

## Inductive transducers in cylindrical metal housings

# 11

Product group

### A WA F A WA X A WD X A WU X

### Application

The inductive transducer is a linear displacement measuring system. It can either be flange-mounted at a solenoid and at other measuring objects. The core which can be moved within the coils has to be connected to the measuring object with a threaded rod. The MSM transducers are characterized by high resolution, good linearity and long service life.

If the sensor is coupled to control electronics and a proportional solenoid, a complete displacement control system is created. Fastening is made with central thread resp. by a flange. For applications under pressurisation the sealing between the pressure-tight tube and the solenoid or valve is made through an o-ring.

### Function

The function of the inductive transducer bases on the principle of the differential transformer. The electronics integrated in the device supply the primary coil, evaluate the voltage induced in the secondary coils and provide a defined output signal or convert this into a bus signal.

### Construction characteristics

- Frequency limit 500 Hz for analog outputs
- Suitable for dry and pressure-tight applications
- Pressure-tight tube, designed for 350 bar bzw. 420 bar static pressure
- Mounting via central thread
- Variants with analogue outputs and CAN-Bus interface
- Electrical connection and protection class when properly installed:
  - Connection via surface-mounted plug circular connector M12x1
  - Protection class according to DIN VDE 0470/ DIN EN 60529 – IP X5
- (Electronic) zero adjustment from outside
- Threaded rod for fastening the core with the measuring object
- EMC directive
- Version according to ATEX on request  
Further interfaces: on request



Fig. 1: Type A WA X 004 A01 / A02

## Technical data

		<b>A WD X 004 A01</b>	<b>A WA X 004 A01</b>	<b>A WA X 008 A01</b>	<b>A WU X 008 A01</b>
Measurement path (mm)		± 4		± 8	
Pressure resistance static (bar)		350			
Supply voltage (≡ V)		18 ... 30			
Current consumption (mA)		< 50	< 60	< 70	< 35
Sensitivity (V/mm) (mA/mm)		---	1 2	0,5 1	0,25
Resolution (bit/mm)		499	---		
Output voltage (≡ V)		---	2 ... 10		5,5 ... 9,5
Output current (mA)		---	4 ... 20		---
Interface		CAN	analog		
Linearity tolerance (%)		± 1			
Cut-off frequency (-3 dB) (ca. Hz)		depending on the update frequency of the bus system	500		
Reference temperature range (°C)		-20 ... +75			
Temperature drift (% / K)		typ. 0,05			
Load of the output voltage (kΩ)		---	> 5		
Load of the output current (Ω)		---	< 500		
Declaration of conformity (EMV)		DC 013627	DC 009361	DC 013450	DC 009454

		<b>A WA X 015 A01</b>	<b>A WA F 025 A01</b>	<b>A WA F 025 A02</b>
Measurement path (mm)		± 15	± 25	
Pressure resistance static (bar)		350	420	
Supply voltage (≡ V)		18 ... 30		
Current consumption (mA)		< 60	< 70	
Sensitivity (V/mm) (mA/mm)		0,26 0,53	0,16 0,32	
Resolution (bit/mm)				
Output voltage (≡ V)		2 ... 10		
Output current (mA)		4 ... 20		
Interface		analog		
Linearity tolerance (%)		± 1 %		
Cut-off frequency (-3 dB) (ca. Hz)		500		
Reference temperature range (°C)		-20 ... +75		
Temperature drift (% / K)		typ. 0,05		
Load of the output voltage (kΩ)		> 5		
Load of the output current (Ω)		< 500		
Declaration of conformity (EMV)		DC 009472	DC 009471	DC 013594

### Sensitivity

The sensitivity is the change of the output signal  $\Delta U$  referring to the change of the measurement path  $\Delta s$ .

$$\text{Sens.} = \frac{\Delta U}{\Delta s} = \frac{U_{A1} - U_{A2}}{s_1 - s_2}$$

### Tolerance of the output voltage

The tolerance of the output voltage indicates the deviation of the output signal from the ideal straight line in per cent.

