

# KINAX WT707

## Transmitter for angular position

### For industrial applications in rough environments



KINAX WT707 is a very robust, absolute transmitter for angular position, which is particularly suited to applications in rough environments due to its unique capacitive measuring principle. It acquires the angular position of a shaft in a non-contact manner and converts it into an impressed direct current proportional to the measured value.



### Your customer benefit

#### LOW LIFE-CYCLE COSTS DUE TO:

##### TESTED TOP QUALITY

- Capacitive Measuring principle
- With maritime execution (formerly GL, Germanischer Lloyd) available
- Explosion protection acc. ATEX and IECEx intrinsic safety "ia" (gas)

##### SAFE, FREE OF MAINTENANCE

- Resistant to high mechanical stress due to its robust design and high-quality materials
- High immunity against magnetic fields

##### EASY AND FAST COMMISSIONING

- No wear, low annual maintenance
- Defined angle value

### Technical data

#### General

Measured quantity: Angle of rotation  
 Measuring principle: Capacitive method

#### Measuring input

Angle measuring range:  $0 \dots \geq 5$  to  $0 \dots \leq 270^\circ$   
 Preferred ranges  
 $0 \dots 10$ ,  $0 \dots 30$ ,  $0 \dots 60$ ,  $0 \dots 90$ ,  
 $0 \dots 180$  or  $0 \dots 270^\circ$

Drive shaft diameter:  $\varnothing 19$  mm [0.748"],  $\varnothing 12$  mm [0.472"]

Starting torque in unloaded condition: max. 0.25 Nm [35.402 in-oz]

Sense of rotation: clockwise or counter-clockwise (in view of drive shaft)

#### Measuring output

Output variable  $I_A$ : Load-independent DC current, proportional to the input angle

Zero point variation: approx.  $\pm 5\%$

Final value variation: approx.  $+5\%$  /  $-30\%$  (see criterion of choice 9)

Current limitation:  $I_A$  max. 40 mA

Standard range:

0...1 mA, 3- or (4)-wire connection  
 0...5 mA, 3- or (4)-wire connection  
 0...10 mA, 3- or (4)-wire connection  
 4...20 mA, 2-wire connection or  
 0...20 mA, 3- or (4)-wire connection (adjustable with potentiometer)  
 4...20 mA, 3- or (4)-wire connection  
 0...20 mA, 4-wire connection

Non standard:

0...>1 mA to 0... <20 mA,  
 3- or (4)-wire connection

Power supply:

DC and AC voltage:

Nominal voltage $U_N$	Tolerance
24...60 VDC/AC	DC -15 ... +33 %
85...230 VDC/AC	AC $\pm 15\%$

(Non Ex, with electric isolation, with DC/AC power pack(DC / 45... 400 Hz))

DC voltage only

input voltage  $U_i$ : 12...33 V  
 (Non Ex, without electric isolation)

Explosion protection intrinsic ia:

input voltage  $U_i$ : 12 ... 30 V  
 max. input current  $I_i$ : 160 mA  
 max. input power  $P_i$ : 1 W  
 max. internal capacitance  $C_i$ : 22 nF  
 max. internal inductance  $L_i$ : is negligible

# KINAX WT707

## Transmitter for angular position

Residual ripple in output current:	< 0.3 % p.p.
Response time:	< 5 ms
External resistance: (load)	$R_{\text{ext max.}} [\text{k}\Omega] = \frac{12 \text{ V}}{I_A [\text{mA}]}$
	(for instruments with DC/AC power supply, with electric isolation)
	$R_{\text{ext max.}} [\text{k}\Omega] = \frac{H [\text{V}] - 12 \text{ V}}{I_A [\text{mA}]}$
	(for instruments with DC power supply, without electric isolation)
	H = Power supply
	I <sub>A</sub> = Output signal end value

### Accuracy data

Basic accuracy:	≤ 0.5 % for ranges 0...≤ 150° ≤ 1.5 % for ranges from 0...> 150° to 0...270°
Reproducibility:	< 0.2 %
Influence of temperature output current (-40...+85 °C): [-40 ... +167 °F]	± 0.2 % / 10 K

### Installation data

Housing (main part):	Steel (finish QPQ) standard High-grade steel 1.4462 sea-water
Rear (cover):	Plastic (polyester), when plug-in cable or aluminium (silafont), when screwed cable gland
Connections:	Plug connector plastic or screwed cable gland metal

The **plug-in connector** (1) consists of a socket and plug (1.2) on the end of the connecting cable (screw gland PG 11) and 7 screw terminals.

