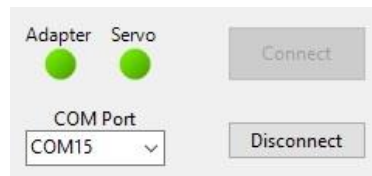# FUTABA DroneCAN Tools Software Manual

Contents

Caution

To use this software, USB-CAN converter of the BLA21/BLA15 series starter kit is required.

When connecting USB-CAN converter to a PC for the first time, the USB/UART bridge IC driver must be downloaded from the following site in advance.

https://ftdichip.com/drivers/vcp-drivers/

Connection

[COM Port]

Select the COM port of the PC to be used.

*COM port to which the CAN communication devise is connected

[Connect]

Connect the servo to a peripheral device, set the COM port, and press Connect.

Once communication connection is established, each operation can be performed.
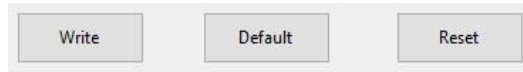
[Adapter lamp / Servo lamp]

When communication between the CAN communication device and the servo is enabled, the lamp turns green.

The Servo lamp turns yellow when there is notification or warning information and red when there is fault information.

[Disconnect]

Disconnect communication with CAN communication devices.

Configuration

Write	Default	Reset

[Write]

Save the configuration parameters of the current RAM area to the ROM area by the SAVE function of uavcan.protocol.param.ExecuteOpcode.

*The DroneCAN command is different, but the function is the same as WriteROM in Operation tab.

[Default]

Initialize the configuration parameters of current the RAM area to default values by the ERASE function of uavcan.protocol.param.ExecuteOpcode. To apply it to the ROM area, execute Write button or WriteROM in Operation tab.
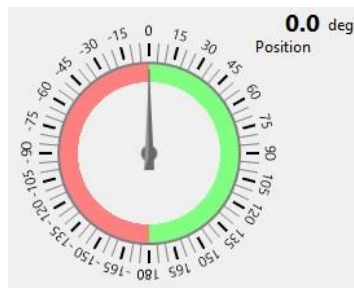
*The DroneCAN command is different, but the function is the same as Initialize in Operation tab.

[Reset]

Restart the servo by uavcan.protocol.RestartNode.

*The DroneCAN command is different, but the function is the same as Reboot in Operation tab.

Present Angle
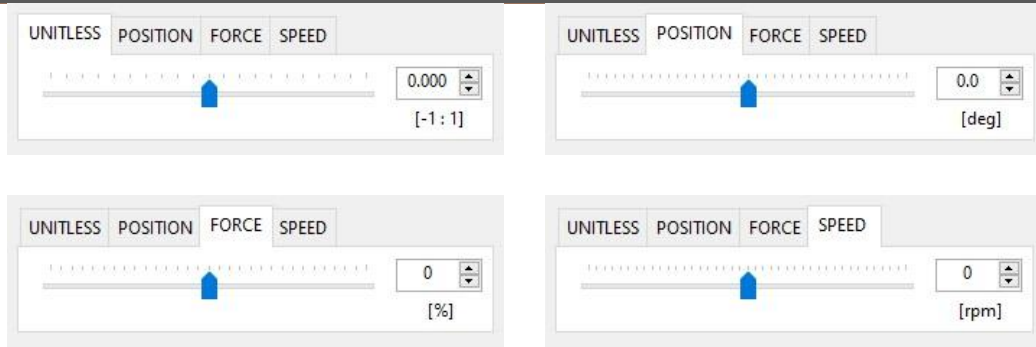

[Position]

Display the current angle obtained from uavcan.equipment.actuator.Status in tachometer and numerical value [deg].

*The direction of rotation is displayed as CCW: -, CW: +.

Target Command

[UNITLESS]

Command the target angle in the range from -1 (CCW: 180 degrees) to +1 (CW: 180 degrees) by the UNITLESS function of uavcan.equipment.actuator.ArrayCommand.

[POSITION]

Command the target angle [deg] by the POSITION function of uavcan.equipment.actuator.ArrayCommand.

[FORCE]

Command the target torque [%] by the FORCE function of uavcan.equipment.actuator.ArrayCommand.

[SPEED]

Command the target speed [rpm] by the SPEED function of uavcan.equipment.actuator.ArrayCommand.

*If speed/torque control [0x25] is set to disabled, the software will not operate even if target speed/torque is input.

*Target speed/torque in the range of ±1 to 9 [rpm/%] cannot be input with this software.

Configuration Parameter

Uavcan.protocol.param.GetSet allows you to read and write the configuration parameters of the RAM area.

Each group is divided by tab. When the tab is opened for the first time after the servo is connected, the current settings of the display group are read. After the reading is completed, you can operate the servo.