$$\text{Dev.}_{\text{Lin}} = \frac{|U_{\text{actual}} - U_{\text{target}}|}{U_{\text{Voltage stroke}}} \times 100 \%$$

### Temperature drift

The temperature drift indicates the deviation in per cent of the output signal per degree of temperature change (indicated in %/°K).


$$\text{Dev.}_{\text{Temp.}} = \frac{|U_{\text{Temp}} - U_{20^\circ \text{C}}|}{U_{\text{Voltage stroke}} \times |\Delta T|} \times 100 \%$$

High voltage test: short-circuited connector pins (1, 2, 3, 4) against housing (5) according to DIN VDE 0580.

**Information and remarks concerning European directives** can be taken from the correspondent information sheet which is available under [Produktinfo.Magnet-Schultz.com](http://Produktinfo.Magnet-Schultz.com).

### Note on the RoHS Directive

According to our current state of knowledge the devices pictured in this document do not contain any substances in concentration values or applications for which putting into circulation with products manufactured from them is prohibited in accordance to RoHS.

**Please make sure that the described devices are suitable for your application. Supplementary information concerning its proper installation can be taken also from the  -Technical Explanation, the effective DIN VDE0580 as well as the relevant specifications.**

This part list is a document for technically qualified personnel. The present publication is for informational purposes only and shall not be construed as mandatory illustration of the products unless otherwise confirmed expressly.