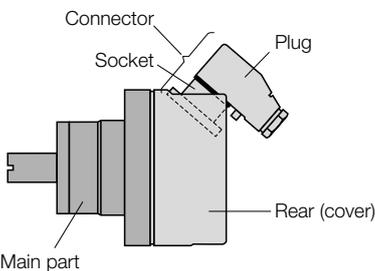


Fig. 1. Cable outlets towards the back

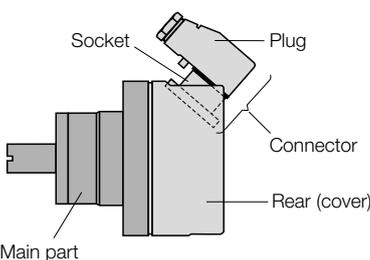


Fig. 2. Cable outlets towards the front

On units with **screw terminals** and **cable glands PG 11** (see Fig. 3) there are 4 screw terminals and a grounding terminal in the rear cover. The screw terminals accept gauges up to 1,5 mm<sup>2</sup> and are accessible after removing the cover.

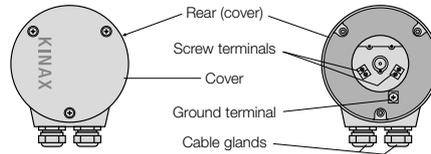


Fig. 3. Screw terminals / screwed cable gland

Mounting position:	Any
Fastening types:	Immediate fastening (Device without foot, without flange) Fastening with foot or flange
Weight:	Approx. 2.9 kg every 0.5 kg for foot or flange

### Regulations

Spurious radiation:	EN 61000-6-3
Immunity:	EN 61000-6-2
Test voltage:	2.2 kV <sub>eff</sub> , 50 Hz, 1 min. between power supply and housing or power supply and measuring output (DC/AC power supply, with electrical isolation) 500 V <sub>eff</sub> , 50 Hz, 1 min. All connections against housing (DC power supply, without electrical isolation)
Admissible common-mode voltage:	100 VAC, 50 Hz, CAT II
Impulse voltage withstand:	1 kV, 1.2/50 μs, 0.5 Ws
Housing protection:	IP 66 acc. to EN 60 529

### Environmental conditions

Climatic rating:	<u>Standard (NEx):</u> Temperature -25 ... +70 °C [-13 ... +158 °F] Rel. humidity ≤ 90 % non-condensing
	<u>Version with improved climatic rating</u> Temperature -40 to +70 °C [-40...158 °F] Annual mean relative humidity ≤ 95%
	<u>Ex version</u> Temperature -40 to +55 °C [-40...131 °F] at T6 resp. -40 to +70 °C [-40...158 °F] at T5 resp. -40 to +75 °C [-40...167 °F] at T4

# KINAX WT707

## Transmitter for angular position

Permissible vibration:

0...200 Hz,  
10 g continuous, 15 g for 2 h  
200...500 Hz,  
5 g continuous, 10 g for 2 h

Shock:

3 × 50 g every 10 impulses  
in all 3 axes

Permissible static  
load on the shaft:

Max. 1000 N (radial)  
Max. 500 N (axial)

The torque of the driving element should be selected so that it is sufficient for the resulting starting torque caused by the given axle loads and vibrations. We recommend decoupling the WT707 with the couplings available in our accessories range in order to increase the service life of the bearings. You will find our range of couplings in the "Position sensors/accessories" section of our website.

