

**Absolute multiturn rotation encoder**

# **AA66111**

**4096 x 4096 impulse multiturn SSI**



## **Digitronic Automationsanlagen GmbH**

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## Notification

This handbook corresponds with the unit version of 12/2004. The company Digitronic Automationsanlagen GmbH reserves the right to implement changes that result in an improvement of the quality and the functions of the device at any time and without any announcements.

This instructions manual was created with a maximum of care, but mistakes are not out of the question. We are thankful for any comments, regarding possible mistakes in the instruction manual.

## UP-date

You can also obtain this instruction manual on the Internet at <http://www.digitronic.com> in the latest version as PDF file.

## Qualified personal only

Commissioning and operation of the device may only be carried out by qualified personal. Qualified personal are persons, authorized with commissioning, grounding and labeling devices, systems and electrical circuits according to the applicable standards of security

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**Note:** The products of Digitronic are so well constructed that they will not be effected by the millenium.

**Note:** This device fulfills the following norms according to electromagneticalcompatibility: EN 55011, EN 55022, EN 55024 Teil 2, EN 50082 Teil 2, ENV 50140, VDE 0843 Teil 2, VDE 0843 Teil 4, VDE 0871, VDE 0875 Teil 3 ("N"), VDE 0875 Teil 11, VDE 0877 Teil 2, IEC 801 Teil 3, IEC 801 Teil 2, IEC 801 Teil 4, IEC 801 Teil 5.



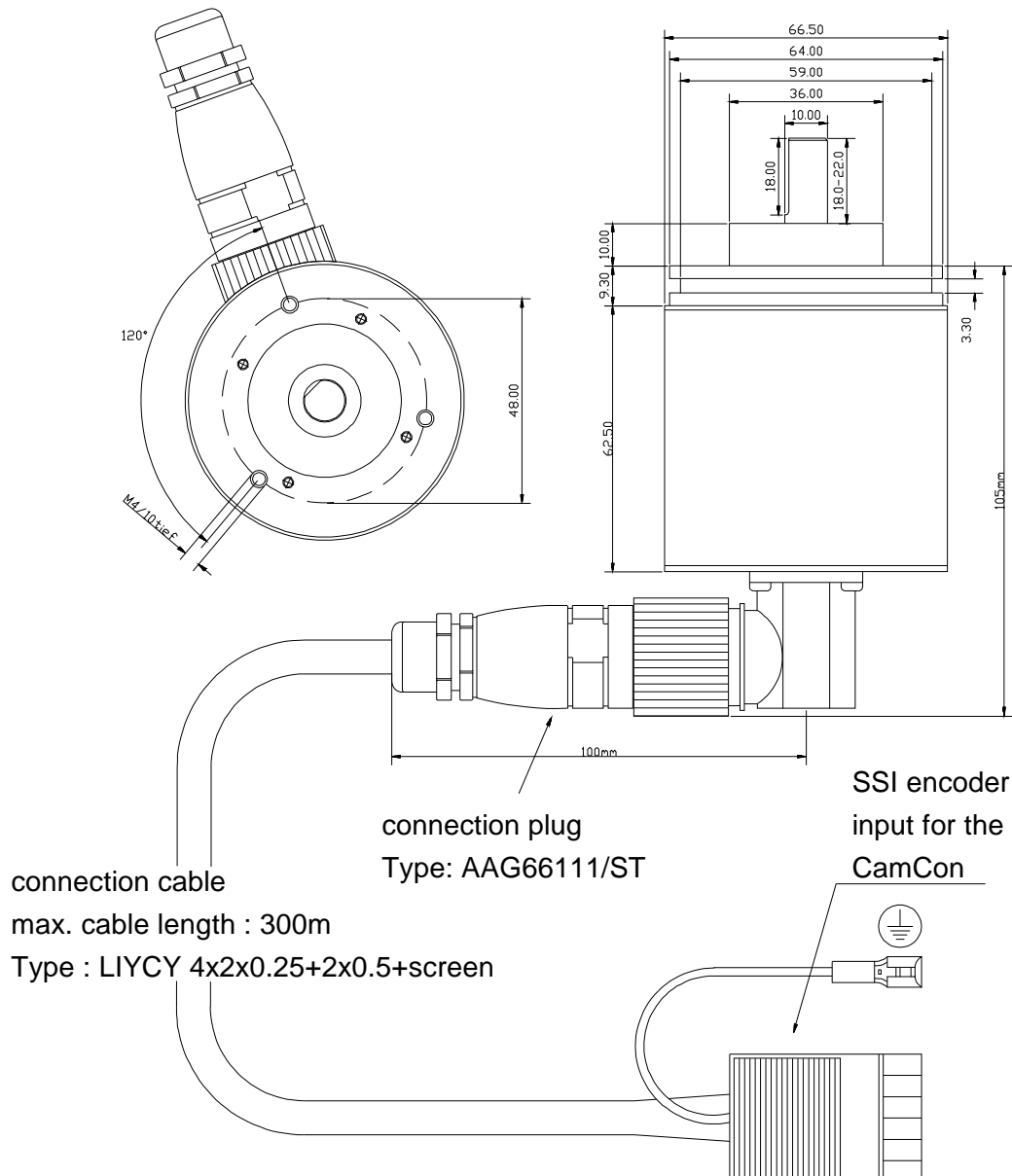
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## 1. The absolute multiturn rotation encoder AAG66111

