Model Number

CSM58*

Features

- **Industrial standard housing Ø58 mm**
- **30 Bit multiturn**
- **Galvanically isolated CAN interface**
- **DSP 406, CLASS 1 and 2**
- **Recessed hollow shaft**
- **2 limit switches**

Description

In addition to DeviceNet, PROFIBUS and AS-Interface rotary encoders, we have broadened our product line of bus-capable absolute encoders with the CSM58 for CANopen.

The bus electronics module is integrated into the removable housing cover. This makes it possible to mount or replace the new rotary encoders and the matching bus electronics separately during installation or service.

Absolute encoders deliver an absolute step value for each angle setting. All these values are represented by code samples on one or more code disks. The code disks are screened by an infrared LED and the obtained bit sample is detected by an optical array. Its signals are electronically amplified and forwarded on to the interface for processing.

The absolute encoder has a maximum basic resolution of 65536 steps per revolution (16 Bits). In the multiturn design, additional up to 16384 revolutions (14 Bits) can be resolved. This results in a total maximum resolution of 1073741824 steps (30 Bits).

The integrated CAN bus interface of the absolute encoder supports all CANopen functions. The following operating modes can be programmed, and can be selectively turned on or off:

- Polled mode
- Cyclic mode
- Sync mode

The absolute encoder is mounted directly onto the application shaft, without any coupling. Rotation of the absolute encoder is prevented by a torque rest.

Technical data

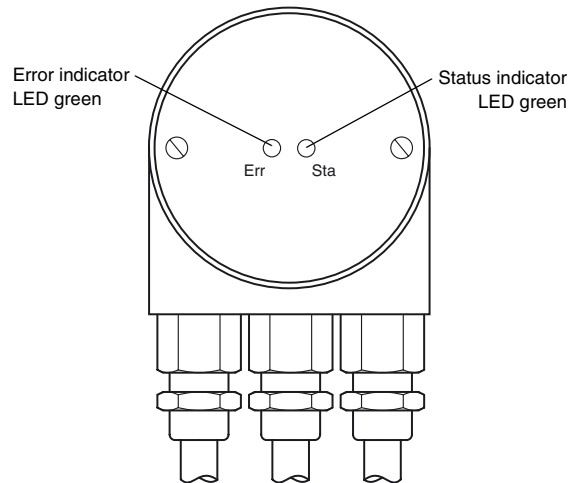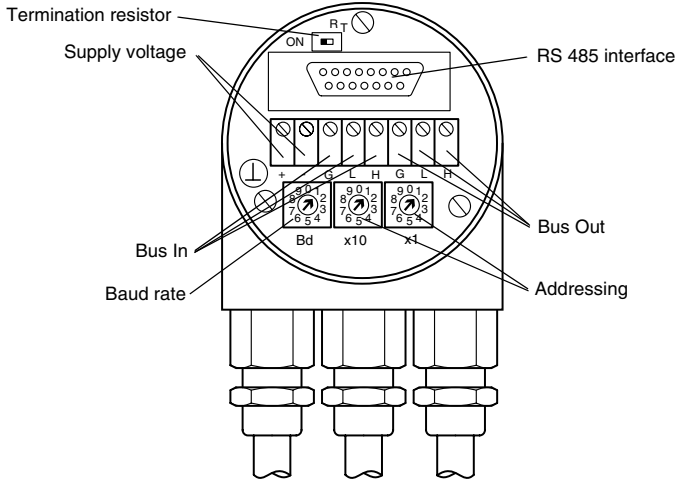| Functional safety related parameters	
MTTF$_d$	70 a
Mission Time (T$_M$)	20 a
L$_{10h}$	1.9 E+11 at 6000 rpm and 20/40 N axial/radial shaft load
Diagnostic Coverage (DC)	0 %
Electrical specifications	
Operating voltage U$_B$	10 ... 30 V DC
No-load supply current I$_0$	max. 230 mA at 10 V DC max. 100 mA at 24 V DC
Linearity	± 2 LSB at 16 Bit, ± 1 LSB at 13 Bit, ± 0,5 LSB at 12 Bit
Output code	binary code
Code course (counting direction)	cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)
Interface	
Interface type	CANopen
Resolution	
Single turn	up to 16 Bit
Multiturn	14 Bit
Overall resolution	up to 30 Bit
Transfer rate	max. 1 MBit/s
Standard conformity	DSP 406, CLASS 1 and 2
Connection	
Terminal compartment	in removable housing cover
Standard conformity	
Protection degree	DIN EN 60529, shaft side: IP64 (without shaft seal)/IP66 (with shaft seal) housing side: 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, 6 ms
Vibration resistance	DIN EN 60068-2-6, 10 g, 10 ... 1000 Hz
Ambient conditions	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Mechanical specifications	
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Mass	approx. 600 g (combination 1) approx. 1200 g (combination 2)
Rotational speed	max. 12000 min^{-1}
Moment of inertia	30 gcm^2
Starting torque	≤ 3 Ncm (version without shaft seal)
Tightening torque, fastening screws	max. 1.8 Nm
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm

