design	Ø58 x 78mm	
incremental	number of pulses	**30 to 5000**

✓ **compensation of ageing and temperature drift**
✓ **compensation in case of a soiled encoder disc**
✓ **high signal-to-noise ratio thanks to complementary output signals**

**angular, linear and
speed measurement**

description

Incremental encoders are used to detect angle of rotation and rotary speeds. To measure length or position, connect the encoder to a driveshaft using a flexible coupling or directly by way of a friction wheel or pinion.

When measuring length using incremental encoders, the square wave signals, emitted by the encoder on its signal lines, are counted. The resolution can be influenced by selecting the number of encoder pulses per rotation.

Incremental encoders operate using photoelectric scanning. Infrared light that is emitted by a temperature controlled LED passes through a mask and a code disc and produces a light proportional DC signal on the optical diodes. When the shaft turns, periodic signals, similar to sine waves, result on the optical diodes. The number of signal periods per rotation corresponds to the number of markings on the encoder disc.

To increase immunity to interference each channel is scanned differentially.

A light-intensity controller compensates both for the temperature and/or ageing drift and for any soiling of the glass encoder disc.

Incremental encoders lose their current measured value when the control is turned off or after a power failure. In order to allow an angle position for any given position to be referenced again, a zero pulse is used that is transmitted once per rotation thus providing an absolute marker.

Incremental encoders emit two output signals in 90° phase quadrature thus allowing the direction of rotation to be determined.

Linking the two square wave signals together with a pulse edge evaluation allows the number of pulses per rotation to be quadrupled. To ensure a clear marker is obtained from the zero pulse even with pulse quadrupling, its pulse width is one quarter of the period width of one signal.

As the signals from the incremental encoders are counted during the evaluation, noise pulses on the signal lines are bound to cause false counts. For this reason special emphasis must be placed on a particularly large signal-to-noise ratio. In practice the signal-to-noise ratio is doubled by outputting the complementary (i.e. the inverted) pulses on two different tracks in addition to the pulse signals in phase quadrature.

application examples

▶ angular measurement at bending machines
▶ linear measurement at conveyor systems
▶ speed measurement at wind-up units

linear measurement systems

1200   encoder

ARTICLE-NO.	NUMBER OF PULSES	ARTICLE-NO.	NUMBER OF PULSES
VD580538	30	VD580522	1000
VD580541	100	VD580523	1024
VD580506	260	VD580526	1500
VD580513	360	VD580528	2000
VD580514	400	VD580530	2500
VD580515	500	VD580531	3600
VD580520	750	VD580535	5000

fig. 1
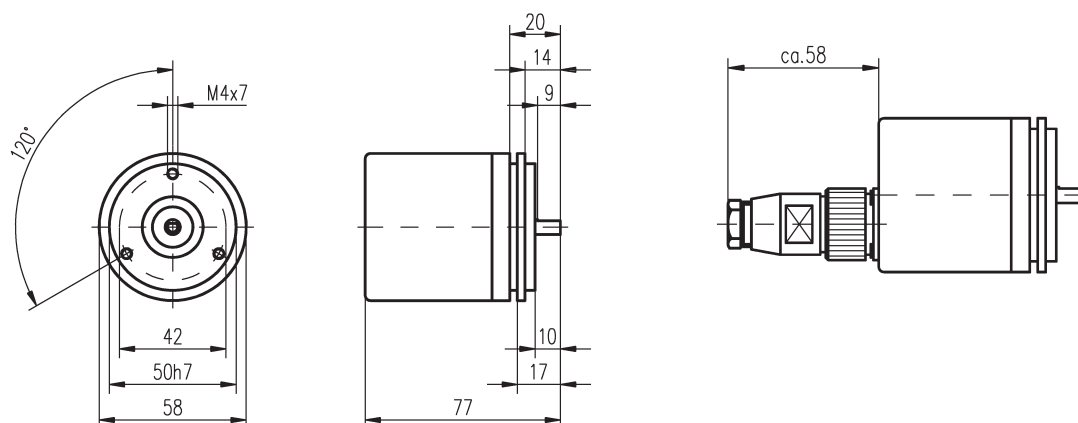
TECHNICAL DATA

max. rotation speed (w/o rotary shaft seal)	10.000min^{-1}
pulses per rotation	see list of articles, others on request
permissible angular acceleration	10^{5}rad sec^{-2}
moment of friction (at 20°C)	without rotary shaft seal: ≤ 0.2Ncm
	with rotary shaft seal: ≤ 1Ncm (option)
shaft stability under load	axial 10N radial 20N
permissible vibration (16 ... 500Hz)	< 100msec^{-2}
shock (max. 3msec)	< 1000msec^{-2}
rotary moment of inertia	25g cm^2
operating temperature range	0 ... +60 °C
storage temperature range	-30 ... +80 °C
weight	approx. 0.2kg
system of protection (EN 60529)	without rotary shaft seal: IP54
	with rotary shaft seal: IP65 (option)
power supply	4.75 ... 30V DC
typical current consumption	40mA
typical output frequency	150kHz
max. output current per channel	40mA (6 channels with short-circuit protection)
shaft dimensions	Ø6 x 10mm
connection	12-pin flanged connector axial
fitting cable socket	e.g. **AV000023**

Other shaft diameters or connectors on request.

For **encoder accessories** please refer to the datasheet accessories 1300 in this register!

The functions and programming of the pulse counters are explained in detail in the operating instructions enclosed with the pulse counter.

Warning: Never use these devices in applications where the safety of a person depends on their functionality.