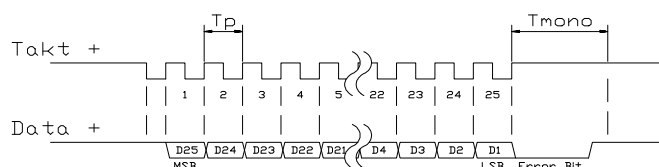
The AAG66111 is the replacement of the no longer usable AAG626 encoder. Turns with a resolution of 4096 impulse and with 4096 rotations can be measured by the absolute multiturn rotation encoder and can be connected through the serial synchronized data exchange to the camswitchunits of the CamCon series.

### 1.1. Survey of the components of the AAG66111 multiturn rotation encoder



### 1.2. The SSI interface

The SSI interface is a common interface for absolute single and multiturn encoders. The CamCon supplies the measuring system with 24Volt via this interface. To read the data, CamCon sends a clock signal with an RS422 level to the encoder. The encoder answers synchronously with the output (data) of the position in Gray code. The frequency of the clock signal depends on the length of the cable connecting encoder and CamCon. This value can be configured at the CamCon. The data protocol corresponds with the Stegmann SSI Norm.



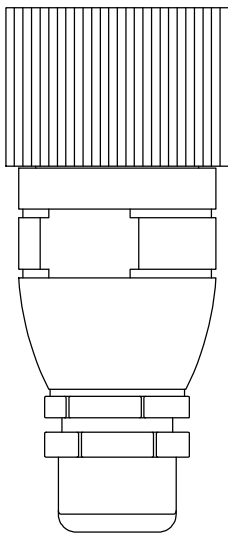
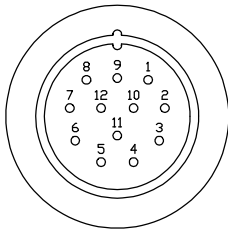
$T_p$  = clock impulse  
maximum of 1MHz to a  
minimum of 66kHz. (configured  
at the cable length setting)

$T_{mono}$  = mono flop time 25µs

### 1.3. The terminal assignment of the AAG66111 rotation encoder

#### Connection plug Type: AAG66111/ST

Binder Series 623  
soldering side



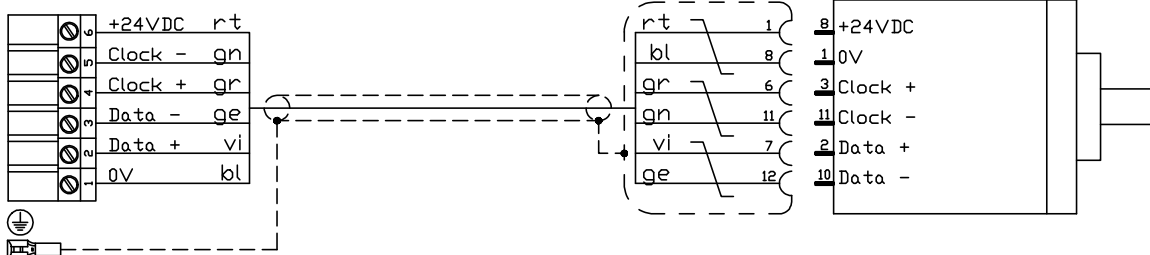
**Attention:** The order of the numbering of the connector plug may differ from manufacturer to manufacturer. You can only connect a plug with a different order, if you keep the displayed attachment allocation in mind. The location of the pins has to match the corresponding functions at the device. This booklet uses a plug of the Binder 623 series.

**Attention:** Connecting wrong poles of the connection cables can damage or destroy the CamCon or the encoder.

The connection plug of the SSI interface is dependant of the type of the CamCon. Consult the handbook of your CamCon.

connection plug  
Type: AAG66111/ST  
Binder series 623

Encoder  
Type: AAG66111



max. cable length: 300m  
cable type: LIYCY 4x2x0.25 + 2x0.5 + shield

**Please note:** Only use a sheathed pairwise connection cable. Do not put the cable near power current wires. If possible, put the screening up at both sides.

