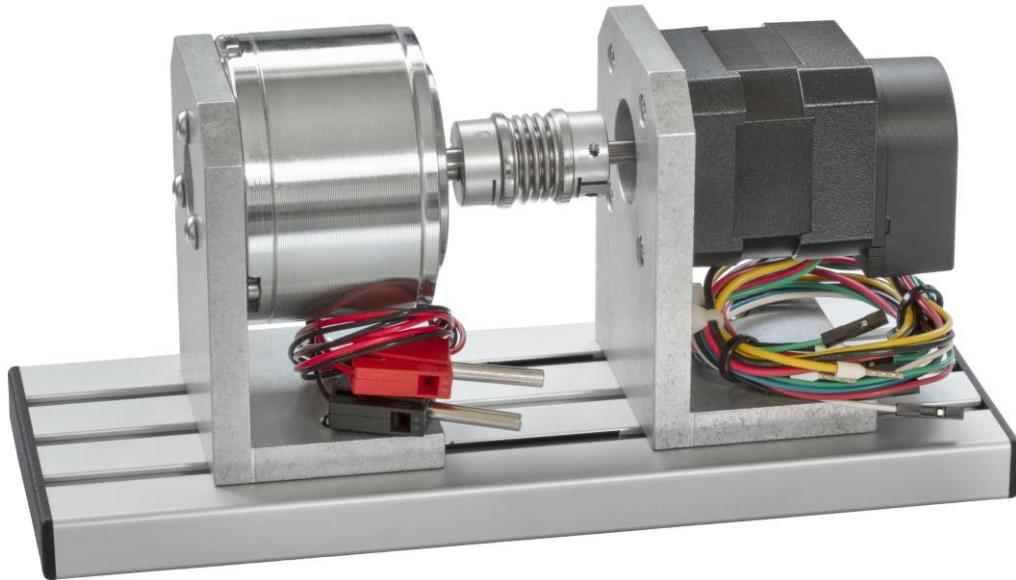


# User Manual

## MOTIX™ Motor Bench



## About this document

### Scope and purpose

This User Manual is intended to enable users to use the MOTIX™ Motor Bench.

This document describes the MOTIX™ Motor Bench and its components.

The MOTIX™ Motor Bench can be combined with Infineon evaluation boards and reference designs for BLDC motor control evaluation. It is meant to support the motor control software development process.

The MOTIX™ Motor Bench is intended to be used with 3 phase evaluation boards of Infineon products.

For example:

- MOTIX™
- AURIX™
- TRAVEO™
- iMOTION™

### Intended audience

This document is intended for anyone using the MOTIX™ Motor Bench. It is recommended for trained personnel.

