

Optical Absolute Encoder, End shaft Singleturn, high-resolution, 18 bit with SSI interface



GDA2S



Features

- 18 bit resolution, 262144 steps/revolution
- Gray or binary code
- High code switching speed
- Electronic zero-point setting

Electrical data

Operating voltage	10...30 VDC
Current consumption	Max. 80 mA (w/o load), at 24 VDC
Max. resolution	18 bit (1 measuring step = 5°)
SSI pulse frequency	62.5 kHz to 1.5 MHz
Monoflop time	20 μs
Pulse pause	Min. 25 μs
Code switching speed	26 MHz
Accuracy	±0.01°
Rotating direction	Increasing position values when viewing flange side with clockwise (cw) shaft rotation.

Mechanical data

Speed	
mechanical	Max. 10000 rpm
electrical	Max. 6000 rpm
Operating torque	Typ. 0.0175 Nm (3000 rpm 20 °C)
Moment of inertia	18.4 x 10 ⁻⁷ kgm ²
Material	Aluminum
Weight	Approx. 300 g

Ambient conditions

Operating temperature	-20...+85 °C
Protection type	IP 64
Humidity	Max. relative humidity 95 %, non-condensing
Resistance	
Vibration	DIN EN 60068-2-6 ≤100 m/s ² , 10-2000 Hz
Shock	DIN EN 60068-2-27 ≤500 m/s ² , 11 ms
Interference resistance	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

Inputs

Control signal Zero	
Level High	> 0.7 UB
Level Low	< 0.3 UB
Zeroing input with 10 kohms against GND.	
SSI	RS422

Outputs

SSI	RS422
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GDA2S

Order designation

Order No.	End shaft
1	12 mm, clamping ring, coupling spring, IP 64
	Resolution / Coding
30	18 bit / Gray, 10...30 V
32	18 bit / Binary, 10...30 V
	Connection
A1	C housing plug, 12-pin, radial
41	Cable 9-wire, radial

GDA2S.1 02

Connection assignment, cable

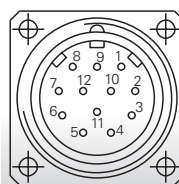
Cable Color	Assignment
brown	UB
green	Pulse +
yellow	Pulse -
pink	Data +
gray	Data -
white	GND
red	n.c.
black	Zero
blue	n.c.
Cable	9 x 0.14 mm ² , PVC, shielded, 2 m

Accessories

Order No.	
Z 119.042	Coupling spring
	Extension cord with connector on one end
Z 130.001	Connector without cable
Z 130.003	Connector with 2 m cable
Z 130.005	Connector with 5 m cable
Z 130.007	Connector with 10 m cable
NA214	Suitable position display

Connection assignment, 12-pin plug

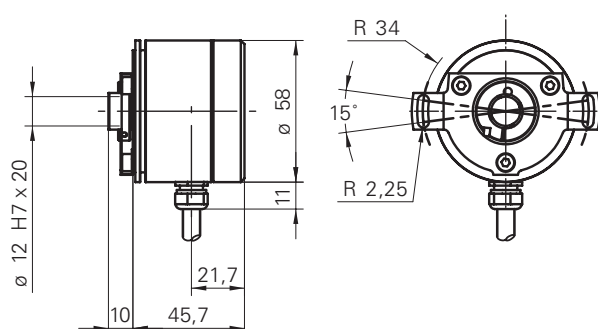
Plug	Extension Cable Color Z 130	Assignment
1	brown	UB
2	black	GND
3	blue	Pulse +
4	beige	Data +
5	green	ZERO
6	yellow	Data -
7	violet	Pulse -
8	brown/yellow	-
9	pink	-
10	black/yellow	-
11	-	-
12	-	-



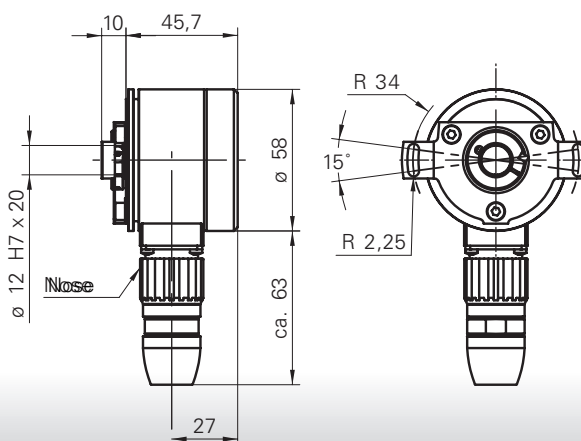
Please use leads twisted in pairs for extension cables.

