



Industrial position sensor for very long measurement ranges

- Protection class IP52
- Measurement ranges 0 ... 60000 mm
- Absolute or incremental encoder



Specifications

Outputs	Incremental encoder with TTL or HTL output Absolute encoder see order code
Resolution	8 pulses/steps per mm
Linearity	±0.10 % f.s.; optional 0.025 % f.s.
Sensing device	Absolute encoder / incremental encoder
Material	Aluminium and stainless steel; Cable: stainless steel
Protection class	IP52, encoder IP64
Connection	Depending at the encoder type: connector or bus cover
Weight	Approx. 15 kg maximum
EMC, temperature	Refer to output specification

Order code WS60

WS60 - [] - [] - [] - []

Model name

Measurement range (in mm)

60000

Outputs

- LD5VC = Incremental encoder TTL compatible
 PP24VC = Incremental encoder HTL compatible
 HSSI = Absolute encoder with synchronous serial output (SSI)
 HPROF = Absolute encoder with Profibus interface
 HINT = Absolute encoder with Interbus interface
 HDEV = Absolute encoder with DeviceNet interface
 HCAN = Absolute encoder with CAN interface
 HCANOP = Absolute encoder with CANopen interface

Linearity (option)

L025 = ±0.025% f.s.

Cable fixing

- M4 = M4 cable fixing
 SB0 = Cable clip

Order code mating connector

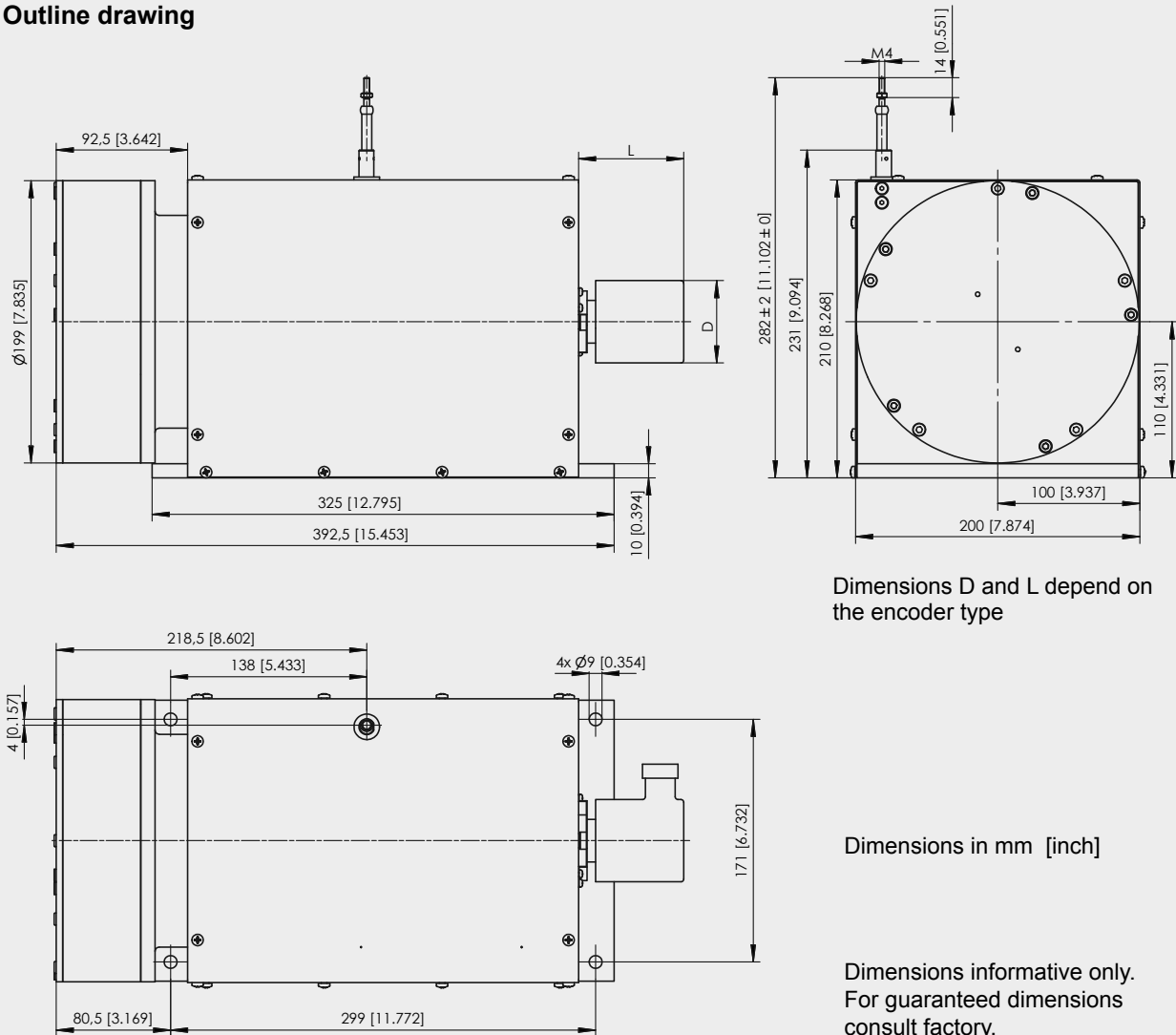
incremental, HSSI:

CONN-CONIN-12F-G

Order example: WS60 - 60000 - HSSI - M4

Cable forces, typical at 20 °C	Range	Max. pull-out force	Min. pull-in force
	[mm]	[N]	[N]
	60000	17.0	6.5

Outline drawing



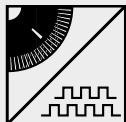
POSIWIRE®

LD5VC and PP24VC

Incremental Output

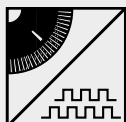


Signal conditioner LD5VC Incremental



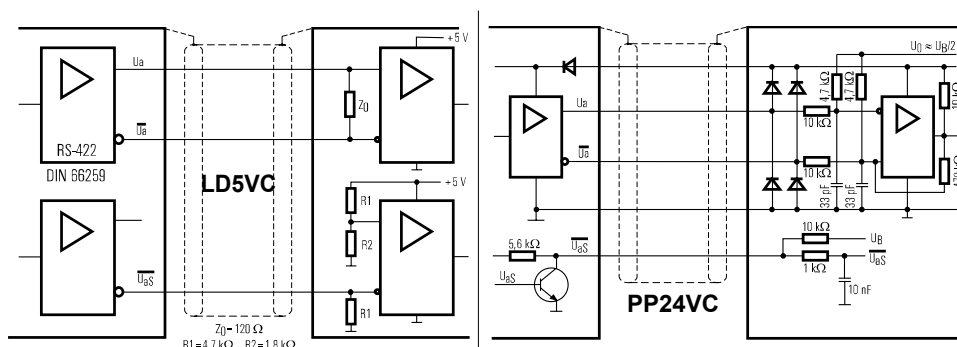
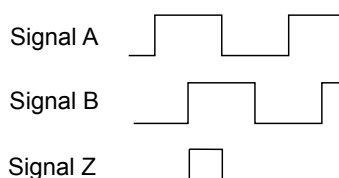
Interface	Line driver RS422
Excitation voltage	5 V DC $\pm 10\%$
Excitation current	150 mA max. w/o load
Output frequency	300 kHz max.
Output current	20 mA per channel
Signal level	
Ud High at Id=20 mA	≥ 2.5 V
Ud Low at Id=20 mA	≤ 0.5 V
Transition time positive edge	< 100 ns
Transition time negative edge	< 100 ns
Stability (temperature)	$\pm 20 \times 10^{-6}$ / °C f.s. (sensor mechanism)
Operation temperature	-20 ... +85 °C
Protection	Short circuit, overvoltage
EMC	According to EN 61326:2006

Signal conditioner PP24VC Incremental



Interface	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)	$\pm 20 \times 10^{-6}$ / °C f.s. (sensor mechanism)
Operating temperature	-20 ... +85 °C
Protection	Reverse polarity, short circuit, overvoltage
EMC	According to EN 61326:2006

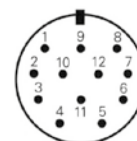
Output signals



Signal wiring / connection

Signal name	CONN-CONIN-12F, connector pin no.
Excitation +	12
Excitation GND (0 V)	10
Signal A	5
Signal $\bar{A}$	6
Signal B (A + 90°)	8
Signal $\bar{B}$	1
Signal Z (reference pulse)	3
Signal $\bar{Z}$	4
Fault detection signal $\bar{U}_{as}$	7
Shield	Housing

View to sensor
connector



CONN-CONIN-12F

POSIWIRE®

HSSI

Absolute SSI Encoder



Signal conditioner HSSI

Absolute encoder
synchronous serial



Excitation voltage	10 ... 30 V DC
Excitation current	100 mA
Interface	Standard SSI
Lines / drivers	Clock and data / RS422
Code	Gray
Resolution	12 + 12 Bit
3 dB cutoff frequency	500 kHz
Control input	Direction
Preset key	Zero adjustment with optical response
Alarm output	Alarm bit (SSI option), warning bit
Status LED	Green = OK, red = alarm
Connection	12 pin male socket

Data format

Resolution	Clock												
	T1	T2	T3	...	T12	T13	...	T21	T22	T23	T24	T25	T26
	Data bits												
24 bit	M11	M10	M9	...	M0	S11	...	S3	S2	S1	S0	0	
Mx = multiturn bits, Sx = singleturn bits													

Mx = multiturn bits, Sx = singleturn bits

Transmission rate

Cable length	Baud rate
< 50 m	< 400 kHz
< 100 m	< 300 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

Note:

Extension of the cable length will reduce the maximum transmission rate.

