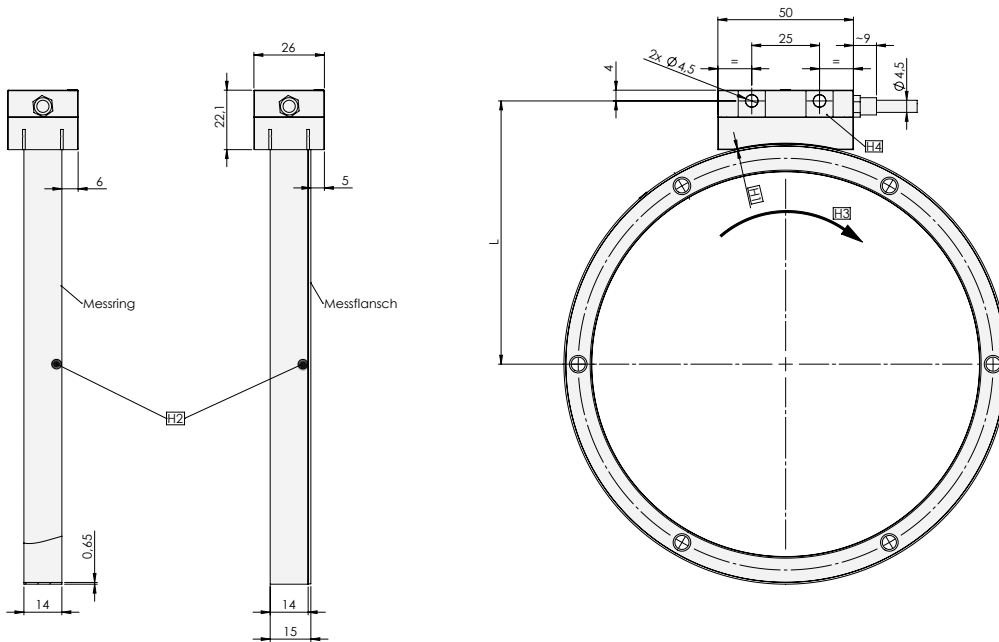


**Absolute angle encoders
based on the inductive
AMOSIN[®] – Measuring Principle**

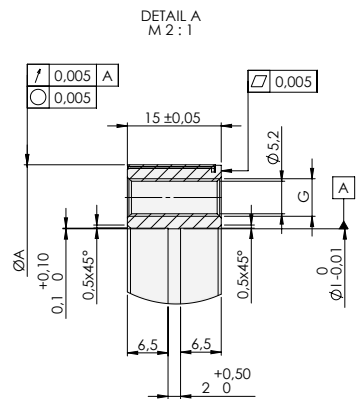
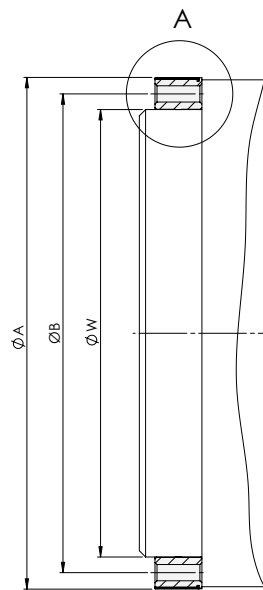
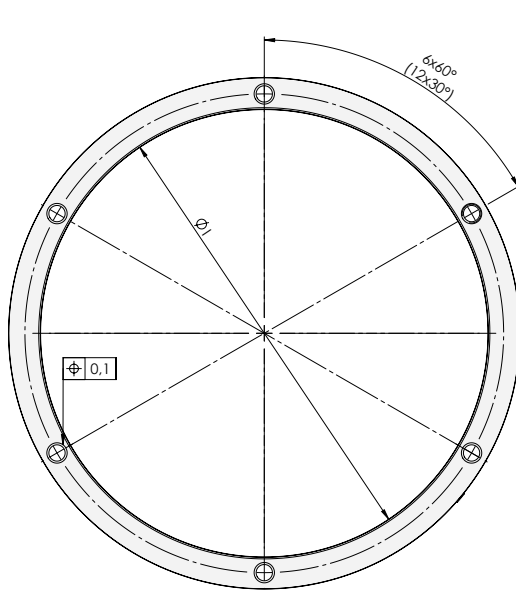