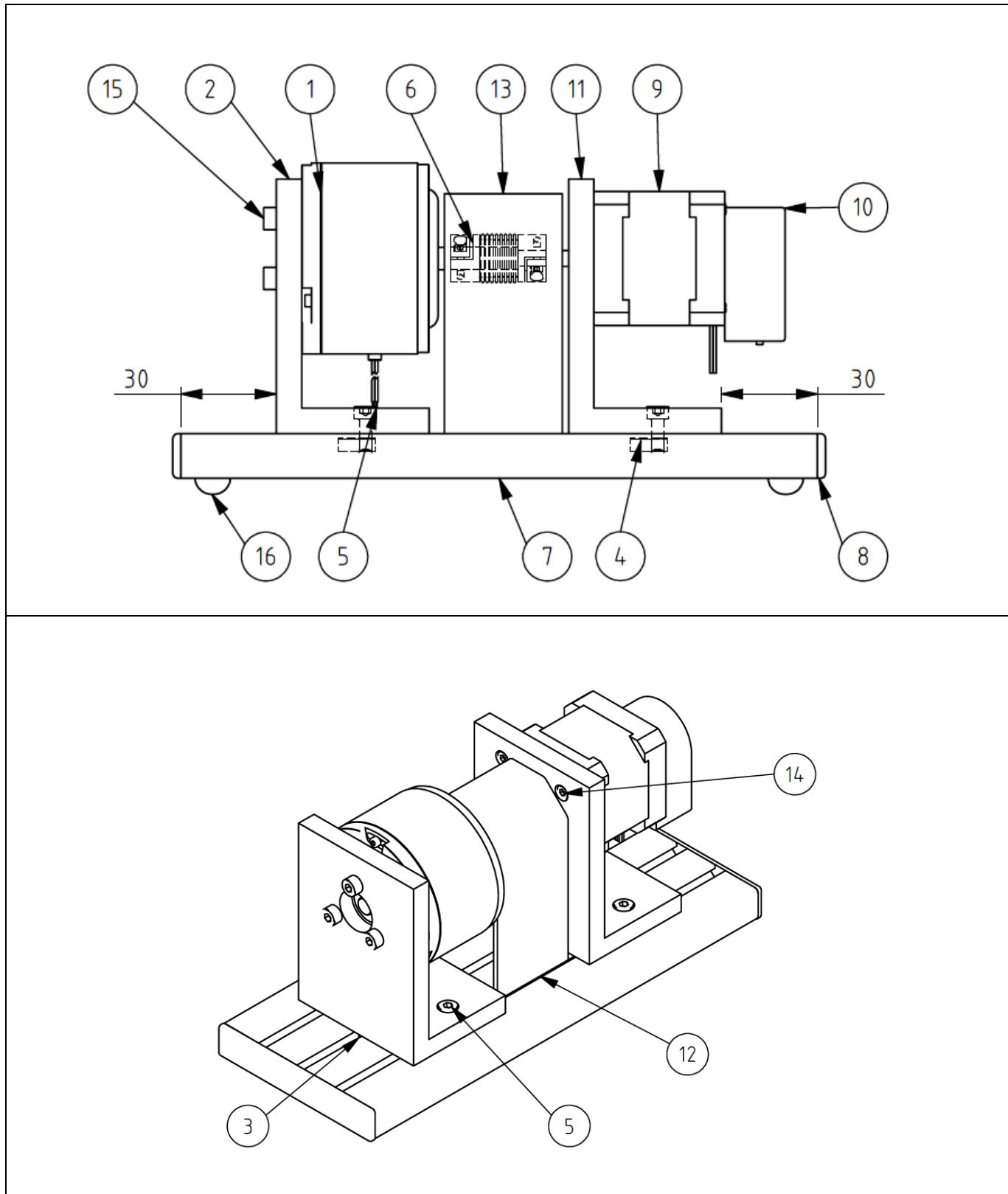
*Note: The MOTIX™ Motor Bench contains spinning components while operational. Always keep the acrylic cover closed. Check all screws and achsle alignment frequently.*

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## 1 Mechanical Setup

### 1.1 Main Assembly



**1.2 Bill of Material****Table 1 Bill of Material**

No.	Qty.	Title	Comp. / Manuf.	Draw. / Manuf. No.	Rev. / Note
<b>1</b>	1	hysteresis brake	Mobac	HB-50M-2	-
<b>2</b>	1	brake bracket	MOTEON (MTN)	PMTN19-MTN-P002 / Alu-Winkel EN-AW 6060 80x80x8 mm	Rev.1.0
<b>3</b>	4	parallel pin ISO 2338 - 5 m8 x 10	-	-	Toolbox Part
<b>4</b>	4	slot nut M4	item	0037006	-
<b>5</b>	4	Screw ISO 4762 M4 x 10 - 10N	-	-	Toolbox Part
<b>6</b>	1	miniature bellows coupling MK2	R+W	MK2/15/30/5/7	-
<b>7</b>	1	profile 5 80x14 L=200	item	0037085	3m length item 0044813
<b>8</b>	2	cover cap 5 80x14	item	0037091	-
<b>9</b>	1	brushless DC motor DB42S03	nanotec	DB42S03	-
<b>10</b>	1	encoder WEDL5541-B14	nanotec	WEDL5541-B14	-
<b>11</b>	1	motor bracket	MOTEON (MTN)	PMTN19-MTN-P001 / Alu-Winkel EN-AW 6060 80x80x8 mm	Rev.1.0
<b>12</b>	2	cover profile 5 L=40 mm	item	0039174	only orderable in 2m length
<b>13</b>	1	shaft cover	MOTEON (MTN)	PMTN19-MTN-P003 / 2mm transparent acrylic	Rev.1.0
<b>14</b>	4	Screw ISO 4762 M3 x 10 - 10N	-	-	Toolbox Part
<b>15</b>	3	Screw ISO 4762 M4 x 16 - 16N	-	-	Toolbox Part
<b>16</b>	4	Buffer D11x5	item	0.0.667.78	Set of 4

