MULTITURN SHAFT ENCODER Model CK 105
absolute/electro-optical

- For the conversion of long range displacements into digital signals
- Resolution up to 1024 counts per 360°
- Number of revolutions up to 1024
- Total capacity up to 2^{20} = 1,048,576 counts
- Output codes: Gray, Binary or BCD
- Heavy duty configuration

TWK

Constructional features

Anodized aluminium housing – Stainless steel shaft (10 mm dia) – Sealed ball bearings – Multi-stage code gear – Sealed connector exit – Plastic code discs – Gallium-Arsenide-diodes – Phototransistors followed by comparator and trigger – Disc code format: unambiguous Gray or Gray-Excess – Internal transcoder supplies Binary or BCD-output – Code direction (upward or downward counting) at option.

Functional features

The code disc of the first stage is directly fixed to the input shaft. It can be provided with more than 20 different numbers of counts defining the resolution (counts per 360°) as per table page 2. The first code disc is followed by a multi-stage gear comprising one code disc each stage. This allows to accept up to 1024 revolutions of the input shaft. When using a Gray or Binary output code the usable capacity is 1024 counts/360° x 1024 revolutions = 1.048.576 counts $\cong$ 20 Bits.
When using a BCD output code the total capacity is limited to 100.000 counts owing to the maximum number of 20 output channels which allow for 5 decades. For further details see table page 2.

Mechanical specification

- Slewing speed: 3000 rpm max.
- Starting torque: $\leq$ 5 Ncm
- Shaft load max.: 250N radial, 200N axial
- Useful life of bearings: 10^9 rev. at max. load and max. speed
- Operating temperature: – 5°C to + 50°C
- Storage temperature: – 25°C to + 70°C
- Weight: 2,2 kg
- Environmental protection: IP 65 (dust and water)
- Connector type: DB 25 with special sealed case (IP 65)
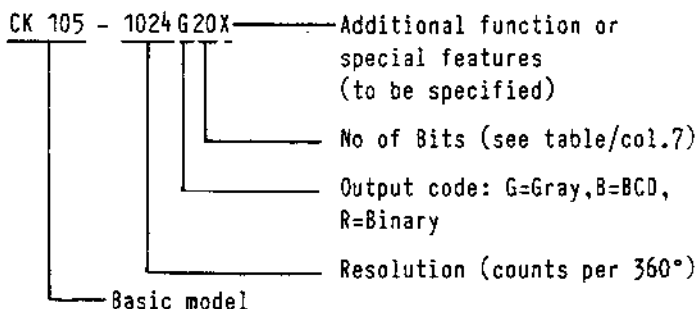
Electrical specification

- Light sources: GaAs-diodes
- Signal conditioning: Phototransistor-comparator-trigger/memory-transcoder
- Output circuitry: Open collector, positive logic (TCA 971) Umax=24 V, Imax=50 mA
- Output level: log "1"$\cong$U, log "0" $\leq$ 0,4 V
- Supply voltage: 12 to 24 VDC
- Current requirements: 200 mA (Gray and Binary) 350 mA (BCD)
- Code direction: Upward count when turning CCW, can be inverted by external strap
- Readout frequency: 8 kHz max.
- Latch (output signal memory) "L": Available for BCD and Binary output only.

Additional functions (optional)

- Enable input for use with bus operation
- Push-pull output circuitry
- Heating (thermostatic controlled) to extend operating temperature to – 20°C and to avoid water condensation due to extreme temperature variations
- Parity-Bit
- Zero point indication by LED

Note: The number of additional functions is limited by the 25-contact connector.

Ordering code

CK 105 – 1024 G 20 X ———— Additional function or special features (to be specified)

——— No of Bits (see table/col.7)

——— Output code: G=Gray, B=BCD, R=Binary

——— Resolution (counts per 360°)

——— Basic model

Available resolutions and revolutions

| Resolution counts/360°	Output code	Revolutions usable	Revolutions not usable	Revolutions total	Total capacity counts	Bits
1.	2.	3.	4.	5.	6.	7.
1024	Gray or Binär	1024	0	2^{10}	1.048.576	20
512	"	1024	0	2^{10}	524.288	19
256	"	1024	0	2^{10}	262.144	18
128	"	1024	0	2^{10}	131.072	17
64	"	1024	0	2^{10}	65.536	16
32	"	1024	0	2^{10}	32.768	15
16	"	1024	0	2^{10}	16.384	14
1000	BCD	100	24	2^{7}	100.000	20
800	"	125	3	2^{7}	100.000	20
600	"	166⅔	89⅓	2^{8}	100.000	20
500	"	200	56	2^{8}	100.000	20
400	"	250	6	2^{8}	100.000	20
300	"	256	0	2^{8}	76.800	19
250	"	400	112	2^{9}	100.000	20
200	"	500	12	2^{9}	100.000	20
100	"	1000	24	2^{10}	100.000	20
80	"	256	0	2^{8}	20.480	18
60	"	256	0	2^{8}	15.360	17
50	"	1024	0	2^{10}	51.200	19
40	"	512	0	2^{9}	20.480	18
30	"	256	0	2^{8}	7.680	15
20	"	1024	0	2^{10}	20.480	18
10	"	1024	0	2^{10}	10.240	17

Notes referring to above columns

1: Resolution of the first code disc which is directly fixed to the input shaft

2: All discs are formated to the Gray or Gray Excess code to ensure complete unambiguity. The signals are memorized and then transcoded into Binary or BCD if required.

