



# AAM 38 F BISS

## BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

### MAIN FEATURES

Miniaturized optical multturn 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

ORDERING CODE	AAM	38F	16	/	23	B	5	B	8	X	X	PR	.XXX
<b>SERIES</b> absolute multiturn encoder	AAM												
<b>MODEL</b> blind hollow shaft with stator coupling		38F											
<b>MULTITURN RESOLUTION</b> bit 16			16										
<b>SINGLETURN RESOLUTION</b> bit 23				/	23								
<b>CODE TYPE</b> binary						B							
<b>POWER SUPPLY</b> 5 V DC							5						
<b>ELECTRONIC INTERFACE</b> BiSS-C								B					
<b>BORE DIAMETER</b> mm (1/4") mm									8				
<b>ENCLOSURE RATING</b> IP 50										X			
<b>OPTIONS</b> to be reported											X		
<b>OUTPUT TYPE</b> radial cable (standard length 0,2m)												PR	
<b>VARIANT</b> custom version													XXX

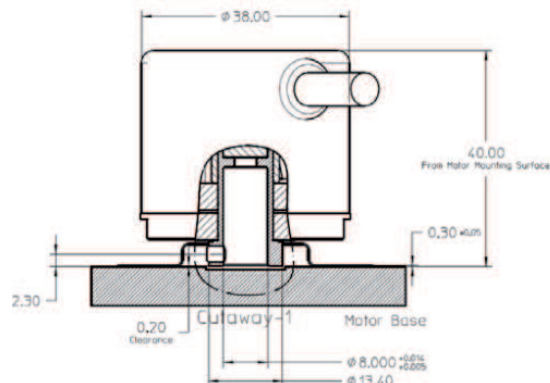
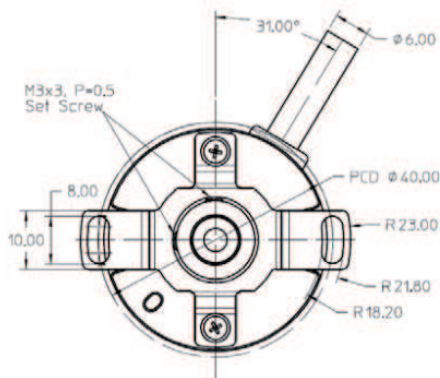


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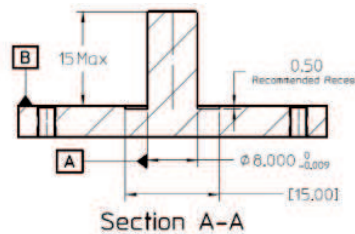
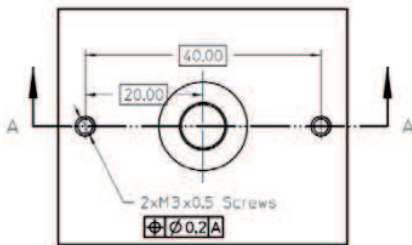
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## OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 38 F BISS

## AAM 38 F



## 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 <sub>busy time</sub>
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	∅ 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 axial play allowed	± 0,1 mm
Shaft material	brass
Housing material	steel
Bearing stage material	aluminum
Bearings	2 ball bearings
Bearings life	10 <sup>9</sup> 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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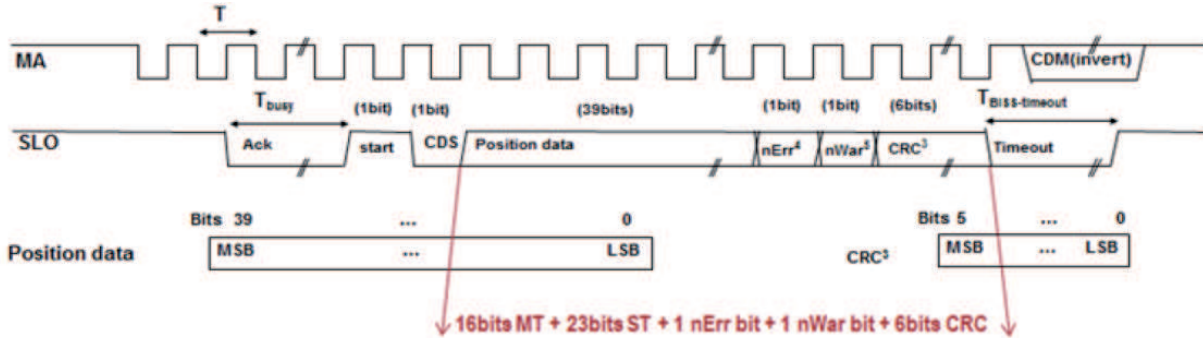
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BISS-C TIMING DIAGRAM

Parameter	Symbol	Value			Unit	Note
		Min	Typical	Max		
MA frequency	$f_{MA}$	0,08	–	10	MHz	1
Busy	$T_{busy}$	$2 / f_{MA} + 3,35 \mu s$	–	$2,5 / f_{MA} + 3,75 \mu s$	$\mu s$	2
Timeout	$t_{BISS-timeout}$	$1,5 / f_{MA}$	–	$1,5 / f_{MA} + 90 ns$	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  $(X^6 + X^1 + X^0)$
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](http://biss-interface.com/files/Bissinterface_c5es.pdf)

