

- **Contactless, robust sensor system**
- **Infinite resolution, no hysteresis**
- **Calibrated output signals:**
0...20 mA, 4...20 mA, ± 10 V, 0...10 V

- **Integral electronics for DC in / DC out**
- **Accuracy 0.5% or 0.25%**
- **Definite repeatability**
- **Protection class IP 66**

Construction and operating principle

The displacement transducer operates according to the principle of the differential choke, i.e. an inductive half bridge. It consists of two coils which are encapsulated in a stainless steel cylinder. A mu-metal plunger core causes opposing changes of inductance when it is displaced through the centre of the coils. These changes are converted by the integral electronic circuit into a signal proportional to the displacement. The circuit contains an oscillator, demodulator, amplifier and in some cases, a current output source. It is short-circuit proof and protected against reverse polarity.

The transducers are completely sealed to ensure positive protection against vibration, shock, humidity, oil and corrosive matter.

**Standard measuring strokes : 20 mm, 40 mm,
100 mm, 200 mm**

The following variants can be supplied upon request :

- Extension of above measuring strokes depending on accuracy tolerances as follows (without increase of case length):
 - for 0.5% tolerances : standard stroke + 15 mm
 - for 0.25% tolerances : standard stroke + 10 mm
- Calibration of shorter strokes within the above standard ranges (without change of case length), e.g. IW 251/40 becomes IW 251/30, i.e. 0 to 30 mm equals 0 to 20 mA.

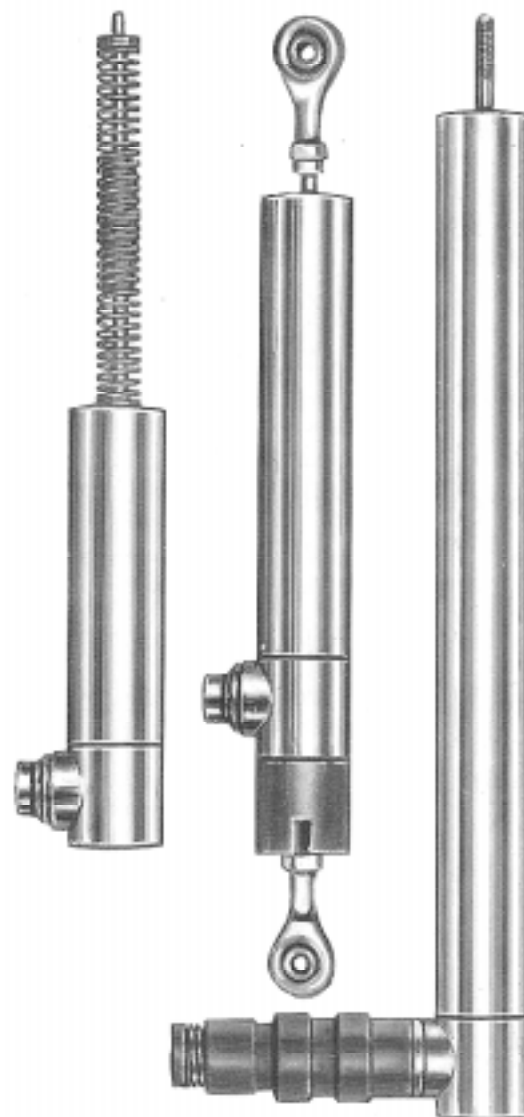
Note : The type IW 255 replaces the previous type IW 25 and is fully interchangeable with it, both mechanically and electrically.

Standard versions and calibrations

Type	Output-signal	V _S **	Output sense *	Mid-point at
IW 251	0 ... 20 mA	21.5 - 32 V	increasing	10 mA
IW 252			decreasing	
IW 253	4 ... 20 mA	21.5 - 32 V	increasing	12 mA
IW 254			decreasing	
IW 255	± 10 V	± 13 - ± 16 V	increasing	0 V
IW 256			decreasing	
IW 25A	0 ... 10 V	21.5 - 32 V	increasing	5 V
IW 25B			decreasing	
IW 259	Special variants			

* Increasing means that the output signal increases positively when the plunger is moved in the direction towards the plug.

