Multiturn Type 5860 Profibus-DP

- **Very compact (only 87.8 mm installation depth); Ideal for dynamic applications thanks to its non-contact multiturn stage**
- **Solid shaft or blind hollow shaft**
- **Long service life thanks to high shock and vibration resistance**
- **Profibus DP with Encoder Profile Class 2 C**

Compact and Rugged:
– minimal installation depth
– high shock and vibration values

Versatile and Easy:
– Many options (no need for adapter sleeves)
– Fully programmable
– Integrated Fieldbus node with T-Coupler

Fast and Safe:
– Certificated connection technology
– Plug & Play cable assemblies
– Diagnostics and alarm functions

- **also available as explosion proof Zones 2 and 22**

New: Now also with blind hollow shaft

Mechanical characteristics:

Speed[1]:	max. 6000 min^{-1}
Rotor moment of inertia:	approx. 1.8 x 10^{-6} kgm^2
Starting torque:	< 0.01 Nm
Load capacity of shaft at shaft extension[3]:	radial: 80 N, axial: 40 N
Weight:	approx. 0.7 kg
Protection acc. to EN 60 529:	IP 65
Working temperature:	–20° C ... +80 °C[2]
Operating temperature:	–20° C ... +85 °C[2]
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	2500 m/s^2, 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s^2, 10 ... 2000 Hz

[1] For continuous operation 3000 min^{-1} at the max. temperature
[2] Non-condensing
[3] Solid shaft version

Specification to Profibus-DP 2.0 Standard (DIN 19245 Part 3)

Electrical characteristics:

Supply voltage (U_B):	10 ... 30 V DC
Power consumption:	max. 0.29 A
recommended fuse:	T 0.315 A
Divisions:	up to 8192 (13 bits) per revolution, 4096 (12 bits) revolutions
Linearity:	± 1/2 LSB (±1 LSB at 13, 14, 25 bit resolution)
Code:	Binary
Interface:	RS 485
Protocol:	**Profibus-DP, encoder profile class C2**
Baud rate:	max: 12 MBits/s
Address:	programmable via DIP switches
Conforms to CE requirements acc. to EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3	
Performance against magnetic influence acc. to EN61000-4, 8, severity of inspection 5	

Profibus Encoder-Profile:

The encoder profile describes the functionality of the communication and the manufacturer specific additional functions. Here the different objects are defined independently of the manufacturer.

The following parameters can be programmed:

- Direction of rotation
- Scaling factor
  – number of pulses/rotation
  – total resolution
- Preset value
- Diagnostic mode

The following functionality is integrated:

- Full Class 1 and Class 2 functionality
- Galvanic isolation of the Fieldbus-stage with DC/DC converter
- Line driver according to RS 485 max. 12 Mbit/s
- Addressing by means of DIP switches
- Diagnostic LED´s

Multiturn Type 5860 Profibus-DP – shaft version

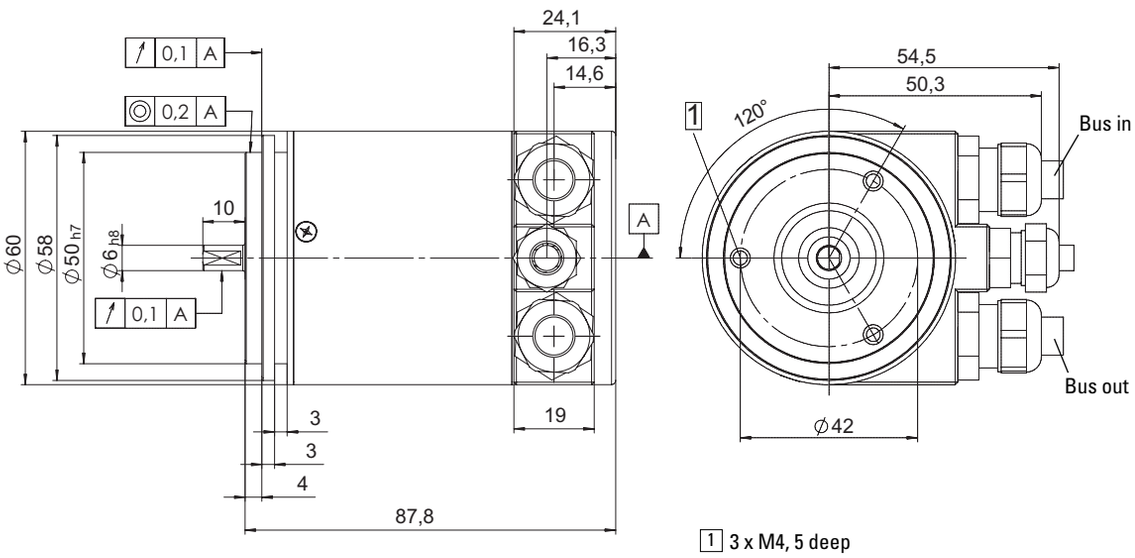
Terminal assignment with terminal box:

Signal :	ENC.		BUS IN			BUS OUT			ENC.	
	+V DC	GND	GND	B	A	A	B	GND	GND	+V DC
Pin :	1	2	3	4	5	6	7	8	9	10

Shield must be connected to the cable gland (with the contact surface as large as possilbe).