Figure 2 Register write access

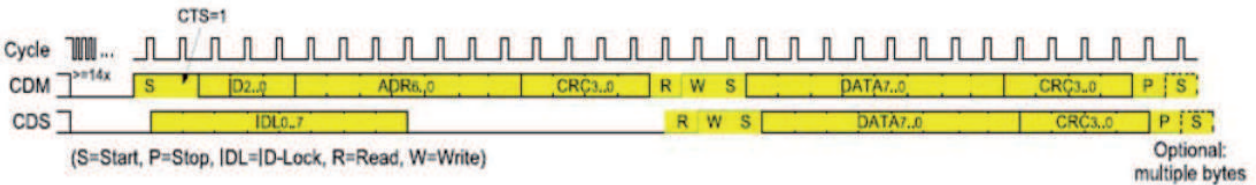


Figure 3 Register read access

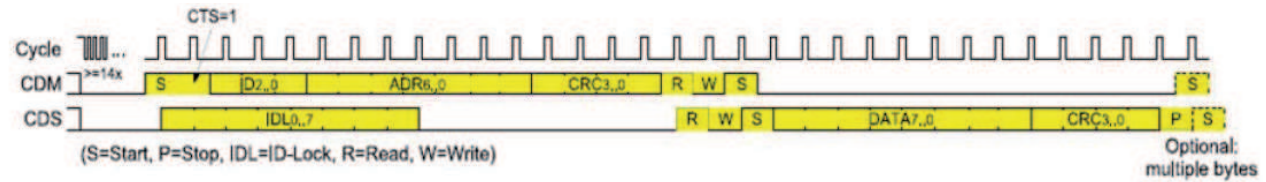


Figure 4 Writing several registers

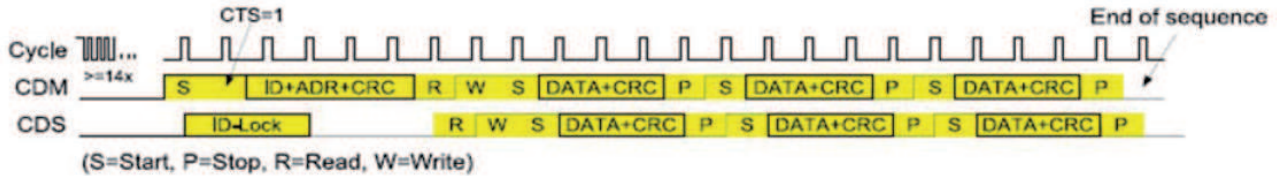
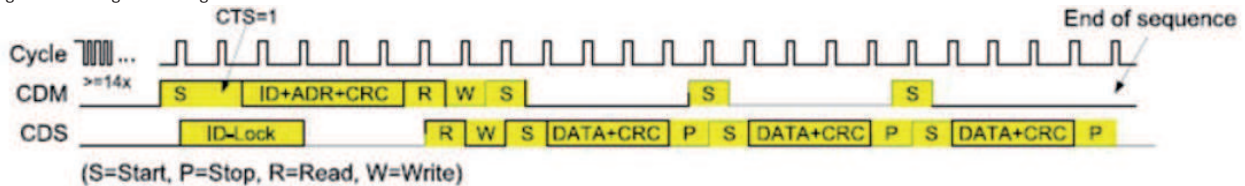


Figure 5 Reading several registers



## OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 38 F BISS

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

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		
280 ... 2FFh	10	00 ...3Fh	Reserved area	
	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)

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## 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



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 87-0  
info.de@pewatron.com



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---

### Sales Germany & Austria

Postcode 00000 – 31999  
Postcode 38000 – 39999  
Postcode 80000 – 99999  
Austria

Kurt Stritzelberger

Phone +49 89 260 52 80  
Mobile +49 171 803 41 35

kurt.stritzelberger@pewatron.com

Postcode 32000 – 37999  
Postcode 40000 – 79999

Gerhard Vetter

Phone +49 674 394 75 75  
Mobile +49 163 762 74 30

gerhard.vetter@pewatron.com

**Geometrical sensors**  
**Sensor elements**

Thorsten Ravagni

Phone +49 60 479 53 627

thorsten.ravagni@pewatron.com

---

### Sales Switzerland & Liechtenstein

Postcode 3000 – 9999

Basil Frei

Phone +41 44 877 35 18  
Mobile +41 76 279 37 26

basil.frei@pewatron.com

Postcode 1000 – 2999

Christian Mohrenstecher

Mobile +41 76 444 57 93

christian.mohrenstecher@pewatron.com

### Sales International Key Accounts

Peter Felder

Phone +41 44 877 35 05  
Mobile +41 79 406 49 83

peter.felder@pewatron.com

---

### Sales Other Countries / Product Management

#### Pressure Sensors

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

#### Accelerometers / Level Flow sensor elements

Thorsten Ravagni  
Phone +49 60 479 53 627  
thorsten.ravagni@pewatron.com

#### Drive technology CH Postcode 5000 – 9999 / DE

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

#### Gas sensors / Gas sensor modules Load cells

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

#### Power supplies

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

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

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

#### Flow / Level / Medical products

Dr. Adriano Pittarelli  
Phone +49 8245 774 95 44  
adriano.pittarelli@pewatron.com

#### Linear position sensors Angle sensors

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

#### Current sensors Power solutions

Osman Coban  
Phone +49 71 635 363 898  
osman.coban@pewatron.com