Model Number

AVS58W-011BEAHGN-0012

Features

- **Industrial standard housing Ø58 mm**
- **12 Bit singleturn**
- **Hardware encoder**
- **Data transfer up to 2 MBaud**
- **Optically isolated RS 422 interface**
- **Servo or clamping flange**

Description

This singleturn absolute encoder with modern fast technology transmits a position value corresponding to the shaft setting via the SSI interface (Synchronous Serial Interface). The resolution of this device is maximum 4096 steps per revolution.

This encoder does not have a microcontroller. Thus, it is a pure hardware encoder.

The control module sends a clock bundle to the absolute encoder to obtain the position data. The rotary encoder then sends the position data synchronous to the cycles of the control module. It is possible to select the counting direction with the function input.

This singleturn absolute encoder is available in clamp flange design with a shaft diameter of 10 mm x 20 mm. The electrical connection is made by a round plug connector M12 x 1, 8 pin.

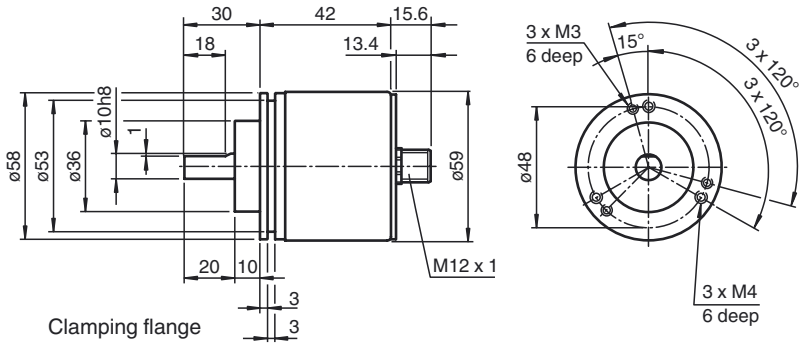
Technical data

Functional safety related parameters	
$MTTF_d$	170 a
Mission Time (T_M)	20 a
L_{10h}	1.9 E+11 at 6000 rpm and 20/40 N axial/radial shaft load
Diagnostic Coverage (DC)	0 %
Electrical specifications	
Operating voltage U_B	10 ... 30 V DC
No-load supply current I_0	max. 180 mA
Linearity	± 0.5 LSB (12 Bit)
Output code	Gray code
Code course (counting direction)	cw descending (clockwise rotation, code course descending)
Interface	
Interface type	SSI
Monoflop time	20 ± 10 µs
Resolution	
Single turn	12 Bit
Overall resolution	12 Bit
Transfer rate	0.1 ... 2 MBit/s
Voltage drop	U_B - 2.5 V
Standard conformity	RS 422
Input 1	
Input type	Selection of counting direction (cw/ccw)
Signal voltage	
High	10 ... 30 V
Low	0 ... 2 V
Input current	< 6 mA
Switch-on delay	< 0.001 ms
Connection	
Connector	8-pin, M12 x 1 connector
Standard conformity	
Protection degree	DIN EN 60529, IP65
Climatic testing	DIN EN 60068-2-3, no moisture condensation
Emitted interference	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005
Shock resistance	DIN EN 60068-2-27, 100 *g*, 3 ms
Vibration resistance	DIN EN 60068-2-6, 20 *g*, 10 ... 2000 Hz
Ambient conditions	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Mechanical specifications	
Material	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Mass	approx. 460 g
Rotational speed	max. 12000 min^{-1}
Moment of inertia	50 gcm^2
Starting torque	< 5 Ncm
Shaft load	
Axial	40 N
Radial	110 N

Approvals and certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Release date: 2012-07-24 15:20 Date of issue: 2012-07-24 233385_eng.xml

Dimensions



Electrical connection

Signal	Wire end	Connector
GND (encoder)	White	1
U_b (encoder)	Brown	2
Clock (+)	Green	3
Clock (-)	Yellow	4
Data (+)	Grey	5
Data (-)	Pink	6
Preset	Black or Blue	7
Counting direction	Red	8
Shielding	Shielding	Housing
Pinout	-	

