Quick Start Guide.

K4 drive system development kit.

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Attention

The K4 motor controller is designed to meet the requirements of ES1 (SELV) according to EN62368-1:2014. It is for use only as part of the development kit and not suitable to be incorporated into finished product. Only ebm-papst K4 development motors should be used with this controller.

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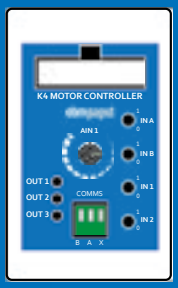
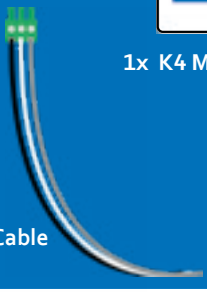
What's in the box

1x Motor or Motor/gearbox selection (prewired)





1x K4 Motor Controller



1x RS485 Comms Wiring Cable



1x RS485 Driver CD



1x RS485 USB Cable



1x RS485 Adapter



1x Black Power Cable



1x Red Power Cable

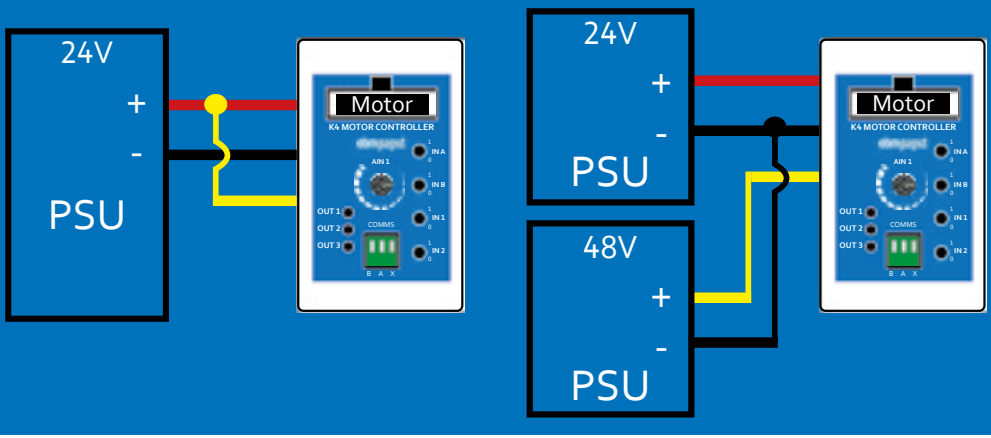


1x Yellow Power Cable

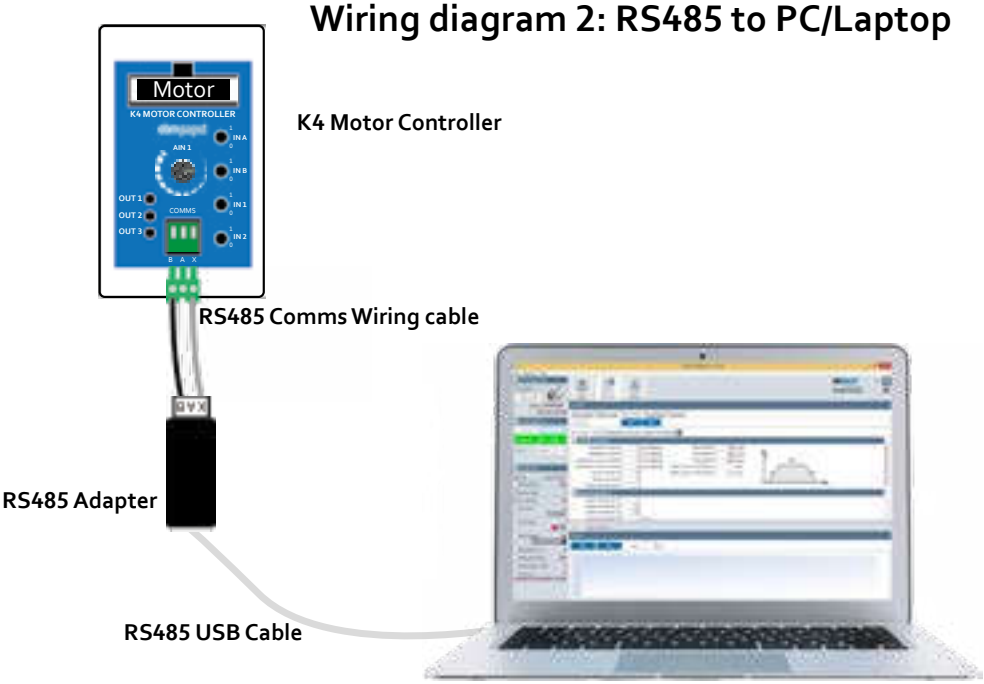
Wiring Diagrams

Wiring diagram 1:

24V DC Motor or 48V DC Motor



Wiring diagram 2: RS485 to PC/Laptop



Out of the Box
Standard operation

The motor is factory set to Velocity Mode, this gives variable **or** a choice of fixed speeds in both clockwise and counter clockwise direction.

1. Connect the motor to the **K4 Motor Controller**.
2. Connect Power supply using **Power Cables (Red, Black and Yellow)** as shown in wiring **diagram 1** depending on 24V DC or 48V DC Motor.

Note: – Ensure correct voltage is selected
Note: - Isolated power supply (24v and/or 48v) with minimum 10A rated should be used

3. Select inputs on **K4 Controller** as shown below to run the motor functions.

INA	INB	IN1	IN2	AIN1	Function
0	0	0	0	x	Free Wheeling
1	0	0	0	Variable	Variable CW Direction
0	1	0	0	Variable	Variable CCW Direction
1	0	1	0	x	Fixed Speed 1 CW Direction (Factory Default 1000rpm)
1	0	0	1	x	Fixed Speed 2 CW Direction (Factory Default 4000rpm)
1	0	1	1	x	Fixed Speed 3 CW Direction (Factory Default 10,000rpm*)
0	1	1	0	x	Fixed Speed 1 CCW Direction (Factory Default 1000rpm)
0	1	0	1	x	Fixed Speed 2 CCW Direction (Factory Default 4000rpm)
0	1	1	1	x	Fixed Speed 3 CCW Direction (Factory Default 10,000rpm*)
1	1	x	x	x	Electronic Brake Activated

**This speed may be beyond maximum capability of the motor*

The Factory Default outputs are as follows:

OUT 1	Motor Ready
OUT 2	Speed Signal
OUT 3	Speed Signal

driveSTUDIO Connection

1. Install and open driveSTUDIO Software on PC/Laptop.
(https://www.ebmpapst.com/en/info-center/downloads/downloads.html#listsoftware)



2. Install the supplied **RS485 driver software** onto PC/Laptop following the manufacturer's instructions.
3. **Connect RS485 Adapter** to PC/Laptop and the K4 Motor Controller– see **wiring diagram 2**.
4. Connect **the motor** to the **K4 Motor Controller.**
5. Connect to Power supply using **Power Cables** as shown in **Wiring diagram 1 - 24VDC or 48VDC.**

Note: – Ensure correct voltage is selected
Note: - Isolated power supply (24v and/or 48v) with minimum 10A rated should be used

6. Click the **Connect** Icon to begin communication with the motor.



Demo Mode

This is a basic introduction to **driveSTUDIO**.

Service Interface

This enables the user to run the motor with basic functionality via the driveSTUDIO software.



Velocity Mode

1. Ensure the Motor is enabled by setting either INA or INB to High (1) on the K4 Motor Controller.
2. Click and hold the Left or Right Icon to run the Motor Clockwise or Counter Clockwise.

Position Mode

1. Ensure the Motor is enabled by setting either INA or INB to high (1) on the **K4 Motor Controller**.
2. Enter required rotation, 1 revolution of the motor output shaft = 65535 counts.

Note: - Any gearbox ratio is not accounted for in this calculation

3. Enter postion figure (+ figure clockwise shaft rotation, - figure anticlockwise shaft rotation).
4. Click <<-Relative+>> to activate motor.

Note: - The direction of rotation from the output of the motor shaft. The direction may be altered if a gearbox is fitted.