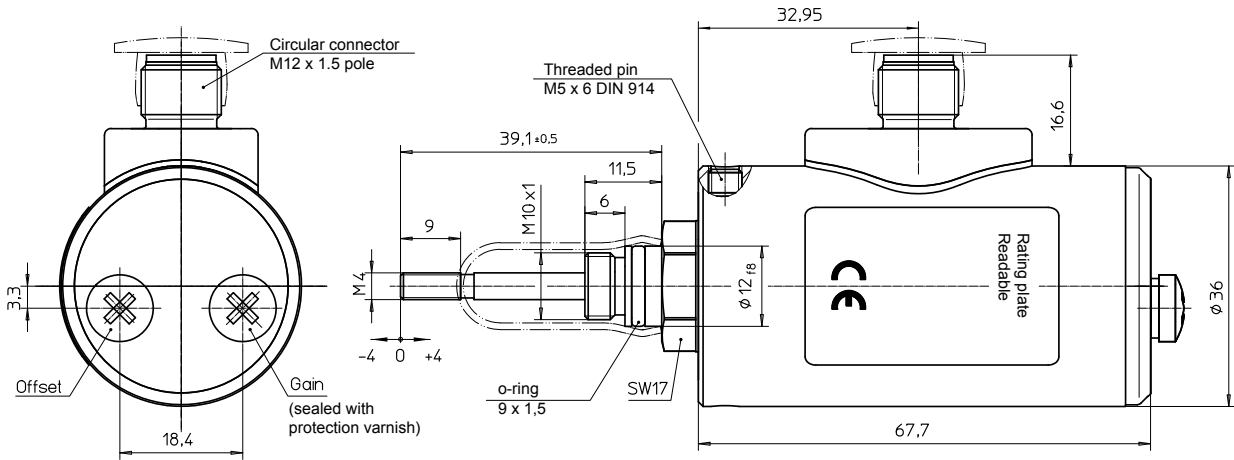


Fig. 2: Type A WD X 004 A01

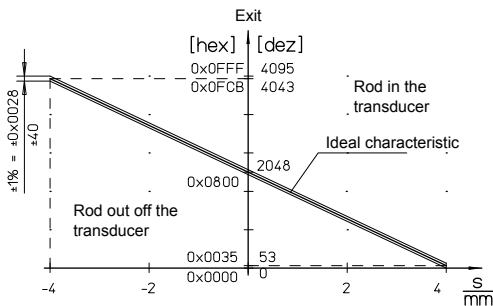


Fig. 3: Characteristic diagram for transducer with electronics A WD X 004 A01

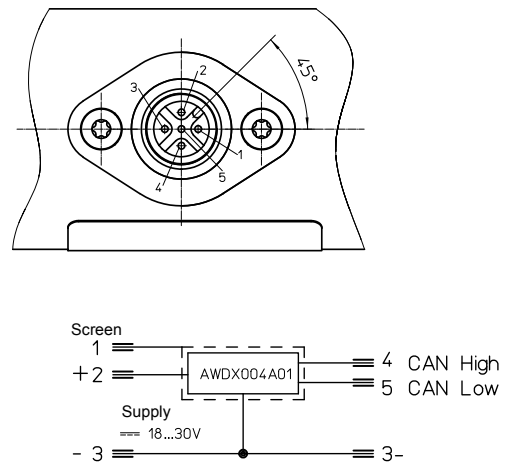


Fig. 4: Connection diagram A WD X 004 A01 Integrated electronics protected against accumulation errors at the Connections 2 and 3

