

# Commissioning of EZ motors on B&R drive controllers Information

en-US  
04/2023  
ID 443184\_en.01

# 1 Overview

This document contains information about **B+R ACOPOS**, **ACOPOSMulti** and **ACOPOS P3** features that are offered in the configuration of STOBBER motors when selecting the drive controller type. These features affect the connection and parameterization of STOBBER synchronous servo motors to drive controllers of the B&R ACOPOS, ACOPOSMulti and ACOPOS P3 series.

STOBBER motor designs with the previously named features are available and can be delivered.

STOBBER has taken the following measures to minimize the effort of commissioning STOBBER motors connected to B&R drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- The electronic nameplate of the motor was designed to be compatible with the B&R controllers.

## Brand names

ACOPOS®	ACOPOS is a registered trademark of ABB Asea Brown Boveri Ltd., Zurich, Switzerland.
B&R AUTOMATION STUDIO®	B&R AUTOMATION STUDIO is a registered trademark of ABB Asea Brown Boveri Ltd., Zurich, Switzerland.

## 2 B&R drive controllers

### Supported series

This document refers to B&R drive controllers of the ACOPOS, ACOPOSmulti and ACOPOS P3 series.

### Automatic parameterization

Using B&R Automation Studio, motor parameters can be read out from the electronic nameplate of a STOBBER motor and saved in a B&R drive controller. The motor can then be commissioned like an original B&R motor. More information can be found in the chapter [Parameterizing the motor \[▶ 9\]](#).

### Connection cables

The plug connectors and terminal assignment of STOBBER motors are designed so that the customer can obtain and connect the corresponding original cables from B&R. STOBBER does not offer any connection cables for B&R drive controllers.

## 3 STOBBER motors

### Supported motor series

The STOBBER EZ motor series can be parameterized to ACOPOS, ACOPOSmulti and ACOPOS P3 drive controllers fully automatically. Other STOBBER motor series are excluded.

### Electronic nameplate

The electronic nameplate is stored in the encoder memory of STOBBER motors. This is written in a format that B+R controllers can recognize and read out. All necessary motor parameters that the drive controller needs to operate the motor reliably are stored in this format.

### Temperature sensor

As standard, PTC or PT1000 temperature sensors are installed in B&R motors, depending on the series. STOBBER offers the same temperature sensors. The temperature sensor connections are routed via the power plug connector. For connections using a shared plug connector (OCS), the temperature is transmitted digitally over data lines so that temperature sensor connections are not routed via the connection cable.

The terminal assignment for plug connectors of STOBBER motors in the designs listed above is identical to B&R motors.

## 3.1 Encoders

### Encoders with EnDat 2.2 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EnDat 2.2 EQI 1131 FMA	M4	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQI 1131	Q6	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQN 1135 FMA	M3	Optical	4096	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQN 1135	Q5	Optical	4096	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECN 1123 FMA	M1	Optical	–	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECN 1123	C7	Optical	–	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECI 1118-G2	C5	Inductive	–	18 bit	262144	> 76	$\leq 1.5 \times 10^{-6}$

### Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$

## Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Encoders with EnDat 2.2 interface and in the FMA design are ready for operation as a one-encoder solution on a safety-related position measuring system with an EnDat 2.2 interface
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

## 3.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from B&R depending on the encoder model.

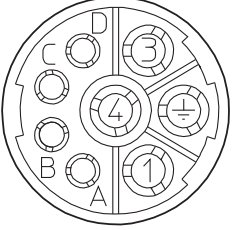
Drive controller		ACOPOS	ACOPOSmulti (EnDat 2.1)	ACOPOSmulti (EnDat 2.2)	ACOPOS P3 (EnDat 2.2)	ACOPOS P3 OCS (EnDat 2.2)	ACOPOSmulti OCS (EnDat 2.2)
<b>Drive controller code</b>		FG	FV	GG	GY	GP	GV
<b>Connection plan ID</b>		442313	442444	442677	443095	443022	443092
Encoder	Encoder code						
EnDat 2.2 EQI 1131 FMA	M4	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQI 1131	Q6	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQN 1135 FMA	M3	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQN 1135	Q5	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECN 1123 FMA	M1	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECN 1123	C7	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECI 1118-G2	C5	–	–	EZ	EZ	–	–
EnDat 2.1 EQN 1125 FMA	M2	EZ	EZ	–	–	–	–
EnDat 2.1 EQN 1125	Q4	EZ	EZ	–	–	–	–
EnDat 2.1 ECN 1113 FMA	M0	–	EZ	–	–	–	–
EnDat 2.1 ECN 1113	C6	–	EZ	–	–	–	–
Resolver	R0	EZ	EZ	–	–	–	–

The encoder and drive controller codes are a part of the type designation of the motor.

