

Operating and Assembly Instructions

Electronic function module UO-EM-AMS

Evaluation to U-ONE® - Absolute encoder

**Read the operating and assembly instructions prior to assembly,
starting installation and handling!
Keep for future reference!**

Universal encoder system U-ONE®

Electronic function module UO-EM-AMS



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1 General

1.1 Information about the operating and assembly instructions

These operating and assembly instructions provide important instructions for working with the device. They must be carefully read prior to starting all tasks, and the instructions contained herein must be followed.

In addition, applicable local regulations for the prevention of industrial accidents and general safety regulations must be complied with.

For other, non SIL certified electronic function modules please refer to the separate Operating and Installation Instructions.

1.2 Scope of supply

The scope of supply includes the electronic function module UO-EM-AMS and the operating and assembly instructions.

The operating and assembly instructions for the electronic function module is also included on the supplied CD.

1.3 Explanation of symbols

Warnings are indicated by symbols in these operating and assembly instructions. The warnings are introduced by signal words that express the scope of the hazard.

The warnings must be strictly heeded; you must act prudently to prevent accidents, personal injury, and property damage.



WARNING!

Indicates a possibly dangerous situation that can result in death or serious injury if it is not avoided.



CAUTION!

Indicates a possibly dangerous situation that can result in minor injury if it is not avoided.



CAUTION!

Indicates a possibly dangerous situation that can result in material damage if it is not avoided.



NOTES!

Indicates useful tips and recommendations as well as information for efficient and trouble-free operation.



NOTES!

Do not use a hammer or similar tool when installing the device due to the risk of damage occurring to the bearings or coupling!



DANGER!

Life-threatening danger due to electric shock!

Indicates a life-threatening situation due to electric shock. If the safety instructions are not complied with there is danger of serious injury or death. The work that must be executed should only be performed by a qualified electrician.

1.4 Disclaimer

All information and instructions in these operating and assembly instructions have been provided under due consideration of applicable guidelines, as well as our many years of experience.

The manufacturer assumes no liability for damages due to:

- Failure to follow the instructions in the operating and assembly instructions
- Non-intended use
- Deployment of untrained personnel
- Opening of the device or conversions of the device

In all other aspects the obligations agreed in the delivery contract as well as the delivery conditions of the manufacturer apply.

1.5 Copyright



NOTES!

Content information, text, drawings, graphics, and other representations are protected by copyright and are subject to commercial property rights.

It is strictly forbidden to make copies of any kind or by any means for any purpose other than in conjunction with using the device without the prior written agreement of the manufacturer. Any copyright infringements will be prosecuted.

1.6 Guarantee terms

The guarantee terms are provided in the manufacturer's terms and conditions.

1.7 Customer service

For technical information personnel is available that can be reached per telephone, fax or email. See manufacturer's address on page 2.

2 Safety



DANGER!

This section provides an overview of all the important safety aspects that ensure protection of personnel, as well as safe and trouble-free device operation.

If these safety instructions are not complied with significant hazard can occur.

2.1 Responsibility of the owner

The device is used in commercial applications. Consequently the owner of the device is subject to the legal occupational safety obligations, and subject to the safety, accident prevention, and environmental protection regulations that are applicable for the devices area of implementation.

2.2 Personnel

Qualified personnel only are permitted to install, mount, program, commission, operate, maintain and take out of service the devices.

Qualified personnel are people who have received

- training to qualify as an electrician or
- instructions from qualified trades personnel

entitling them to work with and on devices, systems, machinery and plant in accordance with generally accepted standards and safety engineering guidelines.

In addition, the owner is obliged to deploy only personnel who

- are familiar with the fundamental regulations covering work safety and accident prevention,
- have read and understood the chapter "Safety" in these Operating and Installation Instructions,
- and are familiar with the basic and specialist standards that apply to the specific application.