** Other supply voltages upon request.



Technical Data

- Supply voltage range V_S : 21.5 to 32 VDC or (prot'd against reverse polarity) ± 13 to ± 16 VDC
- Accuracy : 0.5% or 0.25%
- Temperature drift : < 0.01%/°C
- Stability : < 0.1% in 24 hours
- Measurement frequency : 100 Hz max.
- Operating temperature range : -10°C to +80°C
- Storage temperature range : -30°C to +80°C
- Resistance to shock : 250g SRS at 20 at 2000 Hz
- Resistance to vibration : 20g rms (50g peak) at 20 to 2000 Hz
- Protection class : IP 66

Current output (IW 251 to IW 254)

- Output signal : 0...20 mA or 4...20 mA
- Supply current I_s : 60 mA max.
- Load resistance R_L : 0...500 Ω
- Ripple : $< 0.005 \text{ mA}_{P-P}$
- Dependence on R_L : $< 0.001\%$ for $\Delta R_L = 100 \Omega$
- Dependence on V_s : $< 0.05\%$ for $\Delta V_s = 1 \text{ V}$
- Maximum output current : 25 mA

Voltage output (IW 255 to IW 25B)

- Output signal : $\pm 10 \text{ VDC}$ or $0...10 \text{ VDC}^*$
- Supply current I_s : 50 mA max.
- Permissible load R_L : 2 k Ω (short-circuit proof)
- Ripple : $< 5 \text{ mV}_{P-P}$
- Dependence on V_s : $< 0.05\%$ for $\Delta V_s = 1 \text{ V}$

* Residual voltage 0.1 VDC max.

Note: Unless otherwise stated, all values are valid at +20°C ambient temperature and 24 VDC or $\pm 15 \text{ VDC}$ supply voltage, starting 10 minutes after switch-on.

Special Versions and accessories

- Version T : Gauge type with return spring (only available for 20, 40 and 100 mm strokes).
- Version KV : With ball joint on plunger without guide.
- Version KFN : With ball joint on plunger and special guide.
- Version KHN : With ball joint on case (plug end). Can be combined with KFN.

- Mating plug : Coupling socket BI 681 (to IP 40), included in supplied items.
Coupling socket BI 723M (to IP 66) metal case with outer ring connected to ground, must be ordered separately.
Version 3 PS (3-way) for IW 251 ... 254
Version 4 PS (4-way) for IW 255 ... 258
All contacts gold-plated.

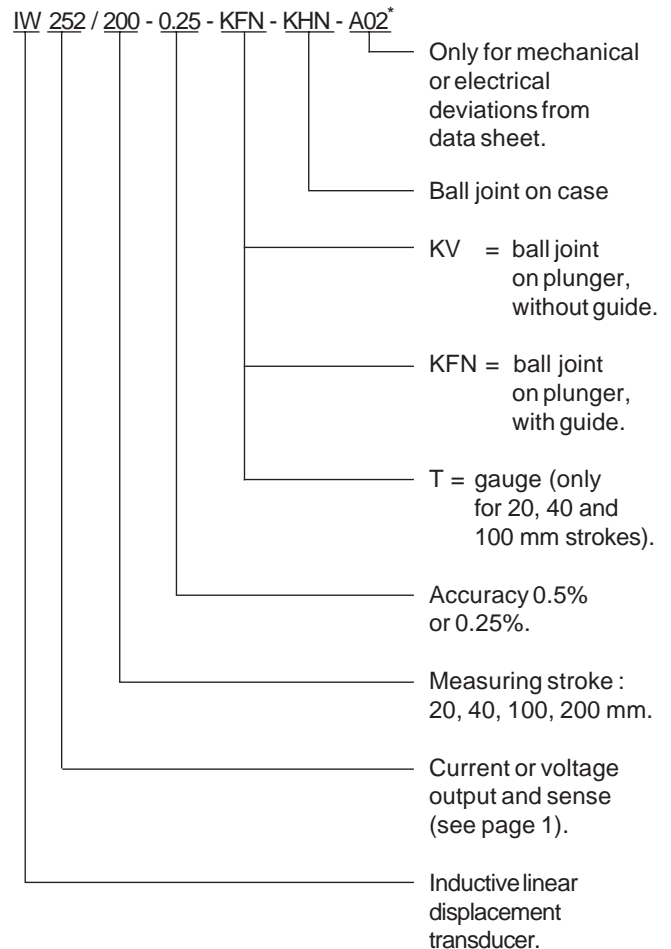
- MB 25 : Mounting block with clamp fixing (must be ordered separately).