Order.nmb.: KKyy/S-XX meter

yy = CamCon Type. e.g. 16,33,40,50,60,90,115 or 300  
XX = length of the cable in meters

## 2. Installation and bringing into service

Rotation encoders are precision measuring units and therefore have to be handled as such. Please regard the following installation instructions before bringing the rotation encoder into service.

- When installing the rotation encoder, pay attention to the slight angular and radial misalignment. (See technical data of the to be used couplings). Avoid blows towards the shaft and regard the values concerning the shaft loads, which are listed on the data sheet.
- Use flexible couplings ! The kind of couplings is determined by the speed, the torque, and the to be by-passed angular and radial misalignment.
- Connect the rotation encoder to the corresponding terminal assignment. See to it, that the operating voltage recommended on the type plaque is installed.
- The plug should not be connected or disconnected when under voltage.
- If the rotation encoder, even if correctly installed, does not function properly, intermittent faults can be the cause of that. Such faults are due to power supply switchings, pulse mode controllers or motors etc. Such faults can be reduced through proper protection facilities and through using cables with a better shielding or an appropriate filtering network.
- Should the occasion arise, protect the rotation encoder against environmental damage. (solid particle impact, water spray ect.).

If any interventions are carried out by unauthorized personnel the factory guarantee becomes invalidated !

Please review the wiring of the unit before switching it on and then engage the supply voltage of the CamCon.

### 2.1. Technical data of the AAG66111 multiturn rotation encoder

Power supply.....	24VDC +-20%
Power consumption.....	up to 3.7 watt
Resolution .....	4096 impulse / turn x 4096 rotations (max. 16777216 impulse).
Stepfrequency .....	maximal 100 kHz
Measuringuncertainty.....	$10^{-3}$ rad
Data output.....	synchronos serial (SSI), graycode
Monofloptime.....	15..25 $\mu$ s
Cablelength between rotation encoder and CamCon.....	300 meter max.

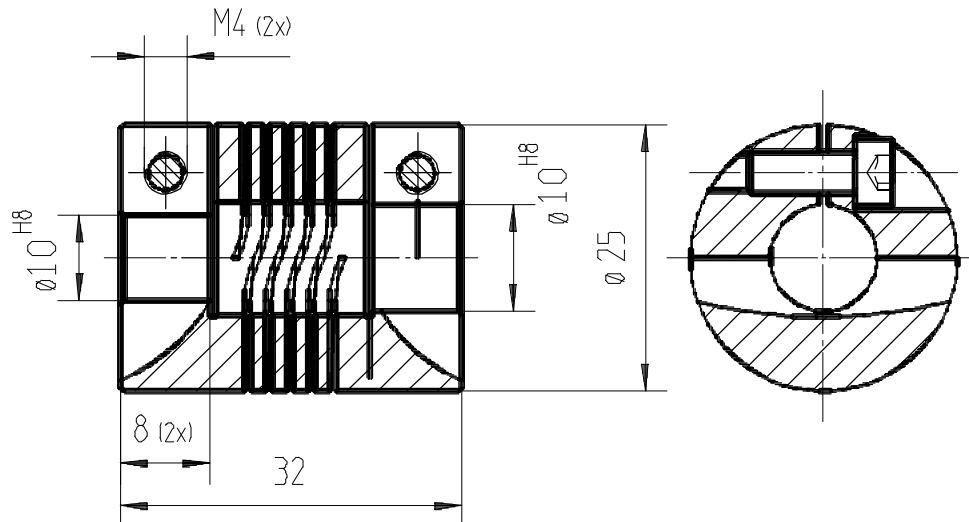
#### Mechanical characteristics

Valid torque .....	maximum 6000 $\text{min}^{-1}$
Angular acceleration of the rotor .....	$10^5 \text{ rad s}^{-2}$
Inertia of the rotor.....	45 $\text{gcm}^2$
Start-up torque at 25°C .....	maximal 1 Ncm
Shaft load (at the shaft-end) .....	axial 50 N / radial 200 N
Ball bearing lifetime with 10 N axially and 10 N radial load, at 3000 $\text{min}^{-1}$ .....	25000 h
Vibration (sine form) 100Hz .....	100 $\text{ms}^{-2}$
Impact radially on the flange within 10 ms .....	300 $\text{ms}^{-2}$
Protection .....	IP65
Relative dampeness.....	90 %
Operating temperature .....	0..+60°
Weight.....	ca. 400 g.

