

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... ≥ 5 to 0... $\leq 270^\circ$ (without gear)
 0... $\geq 10^\circ$ to 0...1600 turns (with gear)
 Preferred ranges
 0...10, 0...30, 0...60, 0...90,
 0...180 or 0...270°

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

Starting torque: 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

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Residual ripple in output current: < 0.3 % p.p.
 Response time: < 5 ms
 External resistance: $R_{\text{ext max.}} [\text{k}\Omega] = \frac{12 \text{ V}}{I_A [\text{mA}]}$
 (load)

(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_A = Output signal end value

Accuracy data

Basic accuracy: $\leq 0.5 \%$ for ranges $0 \dots \leq 150^\circ$
 $\leq 1.5 \%$ for ranges from $0 \dots > 150^\circ$ to $0 \dots 270^\circ$

Reproducibility: < 0.2 %

Influence of temperature output current (-40...+85 °C): $\pm 0.2 \%$ / 10 K
 [-40 ... +167 °F]

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.

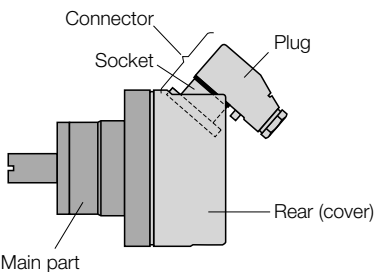


Fig. 1. Cable outlets towards the back

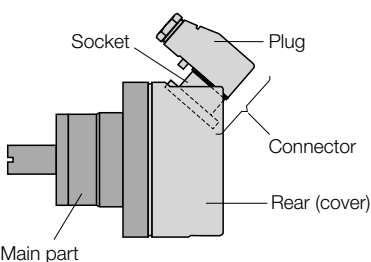


Fig. 2. Cable outlets towards the front

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 mm² and are accessible after removing the cover.

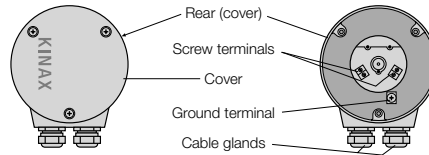


Fig. 3. Screw terminals / screwed cable gland

Mounting position: Any
 Fastening types: Immediate fastening
 (Device without foot, without flange)
 Fastening with foot or flange

Weight: Approx. 2.9 kg (without additional gear)
 Approx 3.9 kg (with additional gear)
 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_{eff}, 50 Hz, 1 min.
 between power supply and housing or
 power supply and measuring output
 (DC/AC power supply, with electrical
 isolation)
 500 V_{eff}, 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: Standard (NEx):
 Temperature -25 ... +70 °C
 [-13 ... +158 °F]
 Rel. humidity $\leq 90 \%$ non-condensing

Version with improved climatic rating
 Temperature -40 to +70 °C
 [-40...158 °F]
 Annual mean relative humidity $\leq 95 \%$

Ex version
 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

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Permissible vibration: (without addit. gear):	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) If subjected to vibration the shaft load should be as low as possible to ensure optimum life of the bearing
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 standard: ATEX: 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

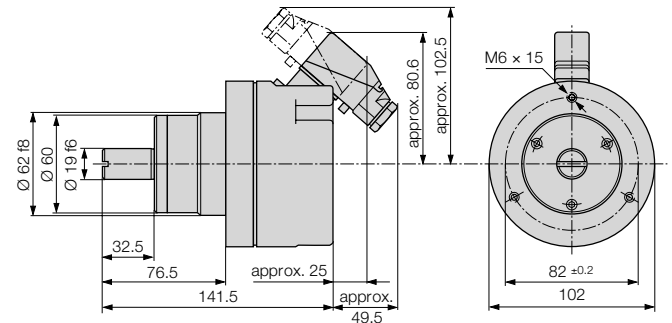


Fig. 4. KINAX WT 707 with plug connector.

