AAM 38 F
BISS
BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturized optical multiturn absolute encoder for high end application. Thanks to BiSS-C interface and high resolution it can be used in robotics, motor feedback and CNC machines.

- Optical sensor technology (OptoASIC + Energy Harvesting)
- 39 bit total resolution (23 bit single turn + 16 bit multiturn)
- Power supply +5 VDC with BiSS-C as electronic interface
- Cable output
- Blind hollow shaft diameter up to 8 mm
- Mounting by stator coupling
- Operating temperature -20° ... +105°C (-4° ... +221°F)

ORDERING CODE

AAM	38F	16	/	23	B	5	B	8	X	X	PR	.XXX

SERIES
absolute multiturn encoder AAM

MODEL
blind hollow shaft with stator coupling 38F

MULTITURN RESOLUTION
bit 16

SINGLETURN RESOLUTION
bit 23

CODE TYPE
binary B

POWER SUPPLY
5 V DC 5

ELECTRONIC INTERFACE
BiSS-C B

BORE DIAMETER
mm 6
(1/4") mm 6,35
mm 8

ENCLOSURE RATING
IP 50 X

OPTIONS
to be reported X

OUTPUT TYPE
radial cable (standard lenght 0,2m) PR

VARIANT
custom version XXX

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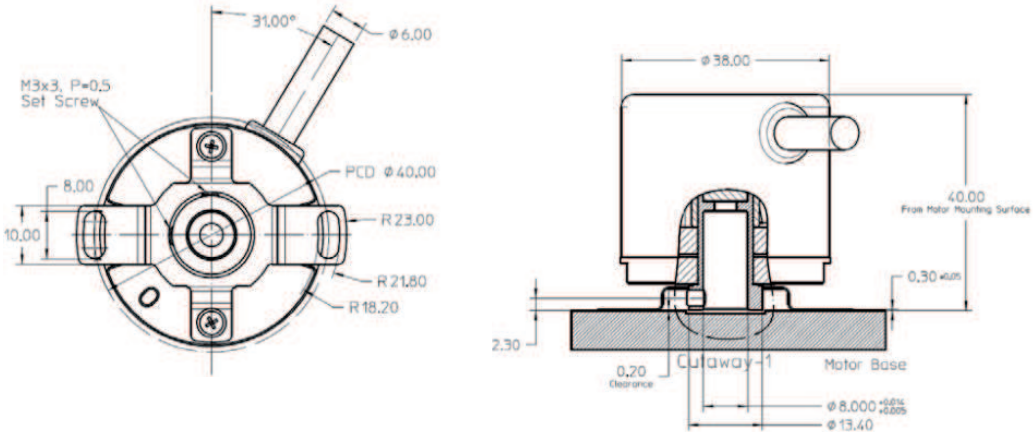
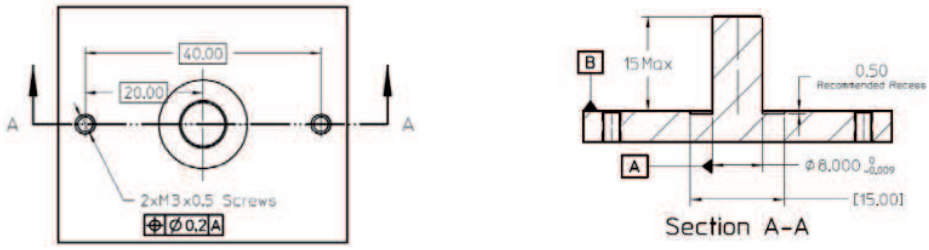


RECOMMENDED SHAFT AND MOUNTING HOLES REQUIREMENT



dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	16 bit
Singleturn resolution	23 bit
Fault status	8 bit
CRC	8 bit
Power supply	4,75 ... 5,25 V DC
Current consumption without load	< 120 mA
Output type	BiSS-C (SN65LBC179Q)
Code type	binary
Clock frequency (MA)	80 kHz ... 10 MHz
Position Calculation Time	Refer to BiSS-C $T_{busy\ time}$
Accuracy	± 80 arc-sec
Counting direction	decreasing clockwise (shaft view)
Start-up time	500 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