### 3. The shaft couplings

Encoders are precision measuring units and therefore have to be kept apart from the vibrations and tremors, as well as the from the misalignment of the machine. To part the encoder from these influences use the flexible shaft couplings.

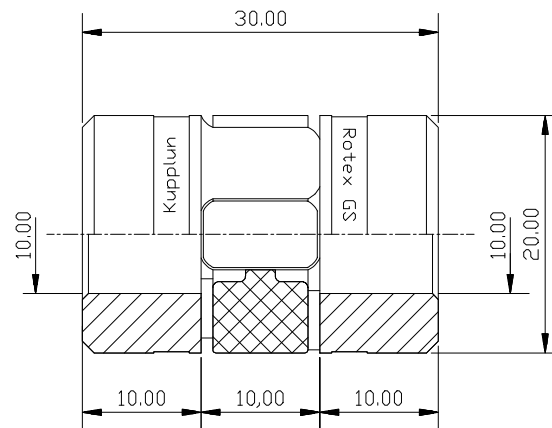
#### 3.1. Wendel - shaft couplings type: WK/A/10-10



##### 3.1.1. Technical data

Outer diameter .....	25 mm
Length .....	32 mm
Clamp-screw .....	M4
Nominal torsial moment .....	120 Ncm
Acceptable radial shift .....	+/- 0.35 mm
Acceptable axial shift .....	+/- 0.5 mm
Acceptable angle-shift .....	+/- 4 degree
Torsions strength .....	16 Nm/rad
Acceptable rotation speed .....	6000 U/min
Weight .....	ca. 34g

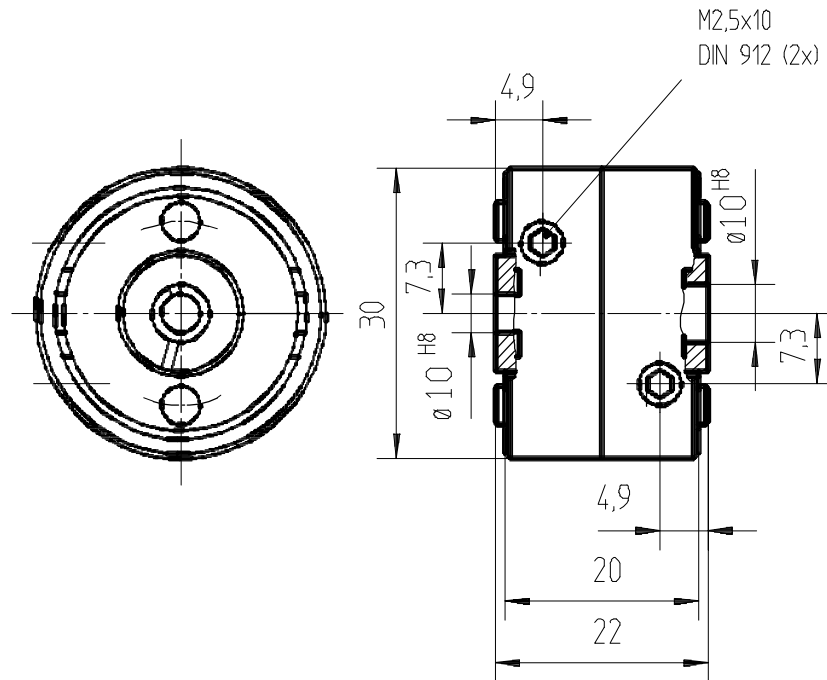
### 3.2. The shaft couplings WK/K/10-10



#### 3.2.1. Technical data

Outer diameter .....	20mm
Length .....	29,5mm
Clamp screw .....	M 2,5
Standart torque .....	1,94 Nm
Valid radial shift.....	+/- 0,13 mm
Valid axial shift .....	+/- 0,8 mm
Valid angular misalignment.....	+/- 1 Grad
Torsion stiffness.....	31,5 Nm/rad
Valid torque .....	28000 min <sup>-1</sup>
Weight.....	20 g

