Conveyor-belt monitor 6KB4111

Operation instruction

Fig. 1: Conveyor belt 6KB4111

Discription
Application

The conveyor-belt monitor 6KB4111 (fig.1) is a speed-dependent transmitter and is suitable for both directions of rotation.

The unit can be used to monitor conveyor belts. It stops the plant if the belt slip is excessive, the belt is blocked, breaks, or the drive motor speed falls below a certain value. The unit can also be used to monitor the correct function of a conveyor-belt. It switches-in a feeder belt when the output belt has attained a certain speed.

The conveyor-belt monitor has a free shaft end to which any drive element can be attached, which must be designded to match the rated speed.

A plastic roller with a diameter of 100mm can also be supplied to order (refer to accessories).

For details on the speed controller see data sheet 6KB4111.

Construction

The conveyor-belt monitor 6KB4111consists of the rotation speed monitor Type 6KB4110/ALNI, which is flanged onto a pedestal bearing, through which a two-bearing shaft is fed. The shaft end can be driven through various drive elements, e.g. by a belt roller.

Mode of functioning

The external rotor of the 6KB4111 is driven by the controlling conveyor belt. During rotation a stepping motor in the speed controller generates the operating voltage for analysis switching and signal voltages, from which the turning direction is determined.

The switching speed can be differently set both directions of rotation.
To this end, there are in each case 2 encoding switches, which can be set by means of a small screwdriver. When the set speed is reached, relay 1 with anti-clockwise rotation and relay 2 with clockwise rotation is switched.

Assembly

Conveyour-belt monitor 6KB4111: Install the pedestal bearing in such a way that the belt roller lies firmly upon the conveyor belt, application pressure should be approx. 30 N. The mounting position should be located, as far as possible, near a belt support roller, so preventing the belt roller of the conveyor-belt monitor from being overloaded by the pressure of the belt droop. A dancer arrangement should be used if this is not possible.

A PG16 threaded hole for a compression gland is to hand for cable entry.

Switching capacity

The switching capacity of the un it is determined by the contacts of the **bistable** relay. See the table below for the admissible maximum values for voltage, current and output (with resistive load).

Max. voltage	400V AC	240V DC
Max. current	5A	5A
Max. output	1250 VA	150 W

Terminals

The terminals are suited for cables up to 2.5mm². In order to insert the cables the cage clamp must be opened by the actuating element supplied. Alternatively, the cage clamp can be opened by pressing firmly with a suitable screwdriver (front or rear).

Warning

The terminals of the unit may be live even when the shaft is at a standstill. Before opening the unit these must be isolated at all costs. Penetration of moisture into the opened unit must be avoided.

Technical data of the rotation speed monitor 6KB4110/ALNI

Supply voltage:	is generated internally	
	Nominal speed range:	60 to 6,000 rpm
	Relay contacts:	2 changeover contacts for anti-clockwise and clockwise rotation
	Switching capacity:	Max. 400V AC, 5A, 1250 VA Max. 240V DC, 5A, 150 W (with resistive load)

Mechanical data of the rotation speed monitor BW-ALNI

Adaptation:	Pin coupling, with rubber-bushed coupling
Cable entry:	PG16, for cable of 7 to 12 mm diam.
Casing material:	Glass-fibre reinforced plastic, resistant against oil, grease
Dimensions of the casing:	See dimensioned drawing
Diameter of the flange:	120 mm
Axle bearing:	2 ball bearings
Ambient temperatures:	
Ambient operating temperature	-25 °C .. +70 °C
Storage temperature	-40 °C .. +80 °C
Transport temperature	-40 °C .. +80 °C
Protection category	IP 65

