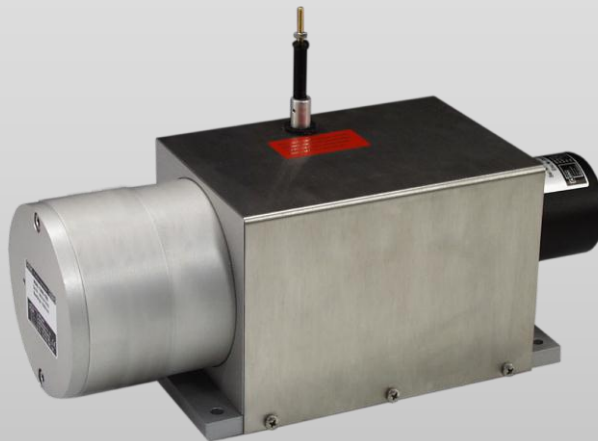


POSIWIRE[®]

Cable Extension Position Sensors

WS60
Position Sensor

Datasheet



Copyright

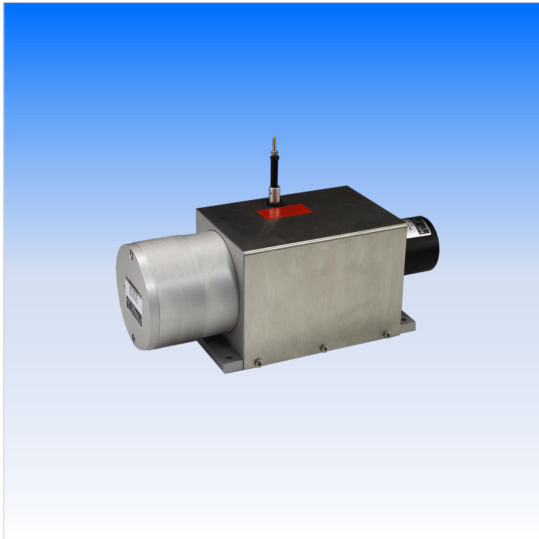
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Absolute encoder output



Sensor features

- Measurement range up to 60000 mm
- Protection class IP52, encoder IP64
- Absolute encoder output



Specifications

Output	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
Resolution for 12 bit per revolution (4096 steps/ revolution)	0.125 mm, (8 steps / mm)
Linearity	±0.10% f.s. (standard) ±0.025% f.s. (optional)
Sensing device	Absolute encoder
Housing material	Aluminium, stainless steel and plastic measuring cable: stainless steel
Protection class	IP52, encoder IP64
Connection	Depending on the type of encoder: connector or Bus cover
Temperature range	-20 ... +85 °C
Weight	Approx. 15 kg max.
EMC	DIN EN 61326-1:2013

Cable forces typical at = 20 °C	Measurement range	Maximum pull-out force	Minimum pull-in force
	[mm]	[N]	[N]
	60000	17.0	6.5

Order codeWS60 – 1 – 2 – 3 – 4**1 Measurement range (in mm)**

60000

2 Output

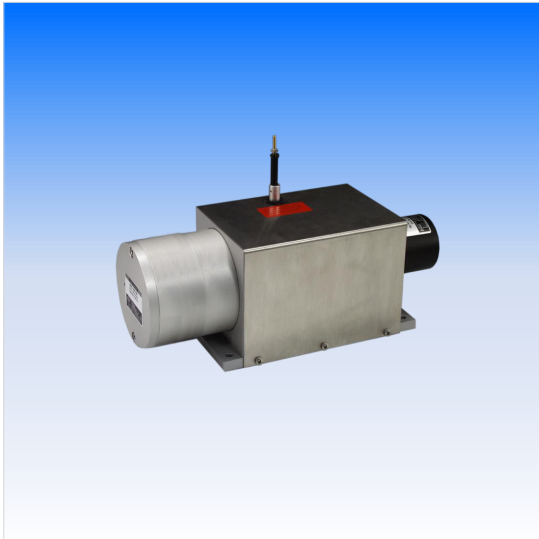
HSSI = Absolute encoder with synchronous serial output (SSI)
HPROF = Absolute encoder with Profibus interface
HINT = Absolute encoder with Interbus interface
HDEV = Absolute encoder with DeviceNet interface
HCAN = Absolute encoder with CAN-interface
HCANOP = Absolute encoder with CANopen interface