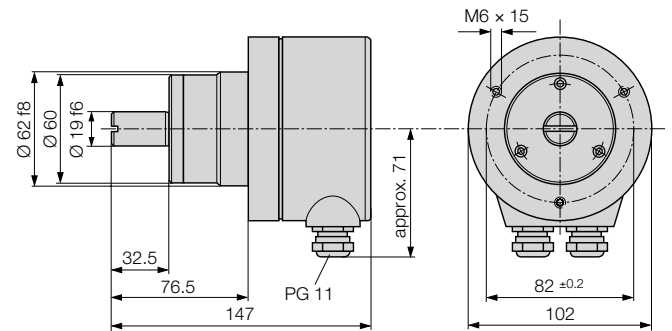


Fig. 5. KINAX WT 707 with screw terminals and cable glands.

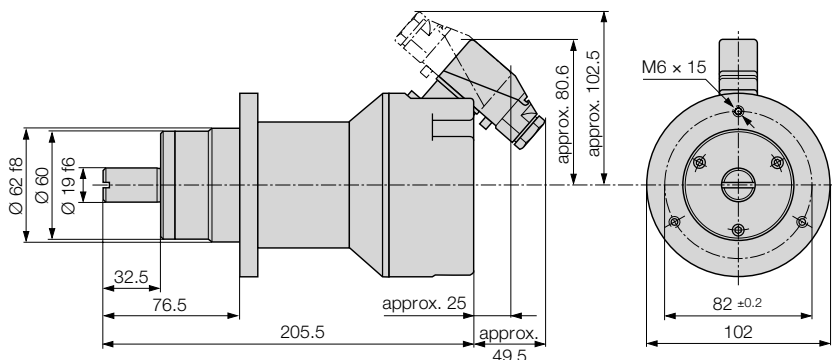


Fig. 6. KINAX WT 707 with additional gear and plug connector.

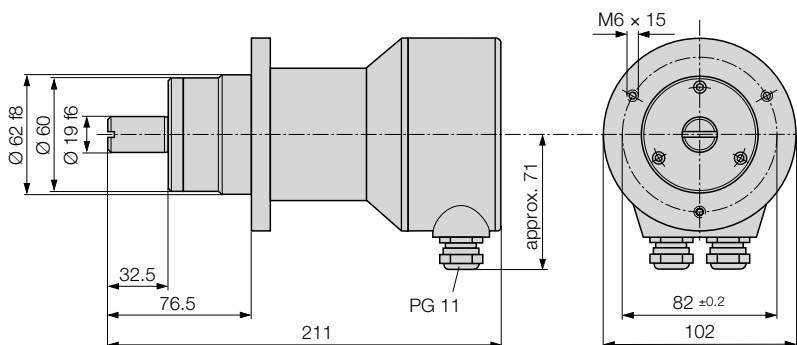


Fig. 7. KINAX WT 707 with additional gear, screw terminals and cable glands.

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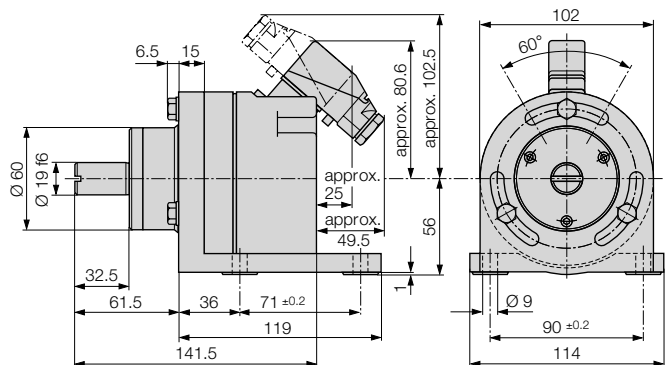


Fig. 8. KINAX WT 707 with plug connector and foot.

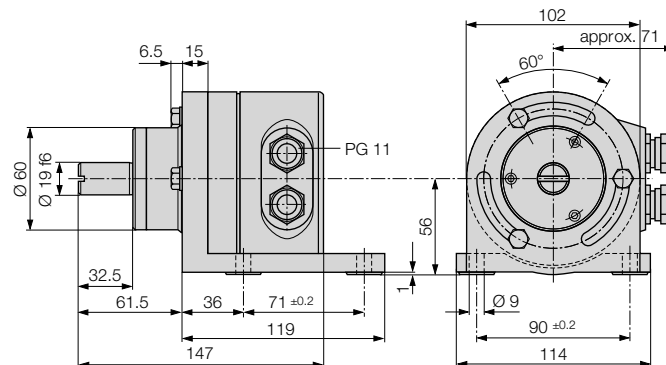


Fig. 9. KINAX WT 707 with screw terminals, cable glands and foot.