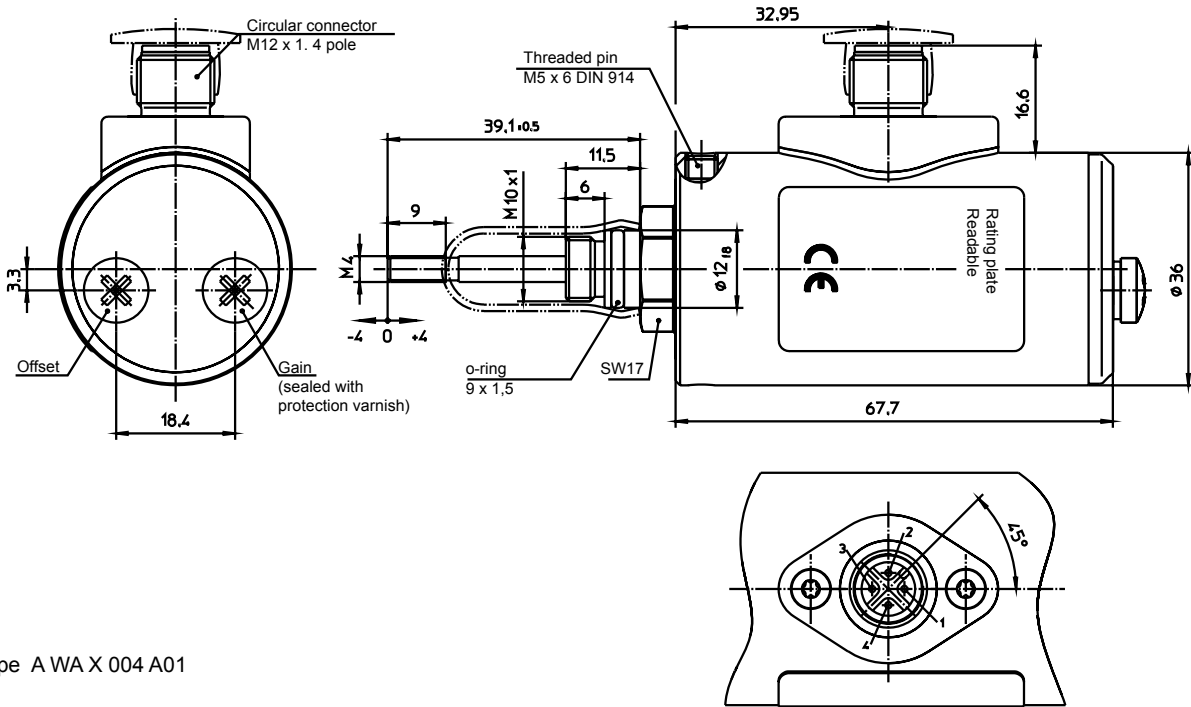


Fig. 5: Type A WA X 004 A01

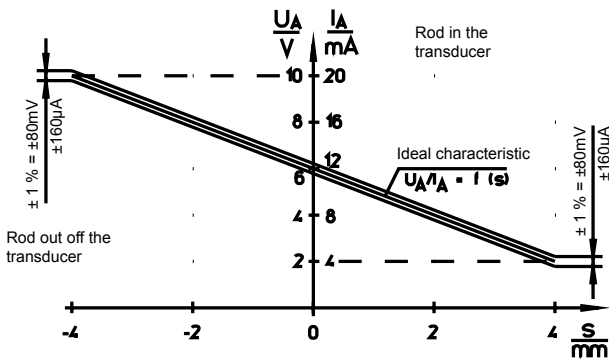


Fig. 6: Current vs. voltage diagram for transducer with electronics A WA X 004 A01

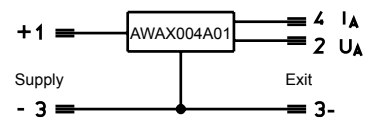


Fig. 7: Connection diagram A WA X 004 A01  
Integrated electronics protected against accumulation errors at the Connections 1 and 3