Electrical connections

(with view on the contacts at the transducer case.)

IW 251, IW 252, IW253, IW 254, IW 25A, IW 25B	IW 255 and IW 256
1 = + V_s 2 = - V_s (0V) - I_o 3 = + I_o (output signal)	1 = + V_s 2 = 0V (V_s common) 3 = - V_s 4 = + V_o (output signal)

Order code format



* The applicable A-No. is allocated after the definition of the deviation when ordering. No A-No. is given for standard versions as specified in the data sheet.

Materials

- External and internal tube : Chrome-nickel steel
- Plunger : Chrome-nickel steel
- Core : Mu-metal
- Connector case : Brass, nickel-plated
- Connector contacts : Gold-plated
- Spring and gauge head : Stainless steel ("T")

Calibration

Both the sensor system and the plunger core are calibrated as one unit. They carry the same serial number.

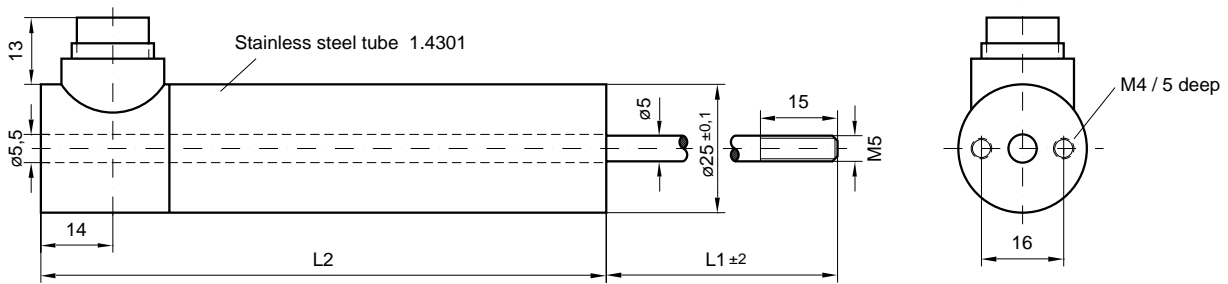
Lengths and masses (refer to drawings page 3)

Type	L1* mm	L2 mm	without plunger g	plunger only g
IW 250/20	40	110	250	15
IW 250/40	50	140	290	18
IW 250/100	80	250	440	13
IW 250/200	130	500	750	56
KV or KFN:	20 g	Mating plug BI 681 (IP 40) : 30 g		
KHN :	55 g	Mating plug BI 723 M (IP 66) : 75 g		

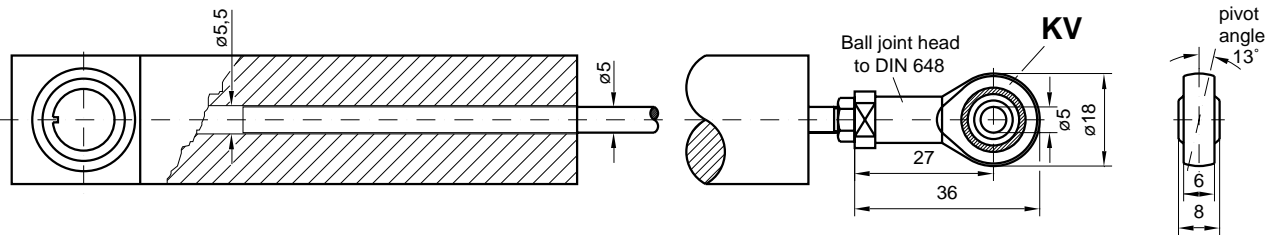
* L1 = Plunger in central position: $I_o = 10$ (12) mA, resp. $V_o = 0$ (5) V.

