

- Measuring ranges from 1 x 360° up to 4096 x 360°
- Contactless electro-optical sensor system
- With 12 Bit D/A-Converter
- For two electronic adjustment modes
- For two reference values
- Three different signal outputs at option : 0 to 20 mA or 4 to 20 mA or 0 to 10 VDC
- Robust, heavy duty design

**Construction**

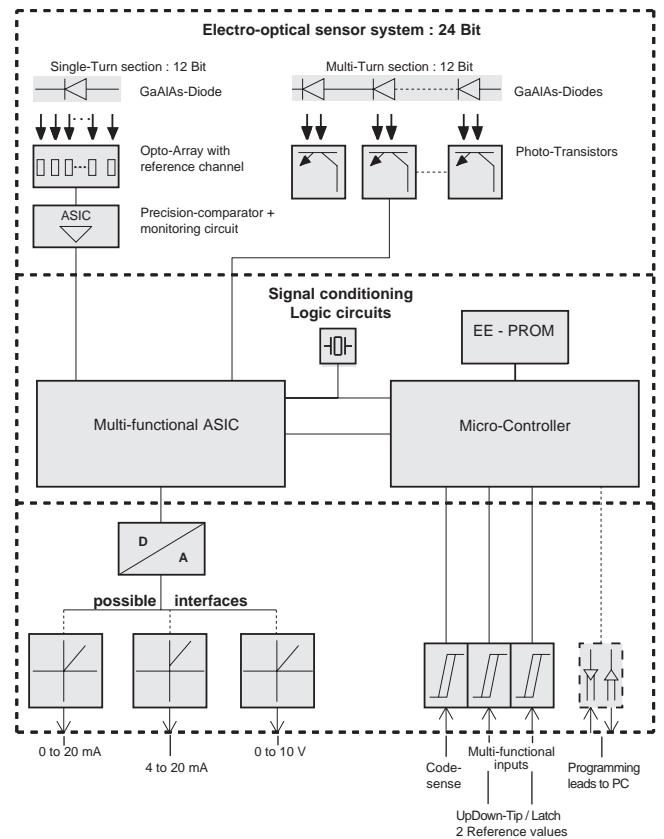
Flange and case in aluminium - shaft in stainless steel - 12 mm ball-bearings with Nilos ring or radial packing ring seal - code disc in plastic or glass - GaAlAs diodes and photo-transistor array - gate array - customer specific microprocessor - multifunctional ASIC - 12 Bit D/A converter - SMD technology ( ref. sectional drawing page 2 ).

The Models DAF 58, DAF 65, DAF 66 and DAF 105 have different shaft, flange and case dimensions and different types of electrical connections ( for details see page 4 ).

**Functional description**

The DAF Transducers have been derived from the CRF Multi-turn-Encoders (Data sheet 10266). They feature an electro-optical sensor system with digital signal processing and a D/A converter. The digital processing unit is designed to resolve any measuring range up to 4096 turns into 4096 positions. The 12 Bit D/A-converter transforms these positions into a proportional analogue signal ( ref. examples 1 to 4 ).

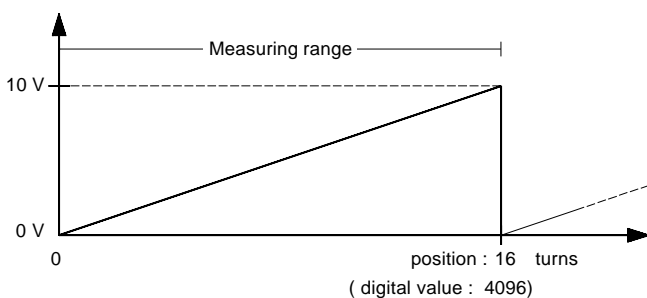
Depending on the ordering specification the transducer will be supplied ex-work with any measuring range between 1 x 360° to 4096 x 360°.



