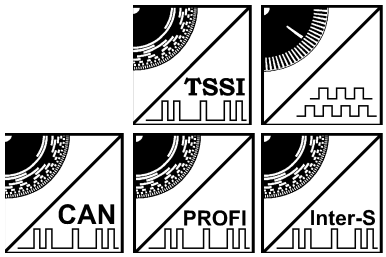
WS19KK Position Sensor with Absolute or Incremental Encoder

Position Sensor with Heavy-Duty Encoder

- **Protection Class IP64**
- **Measurement Range:**
  0 ... 2000 mm up to 0 ... 15000 mm
  0 ... 78.74 in up to 0 ... 590.55 in
- **With Absolute or Incremental Encoder Output**

Optional:



Specifications	Outputs	Multiturn encoder with synchronous serial interface TSSI (-P) with 12 (13) bit resolution
		Incremental encoder with HTL output 0...30 V or Line Driver 5V
	Resolution for TSSI (-P) / pulses per mm for PP24V, LD5V	WS19KK-2000: 0.04 (0.02) mm / 25 pulses WS19KK-3000: 0.063 (0.0315) mm / 15.75 pulses WS19KK-5000: 0.10 (0.05) mm / 10 pulses WS19KK-8000: 0.162 (0.0815) mm / 6.13 pulses WS19KK-15000 mm: 0.146 (0.073) mm / 6.83 pulses
	Material	Aluminium, stainless steel and plastic. Cable: Stainless Steel
	Sensing Device	Absolute Multiturn or Incremental Encoder
	Connector	12 pin (incremental) or 17 pin socket (TSSI)
	Linearity	±0.05 % full scale, optional ±0.01 % full scale
	Protection Class (IEC 529)	IP64
	Weight	See table next page
	Environmental	
	Immunity to Interference (EMC)	Refer to output specification
	Temperature	Refer to output specification

Order Code WS19KK

WS19KK – □ – □ – □ – □

Model Name

Measurement Range (in mm)

2000 (smaller measurement ranges included) / 3000 / 5000 / 8000 / 15000

Outputs

TSSI = Multiturn encoder with synchronous serial output
TSSI-P = Programmable TSSI with SSI, RS-232 and incremental output
PP24VC = Incremental encoder with HTL Output 10-30 V
LD5VC = Incremental encoder with Linedriver Output 5 V
Other outputs on request (Interbus S, Profibus, CAN-Bus)

Linearity

L01 = ±0.01 % related to the specified sensitivity on the label

Option

M4 = M4 cable fixing

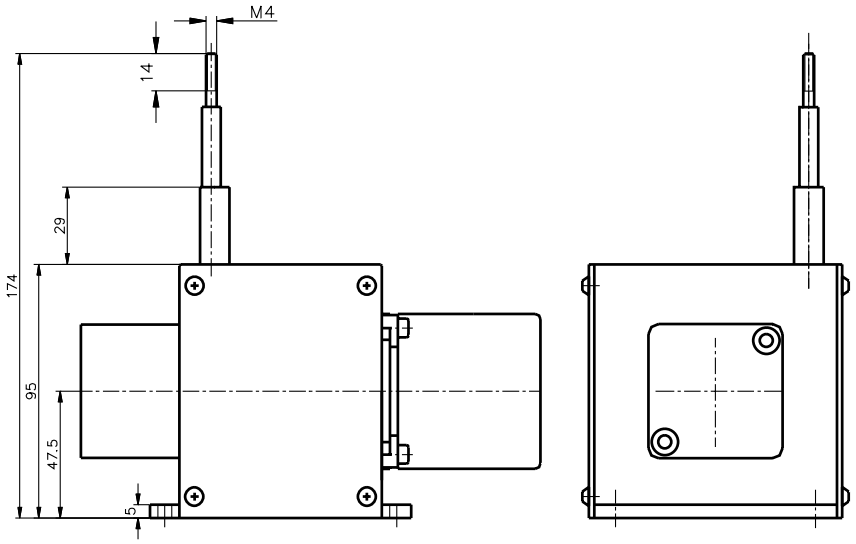
Order Code Mating Conn. (see accessories p. 105) **WS11-CONN-12P** **For TSSI: WS-CONN-017S-M**