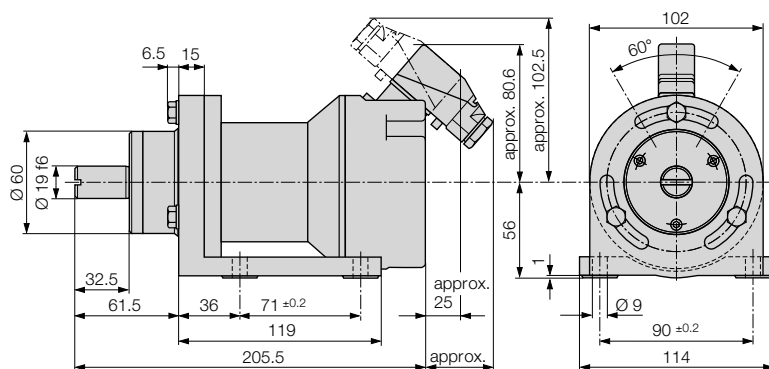


Fig. 10. KINAX WT 707 with additional gear, plug connector and foot.

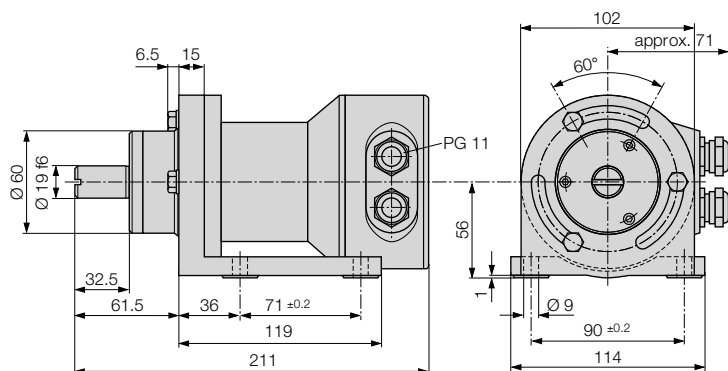


Fig. 11. KINAX WT 707 with additional gear, screw terminals, cable glands and foot.

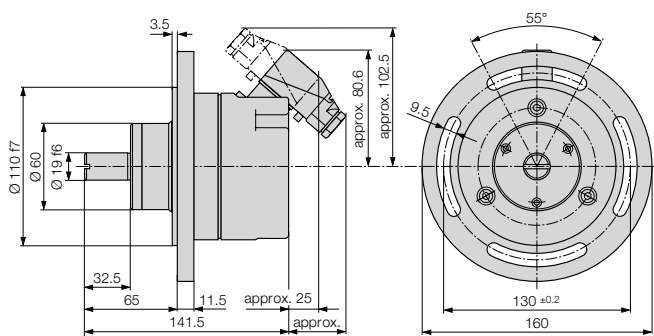


Fig. 12. KINAX WT 707 with plug connector and flange.

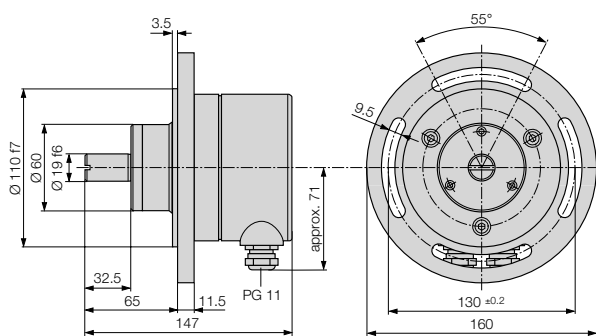


Fig. 13. KINAX WT 707 with screw terminals, cable glands and flange.