The method of setting configuration parameters differs depending on the items. You can set them in one of the following ways:

A. Adjust the setting value by entering numerical value or using ▲▼, and send a command when the adjacent button is clicked.

    e.g.   0.0 ⬍ deg

          Center

B. Send a command when a radio button is selected.

    e.g.   ◉ Torque ON   ○ Torque OFF

C. Send a command when the button is clicked.

    e.g.   Initialize   Set

D. Send a command when the check box is selected.

*Checked: enabled, unchecked: disabled

    e.g.   Enable Soft Start   ☑

*The following pages describe the functions of Firmware Version: 1.15.

Command

[Target Angle: 0x00]

    Command the target angle [deg] by the three-valued switches, CCW / Center / CW buttons.

    The value above the button is applied as the command value for each button.

[Target Speed: 0x01]

    Command the target speed [rpm] by the three-valued switches, CCW / Center / CW buttons.

    The value above the button is applied as the command value for each button.
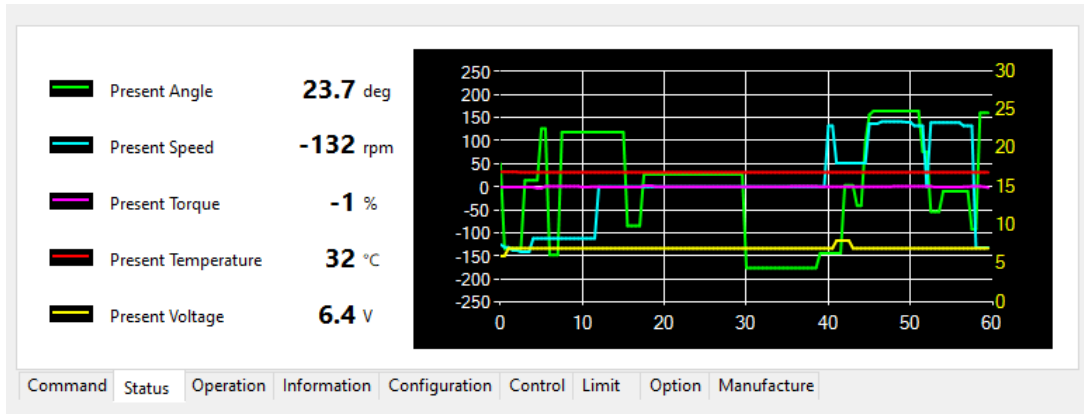
[Target Torque: 0x02]

    Command the torque [%] by the three-value switches, CCW / Center / CW buttons.

    The value above the button is applied as the command value for each button.

    *If speed/torque control [0x25] is set to disabled, the command speed/torque will not operate even if input.

    *This software cannot input command speed/torque in the range of ±1 to 9 [rpm/%].

[Present Angle: 0x08]

    Display the present angle [deg] in a graphical form and a numerical value.

    The graph displays the values obtained every 0.5 seconds for the past 60 seconds in green.

    The left side of the vertical axis is applied.

[Present Speed: 0x09]

    Display the present speed [rpm] in a graphical form and a numerical value.

    The graph displays the values obtained every 0.5 seconds for the past 60 seconds in light blue.

    The left side of the vertical axis is applied.

[Present Torque: 0x0A]

    Display the present torque [%] in a graphical form and a numerical value.

    The graph displays the values obtained every 0.5 seconds for the past 60 seconds in pink.

    The left side of the vertical axis is applied.

[Present Temperature: 0x0B]

    Display the present temperature [°C] in a graphical form and a numerical value.

    The graph displays the values obtained every 0.5 seconds for the past 60 seconds in red.
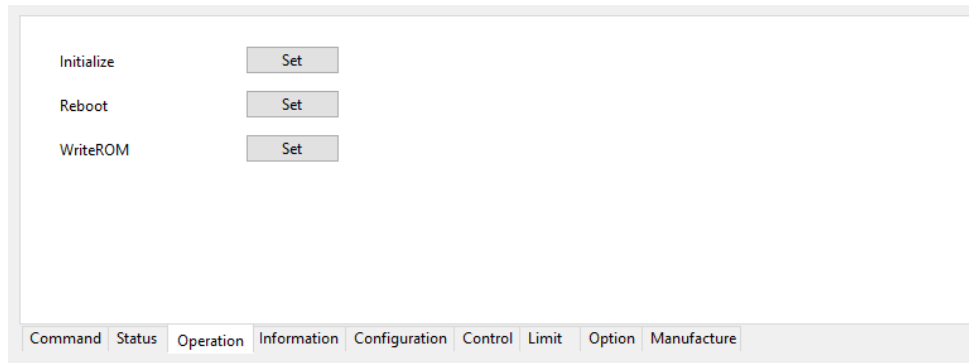
    The left side of the vertical axis is applied.