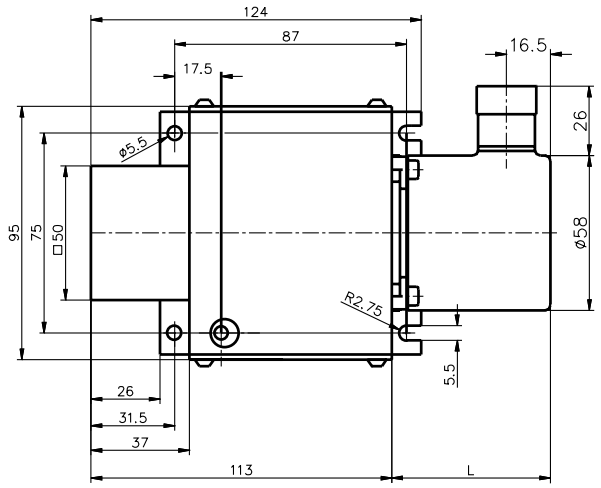
Order Example: WS19KK - 5000 - TSSI - M4

WS19KK Position Sensor with Absolute or Incremental Encoder

Cable Forces and Weights typical at 20 °C	Range [mm]	Range [in]	Weight [kg]	Maximum Pull-out Force [N]	Minimum Pull-in Force [N]
	2000	78.74	1.5	11.0	6.2
	3000	118.11	1.7	8.0	4.1
	5000	196.85	3.2	13.1	8.6
	8000	314.96	6.8	10.0	7.0
	15000	590.55	7.3	17.5	7.5

Outline drawing
WS19KK-2000 / 3000





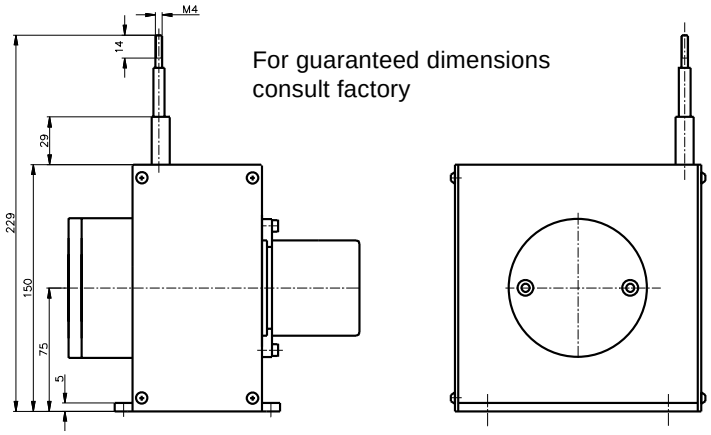
Output	Dim. L [mm]
PP24V, LD5V	53
TSSI	70
TSSI-P	70

Range [mm]	Dim. A [mm]
2000	11,5
3000	0

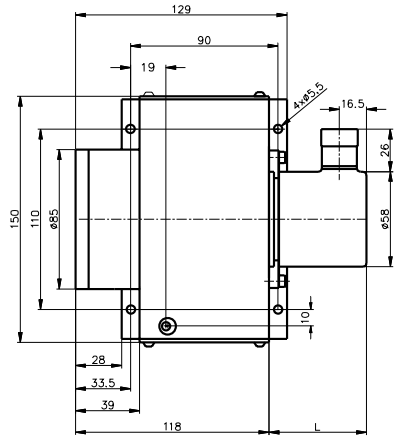
For guaranteed dimensions consult factory