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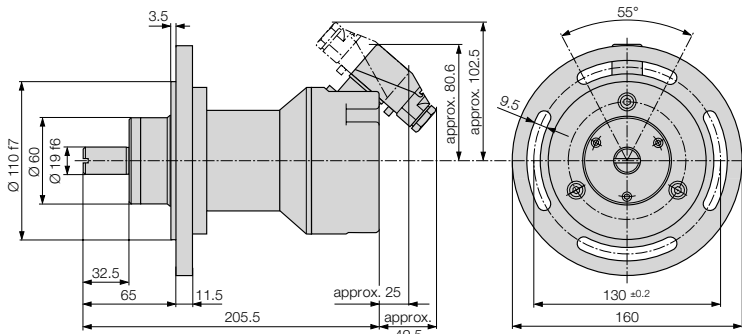


Fig. 14. KINAX WT 707 with additional gear, plug connector and flange.

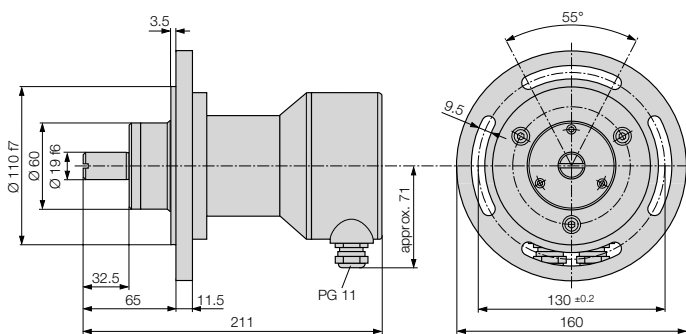
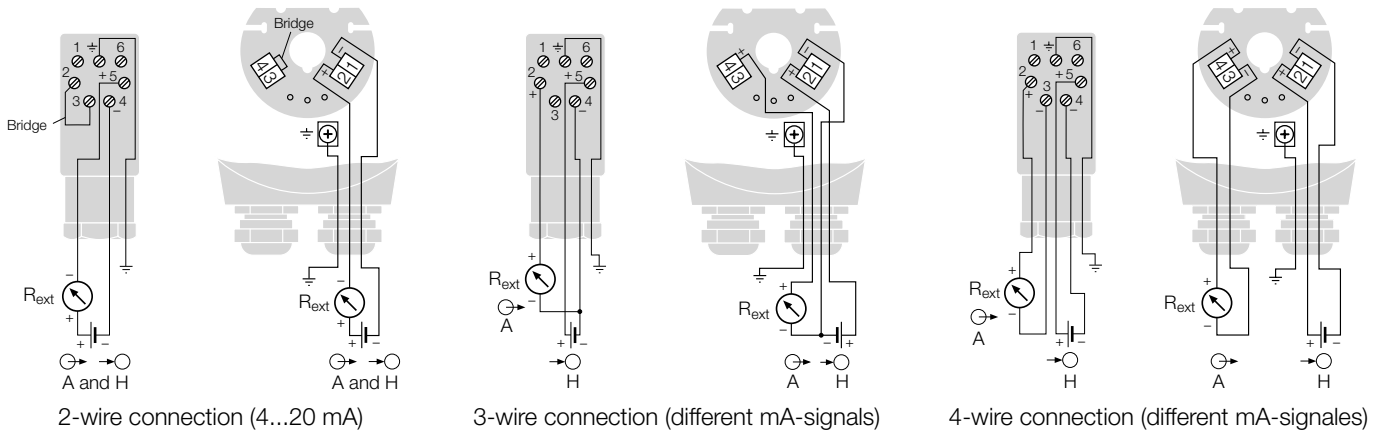


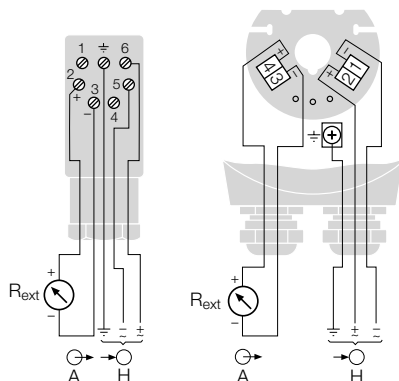
Fig. 15. KINAX WT 707 with additional gear, screw terminals, cable glands and flange.

