment_ice_reciprocating_Status (10,0 Hz, #1120) ~450Bps
  ⊞ uavcan_protocol_GetNodeInfo_res (0,3 Hz, #1) ~25Bps
  ⊞ uavcan_protocol_NodeStatus (1,0 Hz, #341) ~7Bps
```

The Messages contain:

- **uavcan_equipment_device_Temperature**

- 4x Temperature A – D

- **uavcan_equipment_esc_Status**

- 4x Temperature A – D
- Voltage of the ignition power supply
- Current of the ignition power supply
- Used capacity of the ignition power supply
- RPM

- **uavcan_equipment_reciprocating_Status**

- Exhaust gas temperature (Temp. input A)
- Cylinder head temperature (Temp. input B)
- Intake manifold temperature (Temp. input C)
- RPM
- Estimated consumed fuel*
- Fuel consumption rate* cm³

* To get the fuel consumption and the fuel consumption rate you have to connect a **Smoke-EL Fuel Sensor** to the P²-BUS output. No further settings are required.

f) CAN-Settings

You can make all settings of the **Engine Manager Pro** in the CAN-BUS Menu:


| Komando | Δ | Wert | Min | Max | Default | Fav |
|------------------|---|-------|-----|-----|-----------------------------------|--------------------------|
| Channel.A | | 12 | 0 | 26 | 0 | <input type="checkbox"/> |
| Channel.B | | 13 | 0 | 26 | 0 | <input type="checkbox"/> |
| Channel.C | | 14 | 0 | 26 | 0 | <input type="checkbox"/> |
| Channel.Ignition | | 15 | 0 | 26 | 0 | <input type="checkbox"/> |
| Fuel.Tank.Size | | 50 | 5 | 500 | 0 | <input type="checkbox"/> |
| Ign.Voltage | | 6.0V | | | 6.0V 8.0V 12.0V | <input type="checkbox"/> |
| Reset.Cap | | 16 | 0 | 26 | 0 | <input type="checkbox"/> |
| RPM.Factor | | 1 : 1 | | | 1:1 1:2 1:3 1:4 2:1 3:1 4:1 | <input type="checkbox"/> |
| uavcan.node_id | | 13 | 1 | 127 | 13 | <input type="checkbox"/> |

- Channel A – C: Channel settings for the Servo outputs
- Channel Ignition: Switching channel for the Ignition power output. The threshold is at +50% throw
- Reset Cap: Channel to reset the capacity measurement for the ignition battery
- Fuel Tank Size, 50 means 5.0l
- Ign. Voltage, depending on your ignition type, select between 6.0V, 8.0V or 12.0V
- RPM Factor is a factor for the revolution calculation. For example if your engine has 2 magnets, select 2:1

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