WACHENDORFF
The Encoder Experts

Online Data sheet

Encoder WDG 100I

www.wachendorff-automation.com/wdg100i

Wachendorff Automation

... systems and encoders

- Complete systems
- Industrial rugged encoders to suit your application
- Standard range and customer versions
- Maximum permissible loads
- 48-hour express production
- Made in Germany
- Worldwide distributor network

IndustrieROBUST

Encoder WDG 100I

Illustration similar

- Rugged and extremely thin thru-bore encoder for extension on power motors
- Thru-Bore, bore size max. 42 mm
- Balanced stainless steel clamping ring for smooth running
- Insulating sleeve to protect the bearings from currents
- Full connection protection with 10 VDC up to 30 VDC
- Easy mounting
- Meets protection class IP54
- Up to 20,480 PPR
- Optional: -40 °C up to +80 °C [-40 °F up to +176 °F]
  Protection to IP55 all around

www.wachendorff-automation.com/wdg100i

Resolution	
Pulses per revolution PPR	up to 20480 PPR

Mechanical Data	
Flange	hollow shaft (through-bored)
Flange material	aluminum
Housing material	aluminum, powder coated
Torque supports	incl. 1 torque support WDGDS10012
- 1. Spring plate compensation	axial: ±0.8 mm [0.0315"], radial: ±0.2 mm [0.0079"]
Flange diameter	Ø 100 mm [Ø 3.543"]

Shaft(s)	
Shaft material	stainless steel, (insulation sleeve: POM-C)
Starting torque	approx. 1.5 Ncm [2.124 in-ozf] at ambient temperature
Fixing	clamping screw M4 with hexagon socket

Shaft	Ø 25 mm [Ø 0.984"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 25.4 mm [Ø 1"] Ordern No: 1Z
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 30 mm [Ø 1.181"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 32 mm [Ø 1.26"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 38 mm [Ø 1.496"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 40 mm [Ø 1.575"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Shaft	Ø 42 mm [Ø 1.654"]
Advice	with insulating sleeve
Shaft length	L: 48.8 mm [1.921"]
Insertion depth min.	29 mm [1.142"]
Max. Permissible shaft loading radial	200 N [20.394 kp]
Max. Permissible shaft loading axial	100 N [10.197 kp]

Bearings	
Bearings type	2 precision ball bearings
Nominale service life	3 x 10'10 revs. at 100 % rated shaft load 1 x 10'11 revs. at 40 % rated shaft load 1 x 10'12 revs. at 20 % rated shaft load
Max. operating speed	3500 rpm

Machinery Directive: basic data safety integrity level	
$MTTF_d$	200 a
Mission time (TM)	25 a
Nominale service life (L10h)	1 x 10'12 revs. at 20 % rated shaft load and 3500 rpm
Diagnostic coverage (DC)	0 %

Electrical Data	
Power supply/Current consumption	4,75 VDC up to 5,5 VDC: typ. 70 mA (100 mA only F05, P05)
Power supply/Current consumption	5 VDC up to 30 VDC: typ. 70 mA
Power supply/Current consumption	10 VDC up to 30 VDC: typ. 70 mA (100 mA only F24, P24, 645)
Operating principle	optical
Output circuit	TTL TTL, RS422 compatible, inv. HTL HTL, inv. 1 Vpp sin/cos
Pulse frequency	TTL ≤ 5000 ppr: max. 200 kHz HTL ≤ 5000 ppr: max. 200 kHz TTL more than 1200 ppr: max. 2 MHz HTL more than 1200 ppr: max. 600 kHz 1 Vpp sin/cos: max. 100 kHz
Channels	AB ABN and inverted signals
Load	max. 40 mA / channel @ 1 Vpp sin/cos: min. 120 Ohm
Circuit protection	circuit type H24 and R24 only
Electric strength (DIN EN 60243-2)	Insulating sleeve: 500 V

Accuracy	
Phase offset	90° ± max. 7.5 % of the period duration
pulse-/pause-ratio	≤5000 ppr: 50 % ± max. 7 % Output circuits F24, P24, F05, P05, 645: 50 % ± max. 10 %