3 Technical Data

Electronic function module for U-ONE absolute encoder Multiturn, with SSI interface
Protocol: 25 - Bit SSI Type: UO-EM-AMS

3.1 Type plate / Connection diagram



JOHANNES
HÜBNER
GIESSEN

Typ : UO-EM-AMS
Type

ID : 18574

S/N : **123456** Bj/Y : 2019



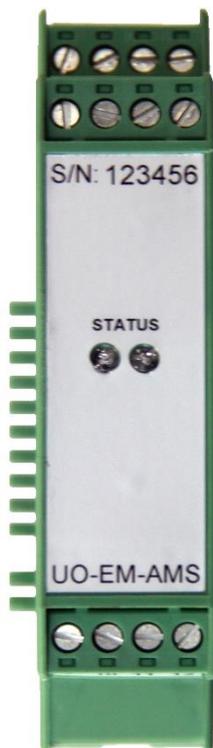

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Pin	Signal	Symbol	Description
1	CLOCK +	[Symbol: Clock +]	EINGANG / INPUT RS422
2	CLOCK -		EINGANG / INPUT RS422
3	DATA +	[Symbol: Data +]	AUSGANG / OUTPUT RS422
4	DATA -		AUSGANG / OUTPUT RS422
5	GND SSI	[Symbol: Ground]	GND
6	GND SSI		GND
7	V/R +	[Symbol: V/R +]	EINGANG / INPUT 12.30V
8	V/R -		EINGANG / INPUT 12.30V
9	SEL +	[Symbol: SEL +]	EINGANG / INPUT 12.30V
10	SEL -		EINGANG / INPUT 12.30V
11	Z +	[Symbol: Z +]	EINGANG / INPUT 12.30V
12	Z -		EINGANG / INPUT 12.30V

3.2 Connections and indicators

The two status LEDs (green and red) indicate the current operating state of the module..

The table shows the possible states and their associated displays.



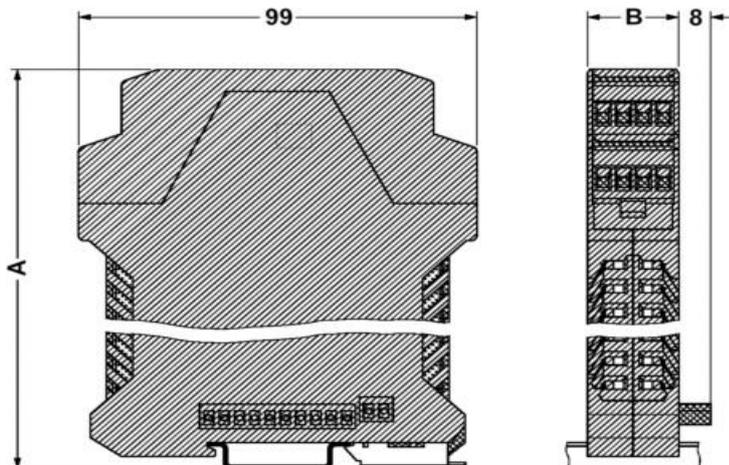
Operating state	SSI – status (clock input)	Status LEDs	
		red	green
Startup	–	off	off
Pre-operation	–	blinking 500ms	off
Operation	No signal	off	blinking 500ms
	Cable interchanged (normal + in-vers)	blinking 250ms	synchron to red
	Normal	off	on
Programming	–	blinking 250ms	inverted to red
Error	–	on	off

3.3 Connected loads environment

Description	Value
Supply voltage	12 ... 30 V DC
Power consumption	max. 1 W plus power consumption of next electronic function modules
Connection	COMBICON®-terminal strip
Connecting diagram	PN 126
Device temperature range	-25 ... + 70 °C
Degree of protection	IP20
SSI-interface	
Data interface	SSI-clock, SSI-data
Clock frequency	80 kHz ... 1 MHz
timeout	28 µs
Hardware inputs	counting direction preset selection preset set
U-ONE programming interface	
Programmable parameter	preset value 1 preset value 2 output format

3.4 Dimension drawing

A = 115 mm B = 22,50 mm



3.5 Mounting the module

Snap the modules onto the top-hat rail and slide together.



CAUTION!

Ensure you do not damage the connectors when you snap the modules onto the rail and push them together!

Ensure the modules contact reliably when joining them together on the top-hat mounting rail.
Fit the supplied shrouding covers to both ends of the mounted terminals.

Follow the connection diagram!

4 Proper use

The electronic function module UO-EM-AMS has been designed and built solely for the intended purpose described in these operating and assembly instructions.

We do not accept liability of any kind for damages arising from improper use of the device. The owner bears sole responsibility for any improper use.

4.1 Improper use

- Do not use the device in potentially explosive areas.
- It is not permitted to use the device in locations higher than 3000 m above sea level.

