STÖBER Antriebstechnik GmbH & Co. KG

Product Release Brief

STOBER OCS One Cable Solution

Ind. EnDat 3 EQI 1131

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Purpose

- This document is intended for the STOBER sales team

- It is a guide how to handle STOBER servomotors with the reworked One Cable Solution (OCS) based on the Heidenhain encoder Ind. EnDat 3 EQI 1131

- This solution is ready to be sold and supported

- This document contains all required information for the product launch

- This document does not receive any updates during the product life cycle

EZ Motor One Cable solution

STOBER will offer a new outline design of the existing EZ motor series. The product name is

One-Cable Solution (OCS).

Power as well as feedback signals use a single cable / single receptacle. Motors with hollow shaft are not within the scope of this solution.

1. The motors with the Ind. EnDat 3 EQI 1131 encoder can be operated with STOBER drive controller SI6 and SC6 only
2. The (NEW) Heidenhain Ind. EnDat 3 EQI 1131 encoder replaces the single cable solution with the (OLD) Sick Stegmann EKM36 Hiperface DSL
3. The connection between motor and SI6/SC6 drive controller is only provided with the new hybrid cable. The maximum recommended cable length is 100m:
    - <50m without choke
    - ≥50m with choke

Motors will be available for conventional cooling as well as for forced air cooling.

Available EZ Motor sizes

Cable sizes as well as receptacle sizes are reducing the number variety of selectable motors and K_{EM}.

Motor	Winding		Winding	
	KEM	Cooling	KEM	Cooling
EZ301	40	U/B		
EZ302	86	U/B	42	U/B
EZ303	109	U/B	55	U/B
EZ401	96	U/B	47	U/B
EZ402	94	U/B	60	U/B
EZ404	116	U/B	78	U/B
EZ501	97	U/B	68	U/B
EZ502	121	U/B	72	U/B
EZ503	119	U/B	84	U/B
EZ505	141	U/B	103	U/B
EZ701	95	U/B	76	U/B
EZ702	133	U/B	82	U/B
EZ703	122	U/B	99	U
EZ705	140	U		
EZS501	97	U/B		
EZS502	121	U/B		
EZS503	119	U/B		
EZS701	95	U/B		
EZ/702	133	U/B		
EZS703	122	U/B		

U/B = convectional cooled and fan cooled, U = convectional cooled only

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Type Designation

The basic structure of the nomenclature of the EZ motors does not change.

Sample code

EZ	4	0	1	U	D	AD	M4	O	096

Explanation

Code	Designation	Design
EZ	Type	Synchronous servo motor
4	Size	4 (example)
0	Generation	0
1	Length	1 (example)
U B W	Cooling[1]	Convection cooling Forced ventilation Water cooling
D M	Mass moment of inertia	Dynamic performance With increased mass moment of inertia[2]
AD	Drive controller	SD6 (example)
M4	Encoder	EQI 1131 FMA EnDat 2.2 (example)
O P	Brake	Without holding brake Permanent magnet holding brake
096	Electromagnetic constant (EMC) K_{EM}	96 V/1000 rpm (example)

The differentiation between the motor version with two cables and the One-Cable solution is done on the level of the encoder (in SAP). Only the encoder (code) will tell if One-Cable or two cables are required to connect the motor to a drive controller.

A-Side

No changes to existing EZ motors with OCS.

B- Side

The inductive encoder Ind. EnDat 3 EQI 1131 does not need a "hat cover" therefore the One-Cable solution results in a shorter overall length compared to the previous Sick Stegmann version.

Bearings

No changes to existing EZ motors with OCS.

Shaft

No changes to existing EZ motors with OCS.

Brake

No changes to existing EZ motors with OCS.

Active Section

No changes to existing EZ motors with OCS.

Housing

No changes to existing EZ motors with OCS.

Protection Rating

No changes to existing EZ motors with OCS

Gearboxes

No changes to existing EZ motors with OCS.

Cooling options

No changes to existing EZ motors with OCS.

Receptacles

No changes to the old EZ OCS with Sick Stegmann encoder EKM36 Hiperface DSL.

The new pin assignment is designed according to the motor connection plan 443174 and 443175.

The single receptacle remains Intercontec SpeedTec. Standard design is an angled receptacle with pins. Connector size varies with motor size and controller type. Each motor can be ordered with an optional plug with sockets (for cable assembly).