WMKA - 2010 series

- Composed of AKWMKA-2010 and measuring flange or measuring ring
- Grating period 1000 μ m
- Encoder with integrated electronics

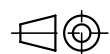


Number of pitches	L [mm]
256	56,74
360	73,29
512	97,82
720	131,64
900	160,39
1024	180,33
1440	246,74
1800	304,25
2048	343,84



- H1 = Air gap 0,15 ± 0,10mm, set with spacer foil
 H2 = Absolute track marking
 H3 = Direction of shaft rotation for positive counting
 H4 = Ground plane (both sides)

Tolerance principle in accordance with ISO 8015
 General tolerances in accordance with ISO 2768-fH
 All dimensions in mm



ØA	Ø1	ØW	ØB	G
81,95	60 +0/-0,01	60 +0,02/+0,01	70	6 x M6
115,12	60 +0/-0,01	60 +0,02/+0,01	75	6 x M6
115,12	95 +0/-0,01	95 +0,02/+0,01	105	6 x M6
163,54	105 +0/-0,01	105 +0,02/+0,01	120	6 x M6
163,54	143 +0/-0,01	143 +0,02/+0,01	153	6 x M6
229,78	180 +0/-0,01	180 +0,02/+0,01	195	6 x M6
229,78	209 +0/-0,01	209 +0,02/+0,01	219	6 x M6
287,08	180 +0/-0,01	180 +0,02/+0,01	195	12 x M6
287,08	266 +0/-0,01	266 +0,02/+0,01	276	12 x M6
326,55	220 +0/-0,01	220 +0,02/+0,01	235	12 x M6
326,55	296 +0/-0,01	296 +0,02/+0,01	311	12 x M6

Technical data

WMKA - scanning head for absolute angle encoders

Grating period 1000 μ m

Scanning head		AK WMKA-2010		
Interface	EnDat 2.2	Fanuc α	BISS/C	SSI + 1Vpp
Designation	EnDat 22	Fanuc02	BiSS	SSI - 1Vpp
Clock frequency	≤ 16 MHz	-	$\leq 2,5$ MHz	≤ 1 MHz
Interpolation factor digital	Performance Standard: 10bit or 12bit Performance High Accuracy: 14bit			Performance Standard: 10bit or 12bit
Cable length on scanning head	0,5m to 6m			
Electrical connection	Cable with M12 coupling, 8pin male			Cable with M23 coupling
Voltage supply	DC 3,6V to 14V			
Power consumption	$\leq 1,5$ W at 5V			
Typical current consumption	300mA at 5V			
Shock	< 2000 m/s ² for 6m/s			
Vibration	< 200 m/s ² 55Hz - 2000Hz			
Operating temperature	-10°C to 85°C			
Storage temperature	-20°C to 85°C			
Protection	IP67			
Weight	40g			