3: Within the range of usable revolutions the output signals correspond to the actual shaft position.

4: After having passed the total number of the "usable" revolutions of column 3 the signal will show permanently the highest value until the last "non-usable" revolution is passed. It will now jump to zero and then go up again.

5: This column shows the total of columns 3 and 4.

6: The total capacity is the result of the resolution (column 1) and of the number of usable revolutions (column 3).

7: The number of Bits is identical to the number of output channels. It is included in the ordering code.

Resolutions up to 314 counts/360° other than those shown can be provided when choosing Model CK 106/data sheet 21 108EA.

Zero-point adjustment

In order to adjust the zero-point when the encoder is fixed and coupled to its driving shaft the hex socket head screw at the rear cover is to be retracted. A screwdriver can now be inserted into the housing and the code discs can be mechanically adjusted with respect to the position of the input shaft of the encoder.

Dimensions in mm

plug housing

M6/8 deep
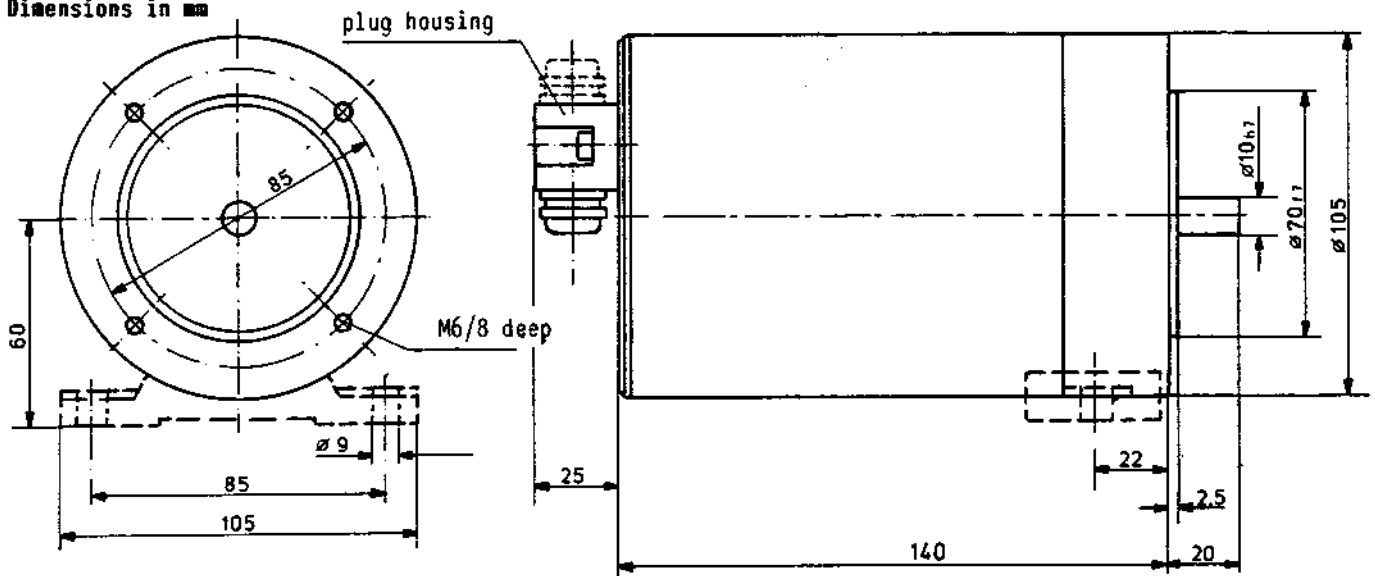
Stainless steel bellow coupling 491/10.
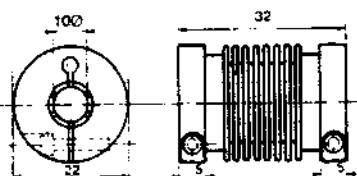
Accessories

Mating plug with DB 25 S sockets and sealed cover is supplied with each encoder. Coupling and mounting bracket must be ordered separately.

Encoders with BCD-output can be used with TWK-indicators WA 100 and WV 104 (Data Sheet 2833 EA)