WS19KK Position Sensor with Absolute or Incremental Encoder

Outline drawing
WS19KK-5000

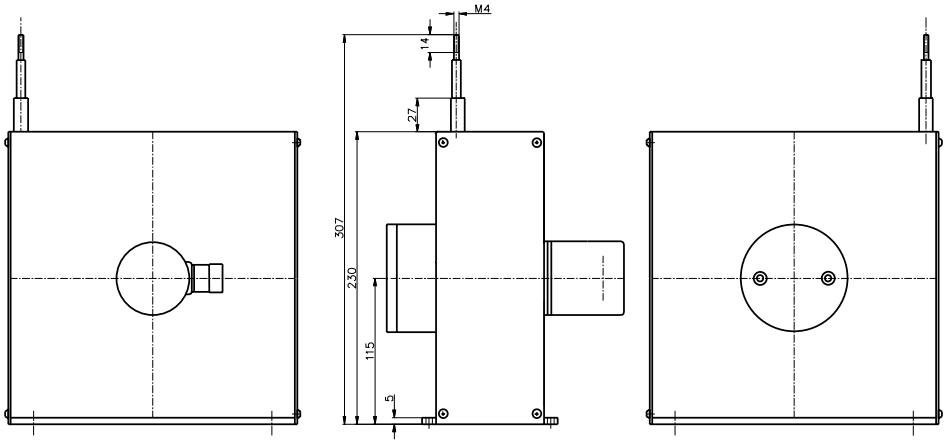


For guaranteed dimensions consult factory

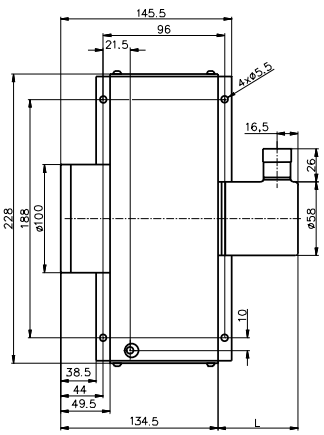


Output	Dim. L [mm]
PP24V, LD5V	53
TSSI	70
TSSI-P	70

Outline drawing
WS19KK-8000



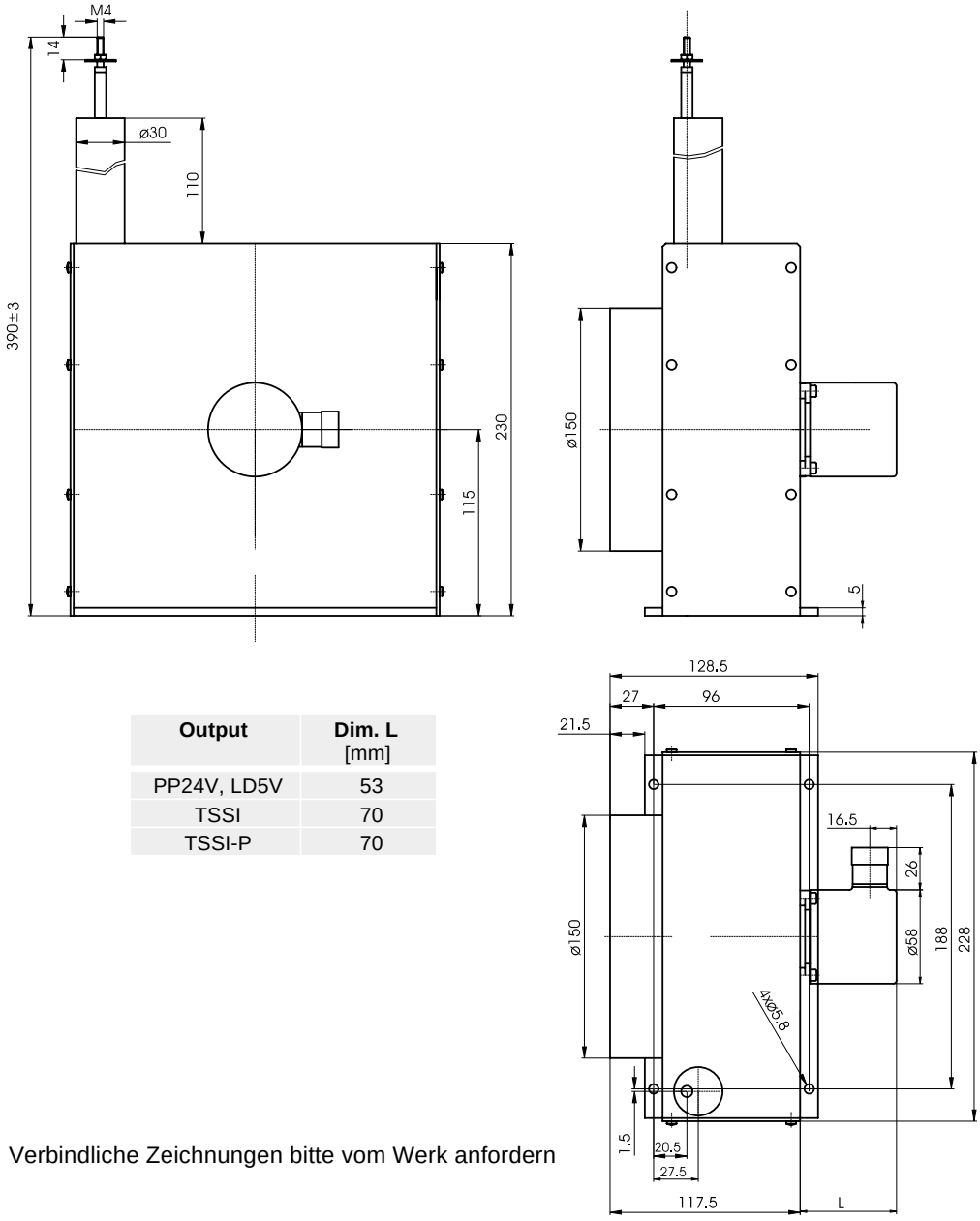
For guaranteed dimensions consult factory