Dimensions

GDA2S with cable



GDA2S with C plug



Optical Absolute Encoder

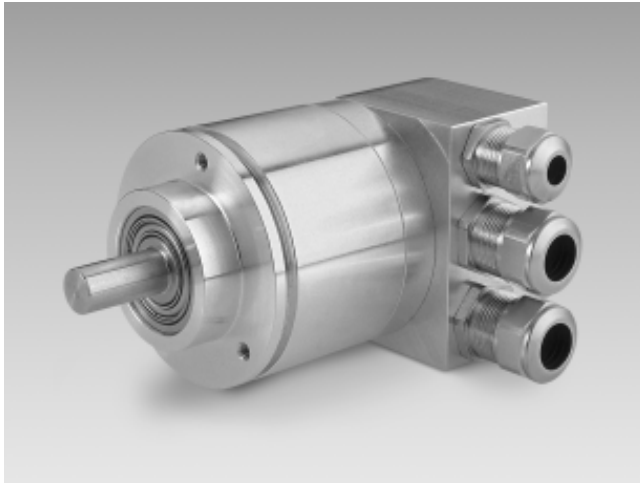
Singleturn or Multiturn, high-resolution

Profibus-DP, CANopen, DeviceNet, SSI, LIGHTBUS



GDAMW, GDMMW

activo[®]



Features

- Interfaces: Profibus-DP, CANopen, DeviceNet, SSI and optic fiber bus
- Resolution: 18 bit singleturn, 31 bit multiturn
- Parameterizable operating modes
- Parameterizable preset value
- Parameterizable scaling

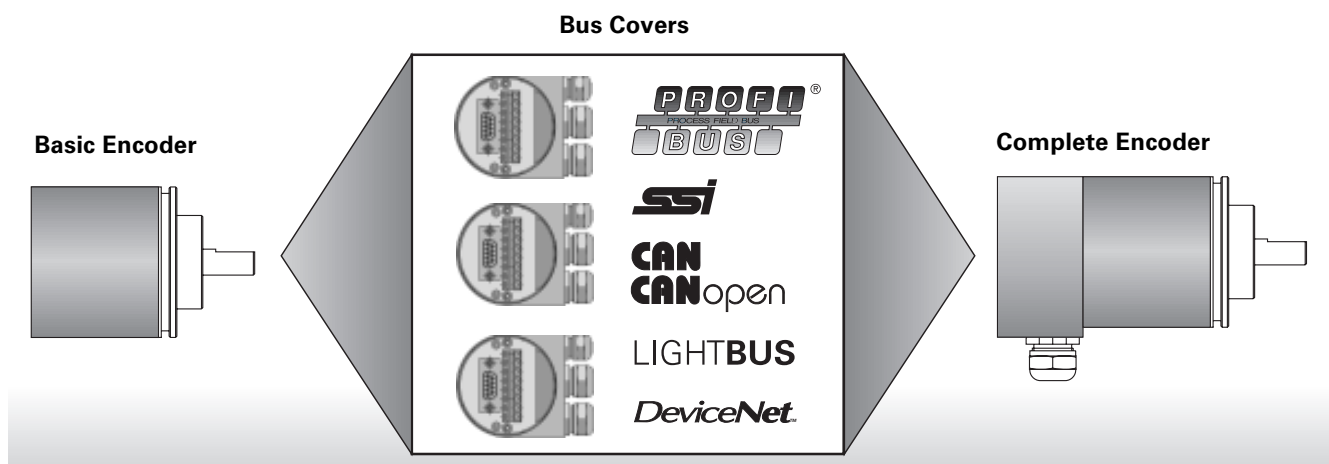
Mechanical data

Speed	
mechanical	Max. 10000 rpm
electrical	Max. 6000 rpm
Operating torque	Typ. 0.0175 Nm
Shaft loading	
axial	< 20 N
radial	< 40 N
Moment of inertia	2 x 10 ⁻⁶ kgm ²
Material	
Housing	Steel
Flange	Aluminum
Bus cover	Aluminum
Cable gland	Metric thread, EMC certified
Weight	Approx. 600 g

Electrical data

Operating voltage	10...30 VDC with reverse voltage protection
Current consumption	Max. 120 mA (w/o load) at 24 VDC
Max. resolution	Singleturn 18 bit, programmable 31 bit, programmable in steps
Accuracy	±0.01°
Preset	Value parameterizable in set resolution range
User address	Settable with rotary switch
Rotating direction	Clockwise (cw) when shaft is viewed from the front (parameterizable)

How to combine your encoders (interchangeable bus cover)



Order designation for GDAMW (Singleturn)

Order No.	Flange/Shaft	
0	Clamping flange / 10 mm, IP 64	
	Description file	
2	Without GSD/EDS file	
3	With GSD/EDS file	
GDAMW.□ 20 3P3 □		Profibus-DP
GDAMW.□ 20 5P3 □		CANopen
GDAMW.□ 20 8P2 □		DeviceNet
GDAMW.□ 20 LM32		Optic fiber bus
GDAMW.□ 20 2PA2		SSI
GDAMW.□ 20 00 00		Basic encoder w/o bus cover

Order designation for GDMMW (Multiturn)

Order No.	Flange/Shaft	
0	Clamping flange / 10 mm, IP 64	
	Description file	
2	Without GSD/EDS file	
3	With GSD/EDS file	
GDMMW.□ 20 3P3 □		Profibus-DP
GDMMW.□ 20 5P3 □		CANopen
GDMMW.□ 20 8P2 □		DeviceNet
GDMMW.□ 20 LM32		Optic fiber bus
GDMMW.□ 20 2PA2		SSI
GDMMW.□ 20 00 00		Basic encoder w/o bus cover

Bus cover description

The matching bus covers are listed from page 154.