Measuring flange WMFA	Measuring ring WMRA								
Line count	256	360	512	720	900	1024	1440 ¹⁾	1800 ¹⁾	2048 ¹⁾
Max. positions/revolution	22bit		23bit			24bit		25bit	
Position error per grating period ²⁾									
Standard	$\pm 11,0''$	$\pm 7,5''$	$\pm 5,5''$	$\pm 4,0''$	$\pm 3,0''$	$\pm 3,0''$	$\pm 2,0''$	$\pm 2,0''$	$\pm 1,5''$
High Accuracy	$\pm 3,0''$	$\pm 2,0''$	$\pm 1,5''$	$\pm 1,0''$	$\pm 1,0''$	$\pm 1,0''$	$\pm 0,5''$	$\pm 0,5''$	$\pm 0,5''$
Grating period accuracy ²⁾									
$\pm 10\mu$ m arc length	$\pm 51''$	$\pm 36''$	$\pm 26''$	$\pm 18,0''$	$\pm 15''$	$\pm 13''$	$\pm 9,0''$	$\pm 7,5''$	$\pm 6,5''$
$\pm 5\mu$ m arc length	$\pm 26''$	$\pm 18''$	$\pm 13''$	$\pm 9,0''$	$\pm 7,5''$	$\pm 6,5''$	$\pm 4,5''$	$\pm 4,0''$	$\pm 3,5''$
$\pm 3\mu$ m arc length	$\pm 16''$	$\pm 11''$	$\pm 8''$	$\pm 5,5''$	$\pm 4,5''$	$\pm 4,0''$	$\pm 3,0''$	$\pm 2,5''$	$\pm 2,0''$
Outside diameter [mm]	81,95	115,12	163,54	229,78	287,08	326,55	458,99	573,61	652,58
Inside diameter WMF [mm]	60	60 95	105 143	180 209	180 266	220 296	Only measuring ring WMRA		
Electrical max. speed [rpm]	≤ 4680	≤ 3330	≤ 2340	≤ 1660	≤ 1330	≤ 1170	≤ 830	≤ 660	≤ 580

¹⁾ Only available as measuring ring.

²⁾ The position error per grating period and the accuracy of the grating result together in the encoder specific error; additional deviations caused by mounting and bearing are not considered in this error.

Ordering code

WMKA - scanning head for absolute angle encoders

Grating period 1000µm

WMKA-2 10 - 20 - - - -

Scanning
 0 = Outside
 1 = Inside

Performance
 S = Standard
 HA = High Accuracy

Interface
 01 = EnDat 2.2
 02 = Fanuc Serial Interface - α Interface
 15 = SSI, additional incremental signals 1Vpp
 16 = BiSS/C

Interpolation factor digital
 10 = 10 bit
 12 = 12 bit
 14 = 14 bit ³⁾

Functional safety
 .. = No
 FA = Analog signals (1Vpp) can be used for safety related equipment ²⁾

Line count
 256 ¹⁾
 360 ¹⁾
 512 ¹⁾
 720 ¹⁾
 900 ¹⁾
 1024
 1440
 1800
 2048

Pin configuration
 C4 = 1SS08
 IS = 03S17, 01

Dividing factor 1Vpp

		S
01	1-fold	x
04	4-fold	x
08	8-fold	x
10	10-fold	x
16	16-fold	x
25	25-fold	x
32	32-fold	x
NN	Without incremental signals	

Electrical connection
 01 = Free cable end
 1SS08 = M12 8pin coupling male
 03S17 = M23 17pin coupling male

Cable length
 0,50 = 0,50 m
 1,00 = 1,00 m
 1,50 = 1,50 m
 2,00 = 2,00 m
 2,50 = 2,50 m
 3,00 = 3,00 m
 4,00 = 4,00 m
 5,00 = 5,00 m
 6,00 = 6,00 m

¹⁾ Not for inside scanning.

²⁾ Option „FA“ only used for SSI and 1Vpp interface with dividing factor „01“

³⁾ Not for SSI interface.