Output	Dim. L [mm]
PP24V, LD5V	53
TSSI	70
TSSI-P	70

WS19KK Position Sensor with Absolute or Incremental Encoder

Outline drawing
WS19KK-15000



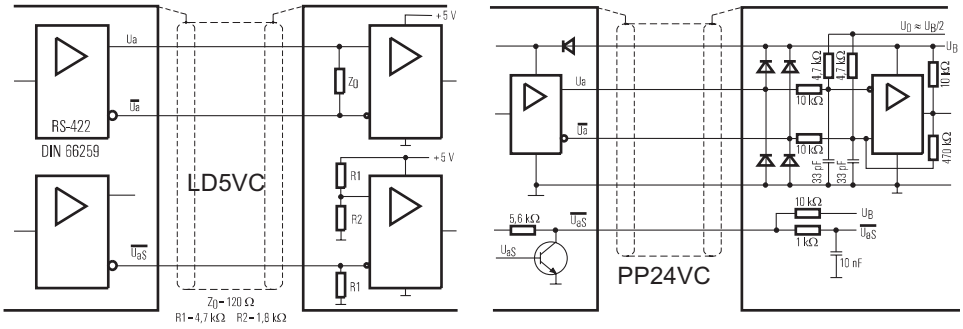
Output	Dim. L [mm]
PP24V, LD5V	53
TSSI	70
TSSI-P	70

Verbindliche Zeichnungen bitte vom Werk anfordern

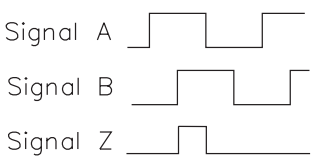
Output Specifications
PP24VC and LD5VC for WS position sensors

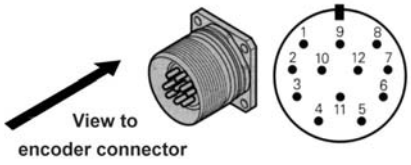
PP24VC Incremental	Output	Push-pull line driver (24 V - HTL)
	Excitation voltage	10 ... 30 V DC
	Excitation current	150 mA max. w/o load
	Output frequency	300 kHz max.
	Output current	100 mA per channel
	Signal level	
	Ud High at Id=20 mA, Ub=24 V	≥21 V
	Ud Low at Id=20 mA, Ub=24 V	≤2,8 V
	Transition time positive edge	< 200 ns
	Transition time negative edge	< 200 ns
	Stability (Temperature)	±20 x 10^{-6} / °C full scale (sensor mechanism)
	Operation temperature	-20 ... +85 °C
	Protection	Short circuit (max. 1 min.), overvoltage, reverse pol.
	EMC)	According to EN 61326:2004
LD5VC Incremental	Output	Line driver according to RS-422
	Excitation voltage	5 V DC ± 10%
	Excitation current	150 mA max. w/o load
	Output frequency	300 kHz max.
	Output current	20 mA per channel
	Signal level	
	Ud High at Id=20 mA	≥2,5 V
	Ud Low at Id=20 mA	≤0,5 V
	Transition time positive edge	< 100 ns
	Transition time negative edge	< 100 ns
	Stability (Temperature)	±20 x 10^{-6} / °C full scale (sensor mechanism)
	Operation temperature	-20 ... +85 °C
	Protection	Short circuit, overvoltage
	EMC	According to EN 61326:2004

