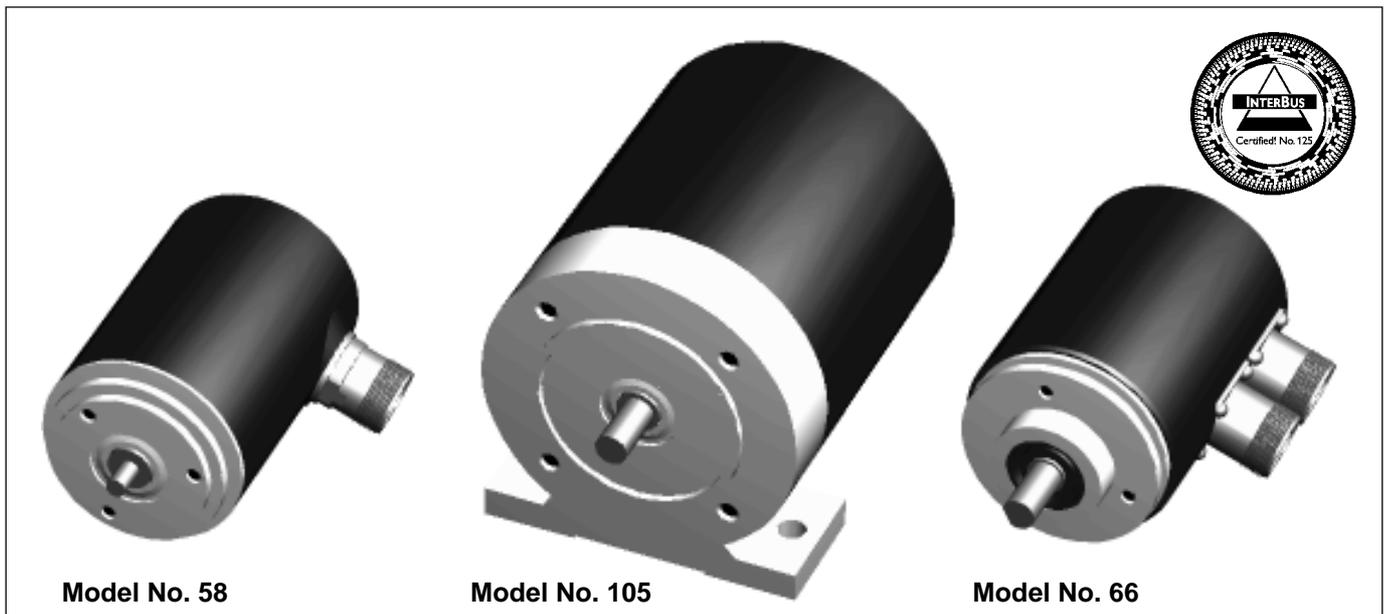


- **Compact and robust design** for mechanical and plant engineering
- **Model CLS:** "Passive" low-cost version without  $\mu$ -processor
- **Model CRS:** "Active" programmable version with  $\mu$ -processor
- **With ENCOM K1, K2, K3 or TWK profiles**
- **Gray or natural binary output code**
- **For connecting direct to the bus in looped-through or star manner**
- **Resolution:** max. 8192 positions per revolution (13 bit)
- **Measuring range:** max. 4096 revolutions
- **Total number of positions:** max.  $2^{25}$  (25 bit)
- **With multiturn gearing** (no battery required for buffering number of revolutions)
- **Permissible axial and radial shaft loading** 250 N
- **Protection grade** IP 65 or IP 66



**Basic versions**

The CLS and CRS series encoders are designed for **2-wire remote-installation buses**. For looped-through connection in the form of a ring structure each encoder is fitted with two round 9-pin connectors (IP 65). Power is also supplied via the bus cable. A DC/DC converter in the encoder galvanically separates each encoder from the other sensor/actuator bus stations.

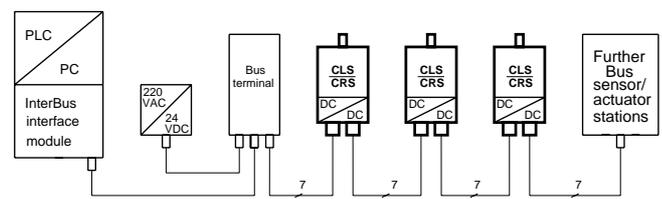
A second version permits 4, 8 or 16 sensor/actuator stations to be connected in star-form to a T-coupler. In the **T-couplers** the wires for in each case one encoder and the next station are grouped together. Galvanic separation and the power supply can be installed in the T-coupler. All connections are carried out with round 12-pin connectors (IP 65).