CONNECTIONS

Function	Cable output
+ Vdc	red
Ground	black
serial data (SLO) +	orange
serial data (SLO) -	blue
serial clock (MA)+	brown
serial clock (MA) -	white

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 6,35 (1/4") / 8 mm
Enclosure rating	IP 50 (IEC 60529)
Rotation speed	6000 rpm continuous
Shock	200 G, 6 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Shaft radial play allowed	± 0,05 mm
Shaft radial play allowed	± 0,1 mm
Shaft material	brass
Housing material	steel
Bearing stage material	aluminum
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-20° ... +105°C (-4° ... +221°F)
Storage temperature	-20° ... +105°C (-4° ... +221°F)
Fixing torque for shaft grains	1 Nm recommended
Fixing torque for spring screws	0,35 Nm recommended for M3 screws (not provided)
Weight	150 g (5,29 oz)

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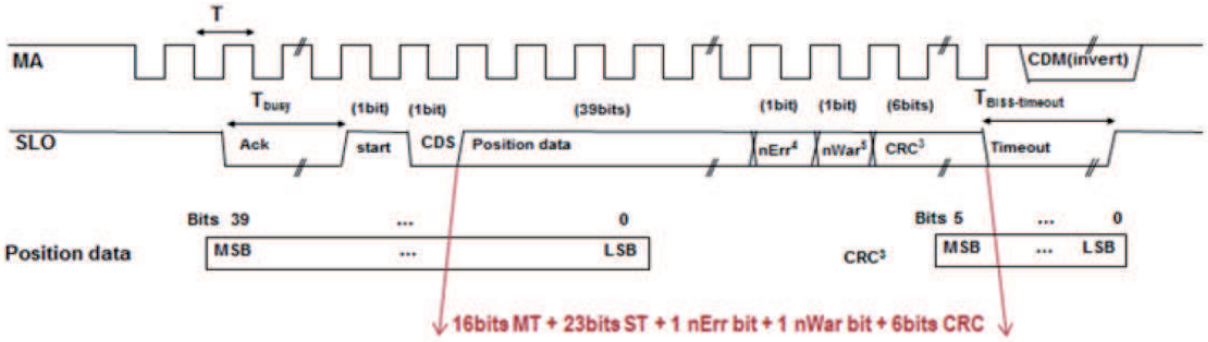
BISS-C TIMING DIAGRAM

Parameter	Symbol	Value			Unit	Note
		Min	Typical	Max		
MA frequency	f_{MA}	0,08	–	10	MHz	1
Busy	T_{busy}	2 / f_{MA} + 3,35 µs	–	2,5 / f_{MA} + 3,75 µs	µs	2
Timeout	$t_{Biss\text{-}timeout}$	1,5 / f_{MA}	–	1,5 / f_{MA} + 90 ns	ns	2

Figure 1 Timing Characteristics of MA and SLO



1. MA low-time = 0,50 / f_{MA}; high-time = 0,50 / f_{MA}
2. Refer to Figure 1 for timing description
3. CRC Polynomial = Invert of (X6 + X1 + X0)
4. nErr bit is active low. (Combine all the Error Status and reflect in nERR bit)
5. nWar bit is active low. (Combine all the Warning Status and reflect in nERR bit)

Description

Refer to BiSS-C Interface Protocol Description Rev C5 document for detailed information of BiSS-C Register Communication.
http://biss-interface.com/files/Bissinterface_c5es.pdf