Output circuit and recommended processing input circuit



Output signals and output connectors





Signal wiring and connection	**Output signals** (Note: Do not connect pins not listed in this table)	**CONN-CONIN-12F-G**
	Excitation +	12
	Excitation GND (0V)	10
	Signal A	5
	Signal $\overline{A}$	6
	Signal B	8
	Signal $\overline{B}$	1
	Signal Z (reference pulse)	3
	Signal $\overline{Z}$	4
	Fault detection signal $\overline{Uas}$	7
	Shield	Housing

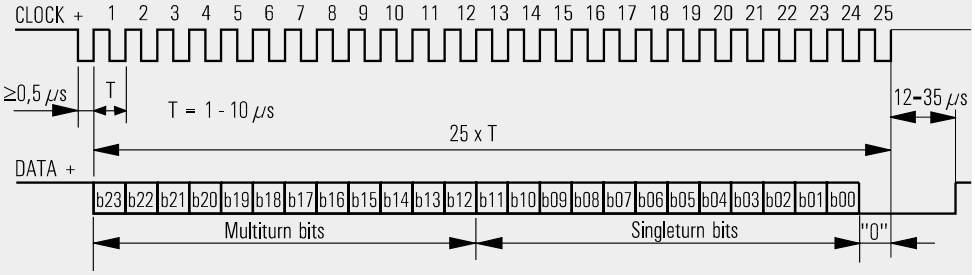
WS Position Sensors
Output Specification TSSI

- **4096 counts per revolution (12 bit), 4096 revolutions (12 bit)**
- **No Loss of Data at Power-down**
- **Easy to Connect to PLC's with SSI Input Circuit**

Description

The sensing device of the SSI is a 24-bit absolute multiturn encoder. The position information is given by an analog/digital converter output serialized as a data word. The processing unit (PLC, Microcomputer) sends pulse sequences which clocks the data transmission at the required transfer rate. With the first falling edge of the pulse sequence the position of the sensor is recorded and stored. The following rising edges control the bit-by-bit transmission of the data word. After a delay time the next new position information

Data Format
(Train of 26 pulses)

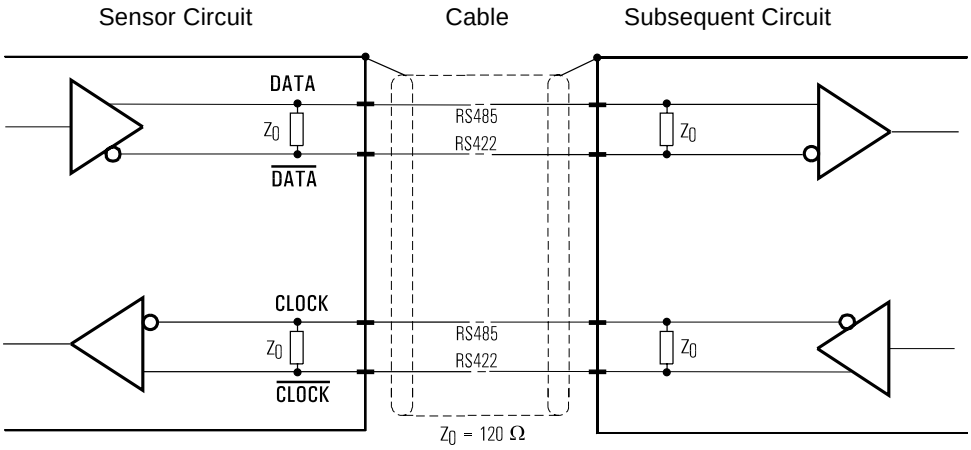


Signal Conditioner TSSI
Absolute Encoder synchronous serial

TSSI

Output	EIA RS-422, RS-485, short-circuit proof
Excitation Voltage	10 ... 30 V DC, reverse polarity protected
Excitation Current	250 mA max. without load
Clock Frequency	100 kHz ... 1 MHz
Code	Gray, continuous progression
Format	Tannenbaum
Delay between Pulse Trains	12 to 35 µs
Stability (Temperature)	±0.002% / K Full Scale (sensor mechanism)
Operation Temperature	-20 ... +85 °C
Immunity to Interference (EMC)	According to EN50082-2, EN50081-1