Accessories

Order No.	
Z 119.006	Eccentric mounting
Z 119.013	Adapter plate for clamping flange
Z 119.017	Angular mounting for clamping flange
Z 119.025	Adapter plate for clamping flange
Z 119.033	Adapter plate, ø65 mm for clamping flange
Z 119.034	Optic fiber bus connector
Z 150.022	CD with GSD/EDS files and manuals
Z 163.3P33	Bus cover for Profibus-DP
Z 163.5P33	Bus cover for CANopen
Z 163.8P23	Bus cover for DeviceNet
Z 163.2PA2	Bus cover for SSI
Z 163.LM32	Bus cover for optic fiber bus
171.02.153	Installation instructions for optic fiber bus

Suitable optical-fiber cable:
LAPP-Kabel, Stuttgart, Art.: 2185030
HITRONIC[®] POF SIMPLEX PUR-PE

Additional accessories (couplings, measuring wheels, cable pulls or protective housings) from page 164.

Optical Absolute Encoder

Singleturn or Multiturn, high-resolution

Profibus-DP, CANopen, DeviceNet, SSI, LIGHTBUS



GDAMW, GDMMW

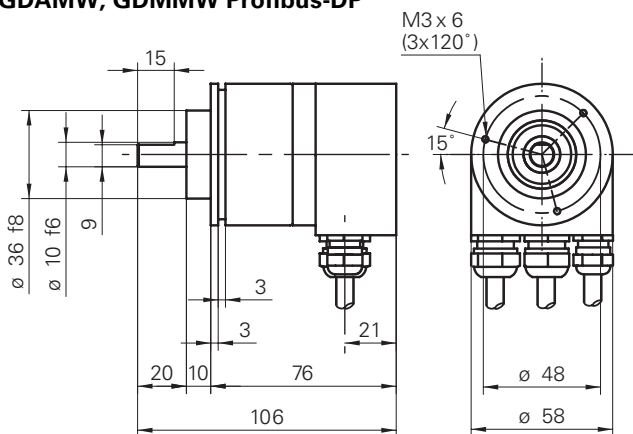
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Ambient conditions

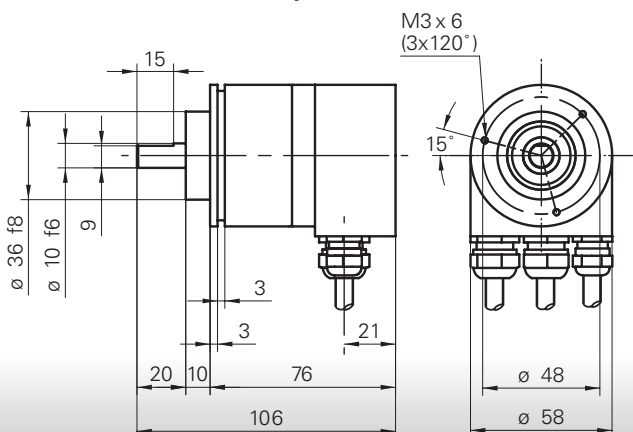
Operating temperature	-20...+85 °C
Protection type	IP 64
Humidity	Max. relative humidity 95 %, non-condensing
Resistance	
Vibration	DIN EN 60068-2-6 ≤100 m/s ² , 10-2000 Hz
Shock	DIN EN 60068-2-27 ≤500 m/s ² , 11 ms
Interference resistance	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

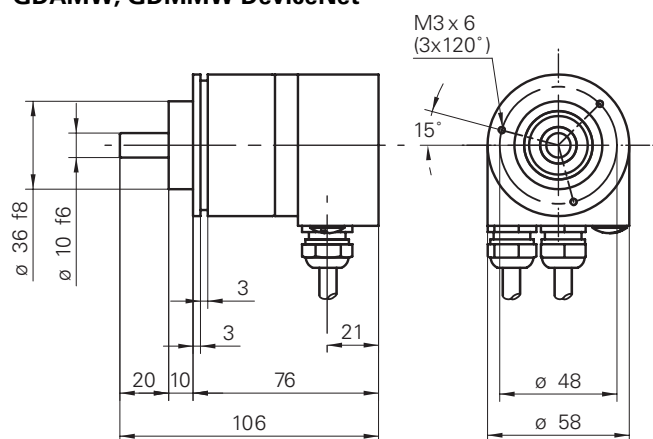
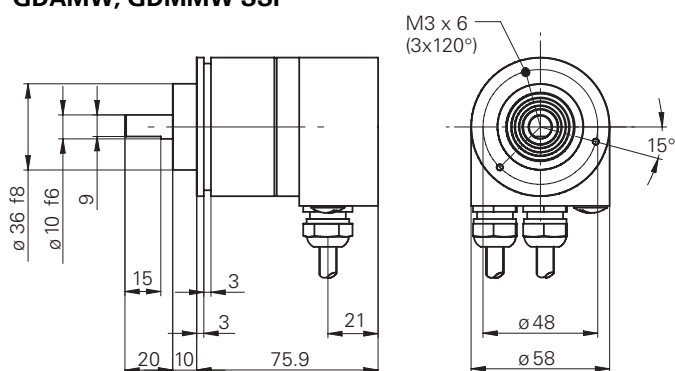
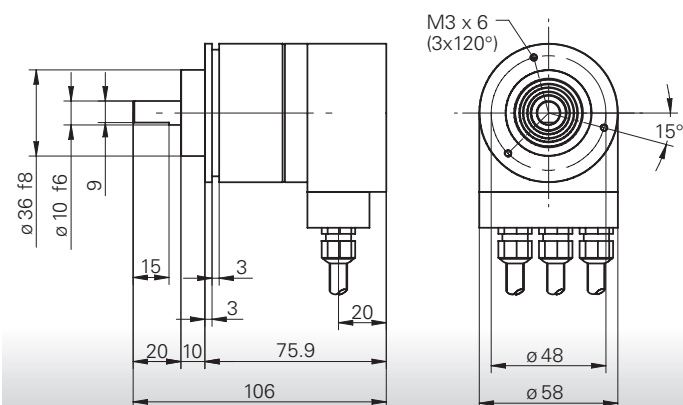
Dimensions