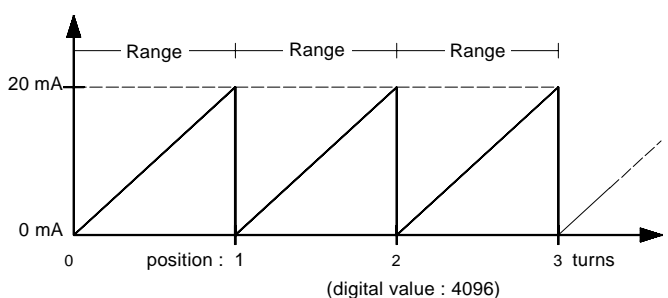
When choosing a measuring range not equal  $2^n$  turns there will be an overflow beyond the measuring range as shown in examples 3 and 4.

Other functional details and parameters can be defined by the user as shown in table page 3. Upon request, these features can be modified when returning the unit to the factory.

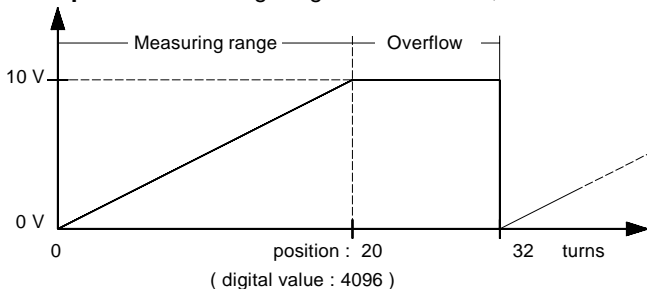
**Example 1 :** Measuring range : 16 turns =  $2^n$



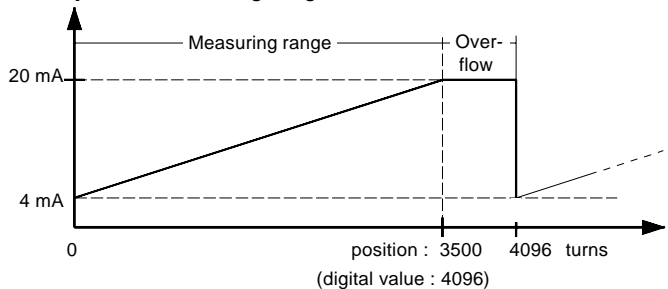
**Example 2 :** Measuring range : 1 turn =  $2^n$



**Example 3 :** Measuring range : 20 turns  $\neq 2^n$ , with overflow



**Example 4 :** Measuring range : 3500 turns  $\neq 2^n$ , with overflow



## Technical Data

( Valid for all versions unless otherwise stated )

- Sensor system : GaAlAs diode, photo-transistor array, precision comparator
- Setting cycles EEPROM :  $\geq 10^6$
- Multifunctional inputs : Depending on adjusting mode ( MFP ) ( signal input E6 )
- Memory circuit ( latch ) : Through MFP
- Disc coding : Gray code
- Signal sense : CW or CCW ( signal input E6 )
- Supply voltage range  $V_s$  : + 20 to + 26 VDC  
15  $\pm$  0,5 VDC ( optional )
- Supply current  $I_s$  : 80 mA typ. / 120 mA max.  
( when output current = 0 )
- Linearity : 0.025% typ. / 0.05% max. ( $\pm 2$ LSB)  
12 Bit monotony warranted
- Temperature drift : 0.0015 % / K typ.

## Current output

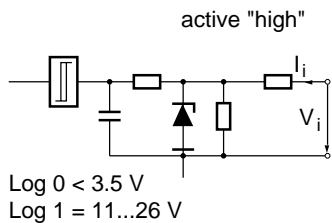
- Accuracy
  - at starting point 0 mA : 0 mA  $\pm$  5  $\mu$ A typ /  $\pm$  15  $\mu$ A max.  
4 mA : 4 mA  $\pm$  5  $\mu$ A typ /  $\pm$  15  $\mu$ A max.
  - at end point 20 mA : 20 mA  $\pm$  5  $\mu$ A typ /  $\pm$  15  $\mu$ A max.
- Load resistance : 0 to 500  $\Omega$  at  $V_s = 20$  to 26 VDC  
0 to 1000  $\Omega$  at  $V_s = 22$  to 26 VDC