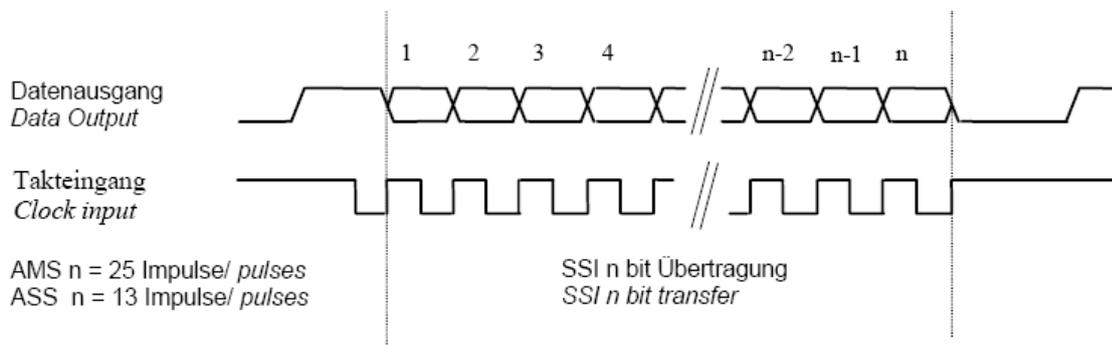
5 Data transmission

5.1 Data transmission

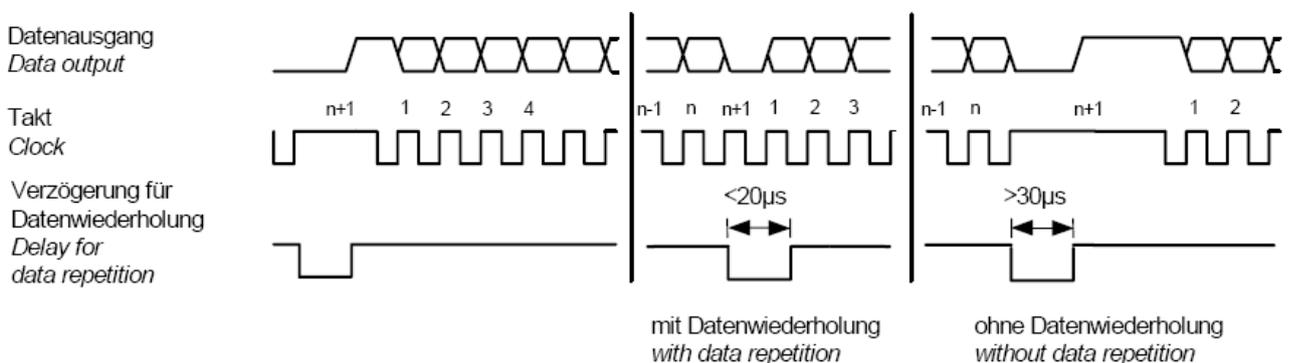
Data transmission is effected acc. to SSI processing (Serial Synchronous Interface). This means the electronic function module UO-EM-AMS input „CLCK“ and CLCKG“ (inverted) will be supplied with sets of 25 clockpulses through an opto coupler input for electrical isolation. Synchronously 25 data bits will be available at the output „DATA“ and inverted signals at the output „DATAG“ through Interface RS422.

The inactive level of clock signal is normally set at HIGH. On first falling edge the encoder position will be read from the code discs. The first transmission bit will then be supplied to the electronic function module output with the rising edge of clock 1 enabling the receiver unit to read the transmission bit with the falling edge of clock 1. This procedure will be repeated up to clock 25 and in this manner all data bits will be transmitted.

Data transmission will end at rising edge of clock input. In normal operation the output will be set to level „HIGH“ after approx. 25 μ s and readiness for next data transmission will be indicated to the receiver unit.



If a new data transfer is started within 20 μ s, no data reading from the code discs will be made but data of the previous cycle will be transmitted again (data repetition).