Figure 2 Register write access

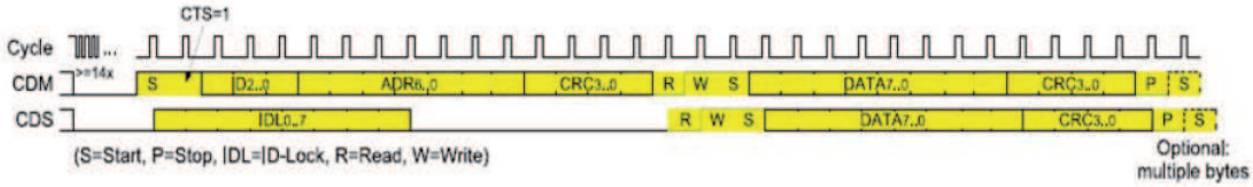


Figure 3 Register read access

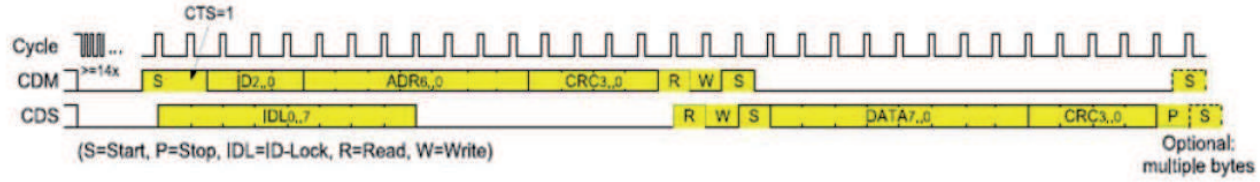


Figure 4 Writing several registers

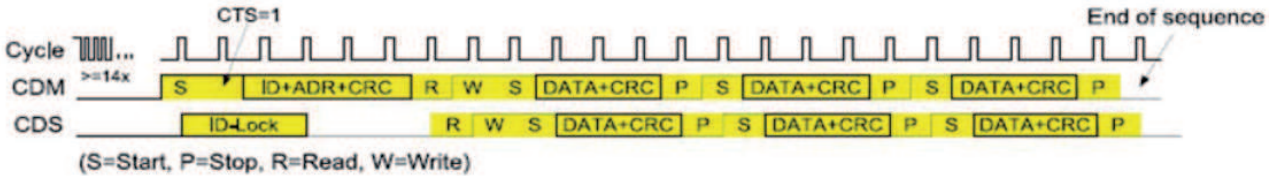
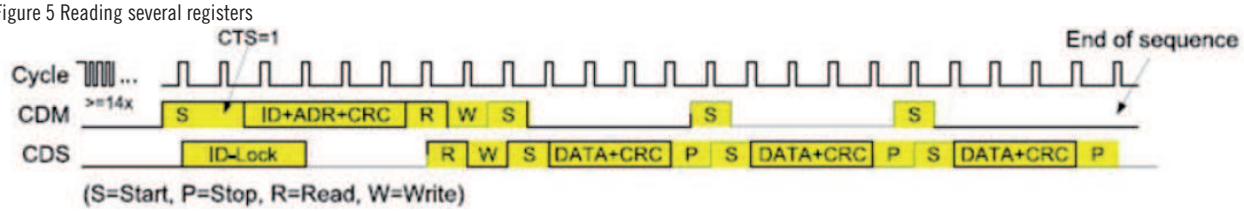


Figure 5 Reading several registers



Refer to BiSS-C Interface Protocol Description Rev C5 document for detail information of BiSS-C Register Assigment.

There are a total of 10 register banks user areas (register bank 0 to register bank 9) that are accessible by users.
The memory data is kept in nonvolatile memory.

REGISTER ASSIGNMENTS

Address (Decimal)	Address (Hexadecimal)	Name	Size	Memo
0 ... 63	0x00 ... 0x3F	Register bank	64 bytes	
64	0x40	Bank selection	0 ... 8 bits (1 byte)	a, b
65	0x41	EDS-Bank	0 ... 8 bits (1 byte)	a,c
66 ... 67	0x42 ... 0x43	Profile ID	16 bits (2 bytes)	c, d
68 ... 71	0x44 ... 0x47	Serial number	32 bits (4 byte)	c, d
72 ... 119	0x48 ... 0x77	Slave register	48 bytes	
120 ... 125	0x78 ... 0x7D	Device ID	48 bits (6 bytes)	c, d
126 ... 127	0x7E ... 0x7F	Manufacturer ID	16 bits (2 bytes)	c, d

a. If no blank switchover is used, the register should not be implemented
b. Unused register contents must therefore be filled with “0”
c. Register is protected against accidental writing
d. The value is saved as a big endian; i.e., with the highest value byte at the lowest value address

