EAS102
Absolute Encoder Interface Module

Type EAS102 M100 modules make it possible to evaluate up to 2 absolute encoders. SSI (Synchronous Serial Interface) is used as the communication protocol.

The EAS102 offers the openness of an extensively configurable SSI protocol. Furthermore, a parity check and the evaluation of transmitted special purpose bits are supported. The counting direction can be defined via the DIR output. Referencing is initiated via the SET output. Digitally transmitted encoder errors can be detected via a separate input. If the actual position is reaching a configured comparison value, module-to-module communication enables a digital output to be switched at the adjacent module without any time loss. An encoder supply directly via the module terminals enables a complete and fast SSI encoder connection directly via the connector panel of the EAS102 module.

Features

- 2 interfaces for evaluating SSI encoders
- DIR output and SET output
- Input for detecting encoder errors
- 2x 5 V DC / 24 V DC / GND encoder supply
- Synchronous clocks
- Direct module-to-module communication:
  - Immediate switching of DO at the adjacent module when the target position / the comparison value is reached

Part type designation	Part number
EAS102	00029504-00
EAS102 EC	00038182-00

Common properties	
Basic function	2 interfaces for evaluating SSI encoders
	SSI protocol extensively configurable
	DIR output and SET output
	Encoder error input
System	Bachmann system M100

Digital inputs – 5 V/24 V pull up	
Number of digital inputs	2
Signal standard	5 V sourcing input
Voltage category, nominal	5 V DC
Connections per input	1 (ERR)
Signal supply voltage range	18 V DC to 32 V DC
Operating voltage range (high/on)	2.5 V DC to 32 V DC
Off-state voltage (low/off)	0 V DC to 1 V DC
Nominal threshold	$0 \rightarrow 1$: 1.9 V
	$1 \rightarrow 0$: 1.2 V
Overvoltage protection	-32 V DC to 32 V DC
Input current, on-state, nominal	1.1 mA
Maximum input frequency	5 kHz
Digital spike filter	2 µs
Time stamps	No
Signal state indication	No

Interface – RS-485	
Number of interfaces	4 (2 per SSI interface)
Signal standard	RS-485
Voltage category, nominal	5 V DC differential
Connections per input	4 (DATA+, DATA-, CLK+, CLK-)
Signal supply voltage range	18 V DC to 32 V DC
Operating voltage range (high/on)	0.2 V DC to 25 V DC
Off-state voltage (low/off)	-25 V DC to -0.2 V DC
Overvoltage protection	-32 V DC to +32 V DC
Input current, on-state, nominal	0.5 mA
Maximum input frequency	2 MHz
Digital spike filter	No
Time stamps	New position value
Signal state indication	No

| Digital output – HTL	
Number of digital outputs	0 to 4 configurable (2 per SSI interface)
Signal standard	HTL source (HighSide)
Voltage category, nominal	24 V DC
Output type	Semiconductor
Signal supply voltage range	18 V DC to 32 V DC
Overvoltage protection	-32 V DC to +32 V DC
Connections per output	1 (signal)
Output current per channel, nominal, continuous	10 mA
Output current per channel, short-term overload	140 mA @ $T_a \leq 25$ °C
Output current per channel, min.	0 mA

Digital output – HTL	
Voltage drop, on-state, max.	850 mV
Signal state indication	No

Digital outputs – TTL	
Number of digital outputs	0 to 4 configurable (2 per SSI interface)
Signal standard	TTL source (HighSide)
Voltage category, nominal	5 V DC
Output type	Semiconductor
Signal supply voltage range	18 V DC to 32 V DC
Overvoltage protection	-32 V DC to +32 V DC
Connections per output	1 (signal)
Output current per channel, nominal, continuous	10 mA
Output current per channel, max.	140 mA @ $T_a \leq 25\ °C$
Output current per channel, min.	0 mA
Voltage drop, on-state, max.	700 mV
Signal state indication	No