**3.3. Isolting springdisks - shaft coupling type: WK/D/10-10**



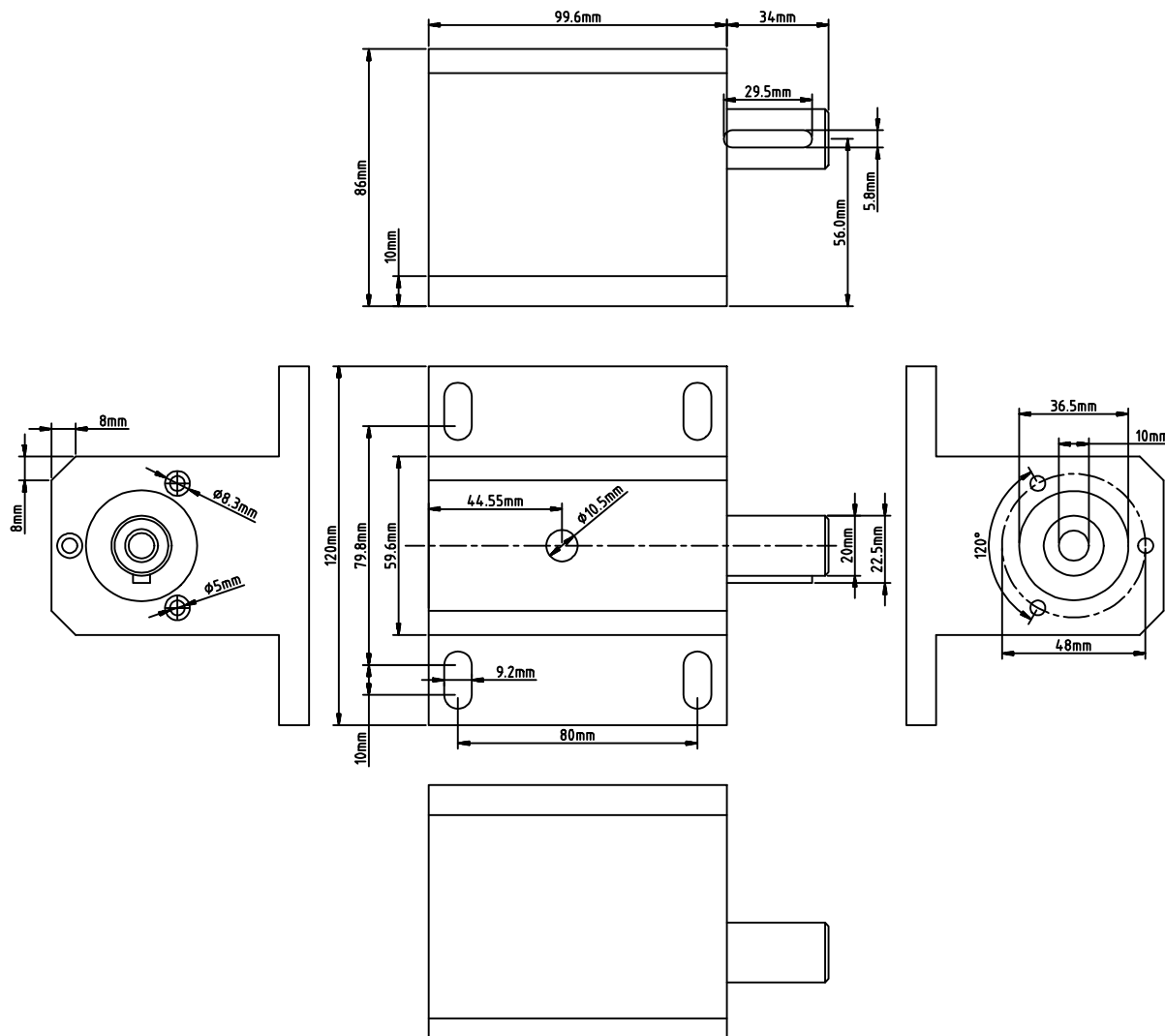
**3.3.1. Technical data**

Outer diameter .....	30 mm
Length .....	22 mm
Clamp-screw .....	M2.5
Nominal torsial moment .....	40 Ncm
Acceptable radial shift .....	+/- 0.4 mm
Acceptable axial shift .....	+/- 0.4 mm
Acceptable angle-shift.....	+/- 2.5 Grad
Torsions strength .....	90 Nm/rad
Acceptable rotation speed.....	12000 U/min
Weight.....	ca. 23 g





#### 4.2. Bearing trestle: LAG60



#### 4.2.1. Technical data

Suitable for ..... AAG60007, AAG612, AAG626, AAG66107, AAG615 and ADG60 i.e. all turn-angle-encoder with 48 mm partial circle, 36 mm flange and 10 mm shaft.

Acceptable rotation speed..... 3000 U/min.

Shaft drive ..... 20mm with closed shaft notch.

Shaft drive ..... 10mm to the turn-angle-encoder with shaft coupling WK/K/10-10.

Bearing ..... 2 pieces, maintenance free groove - ball bearings.

Clamping of the tiurn angle encoder ..... by 3 DIN 912 M4x40mm screws.

Weight..... approximately. 1.5kg.