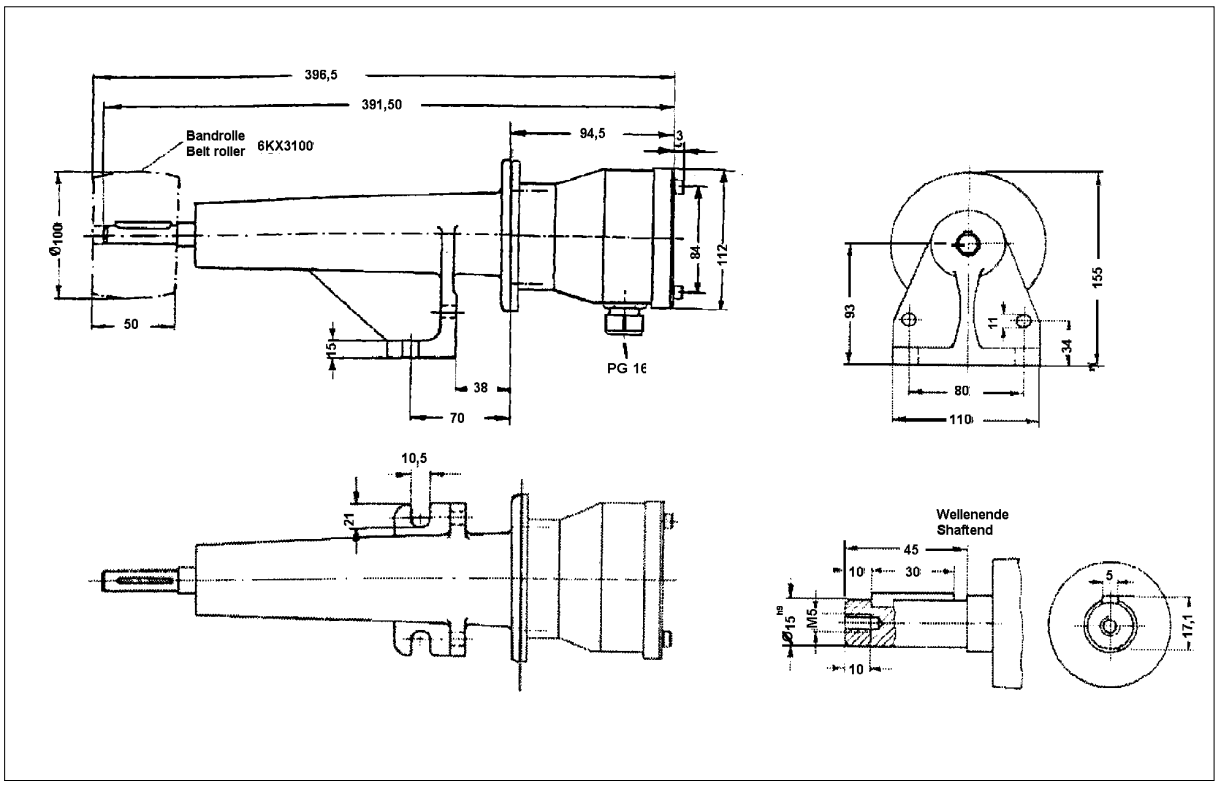
Ordering data

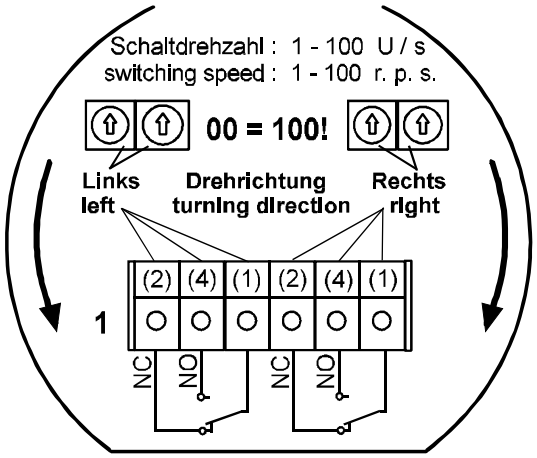
Rotation speed monitor 6KB4110/ALNI
Pin coupling for 6KB4111
pressure rollers diam. 100 mm
Rubber-bushed coupling (spare part)

Tests and qualification of the speed controller 6KB4110/ALNI

Moisture load:	DIN IEC 68-2-30		
		Lower temperature:	+25°C / 97% rel. humidity
		Upper temperature:	+55°C / 93% rel. humidity
		Test duration 6 days	
Vibratory stresses:		DIN EN 60 068 -2 -6	
		Frequency:	10 - 150 Hz
		Amplitude:	0.35 mm
		and/or acceleration:	5g (20 cycles per axle)
Shock load:	DIN EN 60 068 -2 - 27		
		Shock form:	semi-sinusoidal
		Amplitude:	30g
		Shock duration:	18 ms (3 shocks per direction)
Endurance shock load:	DIN EN 60 068 -2 - 29		
		Shock form:	semi-sinusoidal
		Amplitude:	25g
		Shock duration:	6 ms (1000 shocks per direction)
Insulation tests:		DIN VDE 0435 part 303	
		Test value:	2 kV AC
Interference:	RF, mains-borne:	DIN EN 50141	10 V
	RF fields:	DIN ENV 50140	10 V/m
	Discharge:	DIN EN 61 000-4-8	
		Contact discharge	4 kV
		Clearance	8 kV
	Burst:	DIN EN 61 000-4-4	
		Relay contacts	2 kV
	Impulse voltage:	DIN EN 61 000-4-5	
		asymmetrical	4 kV
		symmetrical	2 kV
Emission testing:	RF emission:	DIN EN 55 022	Limit-class B