Connector sizes available are con 23. Therefore, not all motor sizes and K_{EM} are available with the Heidenhain Ind. EnDat 3 EQI 1131 encoder solution.

angled receptacle with pins

optional plug with sockets

Encoder

The revised single-cable solution for EZ motors is based on a "new" encoder from Heidenhain. In fact, it is a further development of the proven EQI 1131 encoder, which has also been sold in large quantities by STOBER. The brand-new encoder protocol EnDat3 is used for information transmission. At the time of this publication, the EnDat3 protocol is only available together with EQI 1131.

Ind. EnDat 3 EQI 113119-bit resolution single turn
12-bit resolution multi turn

This encoder can only be operated with the SI6 and SC6 drive controller.

Encoder model	Code	Meassuring method	Recordable Revolutions	Resolution	Position values per revolution
Ind. EnDat 3 EQI 1131	Q7	inductive	4096	19 bit	524288

The Heidenhain encoder Ind. EnDat 3 EQI 1131 replaces the Sick Stegmann encoder EKM36 Hiperface DSL for the STOBER One-Cable solution.

With the Hiperface DSL protocol, it was unfortunately not possible to introduce advanced safety technology in the SI6 and SC6 drive controllers.

The EnDat3 protocol accommodates our structural drive controller design and thus supports a future implementation of extended safety technology. A design project for SI6 and SC6 with advanced safety function has already been launched.

Temperature Sensor

EZ motors with Ind. EnDat 3 EQI 1131 encoder are available either with

- 3 x PTC located in every winding

or

- 1 x PT1000 located in the winding between the terminals U and V

Possible combination with Drive Controller

Drive controller		SI6	SC6
Drive controller code		BB	BA
Connection Plan ID		443175	443174
Encoder	**Encoder code**		
EQI 1131 EnDat3	**H7**	EZ, EZS	EZ, EZS
Temperatur Sensor		PTC	PTC
		PT1000	PT1000

SI6 and SC6 require firmware version 5.6-B

Motor Connection Plan

The motor connection plan can be found in the download area of the STOBER website as well as in the download area of the STOBER intranet. See table above.

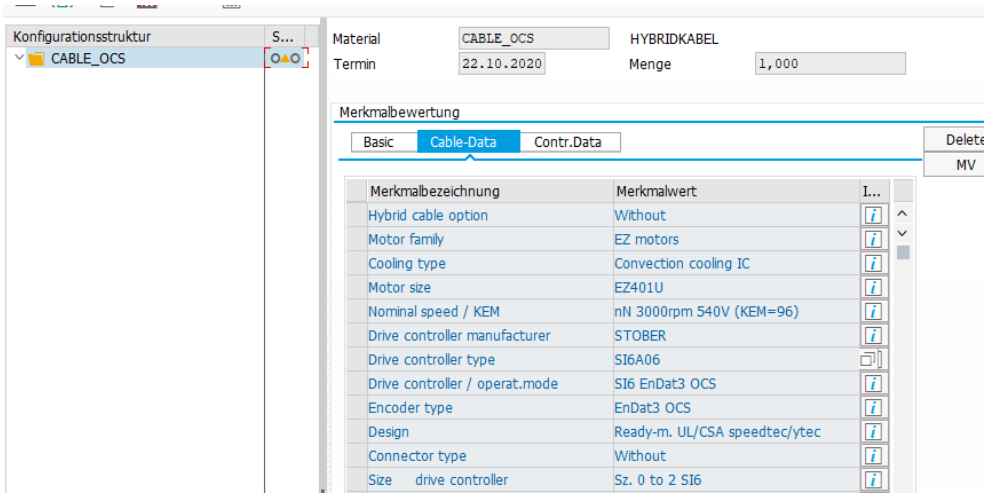
Cables

STOBER's new OCS solution with the Heidenhain EQI 1131 EnDat3 encoder comes with a new hybrid cable.

The goal of enabling motor operation with up to 50m cable length without motor choke was realized by a new, STOBER-specific cable design. In extensive tests in drag chain operation, this cable type was finally able to achieve several million cycles with the SI6/SC6 drive controller without errors in encoder communication. Cables with a conventional design failed these tests with significantly fewer cycles.

The ability of the new hybrid cable to enable motor operation without a choke has the following benefits:

- Savings on the motor choke
- Reduction of component variance
- Elimination of the entire logistics effort for a component
- Reduced installation effort
- Reduced installation space in the control cabinet
- Reduced thermal load in the control cabinet
- Reduced cooling effort in the control cabinet
- Increase in system efficiency
- Lower energy costs for motor operation without choke



Choke

The newly designed STOBER cable does not require a choke for motor operation with a cable length up to 50m.

A choke must be used for cable lengths over 50m.

Information on motor chokes can be found in our catalogs in the electronic accessories section.