Absolute position encoder – SSI	
Number of SSI interfaces	2
Selectable input interfaces	Interface - RS-485
Clock frequency	100 kHz to 2 MHz
Clock pause	5 µs to 50 ms
Code types	Gray
	Binary
Position data length	4 bit to 31 bit
Position data length extension	Extension of the value range to 32 bit (2x)
Leading special purpose bits	0 bit to 16 bit
Trailing special purpose bits	0 bit to 16 bit
Parity bit	Even/odd/none
Automatic compare function	Upper/lower comparison value (2x)
	Incrementing comparison value (2x)

Sensor/actuator supply 24 V DC	
Number of supply points 24 V DC	2
Output current per channel, nominal, continuous	300 mA
Short-circuit protected, supply	Yes, self-healing fuse
Overvoltage protection	-32 V DC to +32 V DC

Sensor/actuator supply 5 V DC	
Number of supply points 5 V DC	2
Output current per channel, nominal, continuous	250 mA
Short-circuit protected, supply	Yes, current limit
Overvoltage protection	No

Sensor/actuator supply GND	
Number of supply points GND	2

Module-to-module communication	
Signal propagation to neighbour	Upper comparison value reached (2x)
	Lower comparison value reached (2x)
Signal receiver from neighbor modules	No

Module bus interface	
System	M100
Slot type	IO (1/E, 2, 3, 4, ...31)
Module data rate	Typ.: 0 Mbit/s to 33.6 Mbit/s depending on the configuration
Bus cycle time, min.	4.5 µs [1]

[1] *Depending on the fieldbus used and the respective configuration, lower data rates and longer cycle times can be expected.*

Synchronization/clocks	
Distributed clocks	Yes
Time stamp format	64 bit in ns
Time resolution	10 ns
Time precision	25 ns within the station 100 ns via network (typ.) 1 µs via network (max.)
Synchronization functions	SSI
Latch input	Yes
Field bus cycle time, min.	100 µs [1]

[1] *Depending on the fieldbus used and the respective configuration, lower data rates and longer cycle times can be expected.*

Diagnostics	
Electronic type plate	Yes (application interface and in the engineering tool)
Machine readable type plate	Yes (QR code with type and part information and internet link)
Environmental conditions sensor	Integrated (temperature)
Operational indications	LED "MOD" (red/green) module status LED "CH" (red/green) channel status summary
Error indications	Module supply Sensor supply 24 V Sensor supply 5 V Sensor error (via input ERR) SSI communication SSI data parity Integrity of prepared position value Warning in the event of faults close to filter limit Module temperature
Powerfail, logic supply	No
Powerfail, signal supply	Powerfail < 16.1 V (fallback > 17 V)
Open circuit	Yes, via SSI communication error
Mismatch output readback	No

| Energy supply	
Supply voltage, nominal	24 V DC
Supply voltage, range	18 V DC to 32 V DC
Supply voltage, short-term overload	40 V for 100 ms
Power consumption from 24 V signal supply	0.7 W plus sensor supply
Maximum residual ripple 24 V signal supply	±2.4 V
Overcurrent protection required	No internal protection External protection with circuit breaker characteristic: B, C, D, Z or K Max. nominal current 8 A DC
Power dissipation, typ./max.	1.3 W / 2.4 W
Reverse polarity protection signal supply	Yes, continuously (up to -32 V)
Power consumption from backplane	420 mW

Energy supply	
Supply terminal block bridge	Yes, internal connection from 1+ to 2+, and 1- to 2-

Product safety	
Galvanic isolation	850 V AC
Galvanic isolation between inputs	No
Permitted potential difference between digital channels	40 V
Degree of protection acc. IEC 60529	IP40, terminal block IP30
Protection class acc. IEC 61010-1, IEC 61010-2-201	III
Overvoltage Category acc. IEC 61010-1	II
Rated impulse withstand voltage acc. IEC 61000-4-5	Supply DC 500 V DM 1000 V CM
Keying of terminal block	Yes (6-fold per 4 contacts)