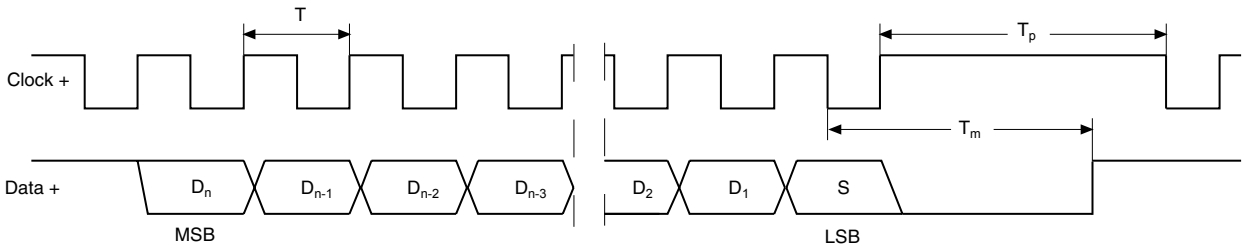
Release date: 2012-07-24 15:20 Date of issue: 2012-07-24 233385_eng.xml

Description

The Synchronous Serial Interface was specially developed for transferring the output data of an absolute encoder to a control device. The control module sends a clock bundle and the absolute encoder responds with the position value.

Thus only 4 lines are required for the clock and data, no matter what the resolution of the rotary encoder is. The RS 422 interface is optically isolated from the power supply.

SSI signal course Standard



D_1, ..., D_n:	Position data	T = 1/f:	Duration of period of clock signal ≤ 1 MHz
S:	Special bit	T_m:	Monoflop time 10 µs ... 30 µs
MSB:	Most significant bit	T_p:	Clock pause ≥ monoflop time ($T_p \geq T_m$)
LSB:	Least significant bit		

SSI output format Standard

- At idle status signal lines "Data +" and "Clock +" are at high level (5 V).
- The first time the clock signal switches from high to low, the data transfer in which the current information (position data (D_n) and special bit (S)) is stored in the encoder is introduced.
- The highest order bit (MSB) is applied to the serial data output of the encoder with the first rising pulse edge.
- The next successive lower order bit is transferred with each following rising pulse edge.
- After the lowest order bit (LSB) has been transferred the data line switches to low until the monoflop time T_m has expired.
- No subsequent data transfer can be started until the data line switches to high again or the time for the clock pause T_p has expired.
- After the clock sequence is complete, the monoflop time T_m is triggered with the last falling pulse edge.
- The monoflop time T_m determines the lowest transmission frequency.

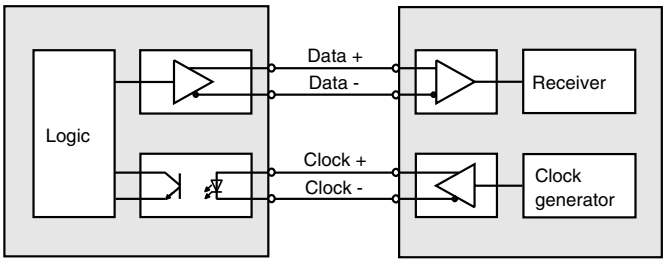
SSI output format ring slide operation (multiple transmission)

- In ring slide operation, multiple transmission of the same data word over the SSI interface makes it possible to offer the possibility of detecting transmission errors.
- In multiple transmission, 25 bits are transferred per data word in standard format.
- If the clock change is not interrupted after the last falling pulse edge, ring slide operation automatically becomes active. This means that the information that was stored at the time of the first clock change is generated again.
- After the first transmission, the 26th pulse controls data repetition. If the 26th pulse follows after an amount of time greater than the monoflop time T_m, a new current data word will be transmitted with the following pulses.

If the pulse line is exchanged, the data word is generated offset.
Ring slide operation is possible up to max. 13 bits.

Release date: 2012-07-24 15:20 Date of issue: 2012-07-24 233385_eng.xml

Block diagram

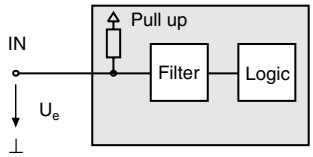


Line length

Line length in m	Baudrate in kHz
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Input

The selection of the counting direction input (V/R) is activated with 0-level.



Order code

A	V	S	5	8	W	–	0	1	1	B	E	A	H	G	N	–	0	0	1	2

Number of bits singleturn
12 4096 (standard)

Output code
G Gray

Exit position
A Axial

Connection type
BE Plug connector M12, 8-pin

Shaft dimension/flange version
011 Shaft Ø10 mm x 20 mm with clamping flange

Housing material
W Shaft seal IP66

Principle of operation
S Singleturn

Shaft version
V Solid shaft

Data format
A SSI (Synchronous Serial Interface)

Release date: 2012-07-24 15:20 Date of issue: 2012-07-24 233385_eng.xml