**Construction**

Flange and housing of aluminium - shaft of stainless steel - 12 mm ball-bearings with Nilos ring seal or radial packing ring seal - code disk of glass or of deformation resistant plastic - GaAlAs diodes - photo-transistor array with comparator and trigger circuits - gate array - SMD technology.

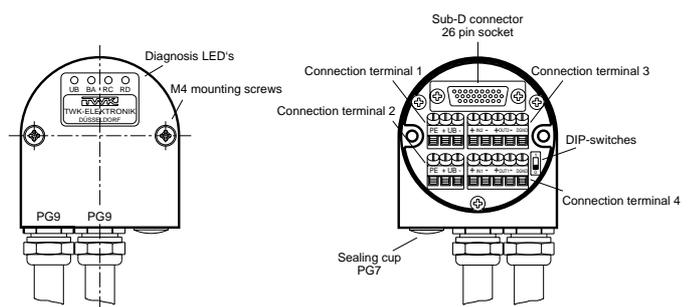
Model Nos. 58, 65, 66 and 105 differ from each other in terms of the dimensions of their shafts, flanges and housings.

**Looped-through connection in the form of a ring structure**



**Variant "Z" with connecting cap**

This variant has been designed to accept a connecting cap as shown below. For further details refer to data sheet CRS 10694.



## Electrical data

(Applicable for all versions unless otherwise stated)

- Sensor system: GaAIAs diodes, photo-transistor array
  - Data inputs and outputs: differential RS-485
  - Resolution: 0.0002 to 4096 (8192) positions per revolution
  - Measuring range: max. 4096 revolutions
  - Total number of positions: max.  $2^{13} \times 2^{12} = 2^{25}$
  - Max. position variance:  $\leq 2' 38''$  at 4096 positions per revolution  
 $\leq 1' 59''$  at 8192 positions per revolution
  - Graduation code: Gray
  - Output code: Gray or natural binary
  - Code sense: CW or CCW \*
- \* CW = code increases when the shaft revolves **clockwise**  
CCW = code increases when the shaft revolves **counter-clockwise**
- Supply voltage range  $V_S$ : + 19.5 to + 30 VDC
  - Power consumption :  $P_V \leq 3.2$  W (inrush current  $\leq 280$  mA)

## Mechanical data

- Operating speed<sup>1)</sup>: 3000 rpm max. (continuous)  
4000 rpm max. (short period)
- Angular acceleration:  $10^5$  rad/s<sup>2</sup> max.
- Moment of inertia of rotor: 45 gcm<sup>2</sup>
- Operating torque:  $\leq 5$  Ncm (8 Ncm - CRS/CLS 66) (at 1000 rpm)
- Starting torque:  $\leq 1$  Ncm (4 Ncm - CRS/CLS 66)
- Permissible axial and radial shaft load: 250 N max.
- Bearing life expectancy<sup>1)</sup>:  $10^9$  revolutions
- Mass: CRS/CLS 58 = 0.6 kg  
CRS/CLS 65/66 = 0.7 kg  
CRS/CLS 105 = 1.3 kg

<sup>1)</sup> Longer life expectancy can be achieved with lower loads.

## Ambient conditions

- Operating temperature range: - 20 °C to + 60 °C  
 optional - 40 °C to + 85 °C
- Storage temperature range: - 25 °C to + 70 °C
- Permissible rel. humidity: 85 % without condensation
- Resistance to shock: 200 m/s<sup>2</sup>; 11 ms (DIN IEC 68)
- Resistance to vibration: 5 Hz to 1000 Hz; 100 m/s<sup>2</sup> (DIN IEC 68)
- Protection grade (DIN 40 050)  
CRS/CLS 58, 65 and 105: IP 65 (Nilos ring)  
CRS/CLS 66: IP 66 (radial packing ring)