## Voltage output

- Accuracy
  - at starting point 0 V : 0 V  $\pm$  2.5 mV typ. /  $\pm$  7.5 mV max.
  - at end point 10 V : 10 V  $\pm$  2.5 mV typ. /  $\pm$  7.5 mV max.
- Output current : 5 mA max.  
When load resistance > 2k $\Omega$   
( short circuit proof )

## Signal input E6

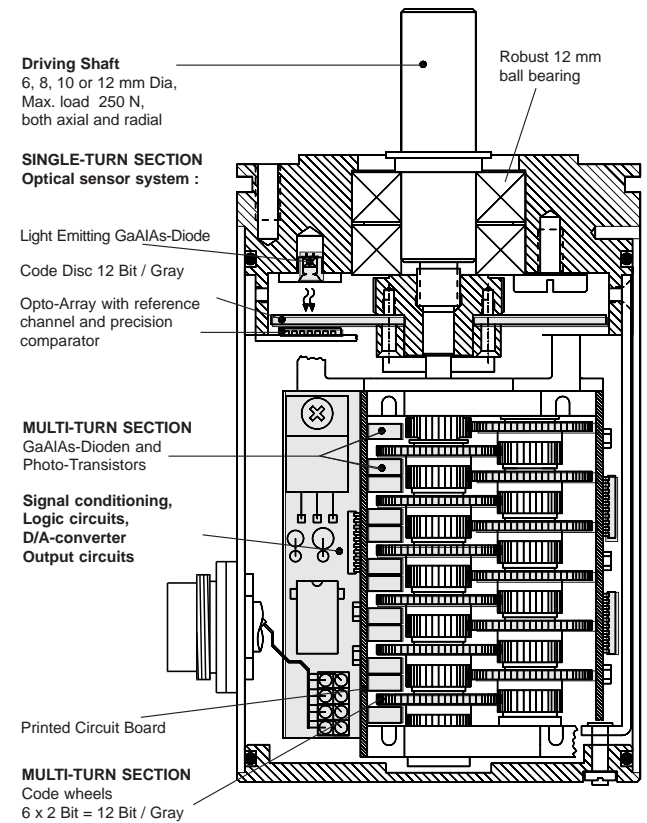
( for code sense and multi-functional-inputs via MFP )



## Electrical connections ( standard versions )

- DAF 58, 65 and 66 : Round connector 12-way ( IP65 ) on case, straight mating plug supplied with each item.
- DAF 105 : Connector DC 37 on case with mating plug and special housing ( IP 65 ).

## Sectional drawing



## Mechanical Data

- Operating speed : 3000 rpm max. ( continuous )  
4000 rpm max. ( short period )
- Operating torque :  $\leq 5$  Ncm ( 8 Ncm - DAF 66 )
- Wind-up torque :  $\leq 1$  Ncm ( 4 Ncm - DAF 66 )
- Angular acceleration :  $10^5$  rad/s<sup>2</sup> max. :
- Inertial mass of rotor : 50 gcm<sup>2</sup>
- Permissible axial and radial shaft load : 250 N max.
- Bearing life expectancy :  $10^9$  turns
- Mass : DAF 58 = 0,6 kg DAF 66 = 0,7 kg  
DAF 65 = 0,7 kg DAF 105 = 1,3 kg

## Environmental Data

- Operating temperature range : - 20°C to + 60°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 ... 1000 Hz ; 100 m/s<sup>2</sup> ( DIN IEC 68 )
- Protection class ( DIN 40050 )
  - DAF 58, 65 and 105 : IP 65 ( Nilos ring )
  - DAF 66 : IP 66 ( radial packing ring )

## Adjustment modes

When ordering one of two different adjustment modes should be chosen to define the function of the **Multi-Functional Pins (MFP)**. For both adjustment modes these pins will be used at normal operation and to control the latch (see table below).