GDAMW, GDMMW Profibus-DP



GDAMW, GDMMW CANopen



Dimensions
GDAMW, GDMMW DeviceNet

GDAMW, GDMMW SSI

GDAMW, GDMMW Optic fiber bus


Incremental Encoder Resolution 6000...20000 pulses



G0355, G0356



G0355 clamping flange



G0356 servo flange

Features

- Standard encoder with 58 mm dia.
- Speed up to 10000 rpm
- Resolution up to 20000 pulses/revolution
- Signal outputs A, A inv., B, B inv., N, N inv.

Electrical data

Operating voltage	5 VDC \pm 10 %; 10...30 VDC with reverse voltage protection
Current consumption	Max. 30 mA (w/o load), at 24 VDC Max. 60 mA (w/o load), at 5 VDC
Limit frequency	300 kHz
Output signals	Channel A, B, N + inverted
Output stages	5 VDC Line driver to RS422 10...30 VDC Push-pull outp., short-circuit-proof

Mechanical data

Speed	Max. 10000 rpm
Start-up torque	
without sealing (IP54)	< 0.010 Nm
with sealing (IP65)	< 0.015 Nm
Shaft loading	
axial	< 20 N
radial	< 40 N
Moment of inertia	1.45×10^{-6} kgm ²
Housing material	Aluminium
Weight	Approx. 250 g

G0355, G0356

Order designation

Order No.	Flange/Shaft
	G0355
0	Clamping flange/10 mm IP 54
A	Clamping flange/10 mm IP 65
	G0356
1	Servo flange/6 mm IP 54
B	Servo flange/6 mm IP 65
	Operating Voltage/Signals
25	5 VDC / Line driver RS422
65	10...30 VDC / Push-pull + inv.
	Connection
C2	C housing plug, 12-pin, axial
C3	C housing plug, 12-pin, radial
31	Cable 1 m (10...30 VDC), axial
41	Cable 1 m (10...30 VDC), radial
51	Cable 1 m (5 VDC), axial
61	Cable 1 m (5 VDC), radial
	Pulse No./Order No.
Pulse	No.
8192	70
9000	74
10000	73
16384	71
20000	72

Additional pulse numbers on request.

G0355. □□□□□□□□

Clamping flange

G0356. □□□□□□□□

Servo flange

Accessories

Order No.	Description
Z 119.006	Eccentric mounting
Z 119.013	Adapter plate for clamping flange
Z 119.015	Mounting bell for servo flange
Z 119.017	Angular mounting for clamping flange
Z 119.025	Adapter plate for clamping flange
Z 119.033	Adapter plate, ø65 mm for clamping flange
Z 119.035	Bearing flange for servo flange
	Extension cord with connector on one end
Z 141.001	Connector without cable
Z 141.003	Connector with 2 m cable
Z 141.005	Connector with 5 m cable
Z 141.007	Connector with 10 m cable

Additional accessories (couplings, measuring wheels, cable pulls or protective housings) from page 164.

Ambient conditions

Operating temperature	-20...+85 °C at 5 VDC -20...+85 °C at 10...30 VDC
Protection type	
Shaft without sealing	IP 54
Shaft with sealing	IP 65
Humidity	Max. relative humidity 95 %, non-condensing
Resistance	
Vibration	DIN EN 60068-2-6 ≤100 m/s ² , 16-2000 Hz
Shock	DIN EN 60068-2-27 ≤1000 m/s ² , 4 ms
Interference resistance	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

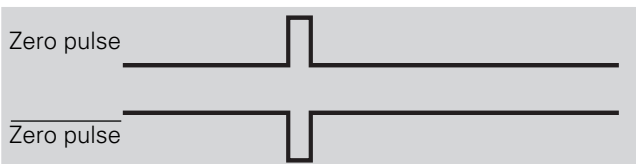
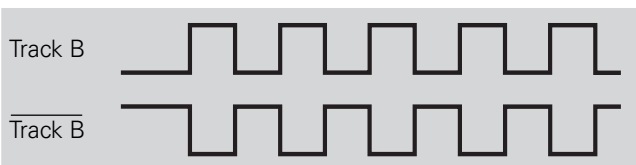
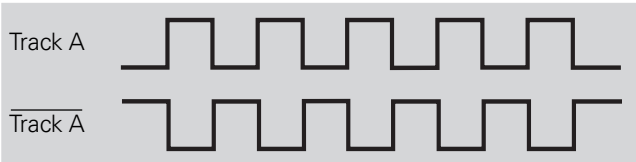
Incremental Encoder Resolution 6000...20000 pulses



G0355, G0356

Output signals

Signals with clockwise rotation when looking at the flange.