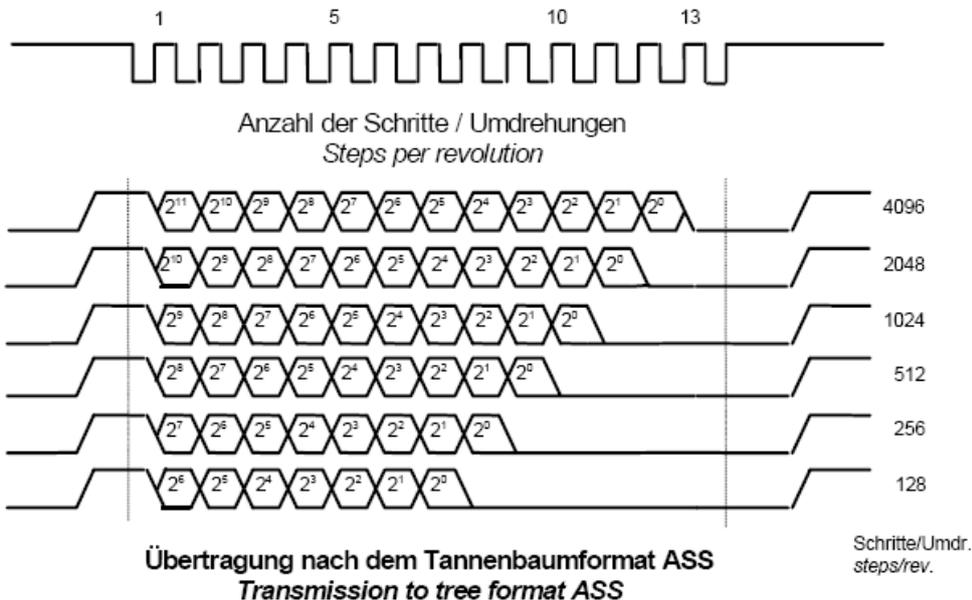
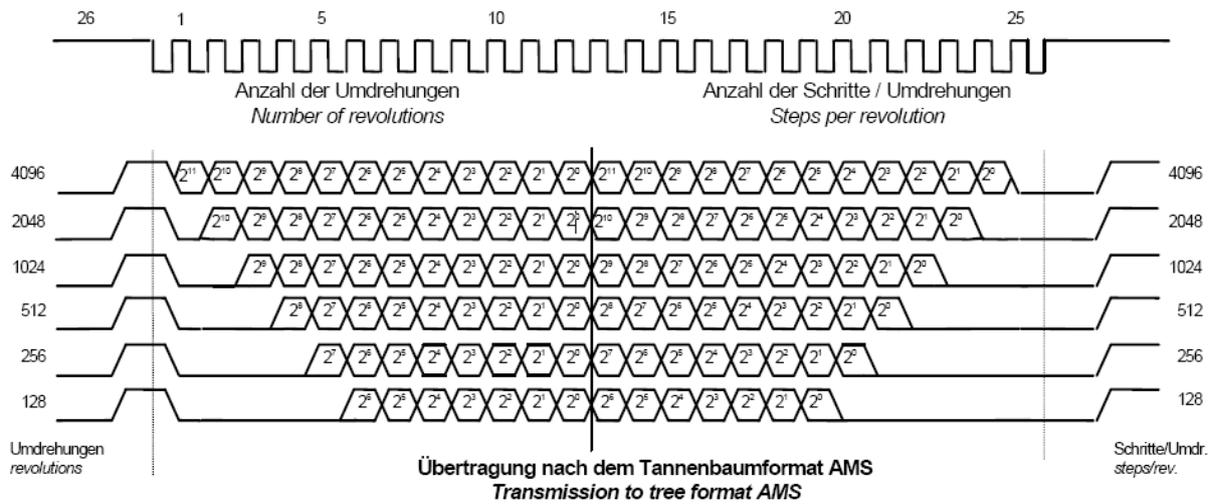
The clock frequency range is from 80 kHz up to 1 MHz. If clock frequency is too low (< 80 kHz) no data transmission will be possible.

5.2 Transmission to tree format

Data output will be made in the sequence Multiturn - Singleturn and the most significant bit (MSB) at first. It is possible to reduce the number of bits for the Multiturn range as well as for the Singleturn range. Transmission period for both ranges will not change. The bits affected by the reduction will be set to low level. Programming of bit rate for Multiturn and Singleturn range can vary from each other.



NOTE!
The connections „CLCKG“ + „CLCKG“ (clock input) have to be connected to the corresponding signals.
Wrong connection will cause error of data reading.



