

## General technical Data absolute encoders WDGA IO-Link

### Safety instructions:

- If a riskless operation can no longer be assured, the unit has to be shut down immediately and be secured against unintended start up.
- In any case of possible hazard of people or possible damage of equipment if the encoder fail, precautions have to be taken to prevent it before start.

### Absolute encoders WDGA:

With absolute rotary encoders WDGA, each shaft position is assigned a unique value, so that an absolute position value between 0° and 360° is assigned at each position of the shaft. For devices with multiturn, the number of revolutions is also available. The position value is maintained even if the supply voltage fails and can be queried immediately after the supply voltage is restored. Therefore, a reference run is not necessary. The angle values are transmitted via a digital interface for absolute encoders. A „position value“ is generated from singleturn and multiturn information, which can be output according to the selected interface. The Singleturn and Multiturn information were combined to a position value and regarding to the interface transmitted.

### Magnetic principle

The absolute rotary encoders WDGA operate with contactless magnetic scanning. A diametrically magnetized magnet is mounted in the stainless steel shaft. When the shaft is turned, the magnetic field changes. This change is detected and processed by our QuattroMag® technology on the opposite board. The evaluation of the signals on a differential basis enables the IC and the following electronics to generate high-precision singleturn information with a resolution of up to 16 bits per 360°.

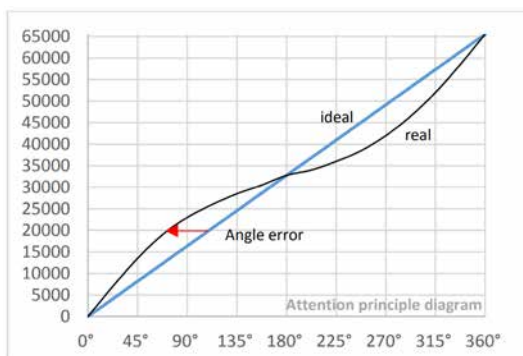
The WDGA rotary encoders do not require a mechanical gear to measure the number of revolutions. Instead, the revolutions (multiturn) are determined using the functional principle of EnDra® technology for the multiturn encoder: The diametrically magnetized magnet accumulates enough energy in an EnDra® wire to generate the information „revolution“ and „direction of rotation“ at a defined position. This unleashes so much energy that the evaluation and memory electronics can be operated safely and the necessary processes are feasible. An external power supply, e. g. via a battery, is not required for this. The patented system works absolutely self-sufficient and can count and process up to 43 bit revolutions. Our magnetic absolute encoders WDGA are perfectly matched measuring systems, combining precise mechanics, efficient magnetic sensors and powerful electronics with tailor-made software

### Accuracy of the absolute encoders WDGA

For rotary encoders, a distinction is made between resolution and accuracy. The singleturn resolution of an absolute rotary encoder determines in how many individual positions a shaft rotation of 360° is divided into. The multiturn resolution of an absolute encoder determines how many revolutions of the shaft can be counted. A distinction is made between singleturn accuracy and singleturn repeatability.

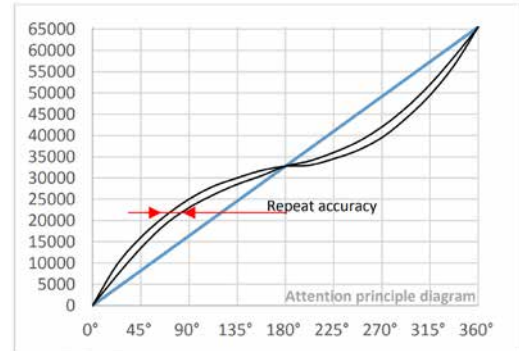
### Singleturn accuracy:

The Singleturn accuracy defines the tolerance of the position of every transmitted position value to the real mechanic shaft position (Singular run to one point and measurement at ambient temperature). There is no summation of the angular errors over several revolutions. The drawing below shows a possible angle error diagram as an example. In reality, this is a maximum of 0.0878°.



### Singleturn repeat accuracy:

The singleturn repeat accuracy describes the tolerance of the position of the measured and transmitted position value to a reference position or in reverse mode. This means that if the same position or a previously approached reference point is approached several times, the measured and transmitted position value varies with an error in a smaller tolerance band.



### Signal Conditioning

The absolute encoders WDGA with a singleturn resolution up to 16 bits are equipped with signal conversion noise caused by the magnetic sensors. The position value is conditioned before it is transmitted. A digital filter is followed by an internal hysteresis at rotation reversing. The conditioning is configured in that way, that no visible negative effect occurs for the position value. These measures have the effect that the position value doesn't change at shaft standstill in spite of the sensor noise of the magnetic field.

### IO-Link

IO-Link is an I/O technology used worldwide to ensure communication between sensors and actuators. It is standardised in accordance with IEC 61131-9. The sensors, which are usually referred to as devices, are connected to an IO-Link master, which in turn forwards the data to the next higher level, for example a fieldbus or an Industrial Ethernet. IO-Link is therefore not a bus system, but a serial, bidirectional point-to-point connection. The different devices are described in the IODD file (IO Device Description): [www.wachendorff-automation.com/iodd](http://www.wachendorff-automation.com/iodd).

Maximum baud rate and cable length result in:

Possible baud rates	Max. Cable length
230.4 kBit/s (COM3)	20 m

### LED and status signalling WDGA IO-Link:

The status LED in the housing signals various statuses of the encoder during use and supports the configuration of the encoder or troubleshooting. display of operating status and error message follow the respective protocol. For more detailed information, please refer to the appropriate manual under:

<https://www.wachendorff-automation.com/download-manuals>

### Protection from Noise Interference:

For efficient protection of the entire system we recommend the following measures:

For normal applications it is sufficient to connect the shield of the encoder cable to the earth potential. The entire system, consisting of the encoder and the signal processing equipment should be grounded at one single location by using a low resistance connection ( e.g. braided copper).

- In all cases the connecting cables should be shielded and should be locally kept away from power lines and other noise-generating equipment.

- Sources of interference such as motors, solenoid valves, frequency converters etc. should always have their noise suppressed at source.
- Encoders should not be powered from the same mains supply as solenoid valves or contactors, as this may cause interference.

In certain applications it may be necessary to install additional protection against interference, depending on the way the system is earthed and on the noise fields present. Such measures would include: capacitive coupling of the screen, the installation of HF-filters in the encoder cable or the installation of transient protection diodes. If these or any other measures are necessary, please contact us from power lines and interference generating devices and components.