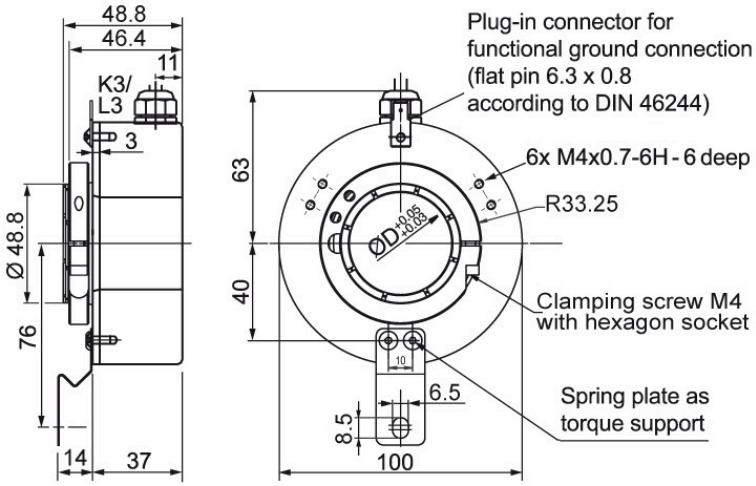
Environmental data	
ESD (DIN EN 61000-4-2):	8 kV
Burst (DIN EN 61000-4-4):	2 kV
includes EMC:	DIN EN 61000-6-2 DIN EN 61000-6-3
Vibration: (DIN EN 60068-2-6)	50 m/s² (10 Hz up to 2000 Hz)
Shock: (DIN EN 60068-2-27)	1000 m/s² (6 ms)
Electrial Safety:	according DIN VDE 0160

Duty information	
Customs tariff number:	90318020
Country of origin:	Germany

General Data	
Weight	approx. 900 g [31.746 oz]
Connections	cable or connector, radial
Protection rating (EN 60529)	IP54
Operating temperature	-20 °C up to +80 °C [-4 °F up to +176 °F] 1 Vpp: -10 °C up to +70 °C [+14 °F up to +158 °F]
Storage temperature	-30 °C up to +80 °C [-22 °F up to 176 °F]

More Information
General technical data and safety instructions **http://www.wachendorff-automation.com/gtd**
Options **http://www.wachendorff-automation.com/acc**

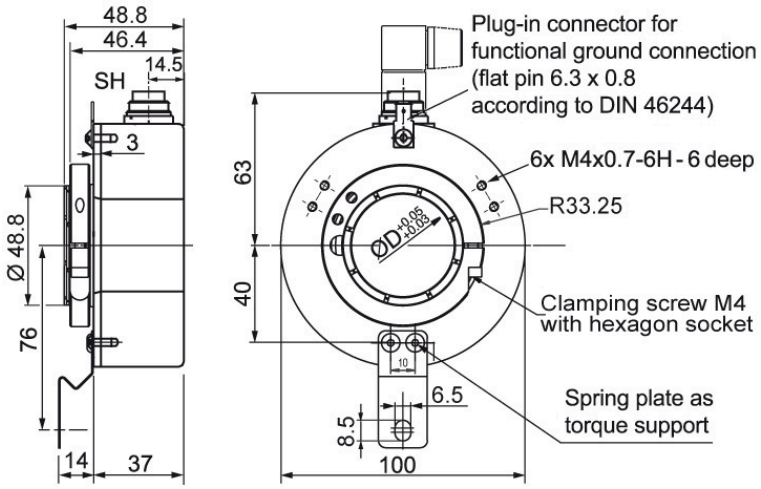
Cable connection K3, L3 with 2 m cable



Description		ABN inv. poss.
K3	radial, shield not connected	•
L3	radial, shield connected to encoder housing	•

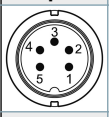
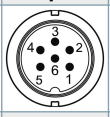
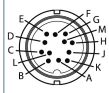
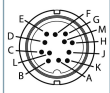
Assignments			
	K3, L3	**K3, L3**	**L3**
Circuit	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN
GND	WH	WH	WH
(+) Vcc	BN	BN	BN
A	GN	GN	GN
B	YE	YE	GY
N	GY	GY	BK
-	-	-	-
A inv.	-	RD	YE
B inv.	-	BK, (BU at ACA)	PK
N inv.	-	VT	VT
Shield	flex	flex	flex