Line driver (5 VDC)

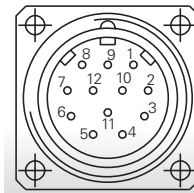
Level high	$\geq 2.5 \text{ V}$	(with $I = -20 \text{ mA}$)
Level low	$\leq 0.5 \text{ V}$	(with $I = 20 \text{ mA}$)
Loading high	$\leq 20 \text{ mA}$	
Loading low	$\leq 20 \text{ mA}$	

Push-pull output (10...30 VDC)

Level high	$\geq \text{UB} - 3 \text{ V}$	(with $I = -20 \text{ mA}$)
Level low	$\leq 1.5 \text{ V}$	(with $I = 20 \text{ mA}$)
Loading high	$\leq 40 \text{ mA}$	
Loading low	$\leq 40 \text{ mA}$	

Connection assignment

Plug	Cable Color	Assignment
Pin 1	pink	Track B inv.
Pin 2	blue	UB Sense
Pin 3	red	Track N (zero pulses)
Pin 4	black	Tr. N inv. (zero pulses inv.)
Pin 5	brown	Track A
Pin 6	green	Track A inv.
Pin 7	–	–
Pin 8	gray	Track B
Pin 9	–	–
Pin 10	white/green	GND
Pin 11	white	GND Sense
Pin 12	brown/green	UB



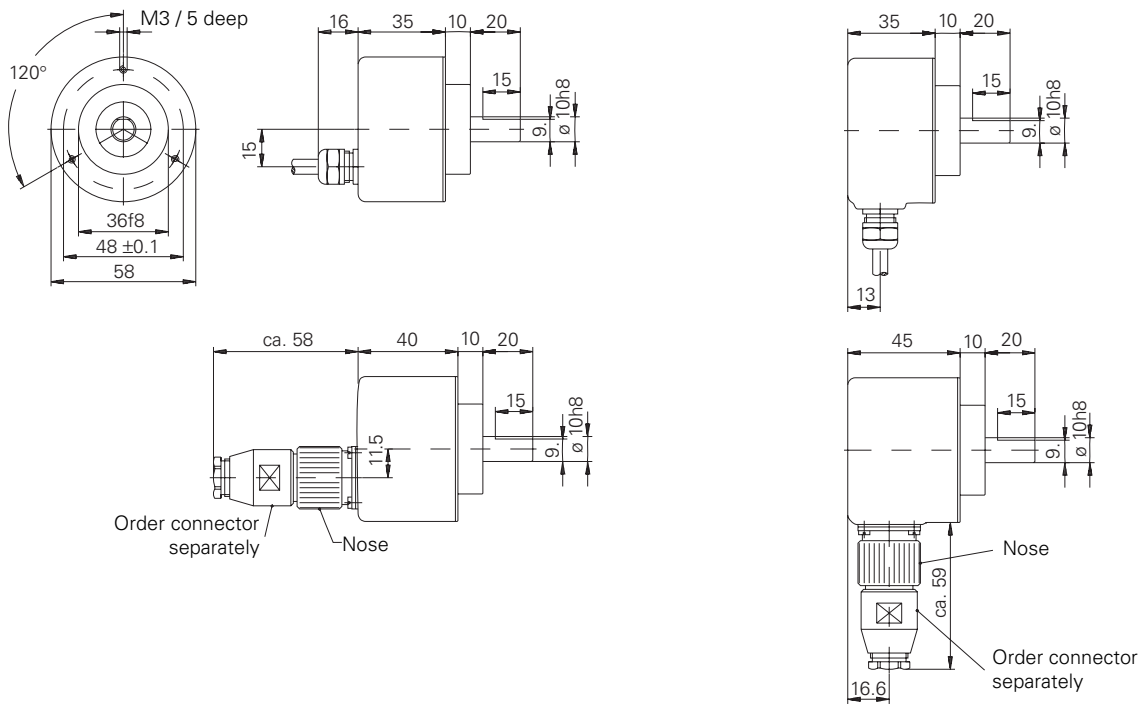
UB Sense and GND Sense are directly connected to UB and GND respectively.

Recommendation: Please use leads twisted in pairs (e.g. A/A inv.) for cable lengths of 10 m or more.