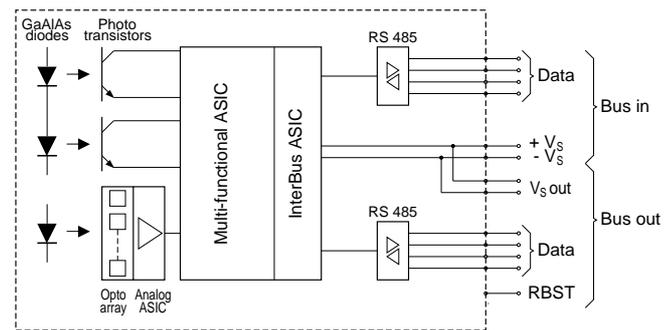
## RBST

Signal input for further InterBus interfaces

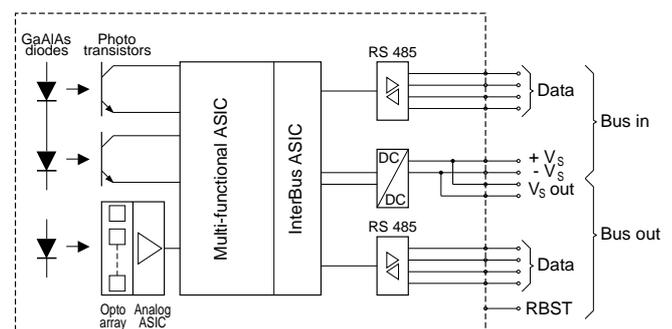
- Not connected: The bus signals are switched off. The encoder functions as the last station on the bus.
- Bridged with 0 Volt: The bus signals are passed on to the next bus station.

## Block diagrams

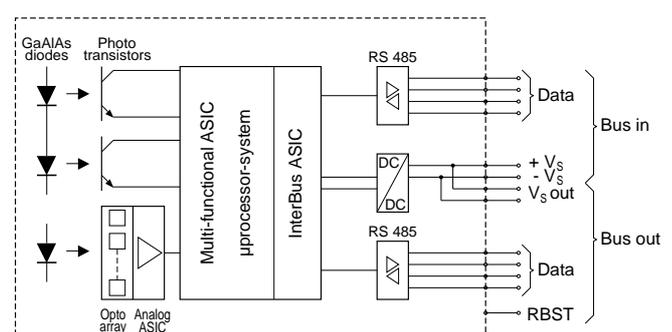
### CLS without DC/DC converter



### CLS with DC/DC converter



### CRS with DC/DC converter

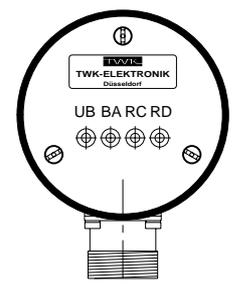


## Option Diagnosis displays

On request the CLS and CRS model series can be supplied with diagnosis LEDs in the cap on the end of the housing.

The acronym "LED" is to be added when enquiring about or ordering this option. In our works the type designation (article number) is augmented at the end following the letter **G** or, as the case may be, **H** with a code number for this variant.

Code	Colour	Function
UB	green	Supply voltage
BA	green	Bus active
RC	green	Remote Bus Control
RD	red	Remote Bus Disable



**Interface profiles**

The manner in which data is transmitted is defined in interface profiles. These profiles were worked out by the ENCOM user group and are described in detail in a manual. The following table provides an overview of the characteristics of the different profiles.

In addition TWK profiles can be realized to match the specific requirements of individual customers. Such profiles are defined in co-operation with the customer in accordance with the application.

	<b>Profile K1</b>	<b>Profile K2</b>	<b>Profile K3</b>	<b>Profile K4</b>
<b>Data format</b>	16 bit	32 bit	32 bit	32 bit
<b>Process data word</b>	right justified	right justified	right justified	right justified
<b>Data bits</b>	max. 13 bit	max. 25 bit	max. 25 bit	max. 28 bit
<b>Control / status bits</b>	none	none	7 bit	4 bit
<b>Output code (1)</b>	G, GT, R, RT			
<b>ID-code</b>	(01)36 H	(02)36 H	(02)37 H	(03)F7 H
<b>Programmable parameters</b>	---	---	(2)	(2)

(1) G = Gray, GT = Gray-tree, R = binary, RT = binary-tree (the CLS models can only be supplied with GT or RT)

(2) Actual position value - output code - total number of positions - measuring range (revolutions) code sense - preset value - zero point - offset value

**Order code format and options**
**Encoder model CLS (low-cost version)**

**CLS** **65** - **4096** **G** **4096** **K** **2** **G** **03**  
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

- (1) Model series: CLS
- (2) Model No.: 58, 65, 66 or 105 (see page 4)
- (3) Resolution: 1 to 4096 (8192) positions per revolution \*
- (4) Code type: Gray-tree "GT" or binary-tree "RT"
- (5) Measuring range: 1 to 4096 revolutions in steps of powers of two \*
- (6) Galvanic separation of the supply voltage:  
     M= with galvanic separation  
     K = without galvanic separation
- (7) Profile: only ENCOM profile K2 possible
- (8) Bus connection: G = T-coupler connection  
                             (1 connector)  
                             H = 2-wire remote-installation bus  
                                     connection (2 connectors)  
                             Z = Via connecting cap
- (9) Electrical and mechanical variants, e.g. connector arrangement, shaft diameter, radial cable output. The basic versions as described in the data sheets bear the number 03. Variants are characterized with a variant number and documented in our works.