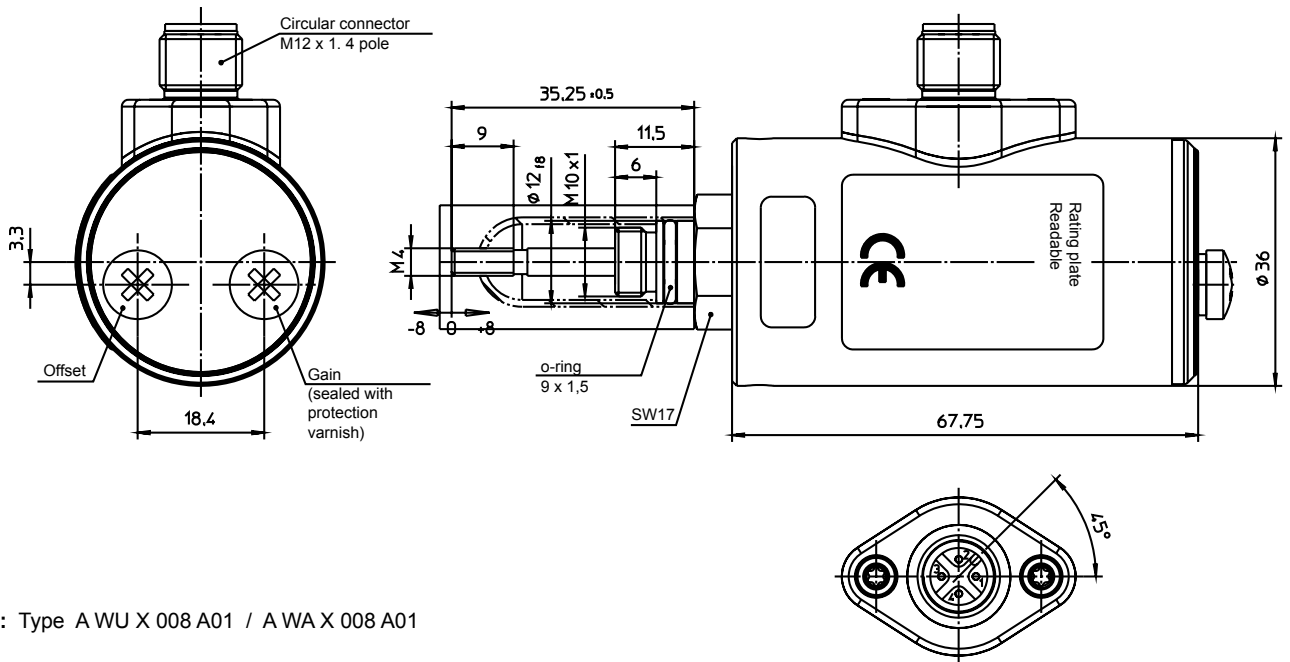


Fig. 8: Type A WU X 008 A01 / A WA X 008 A01

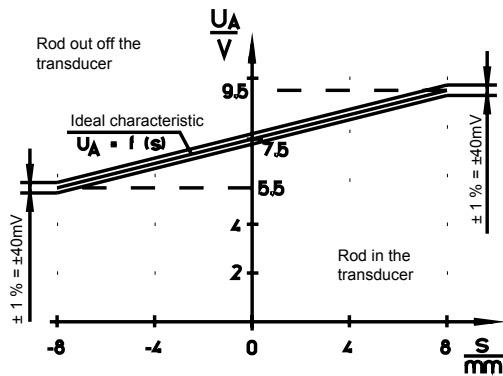


Fig. 9: Voltage vs. displacement diagram for transducers with electronics A WU X 008 A01

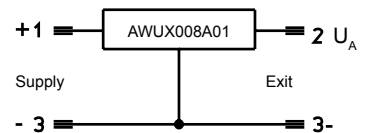


Fig. 10: Block diagram A WU X 008 A01 Integrated electronics protected against accumulation errors at the connections 1 and 3

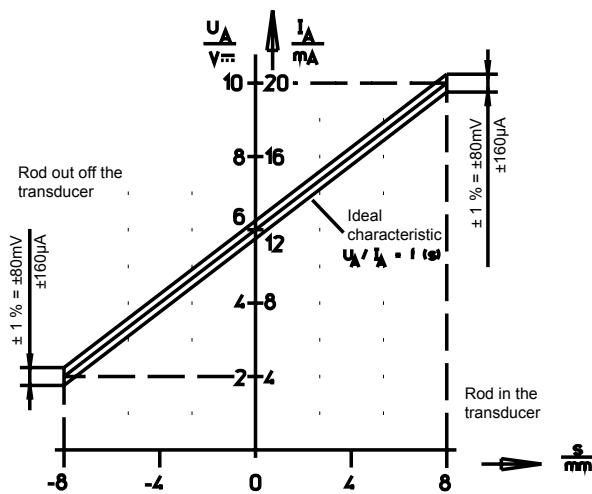


Fig. 11: Voltage vs. displacement diagram for transducers with electronics A WA X 008 A01

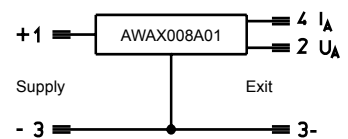


Fig. 12: block diagram A WA X 008 A01 Integrated electronics protected against accumulation errors at the connections 1 and 3