Environmental conditions	
Temperature, operating	-30 °C to +70 °C (standard mounting position)
Temperature, transport and storage	-40 °C to +85 °C
Installation altitude, max.	Up to 2000 m without temperature derating 2000 m to 4500 m: Reduction of the max. ambient temperature by 0.5 °C per 100 m elevation
Air pressure	106 kPa to 58 kPa (0 m to 4500 m)
Relative humidity, operation	Standard: 0 % to 100 % noncondensing Extended Climate: 0 % to 100 % with temporary condensation
Pollution degree acc. IEC 61010-1	Standard: 2, noncondensing Extended Climate: 2
Vibration	6 g (14.1 Hz to 500 Hz) 7.5 mm amplitude (2 Hz to 14.1 Hz) Test duration: 15 h
Shock	45 g max. (test scope 18 shocks) 20 g permanently (test scope 6000 shocks)

Approvals/certificates	
Product safety	CE, UKCA cULus (NRAQ, NRAQ7)
Hazard area operation	ATEX in preparation
Maritime	DNV, LR, ABS, BV, RINA, KR, NK in preparation
Hazardous substances and waste treatment	RoHS, RoHS China, REACH, WEEE
IT/cybersecurity	ISO 27001 IEC 62443-4-1
Quality management	ISO 9001 for development and production

Engineering	
Configuration tool	SolutionCenter (≥ V2.75)
Firmware package update	Yes (via SolutionCenter or console interface on the head module)

Mounting/installation	
Mounting type	Inserting and screwing onto the backplane with integrated M4 screw
Ground connection for protection class I	No

Dimensions	
Number of slots	1
Size unpacked W × H × D	95.7 mm × 152.5 mm × 23.3 mm

Dimensions	
Mass unpacked	268 g

Order data

Part type designation	Part number	Description
EAS102	00029504-00	SSI absolute encoder interface module system M100
		0 to 2 absolute encoder interfaces (synchronous serial interface), transmission frequency 100 kHz to 2 MHz, DIR output and SET output, error input, 1 group; integrated sensor supply; comparison value monitoring, module-to-module communication provider; synchronization, time stamping; isolated from system; without terminal block
EAS102 EC	00038182-00	Like EAS102 with Extended Climate Range 🌡♨

Accessories

Part type designation	Part number	Description
BPR1nn	00039235-nn	Backplane for DIN-rail mounting
		Active backplane system M100: BPR1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for DIN-rail mounting; delivery without backplane slot covers and without mounting rail
BPR1nn EC	00039236-nn	Like BPR1nn with Extended Climate Range 🌡♨
BPS1nn	00039237-nn	Backplane for direct screw mounting
		Active backplane system M100: BPS1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for direct screw mounting; delivery without backplane slot covers and without screws
BPS1nn EC	00039238-nn	Like BPS1nn with Extended Climate Range 🌡♨
TPI100_W24	00039178-00	Signal terminal block
		Completely removable terminal block, push-in spring connector for system M100, 24-way/contacts, pitch: 5.0 mm, female, conductors flexible 0.2 to 2.5 mm^2 (24 to 13 AWG), solid 0.2 to 1.5 mm^2 (24 to 16 AWG), with wire end ferrules 0.25 to 1.5 mm^2 (23 to 16 AWG), stripping length: 10 mm, rating: 300 V / 8 A per contact, connector color: gray / push-release: yellow, labeling: 1 to 24
TPI100_W4	00039177-00	Supply terminal block
		Completely removable terminal block, push-in spring connector for system M100, 4-way/contacts, pitch: 5.0 mm, female, conductors flexible 0.2 to 2.5 mm^2 (24 to 13 AWG), solid 0.2 to 1.5 mm^2 (24 to 16 AWG), with wire end ferrules 0.25 to 1.5 mm^2 (23 to 16 AWG), strippinglength: 10 mm, rating: 300 V / 8 A per contact, connector color: gray / push-release: yellow, labeling: 1+/1-/2+/2-
TKP106	00038798-00	Keying element for signal terminal blocks and supply terminal blocks
		Keying element for signal terminal blocks and supply terminal blocks TPI100 for system M100, plastic ring with 6 keying elements