Pricing

The Heidenhain encoder EQI 1131 EnDat3 is offered for the same price as the Sick-Stegmann encoder EKM36 Hiperface DSL.

Encoder	Gross Price BVP [EUR]
Ind. EnDat 3 EQI 1131	324

Logistics

Motors EZ, EZS are available from Stöber Pforzheim.

Availability

Same leadtime for quotations as any other EZ motor.

Acceptance of order

Orders will be accepted from 1st. February 2021.

Marketing

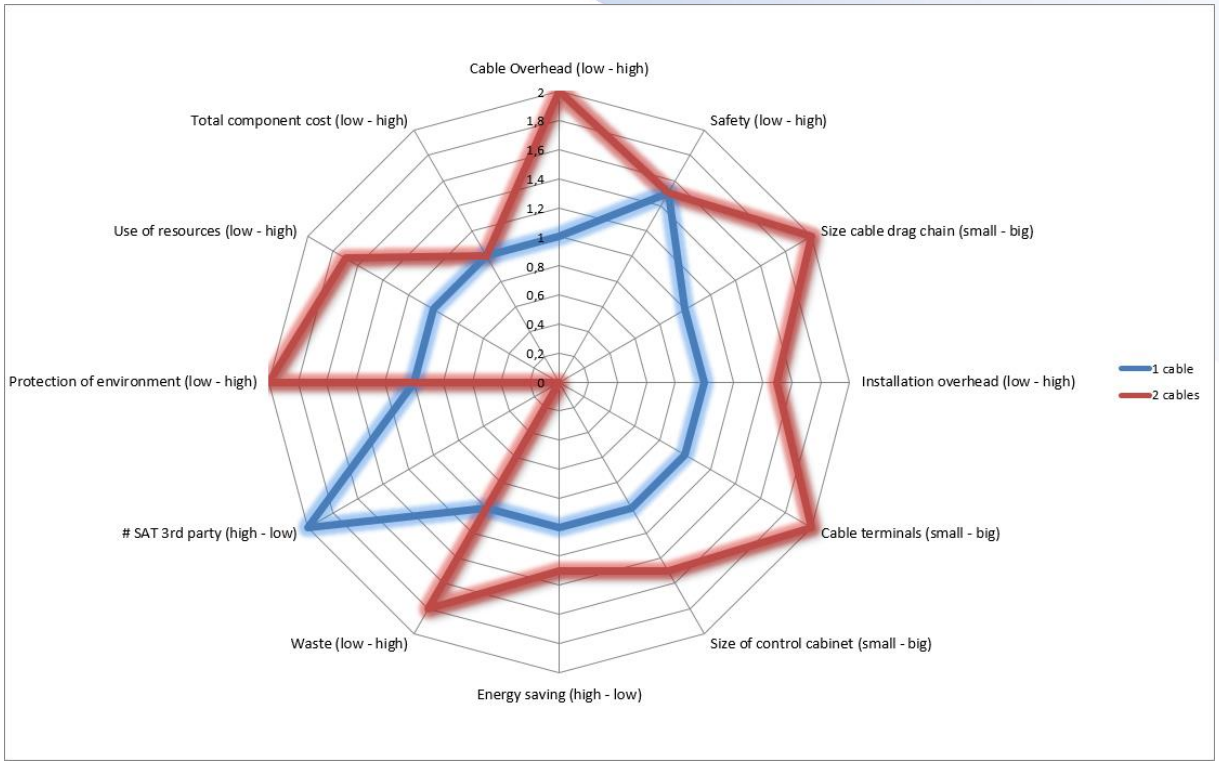
Information is published in the catalog, on the STOBER website, and the online configurator.

The main sales arguments compared to the previous single-cable solution with Sick Stegmann EKM36 Hiperface DSL encoder are:

- Next generation of Single-Cable Solution OCS

- Further savings potential is increased by eliminating motor choke up to 50m cable length
- Motor length reduced again

1 cable vs 2 cables



How to read: waste (low – high): low waste = center of graph, scale = 0 – high = high waste, scale = 2

Benefits

Feature	Benefit
One receptacle	Compact Size One-Cable solution suitable
One-Cable solution	50% less cables Reduction of size / cost of the cable drag chain. Weight reduction in cable drag chain leads to less power consumption and reduced cost of ownership. Less installation overheads saves time and money. Less installation error saves time and money. Saving raw material in production process of cables to protect environment. Environmentally friendly disposal due to reduced amount of raw material. Less system cost. Less administrative costs for: compiling bills of material order processing warehousing incoming inspection
Smaller cabinet terminals	Reducing the size of the control cabinet
Heidenhain Ind. EnDat 3 EQI 1131	Proven encoder design. Proven position generation by inductive method. Robust design. Modern, future-proof encoder transmission protocol. Lower system cost. Less cost of ownership.