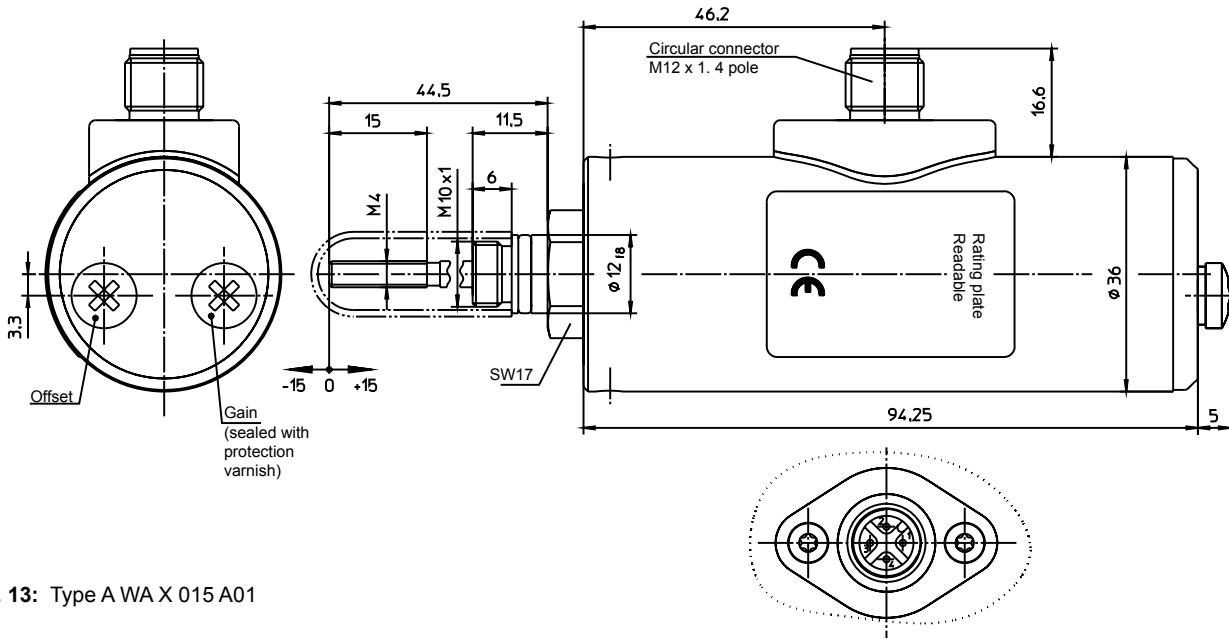


Fig. 13: Type A WA X 015 A01

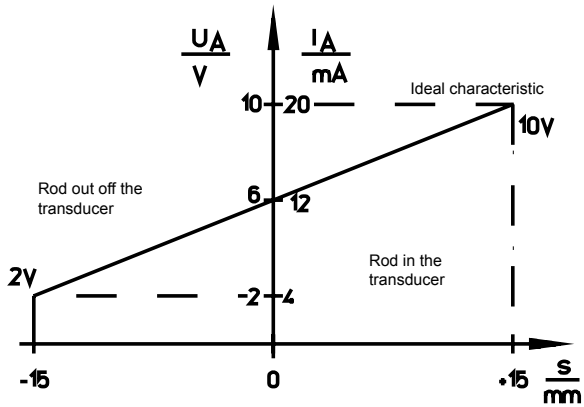


Fig. 14: Current vs. voltage vs. displacement diagram for transducers with electronics A WA X 015 A01

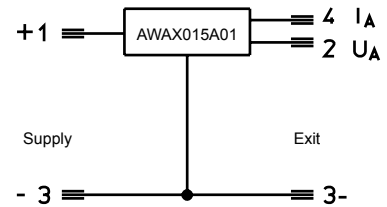


Fig. 15: Connection diagram A WA X 015 A01  
Integrated electronics protected against accumulation errors at the connections 1 and 3