Transportation and  
storage temperature:

-40 ... +80 °C [-40 ... +176 °F]

### Operation in potentially explosive environments:

Gas explosion  
prevention:

Labeling: Ex ia IIC T6 Gb  
Conform to ATEX:  
standard: EN 60079-0:2012  
EN 60079-11:2012  
IECEX:  
IEC 60079-0:2011  
IEC 60079-11:2011-06

Type of protection: ia  
Temperature class: T6  
Group according to  
EN 60079-00:2012: II

### Dimensional drawing

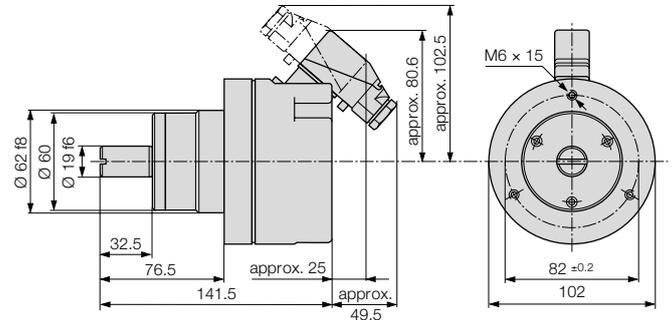


Fig. 4. KINAX WT 707 with plug connector.

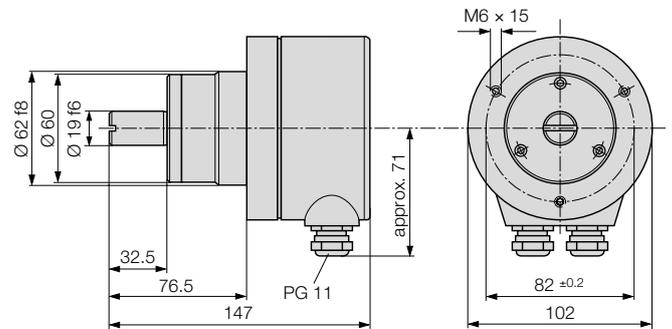


Fig. 5. KINAX WT 707 with screw terminals and cable glands.

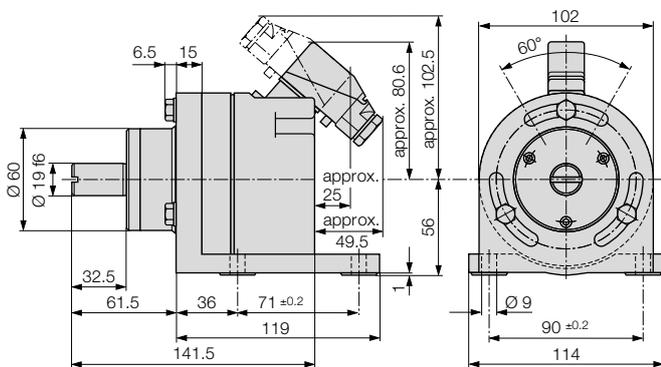


Fig. 6. KINAX WT 707 with plug connector and foot.

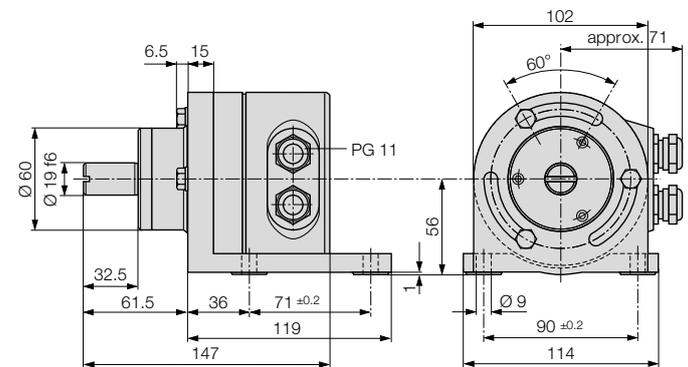


Fig. 7. KINAX WT 707 with screw terminals, cable glands and foot.