Connector (M16x0.75) SH, 5-, 6-, 8-, 12-pin

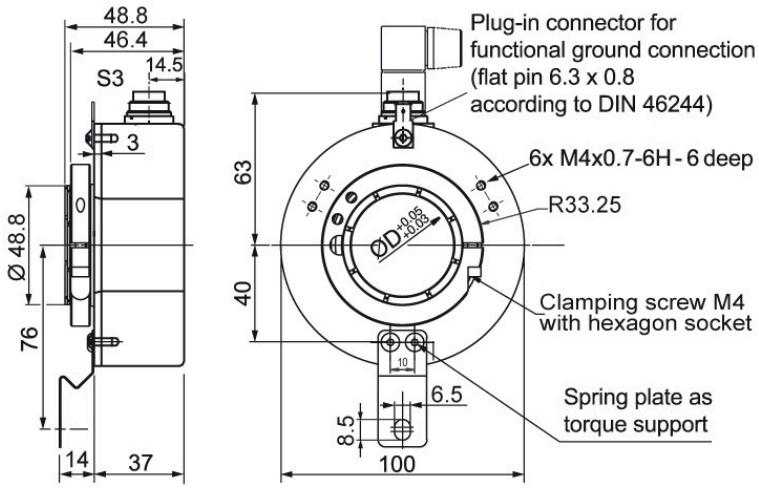


Description		ABN inv. poss.
SH5	radial, 5-pin, Connector connected to encoder housing	-
SH6	radial, 6-pin, Connector connected to encoder housing	-
SH8	radial, 8-pin, Connector connected to encoder housing	•
SH12	radial, 12-pin, Connector connected to encoder housing	•

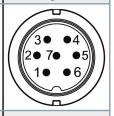
Assignments

	SH5	SH6	SH8	SH8	SH12	SH12
	5-pin	6-pin	8-pin	8-pin	12-pin	12-pin
						
Circuit	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	P05, R05, P24, R24, R30, 245, 645	SIN	P05, R05, P24, R24, 245, 645, R30	SIN
GND	1	6	1	1	K, L	K, L
(+) Vcc	2	1	2	2	M, B	M, B
A	3	2	3	3	E	E
B	4	4	4	4	H	H
N	5	3	5	5	C	C
-	-	-	-	-	-	-
A inv.	-	-	6	6	F	F
B inv.	-	-	7	7	A	A
N inv.	-	-	8	8	D	D
n. c.	-	5	-	-	G, J	G, J
Shield	-	-	-	-	-	-

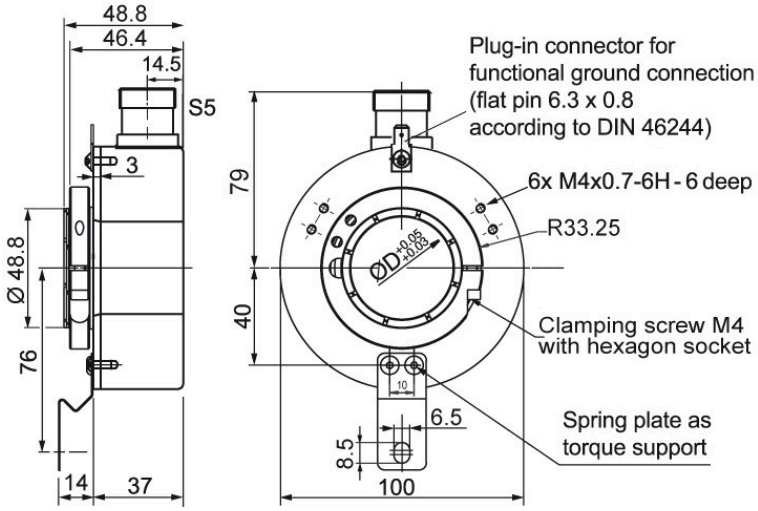
Connector (M16x0.75) S3, 7-pin



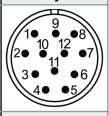
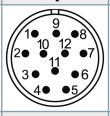
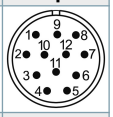
Description		ABN inv. poss.
S3	radial, 7-pin, Connector connected to encoder housing	-

Assignments	
	S3
	7-pin
	
Circuit	F05, H05, F24, H24, H30
GND	1
(+) Vcc	2
A	3
B	4
N	5
-	-
A inv.	-
B inv.	-
N inv.	-
n. c.	6, 7
Shield	-