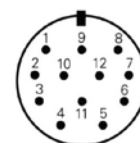
Signal wiring

Signal name	Color	Connector pin no.
Excitation +	White	8
Excitation GND (0 V)	Brown	1
CLOCK	Yellow	3
CLOCK	Green	11
DATA	Pink	2
DATA	Gray	10
Direction *	Blue	5
0 V Signal output	Black	12

* Excitation + = cw increasing code, 0 V = cw decreasing code

Connection

View to sensor
connector



CONN-CONIN-12F

POSIWIRE®

HPROF

Absolute Profibus Encoder



Interface HPROF

Absolute encoder
Profibus



Excitation voltage	10 ... 30 V DC
Excitation current	250 mA
Interface	RS485
Protocol	Profibus DP with encoder profile C2
Resolution	12 (10 ... 14) + 12 bit
Output code	Binary
Baud rate	Automatically selected between 9,6 kBaud and 12 MBaud
Programmability	Resolution, preset, direction
Integrated special functions	Velocity, acceleration, operating time
Bus terminating resistor	Selectable via DIP switch
Connection	Bus cover with T manifold
EMC	EN 61326: class A

Signal wiring

Signal name	Cable terminal no. (bus cover)
U _B in	1
0V in	2
U _B out	3
0V out	4
B in	5
A in	6
B out	7
A out	8

POSIWIRE®

HINT

Absolute Interbus Encoder



Interface HINT

Absolute encoder
Interbus



Excitation voltage	10 ... 30 V DC
Excitation current	250 mA
Interface	Interbus, ENCOM profile K3 (configurable), K2
Output code	32 Bit binary
Baud rate	500 kBaud
Data refresh	Every 600 µs
Resolution	12 (10 ... 14) + 12 bit
Programmability	Direction, preset, offset, resolution
Connection	Bus cover with T manifold
EMC	EN 50081-2, EN 50082-2

Data format

Interbus K2/K3

	Differential signals (RS485) ENCOM profile K3, K2, 32 Bit, binary process data				
DT-Format	Supi address	0	1	2	3
(according to the Phoenix company)	Byte No.	3	2	1	0
ID code K2	36 H (= 54 dec.)				
ID code K3	37 H (= 55 dec.)				

Signal wiring

Signal name	Cable terminal no. (bus cover)
U _B +	1
GND	2
DI1	3
$\overline{\text{DI1}}$	4
DO1	5
$\overline{\text{DO1}}$	6
DO2	7
$\overline{\text{DO2}}$	8
DI2	9
$\overline{\text{DI2}}$	10
RBST	11
GND	12

POSIWIRE®

HDEV

Absolute DeviceNet Encoder



Interface HDEV

Absolute encoder
DeviceNet



Excitation voltage	10 ... 30 V DC
Excitation current	250 mA
Interface	CAN highspeed according to ISO/DIS 11898 CAN specification 2.0 A (11 bit identifier)
Protocol	DeviceNet according rev. 2.0, programmable encoder
Resolution	12 (10 ... 14) + 12 bit
Output code	Binary
MAC-ID	Selectable via DIP switch
Data refresh	Every 5 ms
Baud rate	Selectable via DIP switch: 125 kBaud, 250 kBaud, 500 kBaud
Programmability	Resolution, preset, direction
Bus terminating resistor	Selectable via DIP switch
Connection	Bus cover with T manifold
EMC	EN 50081-2, EN 50082-2

Recommended transmission

Characteristic impedance	135 ... 165 Ω (3 ... 20 MHz)
Operating capacity	< 30 pF
Loop resistance	< 110 Ω /km
Wire diameter	> 0.63 mm
Wire width	> 0.34 mm ²

Transmission rate

Segment length	Kbit/s
500 m	125
250 m	250
100 m	500

Signal wiring

Signal name	Cable terminal no. (bus cover)
U _B in	1
0V in	2
CAN-L	3
CAN-H	4
Drain	5
Drain	6
CAN-H	7
CAN-L	8

POSIWIRE®

HCAN/HCANOP

Absolute CAN / CANopen Encoder



Interface
HCAN/HCANOP
 Absolute encoder
 CANopen/CAN Layer 2



Excitation voltage	10 ... 30 V DC
Excitation current	250 mA
Interface	CAN highspeed according to ISO/DIS 11898
Protocol	CANopen according DS301 with encoder profile DSP406, programmable encoder according class C2
Resolution	12 (10 ... 14) + 12 bit
Output code	Binary
Data refresh	Every millisecond (selectable), on request
Baud rate	Selectable 10 up to 1000 kbit/s
Base identifier	Selectable via DIP switch
Programmability	CANopen: direction, resolution, preset, offset CAN L2: direction, limit values
Integrated special functions	CANopen: velocity, acceleration, rotary axis, limit values CAN L2: direction, limit values
Connection	Bus cover with T manifold
EMC	EN 50081-2, EN 50082-2

Signal wiring

Signal name	Cable terminal no. (bus cover)
U _B in	1
0V in	2
CAN in – (dominant L)	3
CAN in + (dominant H)	4
CAN GND in	5
CAN GND out	6
CAN out + (dominant H)	7
CAN out – (dominant L)	8
0V out	9
U _B out	10