MFP1	MFP0	UpDown-Mode
0	0	Normal operation
0	1	Decrease output value and set (down)
1	0	Increase output value and set (up)
1	1	Output value latched

MFP1	MFP0	Preset-Mode
0	0	Normal operation
0	1	Set reference point No. 1
1	0	Set reference point No. 2
1	1	Output value latched

When using the **Up-Down-Mode** to change the output value as shown above the changing speed increases along with the time of applying ; but when applying Log 0 to both pins for a short period the changing speed will be reduced. The output value which has been chosen will be stored within about 6 seconds. After storage the encoder adapts its normal operation. - The function as described permits to adjust the encoder to a defined mechanical position, e.g. the zero point.

When using the **Preset Mode** reference point No. 1 and / or No. 2 can be set. (Reference point is defined as being the point where the reference value as per the ex-works programming is applied to the signal output).

## Timing - diagrams

Fig. 1 : Setting of the reference point (Preset Mode only)

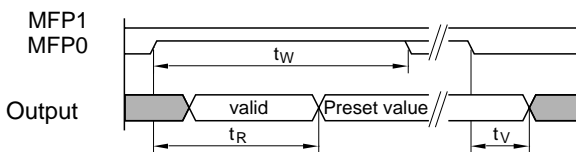
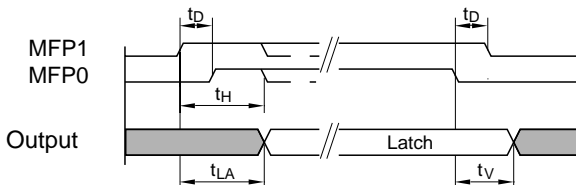
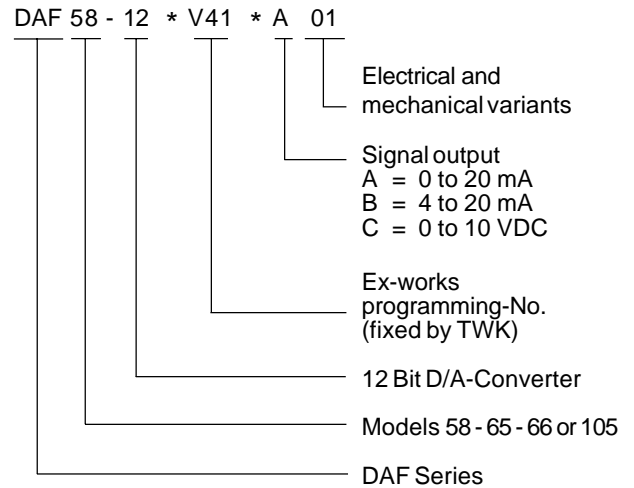


Fig. 2 : Latching



- $t_v$  : delay time  $\leq 1,1$  ms max.
- $t_H$  : latch hold time  $\geq 750$   $\mu$ s min.
- $t_w$  : Waiting period  $\geq 70$  ms min.
- $t_R$  : reaction period  $\leq 60$  ms max.
- $t_{LA}$  : latch reaction period  $\leq 750$   $\mu$ s max.
- $t_D$  : Time difference between the MFP's  $\leq 100$   $\mu$ s max.

## Order code format



## Basic programming

If not otherwise agreed DAF Transducers will be supplied with the ex-works programming as shown in the table below.

## Specific programming

If any specific programming is required the user should state all parameters with reference to the table below.

Transducers featuring a specific programming will carry a short form ex-works code. e. g. DAF58-12\*V41\*A01. This code will be shown on the delivery documents and on an additional instrument label along with all programmed specific parameters which are covered by the \*V-No...\*.