[Present Voltage: 0x0C]

    Display the present voltage [V] in a graphical form and a numerical value.

    The graph displays the values obtained every 0.5 seconds for the past 60 seconds in yellow.

    The right side of the vertical axis is applied.

Operation

[Initialize: 0x10]

Initialize the configuration parameters of the current RAM area to the default values.

To apply this to the ROM area, execute the Write button or WriteROM in Operation tab.

*The DroneCAN command is different, but the function is the same as Default button.
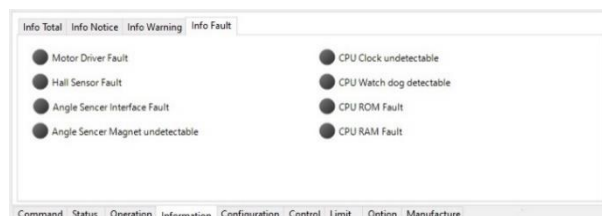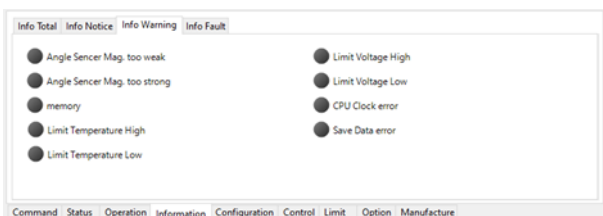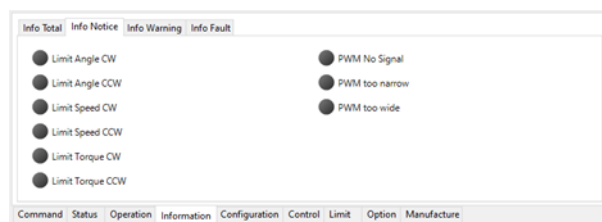

[Reboot: 0x11]

Reboot the servo.

*The DroneCAN command is different, but the function is the same as Reset button.

[WriteROM: 0x12]

Save the configuration parameters (0x20 to 0x4F) of the current RAM area to the ROM area.

*The DroneCAN command is different, the function is the same as Write button.

Error

[Info Total: 0x18]

    Display the occurrence of errors of servo by group. When the lamp is off, there is no abnormality.

    When the lamp is lit, it indicates there is an abnormality in one of the items corresponding to the target group or level.

[Info Notice: 0x19]

    Display the status of the notification level (no function or performance degradation).

    When the lamp is off, there is no abnormality. When the lamp is lit, it indicates there is an information notice.

[Info Warning: 0x1A]

    Display the status of warning level (performance degradation or occurrence of protection operation).

    When the lamp is off, there is no abnormality. When the lamp is lit, it indicates there is a warning.

[Info Fault: 0x1B]

    Display the status of fault level (function loss or partial function restriction).

    When the lamp is off, there is no abnormality.

    When the lamp is lit, it indicates that there is a fault.

Configuration

[Enable Torque: 0x20]

Set the output state of the motor.

[Enable Soft Start: 0x21]

Sets whether the unit moves slowly toward the 0° position after power-on.

[Enable Smoothing: 0x22]

Sets whether the servo is operated smoothly.

[Enable Reverse: 0x23]

Set the servo rotation direction.

[Enable MultiTurn Angle: 0x24]

Set whether to calculate the extended angle data of ±180 degrees or more or to present the absolute angles within ±180 degrees during continuous rotation operation by command speed or command torque input.

[Enable Speed/Torque Control: 0x25]

Sets whether to enable speed/current control.

If this setting is disabled, no operation is performed even if a speed/current command is input.

[No command Operation: 0x26]

Sets the motor output state to be automatically changed by the servo when there is no command to the servo for a certain period of time.

[No command Time: 0x27]

Sets the time until the servo automatically changes the motor output when there is no command to the servo.

[OC Protection: 0x2A]

Sets the current value at which the overcurrent protection function is enabled.

Control

[Angle Prop Gain: 0x2C]

　　Set the holding characteristics (proportional gain) during angle holding operation by command angle [0x00].

[Angle Diff Gain: 0x2D].

Sets the hold characteristics (integral gain) during angle hold operation by command angle [0x00].

[Angle Dead Band: 0x2E]

　　Set the allowable range of stop position of servo (dead band) during angle holding operation by command angle [0x00].

[Speed Prop Gain: 0x30]

　　Set the speed characteristics (proportional gain) during operation by command angle [0x00]/command speed [0x01].