# KINAX WT707

## Transmitter for angular position

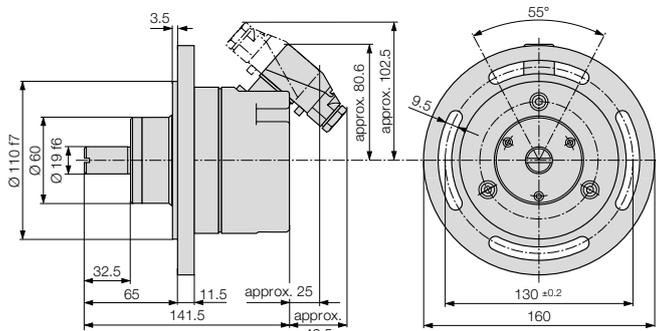


Fig. 12. KINAX WT 707 with plug connector and flange.

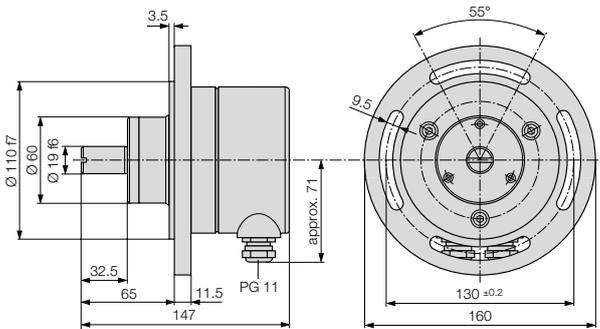


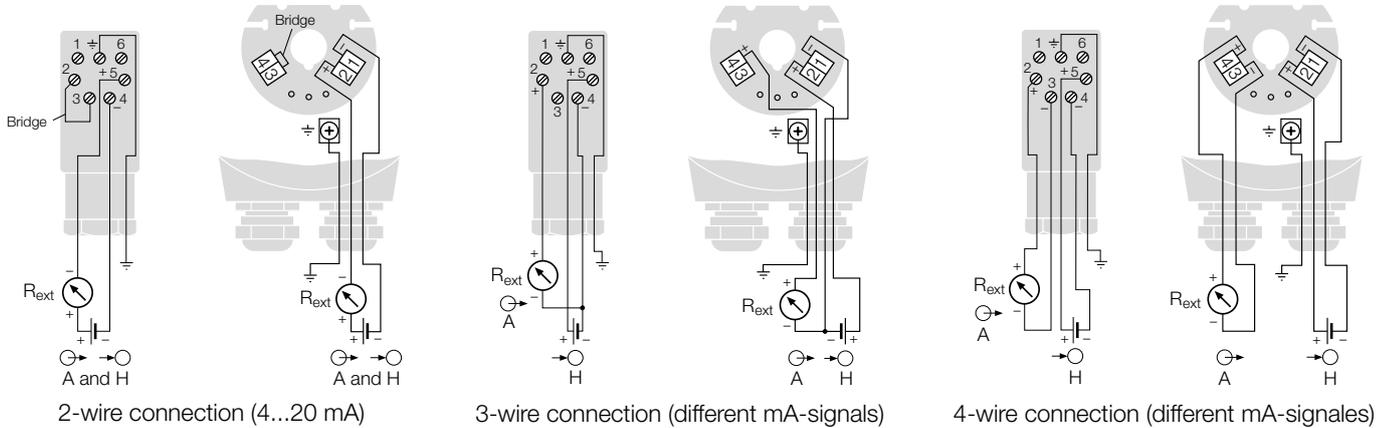
Fig. 13. KINAX WT 707 with screw terminals, cable glands and flange.

# KINAX WT707

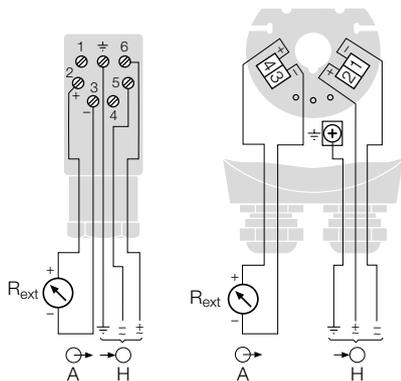
## Transmitter for angular position

### Electrical connections

2-, 3- or 4-wire connection without electrical isolation



4-wire connection with electrical isolation (different mA-signals)



- A = Measuring output ...  
... as 2-wire connection (4...20 mA, signal in output/powering circuit)  
... as 3- or 4-wire connection (different mA-signals)
- H = DC-power supply H = 12...33 V  
resp. H = 12...30 V with Ex-version
- R<sub>ext</sub> = External resistance