Dimensions in mm

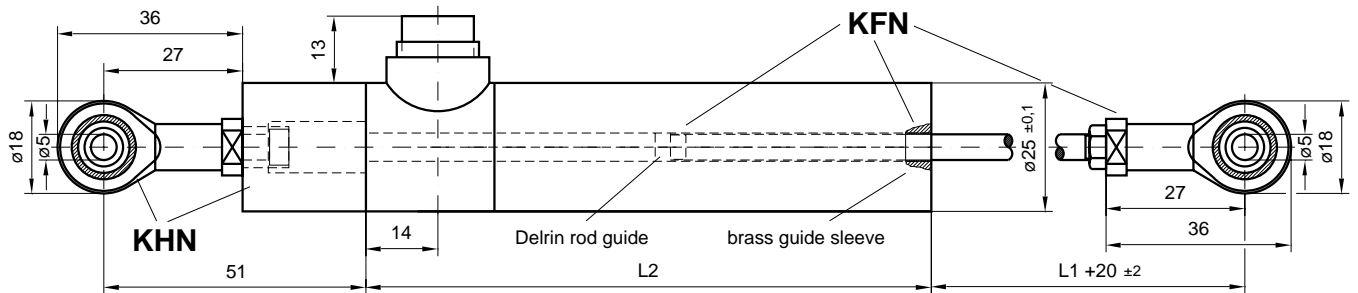
Standard version



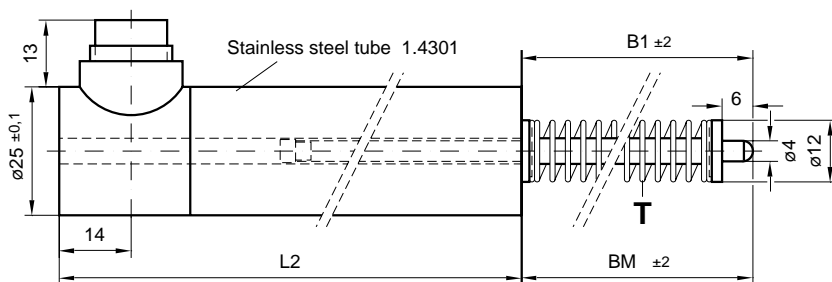
Version with ball joint on plunger (KV)



Version with ball joints on plunger (KFN) and on end of case (KFH)



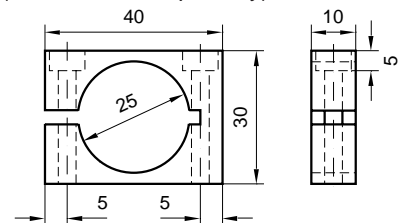
Gauge version (T) with return spring (only up to 100 mm stroke)



Measuring stroke mm	BM mm	B1 mm	FM N	Fc N/m
20	70	85	~ 4	0.14
40	70	98	~ 4	0.07
100	140	198	~ 4	0.03

BM = Plunger in central position
 B1 = Plunger full out
 FM = Spring prestress
 Fc = Spring rate

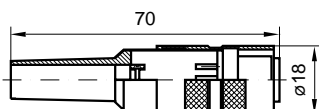
MB 25 Mounting block, brass Nickel plated (to be ordered separately)



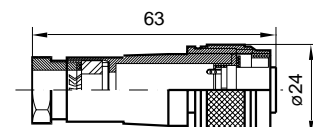
2 hexagon socket screws M4/35 mm long are supplied with each item.

Mass : 60 g

Mating Plugs



Metal case (included in supplied items)
 BI 681 3PS or 4PS (IP40)



Metal case with outer ring connected to ground (must be ordered separately) . BI 723M 3PS or 4PS (IP66)