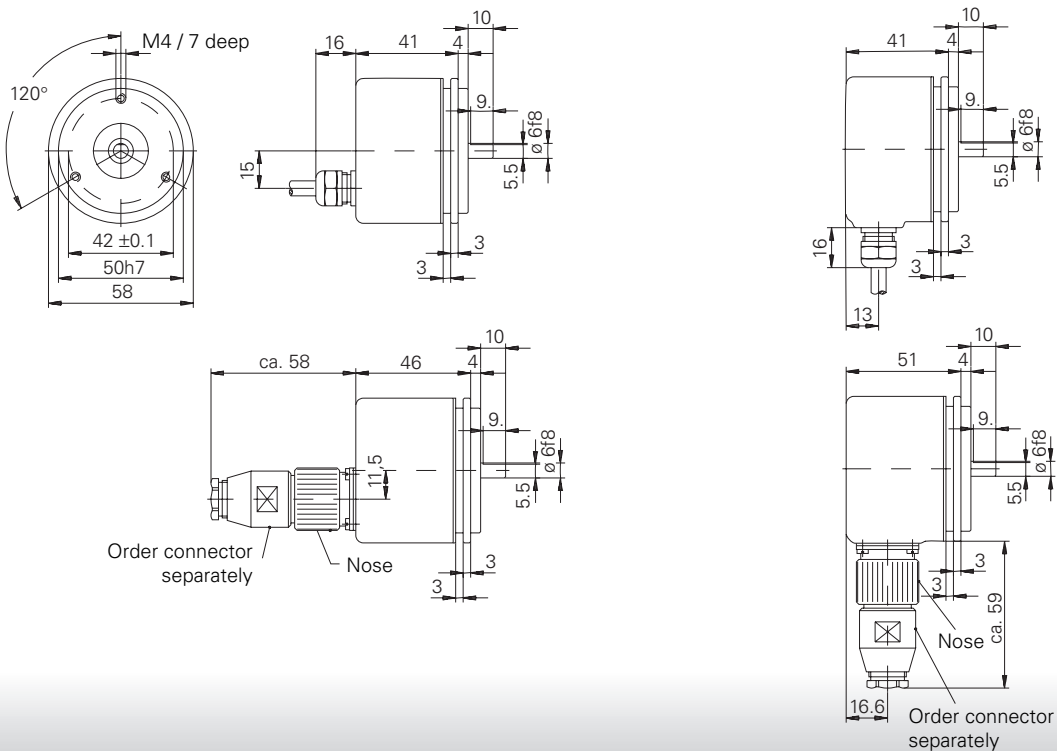
G0355, G0356

Dimensions

G0355 clamping flange



G0356 servo flange



Incremental Encoder with North American Dimensions



GI352



Features

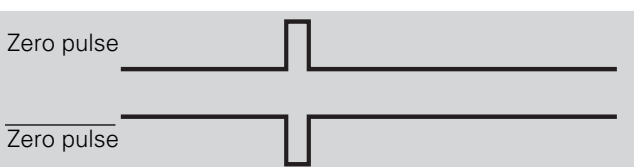
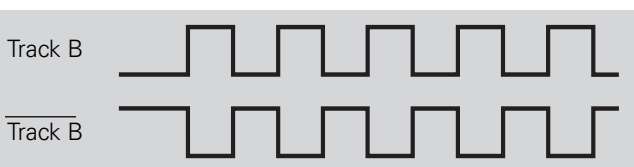
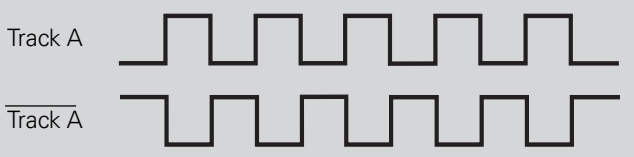
- Encoder with square flange
- Speed up to 10000 rpm
- Resolution up to 6000 pulses/revolution
- Signal outputs A, B, N +inv.
- Operating temperature at 5 VDC up to 100 °C

Electrical data

Operating voltage	5 VDC \pm 10 % 4.75...30 VDC with reverse voltage protection
Current consumption	Max. 30 mA (w/o load), at 24 VDC Max. 60 mA (w/o load), at 5 VDC
Limit frequency	150 kHz
Output signals	10-pin Channel A, B, N + inverted 7-pin Channel A, B, N
Output stages	5 VDC Line driver to RS422 or TTL 4.75...30 VDC Push-pull outp., short-circuit-proof

Output signals

Signals with clockwise rotation when looking at the flange.



Line driver RS422, TTL (5 VDC)

Level high	≥ 2.5 V	(with I = -20 mA)
Level low	≤ 0.5 V	(with I = 20 mA)
Loading high	≤ 20 mA	
Loading high	≤ 20 mA	

Push-pull output (4.75...30 VDC)

Level high	$\geq U_B - 3$ V	(with I = -20 mA)
Level low	≤ 1.5 V	(with I = 20 mA)
Loading high	≤ 40 mA	
Loading high	≤ 40 mA	

Mechanical data

Speed	Max. 10000 rpm
Start-up torque	without sealing (IP54) < 0.010 Nm with sealing (IP65) < 0.015 Nm
Shaft loading	axial < 20 N radial < 40 N
Moment of inertia	1.45×10^{-6} kgm ²
Housing material	Aluminium
Weight	Approx. 250 g