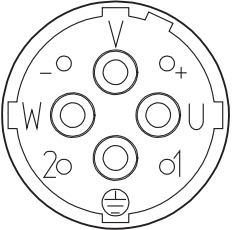
### 3.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

#### Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	W phase	RD
	4	V phase	BU
	A	Temperature sensor +	
	B	Temperature sensor -	
	C	Brake +	RD
	D	Brake -	BK
	⊕	Grounding conductor	GNYE

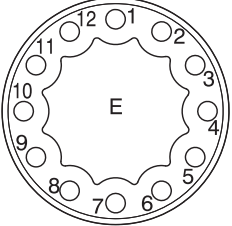
#### Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	-	Brake -	BK
	1	Temperature sensor +	
	2	Temperature sensor -	
⊕	Grounding conductor	GNYE	

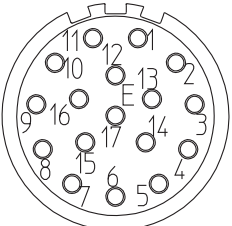
### 3.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

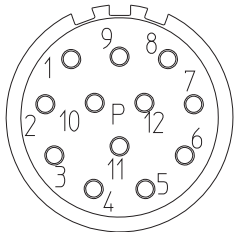
#### EnDat 2.2 digital encoder, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	Up +	BNGN
	2	Data +	GY
	3	Data -	PK
	4	Clock +	VT
	5	Clock -	YE
	6		
	7	0 V GND	WHGN
	8		
	9		
	10		
	11		
	12		

#### EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	Up sense	BU
	2		
	3		
	4	0 V sense	WH
	5		
	6		
	7	Up +	BNGN
	8	Clock +	VT
	9	Clock -	YE
	10	0 V GND	WHGN
	11		
	12	B + (Sin +)	BUBK
	13	B - (Sin -)	RDBK
	14	Data +	GY
	15	A + (Cos +)	GNBK
	16	A - (Cos -)	YEBK
	17	Data -	PK

**Resolver, plug connector size con.23**

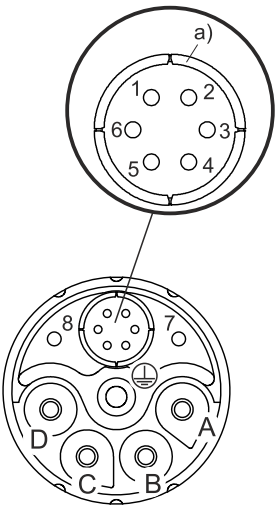
Connection diagram	Pin	Connection	Color
	1		
	2		
	3	S4 Sin +	BU
	4	S1 Cos -	RD
	5	R2 Ref +	YEW
	6		
	7	S2 Sin -	YE
	8	S3 Cos +	BK
	9	R1 Ref -	RDWH
	10		
	11		
	12		

### 3.5 Terminal assignment for plug connectors (One Cable Solution)

In the One Cable Solution design, the power and encoder lines are connected using a shared plug connector.

The temperature sensor of the motor is connected to the encoder internally. The measured values from the temperature sensor are transmitted via the log of the encoder.

**Plug connector size con.23**

Connection diagram	Pin	Connection	Color
	A	U phase	black
	B	V phase	blue
	C	W phase	red
	D		
	1	Up +	browngreen
	2	0 V GND	whitegreen
	3	Data +	grey
	4	Data -	pink
	5	Clock +	violet
	6	Clock -	yellow
	7	Brake -	
	8	Brake +	
	⊕	Grounding conductor	green-yellow

a) Coaxial shield to which the shield of the encoder cores is connected



## 4 Parameterizing the motor

### Prerequisites

Before parameterizing the motor, make sure that the following prerequisites are present or have been met:

- PC with B&R Automation Studio software
- Mechanical installation of the EZ motor in the machine is completed
- Electrical connection of the EZ motor to the B&R drive controller is completed

After B&R Automation Studio has detected the motor, all motor parameters are set so that you can commission the STOBBER motor like a motor from B&R. Further information on commissioning can be found in the technical documentation of B&R Automation Studio, the drive controller and motor.

The technical documentation of a STOBBER motor can be found by entering the motor's serial number under <https://id.stober.com> or scanning the QR code on the motor's nameplate.



443184\_en.01

04/2023

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