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_{ext} = External resistance

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Einstell-Elemente

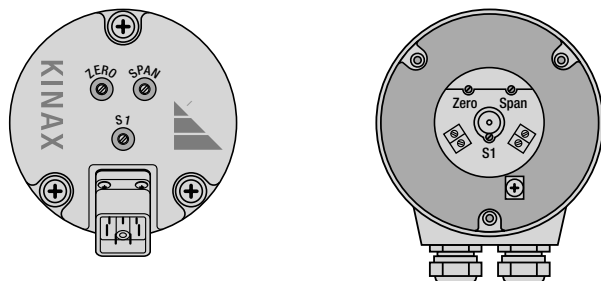


Fig 16. Position of settings

ZERO = Potentiometer for zero point

SPAN = Potentiometer for measuring range end value

S1 = Switch for reversing direction of rotation for $\alpha > 150^\circ$.

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.

Specification and ordering information

Description	Blocking code	No-go with blocking code	Order-Code
KINAX WT707	Order-Code 707 - xxxx xxxx xxxx xx		707-
1. Version of the transmitter			
Standard	A		1
ATEX EX II 2G Ex ia IIC T6 Gb	B		2
Sea water version	N		3
Sea water version with gear	O		4
ATEX EX II 2G Ex ia IIC T6 Gb, sea water version	BN		7
ATEX EX II 2G Ex ia IIC T6 Gb, sea water version with gear	BO		8
IECEX Ex ia IIC T6 Gb	B		A
IECEX Ex ia IIC T6 Gb, sea water version	BN		B
IECEX Ex ia IIC T6 Gb, sea water version with gear	BO		C
2. Sense of rotation			
Calibrated for sense of rotation clockwise	D		1
Calibrated for sense of rotation counter-clockwise	D		2
For V-characteristic (not possible for instruments with additional gear).	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). Sense of rotation for transmitters with additional gear see “Feature 13 and 14”.			
3. Measuring range (measuring input)			
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

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Desription	Blocking code	No-go with blocking code	Order-Code
KINAX WT707	Order-Code 707 - xxxx xxxx xxxx xx		707-
Line 9: Non standard 0... ≥ 5 to 0... < 270 Calibrated for both senses of rotation, non standard range 0... ≥ 5 to 0... $< 90^\circ$ Line A: Specify start M_A and end M_E of measuring range! Observe the limits for ($M_A [\pm \text{ }^\circ] \geq 10$ and $M_E [\pm \text{ }^\circ] \leq 150$) and give both angles separated by an oblique stroke, e.g. $[\pm \text{ }^\circ] 15 / 90!$			
4. Output signal (measuring output) / Connection version			
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_{ext} max. see Section "Technical data", 4-wire connection, with electric isolation only possible with DC/AC power supply (AC/DC power pack). 2-, 3- or 4-wire connection, without electric isolation only possible with DC power supply.			
5. Power supply			
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"!			
6. Mounting mode			
Without foot/flange			0
With foot (mounted)			1
With flange (mounted)			2
7. Material of transmitter rear cover / Routing of connection cable			
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
8. Special features			
Without (order code complete)	Y	O	0
With			1
9. Settings (span adjustment)			
Without extended setting range			0
Extended setting range + 5 % /-60 %		Y	A
Restriction: for angle $\geq 60^\circ$, supplementary error 0.2 % also possible on versions with additional gear			