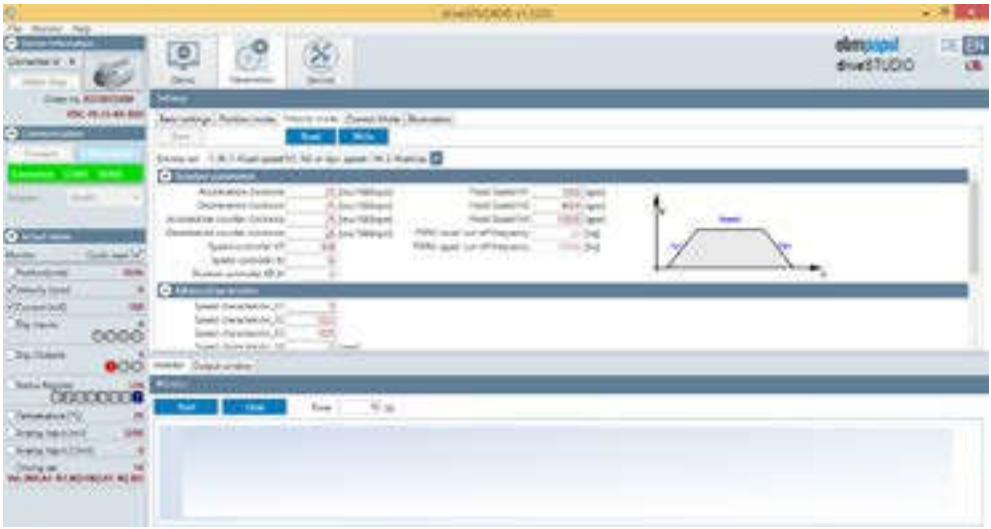
Digital Inputs

This enables the user to change the parameters and run the motor via its Digital inputs (i.e. **K4 Motor Controller**) while monitoring and if required recording the actual motor values i.e. out of the box mode.



Parameters

This enables the user to begin changing the motor parameters to customise the operation and functionality.



Read Read the existing motor settings

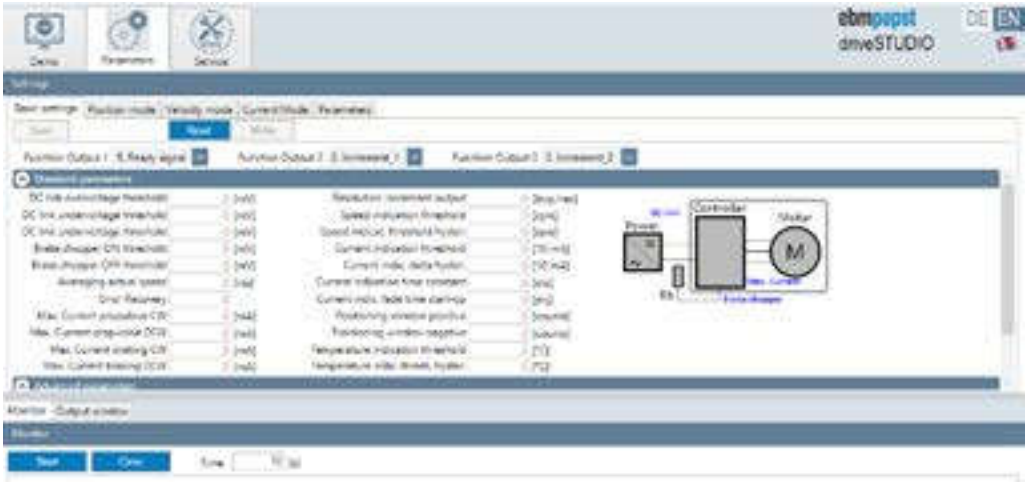
Write Write any updated settings to the motor's temporary memory (these settings will be lost if power is removed from the motor)

Save Save settings to the motor memory (these settings will remain if the power is removed from the motor)

To read, write or save all digital inputs to the motor must be set to low (0)

Basic Settings

This enables the user to set the basic motor parameters including the required functionality and thresholds of the motor outputs.



Position Mode, Velocity Mode & Current Mode

These are pre-set modes enabling the user to quick set required parameters for specific drive sets and applications.

Parameters

This enables the user to modify all available parameters to fully customise the motor solution.