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

Dimensions

Recessed hollow shaft

max. insertion depth = 30
min. insertion depth = 15

Lay-on edge torque rest

* shaft can be reduced to ø10F7 or ø12F7 by using an adapter
** Aluminium: d = 59, stainless steel: d = 61

Accessories

AH 58-B1CA-2BW

Electrical connection

Terminal	Cable	Explanation
⊥	-	Ground connection for power supply
(+)	Red	Power supply
(-)	Black	Power supply
CG	-	CAN ground
CL	Blue	CAN low
CH	White	CAN high
CG	-	CAN ground
CL	Blue	CAN low
CH	White	CAN high

Indicating and operating elements

Adjusting the participant address

The participant address can be adjusted with the rotary switches. The address can be defined between 1 and 96, and may only be assigned once. The addresses 97 ... 99 are reserved.
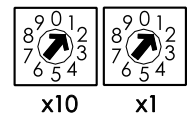
Adjusting the termination resistor

The terminating resistor R_T (121 Ω) can be connected to the circuit by means of the switch:

Baud rate adjustment

Baud rate [kBit/s]	Switch position	Baud rate [kBit/s]	Switch position
20	0	500	5
50	1	800	6
100	2	1000	7
125	3	reserved	8 and 9
250	4	-	-

LED-indicators

LED red	LED green	Meaning
off	off	No voltage supply
off	on	Encoder ready, boot-up message not transmitted, yet. Possible reasons: - no further participant present - wrong baud rate - encoder in prepared status
flashing	on	Boot-up message transmitted, Device configuration possible.
on	on	Normal operation mode, encoder in operational status.

Programmable CAN operating modes

Mode	Explanation
Polled mode	The connected host requests the current actual position value via a remote transmission request telegram. The absolute encoder reads in the current position, calculates all parameters that have been set and sends back the process actual value through the same CAN identifier.
Cyclic mode	The absolute encoder sends the current actual process value cyclically, without being prompted by the host. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms.
Sync mode	After the sync telegram has been received by the host, the absolute encoder sends the current actual process value. If multiple nodes should respond to the sync telegram, the individual nodes report one after the other according to their CAN identifier. There is no programming of an offset time. The sync counter can be programmed so that the rotary encoder does not transmit until after a defined number of sync telegrams.

Programmable rotary encoder parameters

Parameter	Explanation
Operating parameter	The direction of rotation (complement) can be specified by parameter as the operating parameter. This parameter determines the direction of rotation in which the output code will ascend or descend.
Resolution per revolution	The "Resolution" parameter is used to program the rotary encoder so that a desired number of steps can be implemented in reference to one revolution.
Overall resolution	This parameter indicates the desired number of measurement units of the entire travel length. This value must not exceed the overall resolution of the absolute encoder.
Preset value	The preset value is the desired position value that must be achieved for a specific physical setting of the axis. The preset value parameter is used to set the actual position value to the desired actual process value.
Min. and max. limit switch	A total of two positions can be programmed. The absolute encoder sets one bit to high state in the 32 Bit actual process value if a value falls outside the range between these two positions.

Order code

| C | S | M | 5 | 8 | | – | | | | | | R | 0 | B | N | – | | | | |

Number of bits singleturn
12 4096 (standard)
13 8192
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384

Option 2
N Not expanded

Output code
B Binary

Option 1
0 No option

Exit position
R Radial

Connection type
AG Removable housing cover with terminal compartment
AN Removable housing cover with connectors M12x1

Shaft dimension/flange version
F1A Recessed hollow shaft Ø10 mm x 30 mm
F2A Recessed hollow shaft Ø12 mm x 30 mm
F3A Recessed hollow shaft Ø15 mm x 30 mm

Housing material
N Aluminium, powder coated
I Inox
W Aluminium, powder coated with shaft seal

Principle of operation
M Multiturn

Shaft version
S Recessed hollow shaft

Data format
C CAN-Bus