Error indication

A signal indicating correct operation of the electronic function module will be generated on the output „ERR“ as follows: while operating accurately a high level will be generated on „ERR“. Low on signal „ERR“ indicates non-correct operating of the SSI electronic function module. This signal will be shown during switching-on process of electronic function module and during programming process when SSI data output are influenced temporally.

Error reading will also be indicated on malfunction of optical scanning.

Control input V/R

When the voltage will be applied to the Terminal V/R, the counting direction will be set to parameter LEFT. 0 V or no available connection means that the counting direction is set to parameter RIGHT.

Control input Z

When having a pulse of approx. 1s length

(+5V ...+30V) at terminal Z two different zero points can be set to any mechanical position of the encoder which are dependent on the input level SEL. The zero points can be selected through the level (HIGH or LOW) at terminal SEL.

Control input SEL

Zero point 1 will be selected by low level and zero point 2 by high level independently of, whether the voltage will be applied to terminal Z or the setting will be made by a PC. After having defined by programming both, Offset 1 and Offset 2 can be activated.

Programmable functions

Programming of the electronic function module is effected by means of a PC. Set parameters are stored involatile and are available even after a break-down caused by power failure. Following programming functions are possible:

- Setting of zero point 1 and 2 (dependent on level of input „SEL“)
- Bits for multiturn and singleturn range (tree format)
- Offset 1 and 2 (dependent on level of input „SEL“)
- Output code binary / gray
- Identification
- Reading of Programming date
- Standard setting

All set parameters, excluding those for zero points and standard setting, can be read from the electronic function module and be stored.

Zero point 1 and 2

The zero points of the electronic function module can be set to any mechanical position of the encoder. The corresponding points will be positioned and zero points will be set by means of a PC.

Therefore there are no considerable adjustment works necessary during assembly. The positions for Offset 1 and 2 do refer to this set point. When the electronic function module is operating the selection of current zero points can be made through input „SEL“.

Number of transmission bits

Setting is effected according to the tree format and can be made for Multiturn range from 0... 4095 rev. and for Singleturn range from 0... 4095 steps by values of 2^n ($n = 0...12$ Bit). The number of bits for both ranges can be individually selected.

Offset 1 and 2

The Offset values represent a shifting of the zero points. They can be individually set in numbers within the max. resolution range or can be read from the encoder position referring to zero point. When the encoder is operating the selection of current Offsets can be made through input „SEL“.

Identification

An individual text having 8 digits can be stored in the electronic function module. This text has no influence on the electronic function module functions.

Programming date

Programming date will be updated (PC system date) and stored on every programming change of electronic function module.

Output code

Data output of binary or gray code is possible.

Standard setting

Following values can be set with command standard setting:

zero point 1 and 2	=	code disc - zero
number of bits	=	24
Offset 1 and 2	=	0
Output code	=	gray

6 Transport, packaging and storage

6.1 Safety information concerning transport



CAUTION!

Material damage caused by improper transport!

Observe the symbols and information on the packaging:

- Do not throw - risk of breakage
- Keep dry
- Do not expose to heat above 40 °C or direct sunlight.

6.2 Goods inward inspection

Check the delivery immediately upon receipt for transit damage or short delivery.

Inform the carrier immediately on receipt if you determine that damage has occurred during transit (take photos as proof).

6.3 Packaging (disposal)

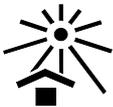
The packaging is not taken back; dispose of according to the respective valid statutory provisions and local regulations.

6.4 Storing packages (devices)



Keep dry

Keep packages dry and free from dust; protect from moisture.



Protect against heat

Protect packages from heat above 40 °C and direct sunlight.

If you intend to store the device for a longer period of time (> 6 months) we recommend you use protective packaging (with desiccant).

6.5 Returning devices (repairs/goodwill/warranty)

Devices that have come into contact with radioactive radiation or radioactive materials are not taken back.

Decontaminate devices that have may come into contact with harmful chemical or biological substances before returning.

They must also be accompanied by a safety clearance certificate.

6.6 Disposal

The manufacturer is not obliged to take back the device.

The device is classed as electronic equipment and subject to the WEEE Directive; observe local, country-specific laws when disposing of the device.

For information on environmentally sound disposal please contact your local authority or a specialist disposal company.