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Description	Blocking code	No-go with blocking code	Order-Code
KINAX WT707 Order-Code 707 - xxxx xxxx xxxx xx			707-
10. Improved climatic rating			
Without improved climatic rating			0
Temperature -40 to +70 °C, annual mean relative humidity ≤ 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 ≤ 95 %		AY	J
11. Marine version			
Without		Y	0
Maritime execution (formerly Germ. Lloyd)		Y	L
12. Increased vibration resistance			
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, 25 g continuous, 30 g for 2 h 200 ... 500 Hz, 15 g continuous Not possible with additional gear!			
13. Additional gear 2 : 1 to 144 : 1			
Choose the full scale value of KINAX WT 707 (without gear) ME ≤ 150°. Limit of error: ≤ 0,5 % for ME ≤ 150° and ≤ 1,5 % for ME ≥ 150°. Determine the required reduction ratio to the following formula: $i = \frac{n \cdot 360 [^\circ]}{ME [^\circ]} \quad i = \text{Reduction ratio}$ <p>n = No. of turns (end of range of object being measured)</p> ME = Full scale value of KINAX WT 707 (without gear). If "ME" is higher but max. ≤ 150°) and "i" is as small as possible the the hysteresis error will be smaller. Example of calculation of the error of the hysteresis; known are: n = 4.1 rotations, i = 10, ME = 147.6° and j = approx. 1.0° j = gear backlash $F \% = \frac{100\% \cdot j \cdot i}{n \cdot 360^\circ} = \frac{100 \cdot 1.0 \cdot 10}{4.1 \cdot 360} = \text{approx. } 0.68\% \text{ error of the hysteresis}$ Gear backlash approx. 1.0° for 2 ≤ i ≤ 12.5 approx. 1.5° for 12.5 < i ≤ 60 approx. 2.0° for 60 < i ≤ 1600 Without gear 2 : 1 - 144 : 1			0
Transformation 2 : 1	J	EGYN	1
Transformation 4 : 1	J	EGYN	2
Transformation 5 : 1	J	EGYN	3
Transformation 6 : 1	J	EGYN	4
Transformation 8 : 1	J	EGYN	5
Transformation 10 : 1	J	EGYN	A
Transformation 12 : 1	J	EGYN	B
Transformation 12.5 : 1	J	EGYN	C
Transformation 15 : 1	J	EGYN	D
Transformation 16 : 1	J	EGYN	E
Transformation 20 : 1	J	EGYN	F
Transformation 22 : 1	J	EGYN	G

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Desription	Blocking code	No-go with blocking code	Order-Code
KINAX WT707	Order-Code 707 - xxxx xxxx xxxx xx		707-
Transformation 24 : 1	J	EGYN	H
Transformation 25 : 1	J	EGYN	J
Transformation 30 : 1	J	EGYN	K
Transformation 32 : 1	J	EGYN	L
Transformation 36 : 1	J	EGYN	M
Transformation 40 : 1	J	EGYN	N
Transformation 50 : 1	J	EGYN	O
Transformation 60 : 1	J	EGYN	P
Transformation 64 : 1	J	EGYN	Q
Transformation 72 : 1	J	EGYN	R
Transformation 75 : 1	J	EGYN	S
Transformation 80 : 1	J	EGYN	T
Transformation 100 : 1	J	EGYN	U
Transformation 120 : 1	J	EGYN	V
Transformation 144 : 1	J	EGYN	W
14. Additional gear 150: 1 to 1600 : 1			
Without gear 150 : 1 - 1600 : 1			0
Transformation 150 : 1		EGJYN	1
Transformation 160 : 1		EGJYN	2
Transformation 180 : 1		EGJYN	3
Transformation 200 : 1		EGJYN	4
Transformation 240 : 1		EGJYN	A
Transformation 250 : 1		EGJYN	B
Transformation 300 : 1		EGJYN	C
Transformation 330 : 1		EGJYN	D
Transformation 360 : 1		EGJYN	E
Transformation 375 : 1		EGJYN	F
Transformation 400 : 1		EGJYN	G
Transformation 450 : 1		EGJYN	H
Transformation 480 : 1		EGJYN	J
Transformation 500 : 1		EGJYN	K
Transformation 550 : 1		EGJYN	L
Transformation 600 : 1		EGJYN	M
Transformation 660 : 1		EGJYN	N
Transformation 720 : 1		EGJYN	O
Transformation 750 : 1		EGJYN	P
Transformation 800 : 1		EGJYN	Q
Transformation 880 : 1		EGJYN	R
Transformation 900 : 1		EGJYN	S
Transformation 1000 : 1		EGJYN	T
Transformation 1024 : 1		EGJYN	U
Transformation 1200 : 1		EGJYN	V
Transformation 1600 : 1		EGJYN	W
15. Test Protocole			
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

You find power supply units for KINAX WT707 in our process instrumentation product range.



SINEAX B812
1-channel power supply unit

SINEAX B811
1-channel power supply unit

to feed 2-wire transmitters



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



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