3 Linearity (optional)**L025** = ±0.025% f.s.**4 Cable fixing**

M4 = M4 cable fixing
SB0 = cable clip

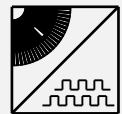
Order example**WS60 – 60000 – HSSI – M4****Accessories:****Mating connector CONN-CONIN-12F-G (see page 18)**

Incremental encoder output



Sensor features

- Measurement range up to 60000 mm
- Protection class IP52, encoder IP64
- Incremental encoder output



Specifications

Output	LD5VC = Incremental encoder TTL compatible PP24VC = Incremental encoder HTL compatible
Resolution	8 pulses / mm (32 edges / mm)
Linearity	±0.10% f.s (standard) ±0.025% f.s. (optional)
Sensing device	Incremental encoder
Housing material	Aluminium, stainless steel and plastic measuring cable: stainless steel
Protection class	IP52, encoder IP64
Connection	Connector 12 pin
Temperature range	-20 ... +85 °C
Weight	Approx. 15 kg max.
EMC	DIN EN 61326-1:2013

Cable forces typical at = 20 °C	Measurement range	Maximum pull-out force	Minimum pull-in force
	[mm]	[N]	[N]
	60000	17.0	6.5

Order code

WS60 - 1 - 2 - 3 - 4

1 Measurement range (in mm)

60000

2 Output

LD5VC = Incremental encoder TTL compatible
PP24VC = Incremental encoder HTL compatible

3 Linearity (optional)

L025 = ±0.025% f.s.

4 Cable fixing

M4 = M4 cable fixing
SB0 = cable clip

Order example

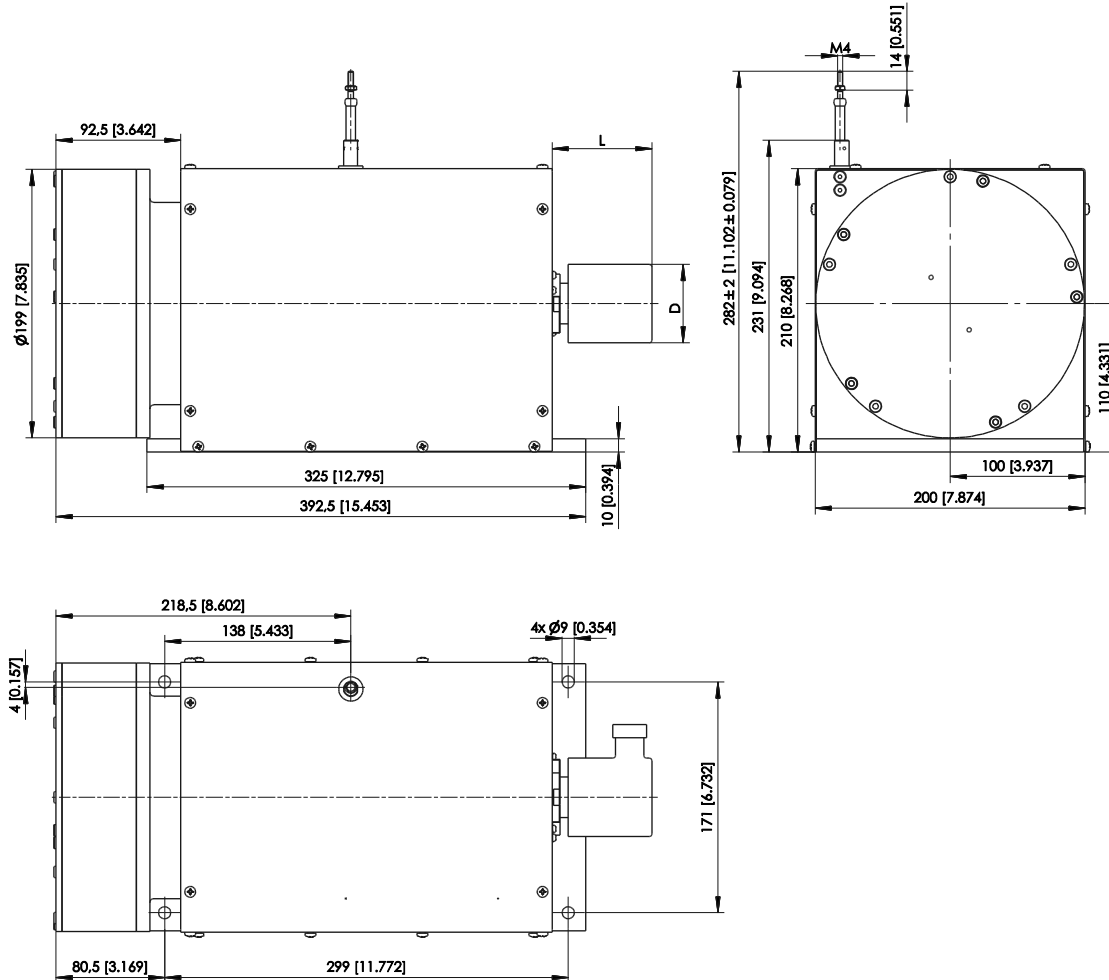
WS60 - 60000 - LD5VC - M4

Accessories:

Mating connector CONN-CONIN-12F-G (see page 18)

Dimensions

Measurement range 60000 mm, absolute encoder output, incremental encoder output,



Dimensions in mm [inch]

Dimensions D and L depending on the encoder.


Dimensions informative only.

For guaranteed dimensions consult factory.

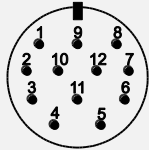
Output specifications

Incremental outputs

Signal conditioner LD5VC

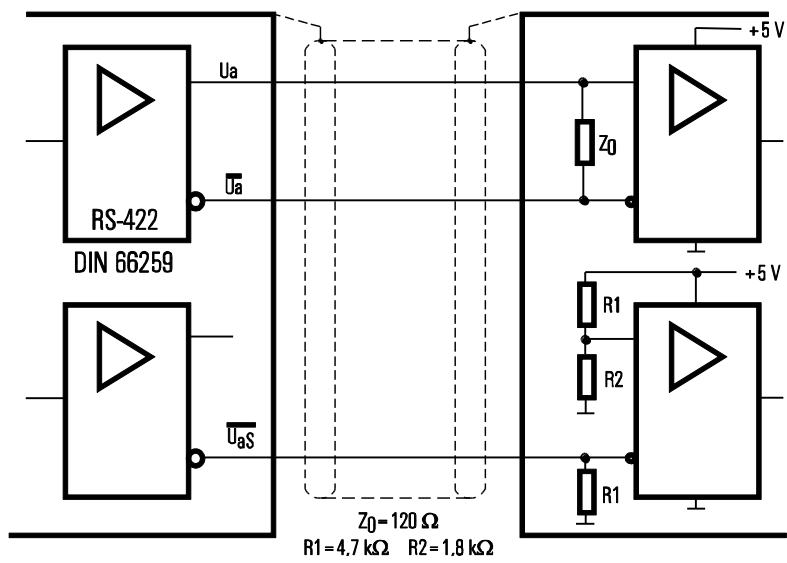
Incremental 	Excitation voltage	5 V DC ±10 %
	Excitation current	150 mA max. w/o load
	Interface	Line driver RS422
	Output frequency	300 kHz max.
	Output current	20 mA per channel
	Signal level	
	U _d High bei I _d = 20 mA	≥ 2.5 V
	U _d Low bei I _d = 20 mA	≥ 0.5 V
	Transition time positive edge	< 100 ns
	Transition time negative edge	< 100 ns
	Stability (temperature)	±20 x 10 ⁻⁶ / °C f.s. (sensor-mechanism)
	Operation temperature	-20 ... +85 °C
	Protection	Short circuit, overvoltage
	EMC	DIN EN 61326-1:2013

Signal wiring

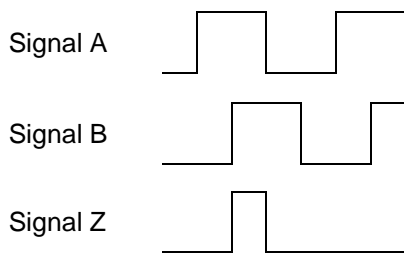
Signal	Connector pin no.	View to sensor connector
Excitation +	12	
Excitation GND	10	
Signal A	5	
Signal \bar{A}	6	
Signal B (A + 90°)	8	
Signal \bar{B}	1	
Signal Z (reference pulse)	3	
Signal \bar{Z}	4	
Fault detection signal	7	
Schirm	housing	