### Einstell-Elemente

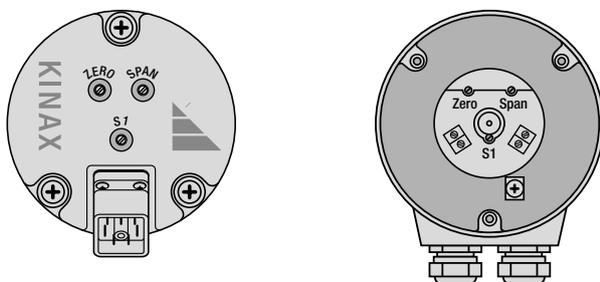


Fig 16. Position of settings  
ZERO = Potentiometer for zero point  
SPAN = Potentiometer for measuring range end value  
S1 = Switch for reversing direction of rotation for  $\angle \alpha > 150^\circ$ .

Transmitters with the ordering code 707 – ...D (see “Table 3: Specification and ordering information”) are designed for either a 2-wire connection with an output range of 4...20 mA or a 3- or 4-wire connection with an output range of 0...20 mA.

If, however, a transmitter be changed from one to the other (see “Electrical connections”), the beginning and end of the measuring range, ZERO and SPAN must be readjusted.

A switch is provided on angular transmitters with a measuring range  $> 150^\circ$  for reversing the direction of rotation. It is marked S1.

# KINAX WT707

## Transmitter for angular position

### Specification and ordering information

Description	Blocking code	No-go with blocking code	Order-Code
<b>KINAX WT707</b>	<b>Order-Code 707 - xxxx xxxx xxxx xx</b>		<b>707-</b>
<b>1. Version of the transmitter</b>			
Standard	A		1
ATEX EX II 2G Ex ia IIC T6 Gb	B		2
Sea water version	N		3
ATEX EX II 2G Ex ia IIC T6 Gb, sea water version	BN		7
IECEX Ex ia IIC T6 Gb	B		A
IECEX Ex ia IIC T6 Gb, sea water version	BN		B
<b>2. Sense of rotation</b>			
Calibrated for sense of rotation clockwise	D		1
Calibrated for sense of rotation counter-clockwise	D		2
For V-characteristic	E		3
Calibrated for both senses of rotation (for measuring ranges $\leq 90^\circ$ only)	M		4
Lines 1 and 2: Instruments with ranges $0 \dots \geq 5$ to $0 \dots \leq 150^\circ$ are usable in both senses of rotation. Instruments with ranges $0 \dots > 150^\circ$ to $0 \dots \leq 270^\circ$ can be changed to the other direction (Beginning and end of the measuring range must be readjusted).			
<b>3. Measuring range (measuring input)</b>			
0...10° angle			1
0...30° angle			2
0...60° angle			3
0...90° angle			4
0...180° angle			5
0...270° angle			6
Non-standard (0 to $\geq 5^\circ$ to 0 to $< 270^\circ$ ) [angle]			9
V-characteristic [±angle]			A
Line 9: Non standard $0 \dots \geq 5$ to $0 \dots < 270$ Calibrated for both senses of rotation, non standard range $0 \dots \geq 5$ to $0 \dots < 90^\circ$  Line A: Specify start $M_A$ and end $M_E$ of measuring range! Observe the limits for ( $M_A [\pm \text{°}] \geq 10$ and $M_E [\pm \text{°}] \leq 150$ ) and give both angles separated by an oblique stroke, e.g. $[\pm \text{°}] 15 / 90!$			