Ambient conditions

Operating temperature	-20...+100 °C at 5 VDC -20...+85 °C at 4.75...30 VDC
Protection type	Shaft without sealing IP 54 Shaft with sealing IP 65
Humidity	Max. relative humidity 95 %, non-condensing
Resistance	Vibration DIN EN 60068-2-6 ≤ 100 m/s ² , 16-2000 Hz Shock DIN EN 60068-2-27 ≤ 2000 m/s ² , 6 ms
Interference resistance	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4

Order designation

Order No.	Flange/Shaft
1	Front panel 63.5 x 63.5 mm / 9.52 mm, IP 54
B	Front panel 63.5 x 63.5 mm / 9.52 mm, IP 65
Operating Voltage/Signals	
21	5 VDC / TTL, 7-pol.
22	5 VDC / Line driver, 10-pol.
70	4.75...30 VDC/push-pull, 10-pol.
71	4.75...30 VDC/push-pull, 7-pol.

Connection

A0	MIL plug MS 3102 R18-1P, 10-pin, axial
A1	MIL plug MS 3102 R18-1P, 10-pin, radial
B0	MIL plug MS 3102 R16S-1P, 7-pin, axial
B1	MIL plug MS 3102 R16S-1P, 7-pin, radial

Pulse No./Order No.

Pulse	No.	Pulse	No.
5	49	500	15
10	36	1000	22
25	50	1024	23
50	39	1250	24
60	40	1500	26
100	41	2000	28
128	57	2500	30
200	06	3600	31
250	09	5000	35
360	13	6000	48
400	14		

Additional pulse numbers on request.

GI352. □□□□□□□□

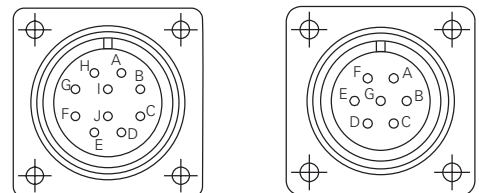
Accessories

Order No.	Description
Z 172.001	Connector 10-pin without cable
Z 172.003	Connector 10-pin with 2 m cable
Z 172.005	Connector 10-pin with 5 m cable
Z 175.001	Connector 7-pin without cable
Z 175.003	Connector 7-pin with 2 m cable
Z 175.005	Connector 7-pin with 5 m cable

Additional accessories (couplings, measuring wheels, cable pulls or protective housings) from page 164.

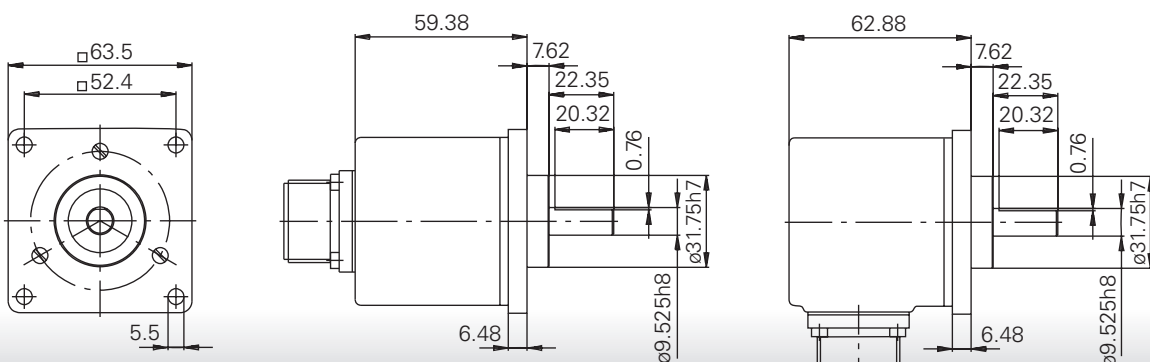
Connection assignment

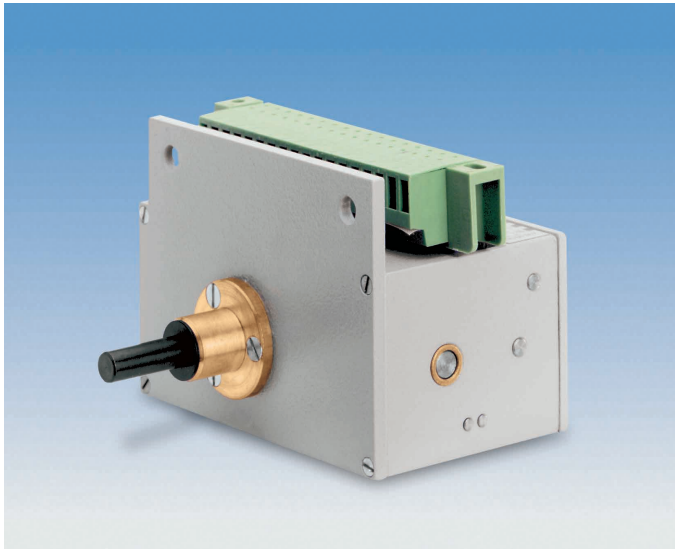
Plug	Assignment	
	10-pin plug	7-pin plug
Pin A	Track A	Track A
Pin B	Track B	Track B
Pin C	Track N	Track N
Pin D	UB	UB
Pin E	n.c.	n.c.
Pin F	GND	GND
Pin G	Shield	Shield
Pin H	Track A inv.	-
Pin I	Track B inv.	-
Pin J	Track N inv.	-



Please use leads twisted in pairs (e.g. A/A inv.) for cable lengths of 10 m or more.