Interfaces

SSI + $\sim 1V_{pp}$

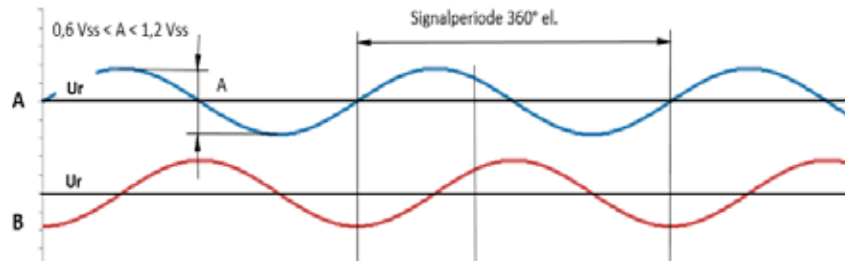
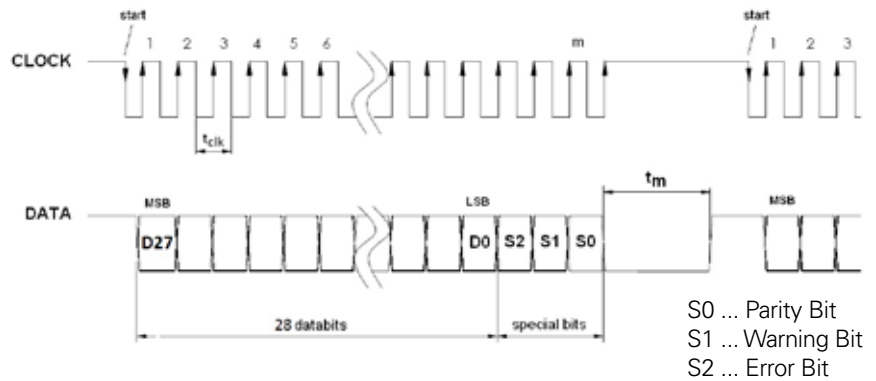
SSI Interface is an unidirectional Interface which can output position values.

The Data DATA gets transferred synchronously to the from the subsequent electronics given Clock frequency CLOCK. Additionally three special bits (Error, Warning and Parity) will be transferred.

AMO-measuring systems with $\sim 1V_{pp}$ -Interface are outputting signals which can be highly interpolated.

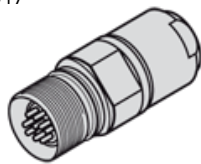
The sine shaped incremental signals A and B are electrically 90° phase shifted and have a signal strength from 1Vpp.

The showed sequence of the outputed signals - B after A - is valid for the in the connection drawing stated movement direction.



Pin configuration

Electrical connection: 03S17
17-pin coupling M23



	Power supply				Incremental signals				Absolut position value			
	7	1	10	4	15	16	12	13	14	17	8	9
	U_P	Sensor U_P	0V	Sensor 0V	A+	A-	B+	B-	DATA+	DATA-	CLOCK+	CLOCK-
	brown/ green	blue	white/ green	white	brown	green	grey	pink	red	black	violet	yellow

Cable Shield is connected with the housing; U_P = Power supply voltage

Sensor: The sensor wire is connected internally with the corresponding power supply.

Non-used pins or wires must not be assigned!