No choke required	• Savings on the motor choke • Reduction of component variance • Elimination of the entire logistics effort for a component • Reduced installation effort • Reduced installation space in the control cabinet • Reduced thermal load in the switch cabinet • Reduced cooling effort in the control cabinet • Increase in system efficiency • Lower energy costs for motor operation as choke is not necessary

FAQ

How much money will be saved?

This depends on the application. Comparing only the cost of components does not show a huge advantage for a single cable solution compared to the traditional two cable solution. The benefits are found in the process of fitting the motor to the application, less installation time, and the possibility to reduce operating costs over the lifetime of the application:

- Cost reduction due to smaller size of the cable drag chain
- Weight reduction might lead to a smaller motor and drive controller and therefore save money
- Lower installation overheads save time and money
- Smaller cable terminals

- Reduction in the size of the control cabinet
- Reduction of required mounting space
- Weight reduction saves energy
- Reduction in the cost of waste
- Reduction in the consumption of valuable resources
- Less installation errors
- Less administrative costs for:
    - compiling bills of material
    - order processing
    - warehousing
    - incoming inspection
- No choke required
    - No material costs for this component
    - Less installation overheads save time and money
    - Less administrative costs for:
        - compiling bills of material
        - order processing
        - warehousing
        - incoming inspection
    - Reduced installation space in the control cabinet
    - Reduced thermal load in the switch cabinet
    - Reduced cooling effort in the control cabinet
    - Increase in system efficiency
    - Lower energy costs for motor operation without choke

What safety levels can be achieved?

Encoders can be used up to Safety Level

- SIL2, EN 61508
- Category 3, PL d EN ISO 13849-1 :2015

As a single encoder system for monitoring and control loop functions. Safe in the single turn range.

Which STOBER drive controllers are compatible with Heidenhain Ind. EnDat 3 EQI 1131 One-Cable solution?

Drive Controller SI6 and SC6 are compatible with EnDat 3 protocol.

Which Heidenhain encoder is used?

We are offering the inductive multi turn encoder Ind. EnDat 3 EQI 1131 with 19 bit resolution (524288 position information) in the single turn information and 12 bit (4096 revolutions) for the multi turn information.

Does the Ind. EnDat 3 EQI 1131 give incremental signals?

No. The Ind. EnDat 3 EQI 1131 is a purely digital encoder. All information is transmitted as a digital string to the drive controller.

Does the Ind. EnDat 3 EQI 1131 give sin / cos signals?

No. The Ind. EnDat 3 EQI 1131 is a purely digital encoder. All information is transmitted as a digital string to the drive controller.

Does the Ind. EnDat 3 EQI 1131 have an analog temperature signal?

No. The Ind. EnDat 3 EQI 1131 is a purely digital encoder. All information is transmitted as a digital string to the drive controller. The measurement and the evaluation of the temperature sensor is done by the encoder.

What are the advantages if I can do without a motor choke?

- Savings on the motor choke
- Reduction of component variance
- Elimination of the entire logistics effort for a component
- Reduction of installation effort
- Reduced installation space in the control cabinet
- Reduced thermal load in the switch cabinet
- Reduced cooling effort in the control cabinet
- Increase in system efficiency
- Lower energy costs for motor operation without choke

Competition

Kollmorgen (Hiperface DSL)

- AKM Servomotoren (Hiperface DSL)

Beckhoff

- Synchron Servomotoren AM8 (Hiperface DSL)

B+R

- Synchronmotoren 8LS (EnDat2.2)

Rockwell

- Kinetix VP Motoren (Hiperface DSL)

BOSCH

- IndraDrive Mi KMS-Motoren (Hiperface DSL)
- IndraDrive DynS MS2N Motoren (Hiperface DSL

Target Market

Printing machines

General Automation

Packaging

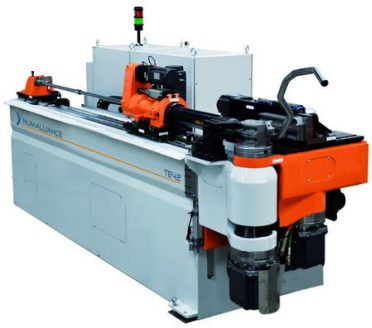
Semiconductor Industry

Machine Tool / Plastic processing machines

- 3 axis robots

- 5 axis robots

- CNC Bending machines



- Waterjet Cutting