**1.3 Electric connections****Table 2 Electric Connections**

<b>Component</b>	<b>Wire</b>	<b>Function</b>	<b>Wire termination</b>
hysteresis brake	red	DC+	Wago 215-212
hysteresis brake	black	DC-	Wago 215-311
motor phase	AWG20 yellow	U	crimped ferrule
motor phase	AWG20 red	V	crimped ferrule
motor phase	AWG20 black	W	crimped ferrule
motor Hall sensor	AWG26 red	+5V	Dupont female 1-pin
motor Hall sensor	AWG26 black	GND	Dupont female 1-pin
motor Hall sensor	AWG26 blue	H1	Dupont female 1-pin
motor Hall sensor	AWG26 white	H2	Dupont female 1-pin
motor Hall sensor	AWG26 green	H3	Dupont female 1-pin

*Note: It is recommended to use pull-up resistors on the H1, H2 and H3 connections to +5V.*

**1.4 Motor**

The MOTIX™ Motor Bench is equipped with a Nanotec DB42S03 BLDC motor. The latest specification can be found on the manufacturer's website.

**Table 3 Motor Parameters copied from DB42S03 Datasheet**

No. of Pol./Phases	8/3		
Voltage Rated (VDC)	24		
Current (AMP)	No load [A]	Rated [A]	Peak [A]
	0.2	1.79	5.4
Resistance / phase to phase [Ohms] @ 25°C	1.5 ± 15%		
Inductance / phase to phase [mH] @ 1kHz	2.1 ± 20%		
Tourque Rated / Peak	Constant [Nm/A]	Rated [Nm]	Peak [Nm]
	0.035	0.0625	0.19
Power Rated [W]	26		
Speed	Rated [RPM]		No Load [RPM]
	4000		6200
Rotor Inertia [Kg-m <sup>2</sup> ]	2.4x10 <sup>-6</sup>		
Weight [Kg]	0.3		

## 1.5 Hysteresis Brake

The MOTIX™ Motor Bench is equipped with a Mobac HB-50M-2 hysteresis brake. The latest specification can be found on the manufacturer's website.

**Table 4 Brake Parameters copied from Mobac HB-50M-2 Datasheet**

Torque at working current [Nm]	0.38	
Working current [mA]	270	
Resistance at 25°C ± 10% [Ohm]	95	
DC Voltage [V]	24	
Rpm max. 25°C ± 10% [min <sup>-1</sup> ]	15000	
Power dissipation [Watt]	Peak	continuous
	90	23
Residual torque without current [Nm]	$1.55 \times 10^{-3}$	
Rotor inertia [kgcm <sup>2</sup> ]	0.1670	
Weight [kg]	0.755	

## 1.6 Couplings

The coupling creates the mechanical link between the motor and the hysteresis brake. It also compensates mechanical inaccuracies in the setup. It is mandatory to realign the setup frequently.

*Note: Couplings may vary in model and manufacturer due to allocation.*

**Table 5**      **Couplings variations**

	
Motor axle diameter (rated) [mm]	5
Brake axle diameter (rated) [mm]	7

## **2        Hardware and Software Support**

### **2.1      MOTIX™ MCUs**

**Table 6      Evaluation Hardware**

Name	Order No.	Example Software
TLE9879 Evalkit	SP001389172	<ul style="list-style-type: none"><li>- Sensor-less FOC</li></ul>
TLE987X EVALB_VQFN	SP005421934	<ul style="list-style-type: none"><li>- Block commutation, Hall sensor based</li></ul>
TLE987X EVALB_TQFP	SP005421936	<ul style="list-style-type: none"><li>- Block commutation with BEMF</li></ul>