EEPROM Address	BiSS-C		Memo
	Page	Address	
000 ... 27Fh	0	00 ...3Fh	User area
	1	00 ...3Fh	
	2	00 ...3Fh	
	3	00 ...3Fh	
	4	00 ...3Fh	
	5	00 ...3Fh	
	6	00 ...3Fh	
	7	00 ...3Fh	
	8	00 ...3Fh	
	9	00 ...3Fh	Reserved area
280 ... 2FFh	10	00 ...3Fh	
	11	00 ...3Fh	
300 ... 37Fh	12	00 ...3Fh	
	13	00 ...3Fh	
380 ... 3BFh	14	00 ...3Fh	
3C0 ... 3FFh	–	40h	Bank selection
		41h	EDS-Bank (User prohibited write) – Not Available
		42 ... 43h	Profile ID (User prohibited write)
		44 ... 47h	Serial Number (User prohibited write)
		48 ... 77h	Slave Register (Refer to the Slave Register Description – user area)
		78 ... 7Dh	Device ID (User prohibited write)
		7E ... 7F	Manufacturer ID (User prohibited write)

SLAVE REGISTER DESCRIPTION

Address 72 (0x48) - Error status [7...0]

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
NA			MLSErr Error	Multi-turnErr Error	STErr Error	MemoryErr Error	XCErr Error

Address 73 (0x49) - Warning status [7...0]

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
NA						Lis_Err Warning	LED_Err Warning

Address 74 (0x4A) - Encoder Clear Command

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
NA				Warning clear command*	Error clear command*	ST clear command*	MT clear command*

* Encoder Clear Command operation
a. Write 1 to execute one time clear command
b. Only one command should be accessed for each time

eltra@eltra.it | www.eltra.it

Headquarter Switzerland:
Pewatron AG
Thurgauerstrasse 66
CH-8050 Zurich
Phone +41 44 877 35 00
info@pewatron.com

Office Germany:
Pewatron Deutschland GmbH
Edisonstraße 16
D-85716 Unterschleißheim
Phone +49 89 374 288 87 00
info.de@pewatron.com

PEWATRON
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We are here for you. Addresses and Contacts.

Sales Germany & Austria

Geometrical sensors
Other products

Kurt Stritzelberger
Phone +49 89 374 288 87 22
kurt.stritzelberger@pewatron.com

Pressure sensors
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Gerhard Vetter
Phone +49 89 374 288 87 26
gerhard.vetter@pewatron.com

Gas sensors and modules

Peter Felder
Phone +41 44 877 35 05
peter.felder@pewatron.com

Sales Switzerland & Liechtenstein

Postcode 3000 – 9999

Basil Frei
Phone +41 44 877 35 18
basil.frei@pewatron.com

Postcode 1000 – 2999

Christian Mohrenstecher
Phone +41 76 444 57 93
christian.mohrenstecher@pewatron.com

Sales International Key Accounts

Peter Felder
Phone +41 44 877 35 05
peter.felder@pewatron.com

Sales Other Countries / Product Management

Pressure Sensors
Load Cells

Philipp Kistler
Phone +41 44 877 35 03
philipp.kistler@pewatron.com

Power supplies

Sebastiano Leggio
Phone +41 44 877 35 06
sebastiano.leggio@pewatron.com

Drive technology
CH Postcode 5000 – 9999 / DE

Roman Homa
Phone +41 76 444 00 86
roman.homa@pewatron.com

Gas sensors
Gas sensor modules

Dr. Thomas Clausen
Phone +41 44 877 35 13
thomas.clausen@pewatron.com

Linear position sensors
Angle sensors

Eric Letsch
Phone +41 44 877 35 14
eric.letsch@pewatron.com

Drive technology
CH Postcode 1000 – 4999 / AT / IT / FR

Christian Mohrenstecher
Phone +41 76 444 57 93
christian.mohrenstecher@pewatron.com

Flow / Level / Medical products

Dr. Adriano Pittarelli
Phone +49 89 374 288 87 67
adriano.pittarelli@pewatron.com

Accelerometers
Sensor elements

Christoph Kleye
Phone +49 89 374 288 87 61
christoph.kleye@pewatron.com

Harald Thomas
Phone +49 89 374 288 87 23
harald.thomas@pewatron.com