Recommended Processing Input Circuit



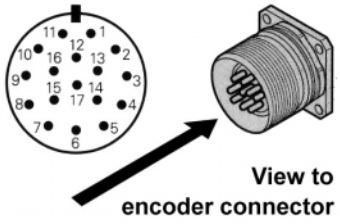
Cable Length	Baud Rate
50 m	100 ... 1000 kHz
100 m	100 ... 300 kHz

Note:
Extension of the cable length will reduce the maximum transmission rate.
The signals CLOCK/$\overline{\text{CLOCK}}$ and DATA/$\overline{\text{DATA}}$ must be connected in a twisted pair cable, shielded per pair and common.

Signal Wiring / Connection

Signal Name	Cable Output (*)	Connector Pin
Excitation +	white	7
Excitation GND (0V)	brown	10
CLOCK	green	8
$\overline{\text{CLOCK}}$	yellow	9
DATA	grey	14
$\overline{\text{DATA}}$	pink	17

(*) WS7.2 only



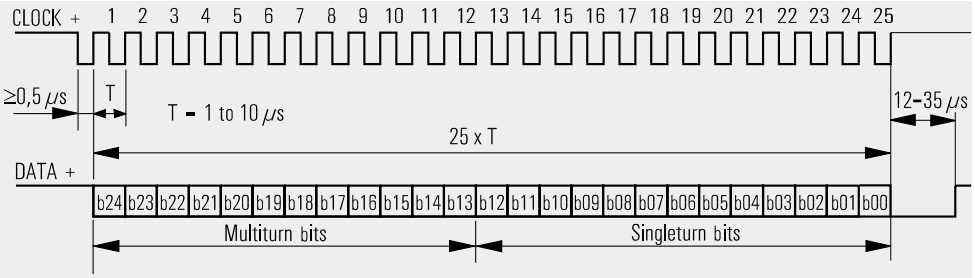
WS Position Sensors
Output Specification TSSI-P

- **8192 counts per revolution (13 bit), 4096 revolutions (12 bit)**
- **Encoder programming and data transfer via RS-232 interface**
- **In addition sinusoidal incremental signals**

Description

The sensing device of the SSI is a 25-bit absolute multiturn encoder. The position information is given by an analog/digital converter as a serial data word. The processing unit (PLC, Microcomputer) sends pulse sequences which clocks the data transmission at the required transfer rate. With the first falling edge of the pulse sequence the position of the sensor is recorded and stored. The following rising edges control the bit-by-bit transmission of the data word. After a delay time the next new position information will be transmitted.

Data Format
(Train of 26 pulses)

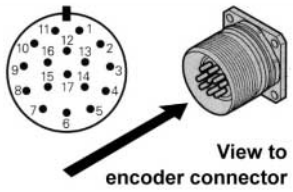


Signal Conditioner TSSI
Absolute Encoder synchronous serial, programmable

Output	EIA RS-422, RS-485, short-circuit proof
Excitation Voltage	10 ... 30 V DC, reverse polarity protected
Excitation Current	250 mA max. without load
Clock Frequency	100 kHz ... 1 MHz
Programmable Functions	Resolution, Offset, Preset, Counting Direction, Output Code and Format
Code	Gray or Binary
Format	Tannenbaum (SSI) or Serial, right aligned
Delay between Pulse Trains	12 to 35 µs
Incremental Signal	Two sinusoidal quadrature signals A and B, each with 512 periods per revolution. Signal amplitude approx. 1 V_{SS} with 120 Ω terminating resistance
Serial Interface	RS-232C asynchronous (TxD, RxD, GND) for encoder programming and data transmission
Hardware Programming	Preset1, Preset2, Counting Direction
Stability (Temperature)	002% / K Full Scale (sensor mechanism)
Operation Temperature	-20 ... +85 °C
Immunity to Interference (EMC)	According to EN50082-2, EN50081-1