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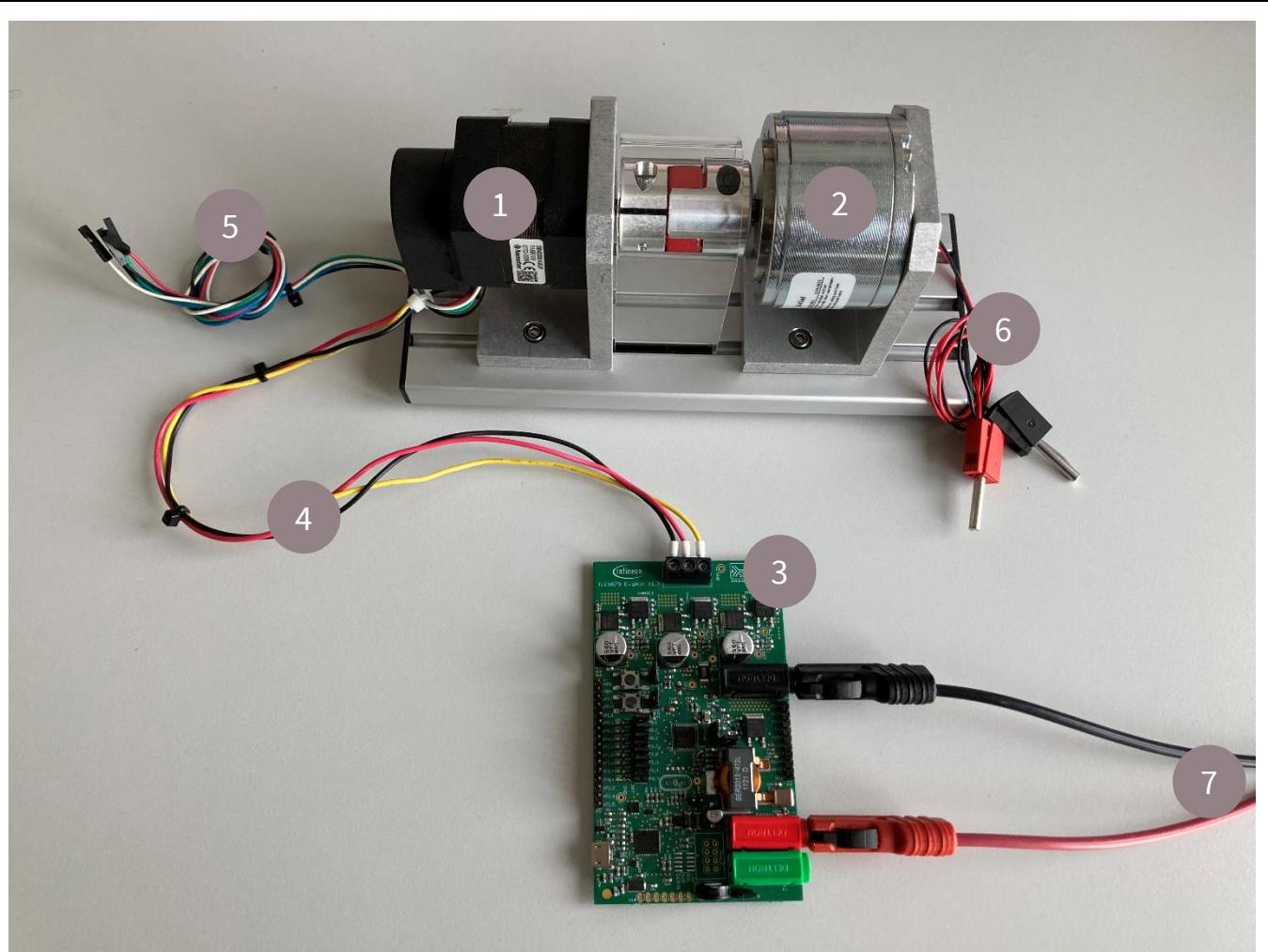
## MOTIX™ Motor Bench

### About this document

## 3 Example Setup

The MOTIX™ Motor Bench can be used with several Evaluation Boards from Infineon Technologies. This chapter describes an example setup.

**Table 7 Example Setup**



1	DB42S03 BLDC motor
2	Mobac HB-50M-2 hysteresis brake
3	TLE9879 Evalkit
4	BLDC motor phase wires
5	Hall sensor wires
6	Hysteresis brake connectors
7	12V Power Supply

## 4 Revision History

**Table 8 Revision History**

Page or Item	Subjects (major changes since previous revision)
Rev. 1.0, 2022-10-11	
All	Initial release.

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