Dimensioned drawing - Conveyour-belt monitor 6KB4111 incl. speed controller 6KB4110/ALNI





Function of the encoding switch and assignment of the terminals

Example:
Switching speed
at 2340 rpm, clockwise rotation =
Switch position 3 : 9,
of the right pair of switches

Setting of the encoding switch 6KB4110/ALNI

Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm
0 : 1	1	60	2 : 1	21	1260	4 : 1	41	2460	6 : 1	61	3660	8 : 1	81	4860
0 : 2	2	120	2 : 2	22	1320	4 : 2	42	2520	6 : 2	62	3720	8 : 2	82	4920
0 : 3	3	180	2 : 3	23	1380	4 : 3	43	2580	6 : 3	63	3780	8 : 3	83	4980
0 : 4	4	240	2 : 4	24	1440	4 : 4	44	2640	6 : 4	64	3840	8 : 4	84	5040
0 : 5	5	300	2 : 5	25	1500	4 : 5	45	2700	6 : 5	65	3900	8 : 5	85	5100
0 : 6	6	360	2 : 6	26	1560	4 : 6	46	2760	6 : 6	66	3960	8 : 6	86	5160
0 : 7	7	420	2 : 7	27	1620	4 : 7	47	2820	6 : 7	67	4020	8 : 7	87	5220
0 : 8	8	480	2 : 8	28	1680	4 : 8	48	2880	6 : 8	68	4080	8 : 8	88	5280
0 : 9	9	540	2 : 9	29	1740	4 : 9	49	2940	6 : 9	69	4140	8 : 9	89	5340
1 : 0	10	600	3 : 0	30	1800	5 : 0	50	3000	7 : 0	70	4200	9 : 0	90	5400
1 : 1	11	660	3 : 1	31	1860	5 : 1	51	3060	7 : 1	71	4260	9 : 1	91	5460
1 : 2	12	720	3 : 2	32	1920	5 : 2	52	3120	7 : 2	72	4320	9 : 2	92	5520
1 : 3	13	780	3 : 3	33	1980	5 : 3	53	3180	7 : 3	73	4380	9 : 3	93	5580
1 : 4	14	840	3 : 4	34	2040	5 : 4	54	3240	7 : 4	74	4440	9 : 4	94	5640
1 : 5	15	900	3 : 5	35	2100	5 : 5	55	3300	7 : 5	75	4500	9 : 5	95	5700
1 : 6	16	960	3 : 6	36	2160	5 : 6	56	3360	7 : 6	76	4560	9 : 6	96	5760
1 : 7	17	1020	3 : 7	37	2220	5 : 7	57	3420	7 : 7	77	4620	9 : 7	97	5820
1 : 8	18	1080	3 : 8	38	2280	5 : 8	58	3480	7 : 8	78	4680	9 : 8	98	5880
1 : 9	19	1140	3 : 9	39	2340	5 : 9	59	3540	7 : 9	79	4740	9 : 9	99	5940
2 : 0	20	1200	4 : 0	40	2400	6 : 0	60	3600	8 : 0	80	4800	0 : 0	100	6000

Operation

Setting: Conveyor-belt monitor 6KB4111

The desired speed of the conveyor-belt monitor can be freely set in accordance with the table above.

With due regard to the diameter d (m) of the drive element used the following relationship exists between the velocity v (m/s) of the conveyor belt and the response time $n_a(min^{-1})$ of the conveyor-belt monitor:

$$v = \frac{d \cdot 3{,}14159 \cdot n_a}{60} \quad (m/s)$$

With a response time of 600 min^{-1} the result for the belt control element with a drive roller of 0.1m in diameter is a belt speed of:

$$v = \frac{0{,}1 \cdot 3{,}14159 \cdot 600}{60} = 3{,}141 \quad (m/s)$$

Hence for clockwise rotation the switch position 1 : 0 of the right pair of switches.

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