Dimensions





Revolution counter with read-out in BCD-code

Description

The U 220 is a mechanical revolution counter without reset, with digital display of the measured values on digit drums. The actual count is sampled via contact springs on the digit drums in BCD-code. The count or measurement is statically available in BCD-code with parallel digits and parallel decades and can be polled via a plug from the outside. The unit drum and/or the decimal drum actuates a control contact. The latter remains open as long as the read-out drums are set to full digit values and can be polled. In case of an undefined position of the poll drums during the transfer to decades and/or in case of certain intermediate positions of the first digit drum, this control contact is closed.

Electrical data

Rating	Conductor max. 100 mA, max. 42 V
Test voltage	1000 V
E-connection	Circuit plug with 18 pins and screw terminal connection

Technical data

Display	5-digit, 9999.9
Digit size	5.2 mm high, white on black background, red decimal position
Drive shaft	From below
Counting mode	In a sense of rotation to be defined, adding. In reversed direction, substrating
Fastening	For external mounting, 2 bore holes for M6 screws
Strain	Max. 150 rpm where 1 rev. = 1 digit Max. 60 rpm where 1 rev. = 10 digits
Torque	Approximately 40 Nmm where 1 rev. = 10 digits
Material	
Housing	Aluminum extruded profile
Base plate	Aluminum
Color	Intrinsic lacquer white/gray
Protection to	IP 40 according to DIN 40050
Ambient temperature	0 ... +60 °C
Weight	Approximately 540 g

U 220

Order designation

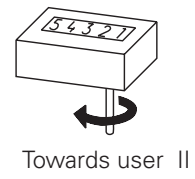
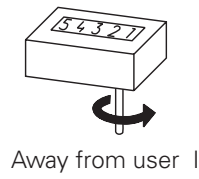
- 1 Drive from below, Sense of rotation I
- 2 Drive from below, Sense of rotation II

- A 1 rev. = 1 digit, 999,9 *
- B 1 rev. = 1 digit, 9999,9 *
- C 1 rev. = 10 digits, 999
- D 1 rev. = 10 digits, 9999
- E 1 rev. = 1 digit, 999
- F 1 rev. = 1 digit, 9999

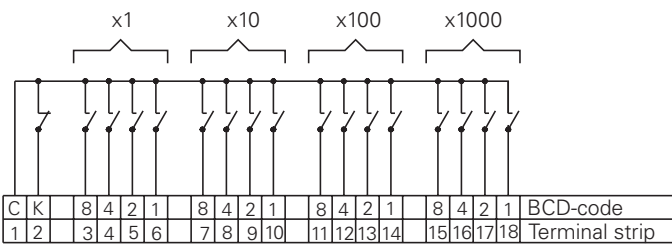
* Decimal position cannot be read out

U 220.010 A1

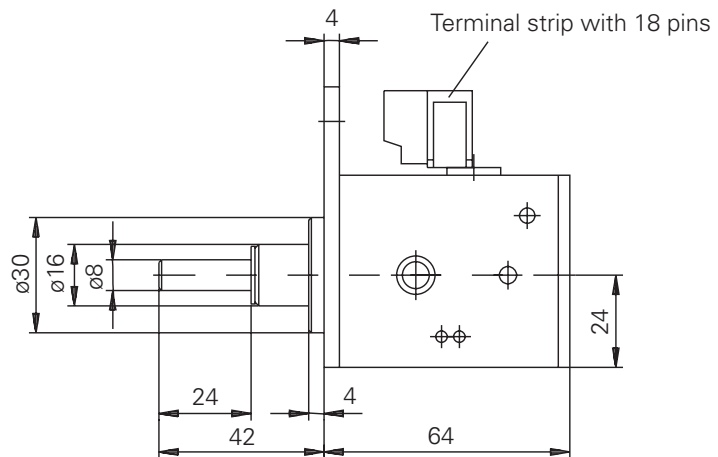
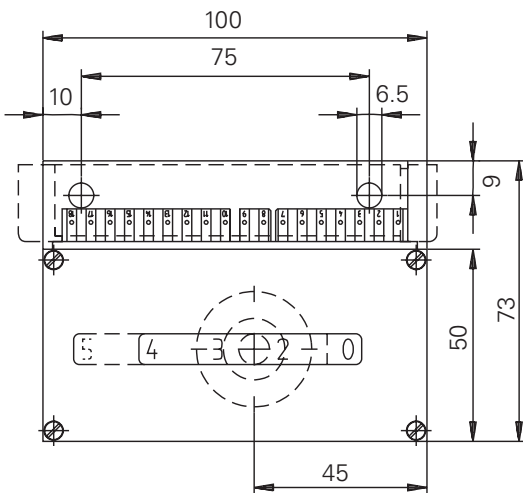
Sense of rotation



Pin assignment



Dimensions and cutout size



Subject to modification in technic and design.
Errors and omissions excepted.