Functions and parameters	Ranges and modes	Basic programming	Specific programming
Measuring range	1,0 to 4096 turns	16	upon request
Output signal sense	CW, CCW	CW	upon request
Adjustment modes	UpDown or Preset	UpDown	upon request
Reference value No. 1	Total range of output	0 <sup>1)</sup>	upon request <sup>1)</sup>
Reference value No. 2	Total range of output	0 <sup>1)</sup>	upon request <sup>1)</sup>

<sup>1)</sup> For Preset-Mode only.

## Accessories (to be ordered separately)

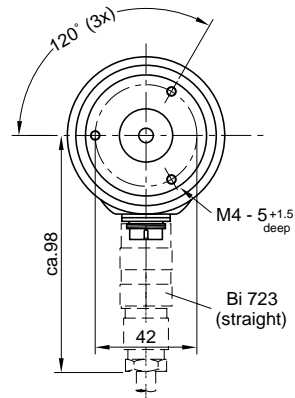
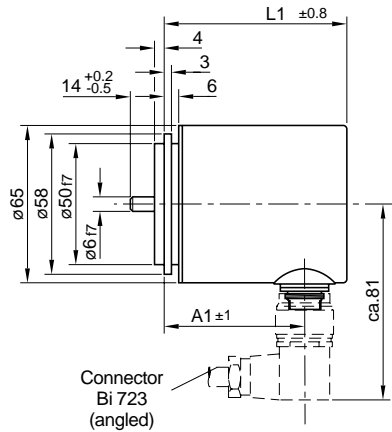
- For DAF 105 : Mounting base
- For DAF 105 : Heater with thermostatic control circuit

## Dimensions in mm

### Model DAF 58

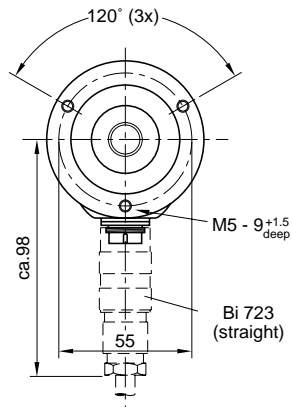
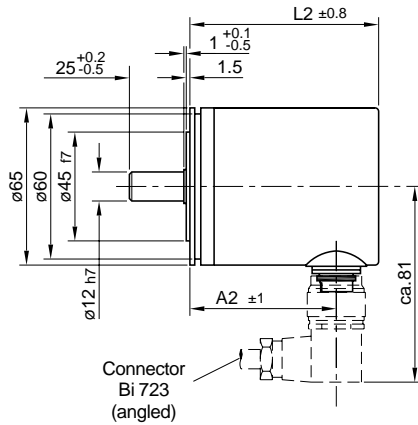
with synchro-flange

L <sub>1</sub>	A <sub>1</sub>	L <sub>2</sub>	A <sub>2</sub>	L <sub>3</sub>	A <sub>3</sub>
97	71,5	99,5	74	97,5	72,0



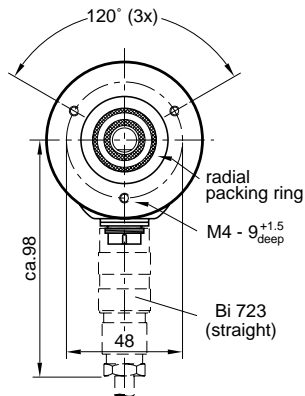
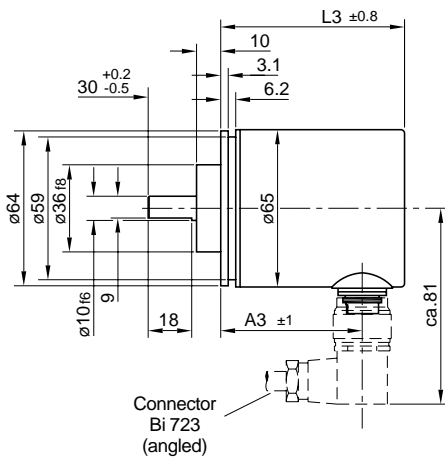
### Model DAF 65

with synchro-flange



### Model DAF 66

with clamping flange, shaft with flat



### Modell DAF 105