CONN-CONIN-12F


Recommended processing circuit



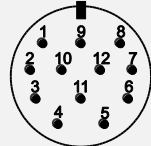
Output signals



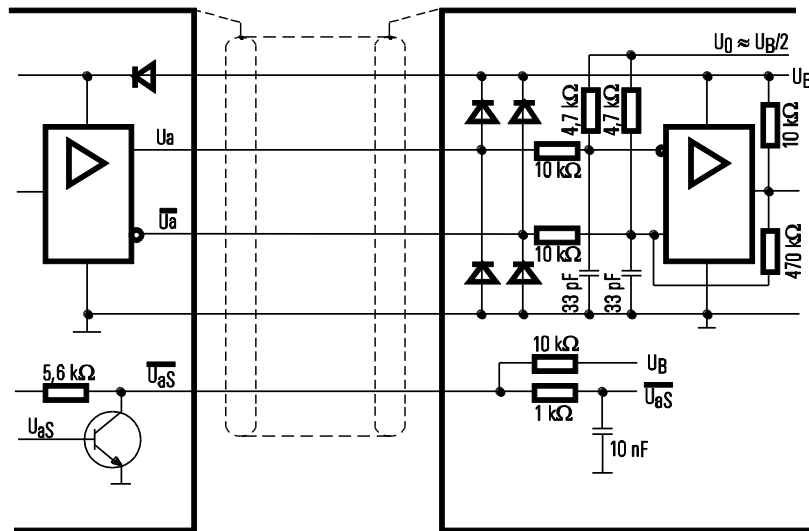
Signal conditioner PP24VC

Incremental 	Excitation voltage	10 ... 30 V DC
	Excitation current	150 mA max. w/o load
	Interface	Push-pull line driver (24 V-HTL)
	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 f.s. (sensor mechanism)
	Operating temperature	Refer to output specification
	Protection	Reverse polarity, short circuit, overvoltage
	EMC	DIN EN 61326-1:2013

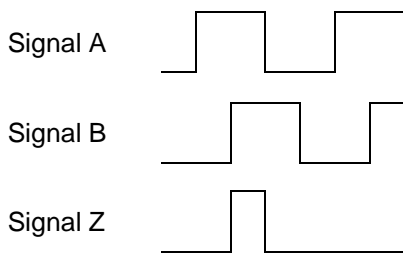
Signal wiring

Signal	Connector pin no.	View to sensor connector
Excitation +	12	
Excitation GND	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	7	
Shield	housing	

Recommended circuit




Output signals



Absolute encoder outputs

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	$\overline{\text{DIRECTION}}$
	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	

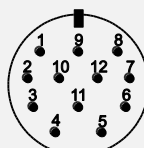
Data format (Mx = Multiturn bits, Sx = Singleturn bits)

Resolution	Clock													
	T1	T2	T3	...	T12	T13	...	T21	T22	T23	T24	T25	T26	
	Data bits													
24 Bit	M11	M10	M09	...	M0	S11	...	S3	S2	S1	S0	0		

Transmission rate

Cable length	Baud rate	Note: Extension of the cable length will reduce the maximum transmission rate.
< 50 m	< 400 kHz	
< 100 m	< 300 kHz	
< 200 m	< 200 kHz	
< 400 m	< 100 kHz	

Signal wiring

Signal	Connector pin no.	Cable color	View to sensor connector
Excitation +	8	white	 CONN-CONIN-12F
Excitation GND	1	brown	
CLOCK	3	yellow	
$\overline{\text{CLOCK}}$	11	green	
DATA	2	pink	
$\overline{\text{DATA}}$	10	grey	
Direction*	5	blue	
0 V Signal output	12	black	

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

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	Din EN 61326: Class A

Signal wiring

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

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
	Resoution	12 (10 ... 14) + 12 bit
	Programmability	Direction, preset, offset, resolution
	Connection	Bus cover with T manifold
	EMC	DIN EN 61326-1:2013


Data format K2 / K3

	Differential signals (RS485) ENCOM profile K3, K2, 32 Bit, binary process data				
DÜ-Format	Süpi-Adresse	0	1	2	3
(according to the Phoenix company)	Byte no.	3	2	1	0
ID-Code K2	36H (=54 dez.)				
ID-Code K3	37H (=55 dez.)				

Signal wiring

Signal	Cable terminal no. (bus cover)
U _b +	1
GND	2
DI1	4
$\overline{DI1}$	6
D01	3
$\overline{D01}$	5
D02	7
$\overline{D02}$	8
DI2	9
$\overline{D02}$	10
RBST	11
GND	12

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
	Date 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	DIN EN 61326-1:2013

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

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	DIN EN 61326-1:2013

Signal wiring

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

Accessories

Plug-in connector CONIN, 12 pin (straight coupling)

Order code:

CONN-CONIN-12F-G

Cable diameter
max. 6 ... 8 mm