Interfaces

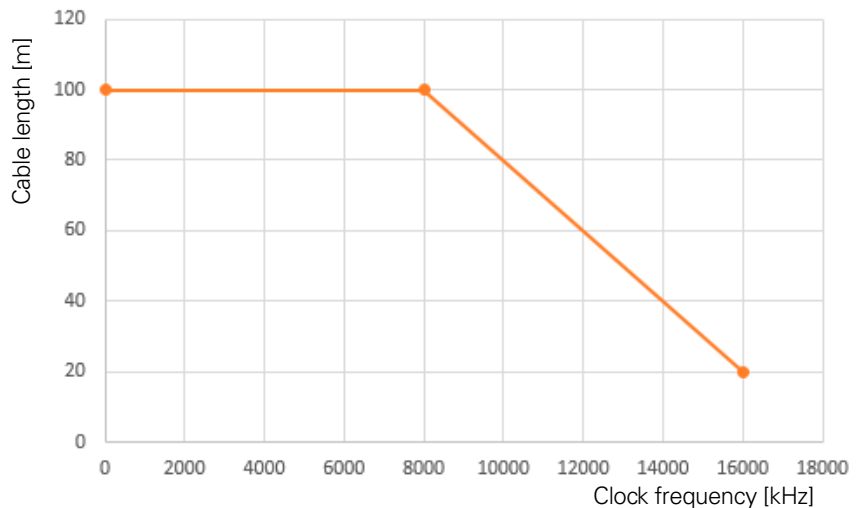
Position values

The EnDat-Interface is a digital, **bi-directional** Interface for measuring systems. With this interface you can read out position values and in the measuring system saved informations. This values can also be updated or new values can be saved. Due to the serial data transfer four signal wires are enough. The data DATA gets transferred synchroniously to the from the subsequent electronics given clock frequency CLOCK. The selection from the mode of transmission (position values, parameter, diagnostics,...) is done with mode- commands which are sent from the subsequent electronics to the measuring system.



The clock frequency is variable - depending on the cable length (max. 100m). With propagation electronics, either clock frequencies up to 16 MHz are possible or cable length up to 100m. For EnDat encoders the maximum clock frequency is stored in the encoder memory. Propagation-delay compensation is provided for EnDat 22.

Transmission frequencies up to 16MHz in combination with large cable length place high technological demands on the cable. Greater cable lengths can be realized with an adapter cable no longer than 6m and an extension cable. As a rule, the entire transmission path must be designed for the respective clock frequency.

Order code	Instruction set	Incremental signals
EnDat22	EnDat 2.2	Without



Pin configuration

Electrical connection: 1SS08 8pin coupling M12								
Power supply				Absolute position values				
	8	2	5	1	3	4	7	6
	U _P	Sensor U _P	0V	Sensor 0V	DATA+	DATA-	CLOCK+	CLOCK-
	brown/green	blue	white/green	white	grey	pink	violet	yellow

Cable Shield is connected with the housing; **U_P** = Power supply voltage

Sensor: The sensor wire is connected internally with the corresponding power supply. Non-used pins or wires must not be assigned!

Interfaces

Pin layouts Fanuc and BiSS/C[®]

Fanuc

AMO measuring systems with Fanuc Interface are for connection to a Fanuc-Control.

Fanuc Serial Interface - α interface

Order code: Fanuc02
normal and high speed, two-pair transmission


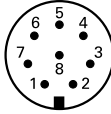


BiSS / C

AMO measuring systems with BiSS/C[®] Interface are for connection to controls which have the BiSS/C Interface implemented.

BiSS/C bidirectional protocol

Order code: BiSS
The Standard Encoder Profile - 32bit will be in use.

Pin configuration

Electrical connection: 1SS08 8pin coupling M12  								
	Power supply				Absoulte position values			
	8	2	5	1	3	4	7	6
	U_P	Sensor U _P	0V	Sensor 0V	DATA+	DATA-	CLOCK+	CLOCK-
	brown/green	blue	white/green	white	grey	pink	violet	yellow

Cable Shield is connected with the housing; **U_P** = Power supply voltage

Sensor: The sensor wire is connected internally with the corresponding power supply.
Non-used pins or wires must not be assigned!

Headquarter:



A-4963 St. Peter am Hart, Nöfing 4 - Austria

Phone: +43 7722 658 56-0

Fax: +43 7722 658 56-11

e-mail: office@amo.at

www.amo-gmbh.com

Branches:

Germany:

AMO GmbH
Zweigniederlassung Deutschland
Bussardstrasse 10
D 78655 Dunningen

Phone: +49 7403 913 283

Fax: +49 7403 913 267

e-mail: office@amo-gmbh.com

Homepage: www.amo-gmbh.com

USA:

AMO Corporation
9580 Oak Ave Parkway Suite 7-162
Folsom, CA 95630

Phone: +1 916 791 2001

Fax: +1 916 720 0430

e-mail: sales@amosin.com

Homepage: www.amosin.com

Italy:

AMO Italia s.r.l.
20128 Milano MI - Italia
Via Asiago 14

Phone: +39 029 108 23 41

e-mail: info@amoitalia.it

Homepage: www.amoitalia.it

Authorized distributors and sales partners in other countries:

Please look at www.amo-gmbh.com