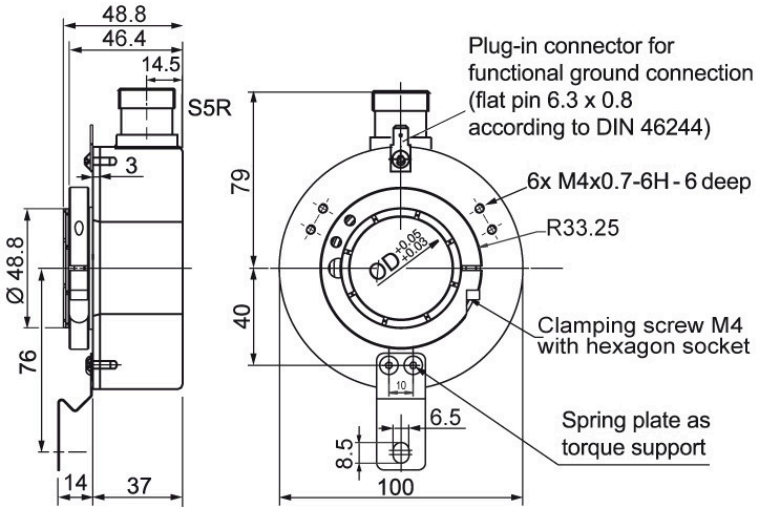
Connector (M23) S5, 12-pin



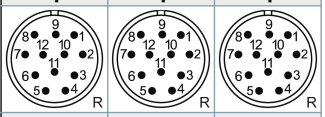
Description		ABN inv. poss.
S5	radial, 12-pin, Connector connected to encoder housing	•

Assignments			
	S5	**S5**	**S5**
	12-pin	**12-pin**	**12-pin**
			
Circuit	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN
GND	10	10	10
(+) Vcc	12	12	12
A	5	5	5
B	8	8	8
N	3	3	3
-	-	-	-
A inv.	-	6	6
B inv.	-	1	1
N inv.	-	4	4
n. c.	1, 2, 4, 6, 7, 9, 11	2, 7, 9, 11	2, 7, 9, 11
Shield	-	-	-

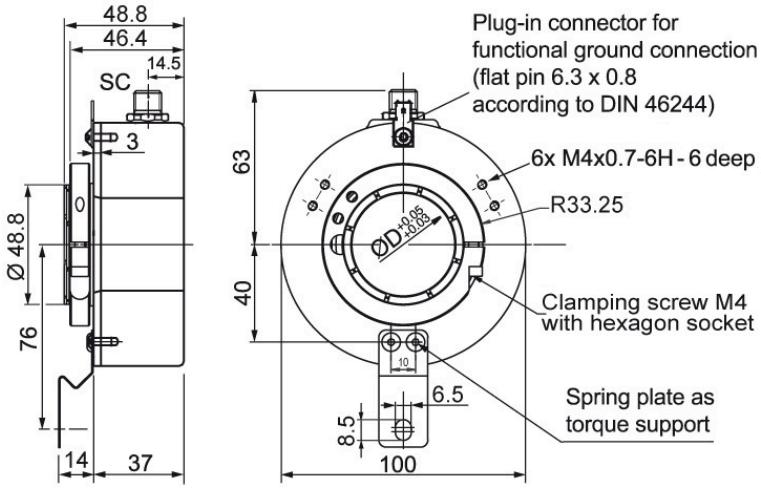
Connector (M23) S5R, 12-pin (clockwise)



Description		ABN inv. poss.
S5R	radial, 12-pin, Connector connected to encoder housing	•

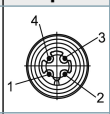
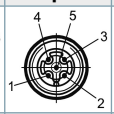
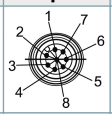
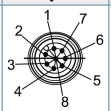
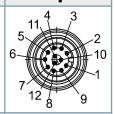
Assignments			
	S5R	**S5R**	**S5R**
	12-pin	**12-pin**	**12-pin**
			
Circuit	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN
GND	10	10	10
(+) Vcc	12	12	12
A	5	5	5
B	8	8	8
N	3	3	3
-	-	-	-
A inv.	-	6	6
B inv.	-	1	1
N inv.	-	4	4
n. c.	1, 2, 4, 6, 7, 9, 11	2, 7, 9, 11	2, 7, 9, 11
Shield	-	-	-

Sensor-connector (M12x1) SC, 4-, 5-, 8-, 12-pin



Description		ABN inv. poss.
SC4	radial, 4-pin, Connector connected to encoder housing	-
SC5	radial, 5-pin, Connector connected to encoder housing	-
SC8	radial, 8-pin, Connector connected to encoder housing	•
SC12	radial, 12-pin, Connector connected to encoder housing	•

Assignments

	SC4	SC5	SC8	SC8	SC12
	4-pin	5-pin	8-pin	8-pin	12-pin
					
Circuit	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	P05, R05, P24, R24, R30, 245, 645	SIN	P05, R05, P24, R24, 245, 645, R30
GND	3	3	1	1	3
(+) Vcc	1	1	2	2	1
A	2	4	3	3	4
B	4	2	4	5	6
N	-	5	5	7	8
-	-	-	-	-	-
A inv.	-	-	6	4	9
B inv.	-	-	7	6	7
N inv.	-	-	8	8	10
n. c.	-	-	-	-	2, 5, 11, 12
Shield	-	-	-	-	-