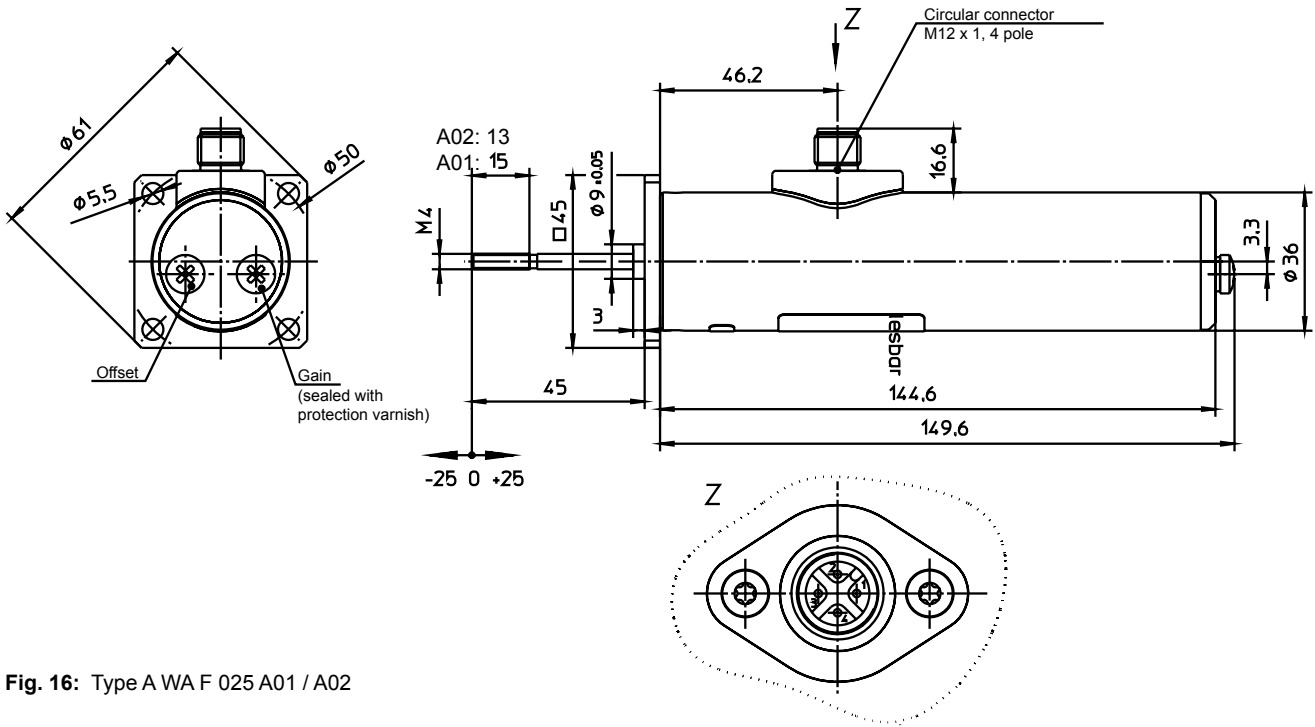


Fig. 16: Type A WA F 025 A01 / A02

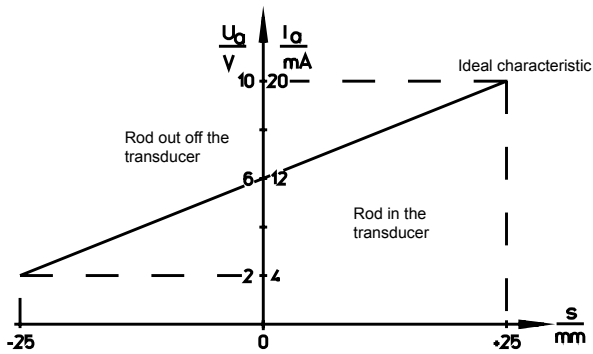


Fig. 17: Current vs. voltage vs. displacement diagram for transducers with electronics A WA F 025 A01 / A02

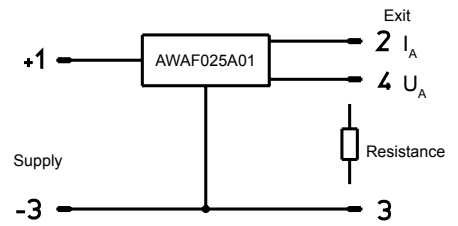
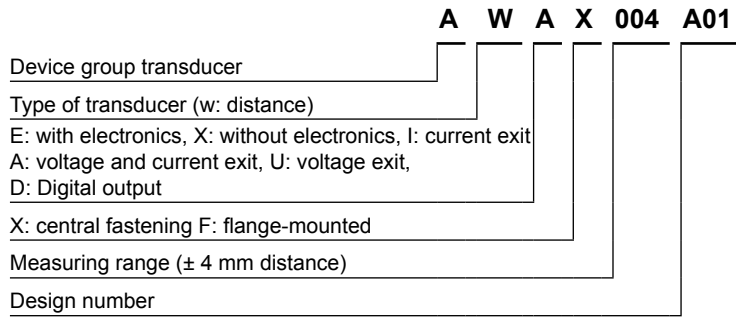


Bild 18: Connection diagram A WA F 025 A01 / A02 Integrated electronics protected against accumulation errors at the connections 2 and 3

## Type code




## Order example

Type                    A WA X 004 A01

Voltage                == 24 V DC

## Specials designs

Please do not hesitate to ask us for application-oriented problem solutions. In order to find rapidly a reliable solution we need complete details about your application conditions. The details should be specified as precisely as possible in accordance with the relevant  -Technical Explanations.

If necessary, please request the support of our corresponding technical office.