\* The values desired for these parameters are to be stated when ordering.

**Encoder model CRS (parameters programmable)**

**CRS** **65** - **4096** **G** **4096** **M** **2** **H** **03**  
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

- (1) Model series: CRS
- (2) Model: 58, 65, 66 or 105 (see page 4)
- (3) Resolution: 0.0002 to 4096 (8192) positions per revolution \*
- (4) Code type: Gray "G", Gray-tree "GT",  
                     natural binary "R" or binary-tree "RT" \*
- (5) Measuring range: 1 to 4096 revolutions in steps of powers of two \*
- (6) Galvanic separation of the supply voltage:  
     M= with galvanic separation  
     K = without galvanic separation
- (7) Profiles: 1 - 4 = ENCOM profiles / L-Z = TWK profiles
- (8) Bus connection: G = T-coupler connection  
                             (1 connector)  
                             H = 2-wire remote-installation  
                                     connection (2 connectors)  
                             Z = Via connecting cap
- (9) Electrical and mechanical variants, e.g. connector arrangement, shaft diameter, radial cable output. The basic versions as described in the data sheets bear the number 03. Variants are characterized with a variant number and documented in our works.

\* The values for these parameters can be programmed with profiles K3 and K4.

## Electrical connections (at option)

The following connections are provided to meet the different modes of connection to the InterBus as well as to satisfy other requirements:

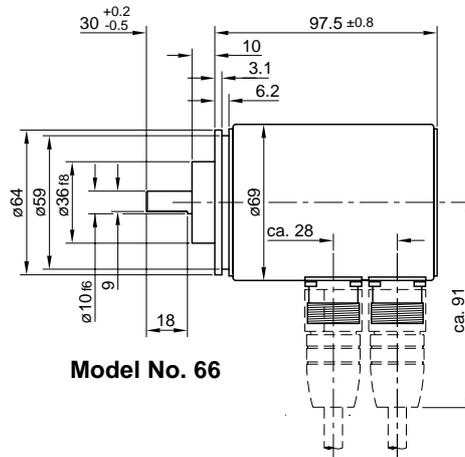
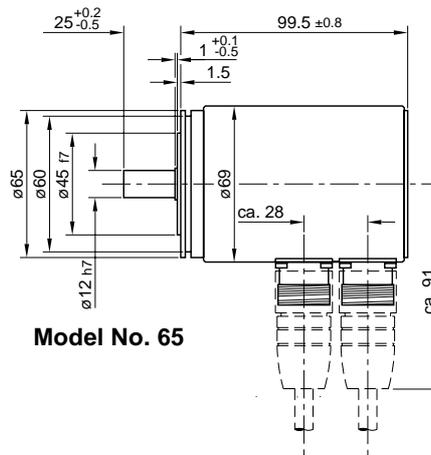
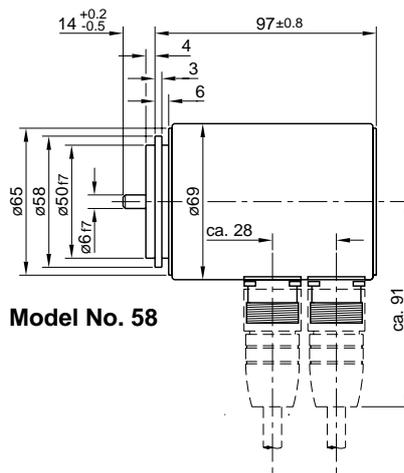
1. For the **2-wire remote-installation bus**, two 9-pin connectors are provided. These are positioned on the side of the encoder aligned at right-angles to the shaft. One connector has sockets, the other pins (standard version H03).
2. For connection to a **T-coupler**, one 12-pin connector positioned as described above is provided. The connector is located on the side at the rear of the encoder. The front connector is dispensed with (standard version G03).
3. In the case of models 58, 65 and 66, the connector/connectors can be positioned not only as shown in the figures but also on the rear of the housing either in line with the shaft or at right-angles to it (as shown in the figure for model 105). When the connectors are mounted on the rear of the housing, the length of the housing increases by approx. 10 mm plus the length of the plug-in connection but the diameter of the housing decreases to 65 mm.

The version required must be stated at ordering. Precise installation drawings are available on request.

The connector/connectors is/are positioned at the end of the housing. Whether it/they should be in line with the shaft or at right-angles to it must be stated when ordering. Precise installation drawings are available on request.

4. Other electrical connection, e.g. cable exit on request.
5. Variant "Z" has been designed to accept a connecting cap. For further details refer to data sheet CRS 10694.

## Dimensions in mm



## Model No. 105