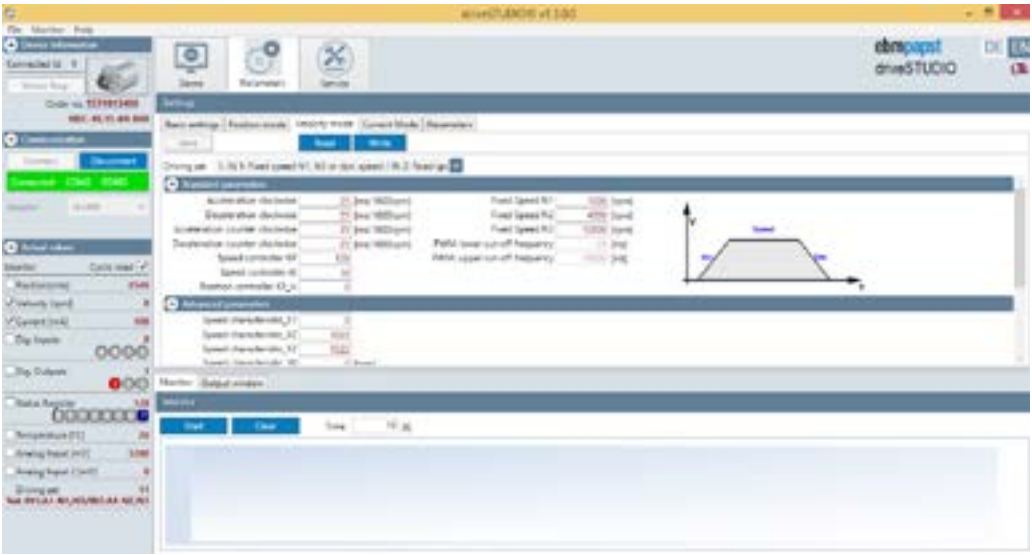
Service

This enables the user to factory reset the motor and update Firmware.

Examples

Velocity Mode – Driving Set 11

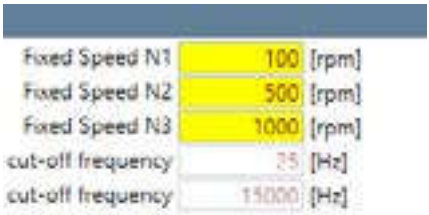
Driving set 11 is the factory default mode but a number of parameters can be further optimised.



1. Click Parameters and then Velocity Mode.
2. Click Read.
3. Click Driving Set Drop down menu and select option **2. In1: Fixed Speed or dyn. Speed / IN 2: Direction change.**

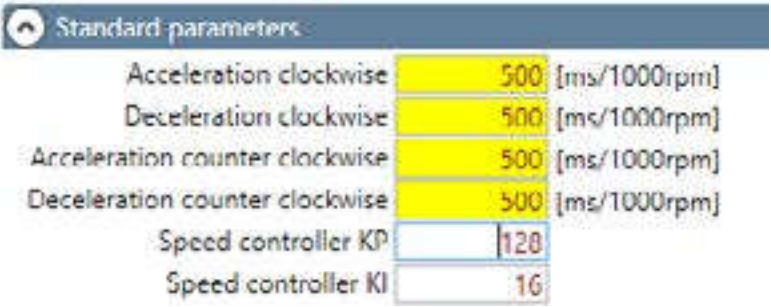
To change default motor fixed speeds

1. Set Fixed Speed N1, N2, N3 to required rpm value example
2. Write to motor.



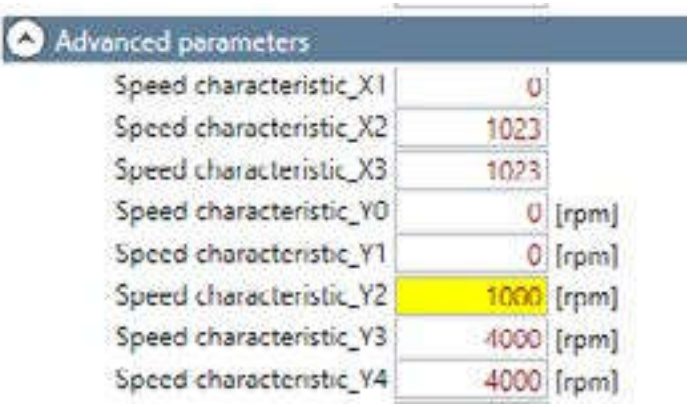
To change motor Acceleration/Deceleration rate

1. Set Acceleration/Deceleration clockwise/counter clockwise to required ms/1000rpm value.
2. Write to motor.



To change analogue input speed range (fixed speed settings will remain as per set values)