Options

Low temperature	Order key
The encoder WDG 100I with the output circuit types F24, H24, P24, R24, F05, H05, P05, R05, 245, 645 is also available with the extended temperature range -40 °C up to +80 °C [-40 °F up to +176 °F] (measured at the flange).	**ACA**

IP55 all around (not 1 Vpp Sin/Cos)	Order key
The encoder WDG 100I can be supplied in a full IP55 version. Max. RPM: 1500 rpm Permitted Shaft-Loading, axial: 100 N [10.197 kp] Permitted Shaft-Loading, radial: 120 N [12.236 kp] Max. PPR: 20480 ppr Starting-torque: approx. 5 Ncm [7.081 in-ozf] at ambient temperature	**ACP**

Cable length	Order key
The encoder WDG 100I can be supplied with more than 2 m cable. The maximum cable length depends on the supply voltage and the frequency; see https://www.wachendorff-automation.com/download-gtd-incremental-encoders/ Please extend the standard order code with a three figure number, specifying the cable length in decimetres. Example: 5 m cable = 050	**XXX = Decimeter**

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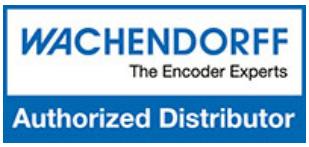
Example Order No.	Type						Your encoder
WDG 100I	WDG 100I						WDG 100I
	Bore size						
38	25; 1Z; 30; 32; 38; 40; 42						
	Pulses per revolution PPR:						
1024	512, 1024, 2048, 2500, 3600, 4096, 4500, 5000, 8192, 10240, 16384, 20480 1 Vpp Sin/Cos only 1024, 2048 Other PPRs on request						
	Channels:						
ABN	AB, ABN						
	Output circuit						
H24	**Resolution PPR**	**Power supply VDC**	**Output circuit**		**-**	**Order key**	
	up to 2500	5 - 30	HTL (TTL at 5 VDC)		-	H30	
		5 - 30	HTL, inv. (TTL/RS422 comp. at 5 VDC)		-	R30	
	up to 5000	4.75 - 5.5	TTL		-	H05	
		4.75 - 5.5	TTL, RS422 comp., inverted		-	R05	
		10 - 30	HTL		-	H24	
		10 - 30	HTL inverted		-	R24	
		10 - 30	TTL, RS422 comp., inverted		-	245	
	8192 up to 20480	4.75 - 5.5	TTL		-	F05	
		4.75 - 5.5	TTL, RS422 comp., inverted		-	P05	
		10 - 30	HTL		-	F24	
		10 - 30	HTL inverted		-	P24	
		10 - 30	TTL, RS422 comp., inverted		-	645	
	1024, 2048	4.75 - 5.5	1 Vpp sin/cos		-	SIN	
	Electrical connections						
K3	**Description**				**ABN inv. poss.**	**Order key**	
	Cable: length (2 m standard, WDG 58T: 1 m)						
	radial, shield not connected				•	K3	
	radial, shield connected to encoder housing				•	L3	
	Connector: (shield connected to encoder housing)						
	connector, M16x0.75, 5-pin, radial				-	SH5	
	connector, M16x0.75, 6-pin, radial				-	SH6	
	connector, M16x0.75, 8-pin, radial				•	SH8	
	connector, M16x0.75, 12-pin, radial				•	SH12	
	connector, M16x0.75, 7-pin, radial				-	S3	
	connector, M23, 12-pin, radial				•	S5	
	connector, clockwise pin count, M23, 12-pin, radial				•	S5R	
	sensor-connector, M12x1, 4-pin, radial				-	SC4	
	sensor-connector, M12x1, 5-pin, radial				-	SC5	
	sensor-connector, M12x1, 8-pin, radial				•	SC8	
	sensor-connector, M12x1, 12-pin, radial				•	SC12	
	Options						
	Description				**Order key**		
	Low temperature				ACA		
	IP55				ACP		
	Without option				Empty		
	Cable length				XXX = Decimeter		

Example Order No.=	WDG 100I	38	1024	ABN	H24	K3		WDG 100I							Your encoder



For further information please contact our local distributor.
Here you find a list of our distributors worldwide.
https://www.wachendorff-automation.com/contact-en/wachendorff-world-wide/

WACHENDORFF

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