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Desription	Blocking code	No-go with blocking code	Order-Code
<b>KINAX WT707</b>	<b>Order-Code 707 - xxxx xxxx xxxx xx</b>		<b>707-</b>
<b>4. Output signal (measuring output) / Connection version</b>			
0...1 mA, 3- or (4)-wire connection			A
0...5 mA, 3- or (4)-wire connection			B
0...10 mA, 3- or (4)-wire connection			C
4...20 mA, 2-wire connection or 0...20 mA, 3- or (4)-wire connection (adjustable with potentiometer)	H		D
4...20 mA, 3- or (4)-wire connection			E
0...20 mA, 4-wire connection (only possible with AC/DC-power supply (DC-, AC-power pack))	L		F
Non standard, 3- or (4)-wire connection 0...>1.00 mA to 0... <20 mA [mA]			Z
Lines A to Z: R <sub>ext</sub> max. see Section "Technical data", 4-wire connection, <b>with</b> electric isolation only possible with DC/AC power supply (AC/DC power pack). 2-, 3- or 4-wire connection, <b>without</b> electric isolation only possible with DC power supply.			
<b>5. Power supply</b>			
24...60 VAC/DC, with electric isolation	F	BH	1
85...230 VAC/DC, with electric isolation	F	BH	2
12...33 VDC, without electric isolation	K	BL	A
12...30 VDC (Ex), without electric isolation	K	AL	B
Lines 1 and 2: Not possible for DC/AC power supply at output signal "Feature 4, line D"!			
<b>6. Mounting mode</b>			
Without foot/flange			0
With foot (mounted)			1
With flange (mounted)			2
<b>7. Material of transmitter rear cover / Routing of connection cable</b>			
Plastic / connector less cable plug, socket mounted for cable routed to the rear		F	1
Plastic / connector less cable plug, socket mounted for cable routed to the front		F	2
Plastic / connector with cable plug, socket mounted for cable routed to the rear		F	3
Plastic / connector with cable plug, socket mounted for cable routed to the front		F	4
Metal / 2 glands PG11 Recommended for AC/DC power supply, 4-wire connection with electric isolation			5
<b>8. Special features</b>			
Without (order code complete)	Y	O	0
With			1
<b>9. Settings (span adjustment)</b>			
Without extended setting range			0
Extended setting range + 5 % /-60 %		Y	A
Restriction: for angle $\geq 60^\circ$ , supplementary error 0.2 %			
<b>10. Improved climatic rating</b>			
Without improved climatic rating			0
Temperature -40 to +70 °C, annual mean relative humidity $\leq 90$ %		BY	H
With Ex version, temperature -40 to +55 °C at T6 resp. -40 to +70 °C at T5 resp. -40 to +75 °C at T4, annual mean relative humidity $\leq 95$ %		AY	J
<b>11. Marine version</b>			

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Description	Blocking code	No-go with blocking code	Order-Code
<b>KINAX WT707</b>	<b>Order-Code 707 - xxxx xxxx xxxx xx</b>		<b>707-</b>
Without		Y	0
Maritime execution (formerly Germ. Lloyd)		Y	L
<b>12. Increased vibration resistance</b>			
Standard	G	FYO	0
Version with DC power supply, without electric isolation	G	KYO	M
Version with AC/DC power supply (AC/DC power pack), with electric isolation			N
0 ... 200 Hz, <b>25 g</b> continuous, <b>30 g</b> for 2 h			
200 ... 500 Hz, <b>15 g</b> continuous			
<b>13. Additional gear 2 : 1 to 144 : 1</b>			
Without gear			0
<b>14. Additional gear 150: 1 to 1600 : 1</b>			
Without gear			0
<b>15. Test Protocole</b>			
Without protocole			0
Protocole in German			D
Protocole in English			E

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### Accessories

Article	Article-Nr.
Mounting foot	997 182
Mounting flange	997 190
Contact box (without plug)	988 470
Cap-Set (for back)	997 207
Different bellow couplings	xxx xxx
Different helical and cross-slotted coupling	xxx xxx
Different spring washer coupling	xxx xxx

### Approvals

Approval	Identification
 Explosion protection according to IECEx	Ex ia IIC T6 Gb
 Explosion protection according to ATEX	Ex II 2G Ex ia IIC T6 Gb

### Scope of delivery

- 1 Transmitter for angular position KINAX WT707 (according to Order)
- 1 Operating instructions in German, French, English and Italian



Camille Bauer Metrawatt AG  
Aargauerstrasse 7  
CH-5610 Wohlen / Switzerland  
Phone: +41 56 618 21 11  
info@camillebauer.com  
www.camillebauer.com