[Speed Intg Gain: 0x31]

　　Set the speed characteristics (integral gain) for operation by command angle [0x00]/command speed [0x01].

[Speed Dead Band: 0x32]

　　Set the allowable range (dead band) of stop speed of servo during operation by command angle [0x00]/command speed [0x01].

[Speed Intg Limit: 0x33]

　　Set the upper limit of the amount of output increase by speed control integral gain [0x31].

[Angle Boost: 0x2F].

　　Sets the holding characteristics (boost amount) during angle holding operation by command angle [0x00].

[PWMIN_Target_Mode: 0x37]

    Sets the operation mode to angle or speed for PWM input.

    *If speed/current control [0x25] is not enabled, setting the operation mode to speed will not work.

[PWMIN_PulseWidth_Neutral: 0x34]

    Sets the neutral pulse width for PWM input.

[PWMIN_PulseWidth_Range: 0x35]

    Sets the pulse width range in which PWM input is possible based on the neutral pulse width.

    *The signal that exceeds the set pulse width will not operate.

[PWMIN_PulseWidth_Target: 0x36]

    Sets the range of angle/speed command values that can be output when PWM is input.

    When the PWM input operation mode [0x37] is angle, the angle range can be set; when it is speed, the speed range can be set.

    The set value is the movement amount when the upper or lower limit signal of the pulse width input range [0x35] is input.

    *When the servo receives both DroneCAN commands and PWM input commands at the same time, the DroneCAN command has priority.

Limit

[Limit Angle CW: 0x38]

    Set the maximum operating angle [deg] of CW based on the zero degrees.

[Limit Angle CCW: 0x39]

    Set the maximum operating angle [deg] of CCW based on the zero degrees.

[Limit Speed CW: 0x3A]

    Set the maximum operating speed [rpm] of CW.

[Limit Speed CCW: 0x3B]

    Set the maximum operation speed [rpm] of CCW.

[Limit Torque CW: 0x3C]

    Set the maximum operating torque [%] of CW.

[Limit Torque CCW: 0x3D]

    Set the maximum CCW torque [%].

[Limit Temperature High: 0x3E]

    Set the upper limit of the operating temperature [°C].

    The motor output is automatically turned off when the limit is exceeded.

[Limit Temperature Low: 0x3F]

    Set the lower limit of the operating temperature [°C].

    The motor output is automatically turned off when the limit is exceeded.

[Limit Voltage High: 0x40]

    Set the upper limit of the operating supply voltage [V].

    The motor output is automatically turned off when the limit is exceeded.

[Limit Voltage Low: 0x41]

    Set the lower limit of the operating power supply voltage [V].

    The motor output is automatically turned off when the limit is exceeded.

*If speed/torque control [0x25] is set to disabled, the speed/torque limit is ignored.

Option

[Origin Position: 0x44]

Change the zero-degree position of the servo.

[Actuator ID: 0x45]

Set the ID to command multiple servos with one message by uavcan.equipment.actuator.ArrayCommand.

[DroneCAN Node ID: 0x46]

This is a unique number for exchanging data between nodes connected to a single DroneCAN communication system.

If DroneCAN Node ID is set to a value other than zero, the set value is used as its own node ID. When set to 0 (default), node ID assignment is requested and dynamically assigned node IDs are used.

Manufacture

[Model Number: 0x50]

Display the product series of the servo.

[Unique Number: 0x51]

Display the unique number of the servo.

[Firmware Version: 0x52]

Display the firmware version of the servo.

[Firmware Version: 0x53]

Display the hardware version of the servo.

[Manufactured date: 0x58~0x5C]

Display the date of manufacture of the servo.

Revision History

Rev.	Page	Details of Revision	Date of issue
1.11	---	・New issue	March,31st, 2020
1.12	P5,7	・Changed command speed/torque value from ±1 to 9.	May,27th ,2021
1.13	P.1 P.9,11 P.10,11,14 P.5,7,13,14	・Changed PC software name BLA21 UAVCAN Tools → FUTABA UAVCAN Tools ・Deletion of unmounted servo items Sleep, OL Protection Torque, and OL Protection Time were deleted. ・BLA21-xxU-AB2 functions are supported. Addition of PWM items Enable Speed/Torque Control, OC Protection added ・Added notes on speed/torque control	November, 5th , 2021
1.14	P.12	・Added Angle Boost	May,16th ,2022
1.15	P.1,4,9,13,15	・Changed the description from UAVCAN to DroneCAN (including PC software name change).	July, 4th,2022
1.16	---	・Changed so that CAN channel is closed when communication is disconnected.	March,1st,2023
1.16.1	P.3	・Added Caution	July,14th ,2023

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