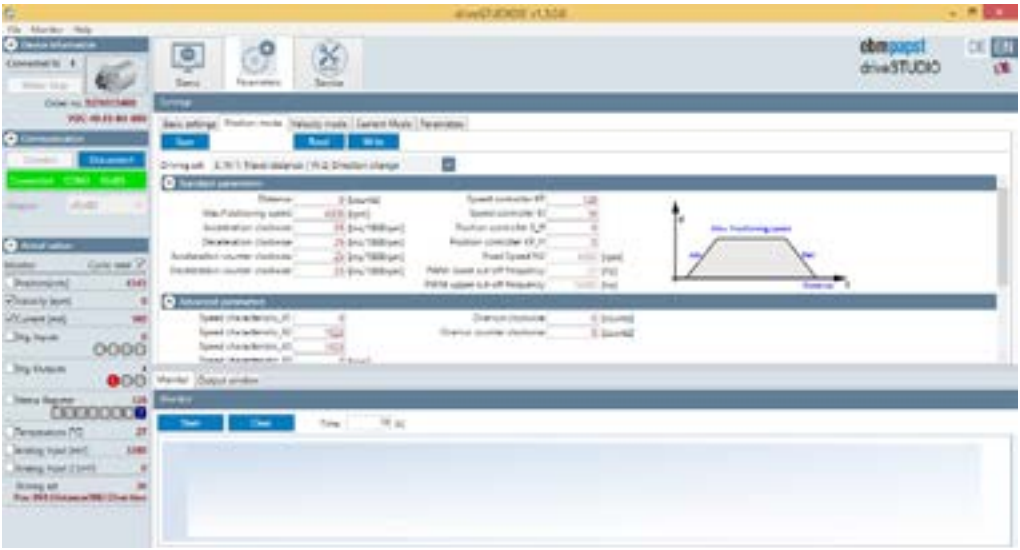
1. Set Advanced parameter Speed characteristic _Y2 to required rpm.
2. Write to motor.



Click save to store settings to the motor – Operation is as per function table at the start of this guide.

Positional Mode – Driving Set 36

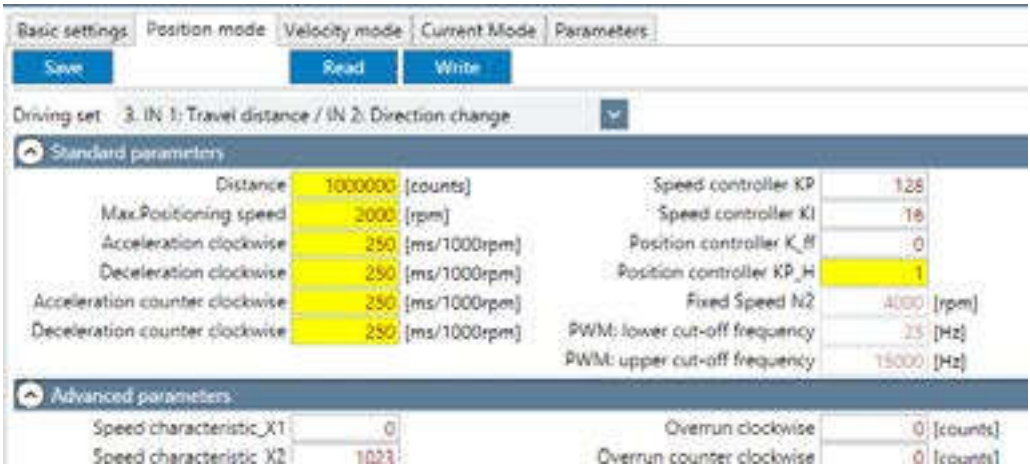
1. Click Parameters and Position Mode.
2. Click Read.
3. Click Driving set drop down menu and select option **3 In 1: Travel distance / In 2: Direction change.**



....steps continued overleaf.

.....continued

4. Set required distance - 1 revolution of the motor output shaft = 65535 counts (excluding gearbox ratio).
5. Set maximum position speed to required rpm.
6. Set Acceleration/Deceleration Clockwise/Counter clockwise to required ms/1000rpm.
7. Set Position Controller KP_H to > 0.
8. Write to motor.



9. Select inputs as shown below to run the motor.

INA	INB	IN1	IN2	AIN1	Function
0	0	0	0	*	Free Wheeling
1	0	0	0	Variable	Continuous operation variable speed CW Direction
0	1	0	0	Variable	Continuous operation variable speed CCW Direction
1	1	1	0	Variable	Set distance variable speed CW direction
1	1	1	1	Variable	Set distance variable speed CCW direction

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