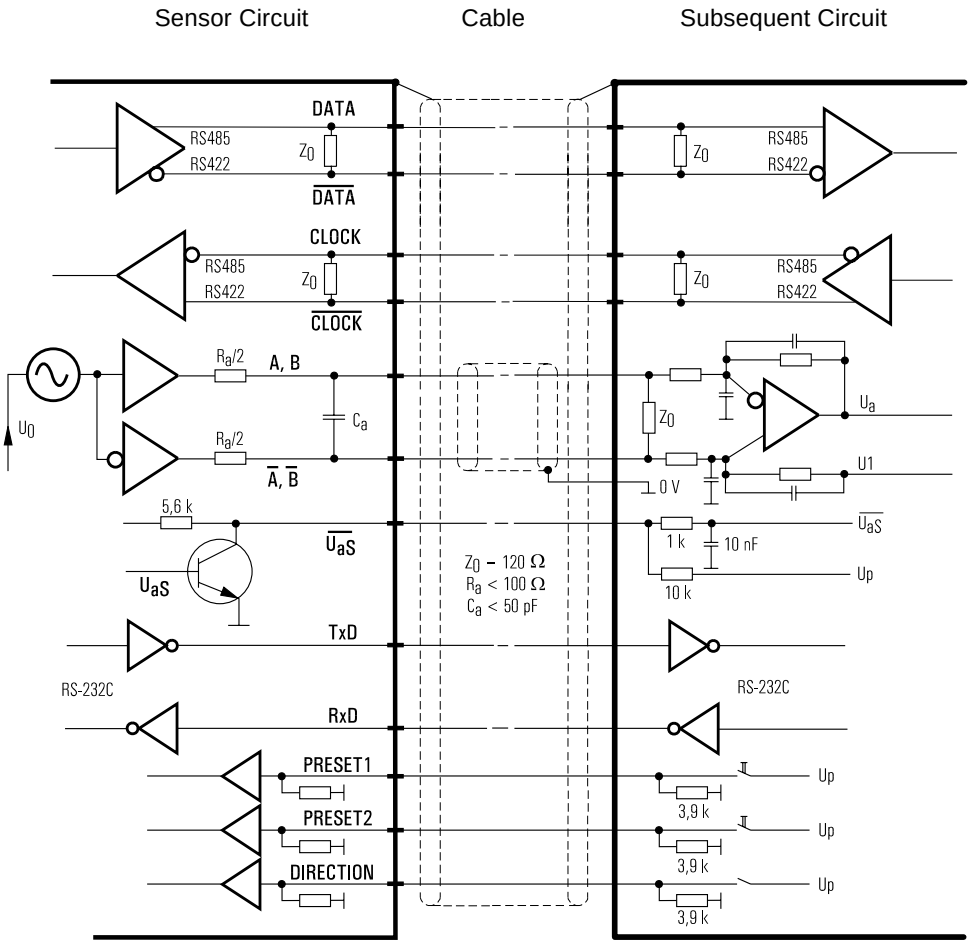
Signal Wiring / Connection

Signal Name	Connector Pin
Excitation +	7
Excitation GND (0V)	10
CLOCK	8
$\overline{\text{CLOCK}}$	9
DATA	14
$\overline{\text{DATA}}$	17
Signal A	15
Signal $\overline{\text{A}}$	16
Signal B	12
Signal $\overline{\text{B}}$	13
Internal shield	11
RxD	1
TxD	4
Fault detection signal $\overline{\text{UaS}}$	3
Preset1	5
Preset2	6
Counting direction	2



Programming Software and Connector Cable see page 104.

Recommended Processing Input Circuit



Cable Length	Baud Rate
50 m	100 … 1000 kHz
100 m	100 … 300 kHz

Note:
Extension of the cable length will reduce the maximum transmission rate.
The signals CLOCK/CLOCK and DATA/DATA must be connected in a twisted pair cable, shielded per pair and common.

Incremental Signals