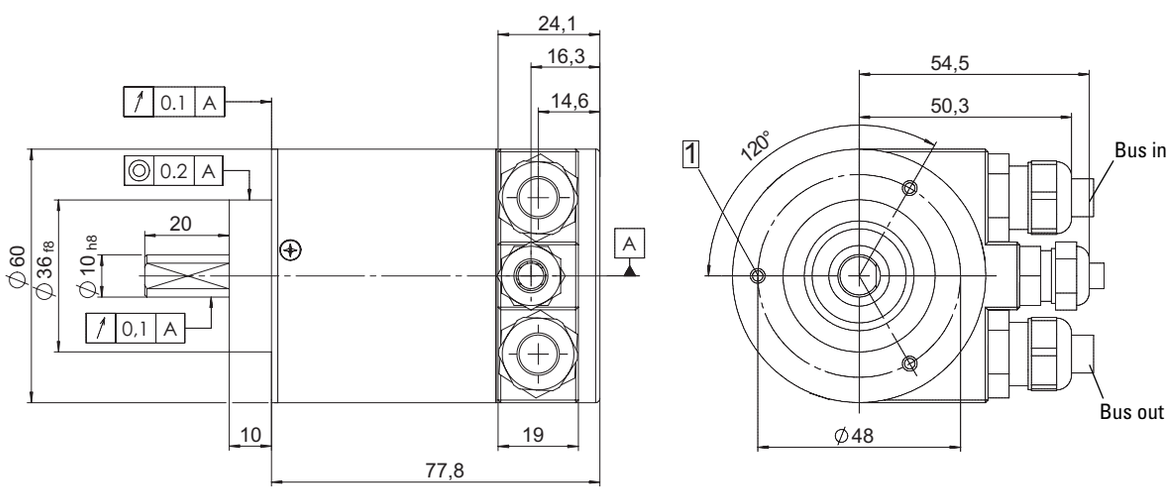
Dimension (Terminal box version)**:**

Servo bracket



1 3 x M4, 5 deep

Clamping bracket

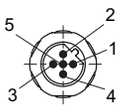


1 3 x M3, 5 deep

Suitable cable diameter	
Supply voltage, cable diameter	4.5 ... 6.5 mm
Data transmission line, cable diameter	8 ... 10 mm

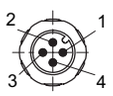
Multiturn Type 5860 Profibus-DP – shaft version with M12 connector

Terminal assignment M12 connector version:



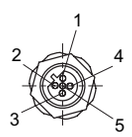
Bus in:

Signal :	–	BUS-A	–	BUS-B	Shield
Pin:	1	2	3	4	5



Supply voltage:

Signal :	U_B	–	0 V	–
Pin:	1	2	3	4



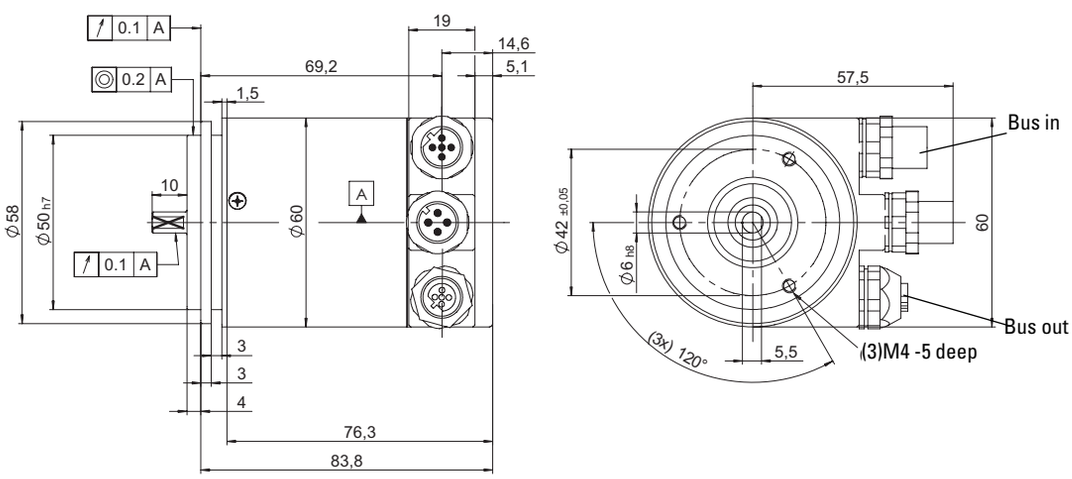
Bus out:

Signal :	BUS_VDC[1)]	BUS-A	BUS_GND[1)]	BUS-B	Shield
Pin:	1	2	3	4	5

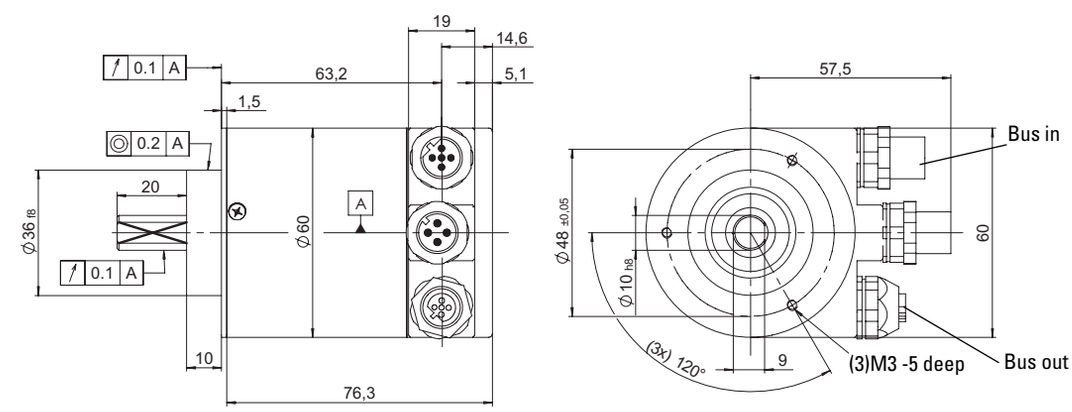
[1)] to supply the external Profibus-DP terminating resistor

Dimension (M12 connector version):

Servo bracket



Clamping bracket



Multiturn Type 5860 Profibus-DP – blind hollow shaft version

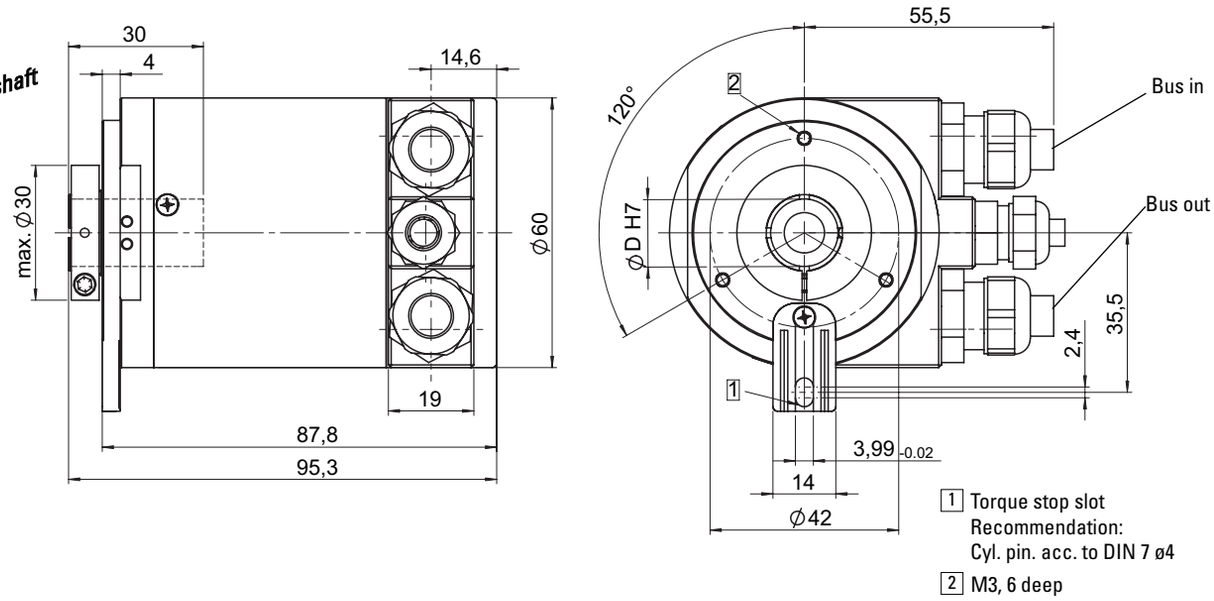
Terminal assignment with terminal box:

Signal :	ENC.		BUS IN			BUS OUT			ENC.	
	+V DC	GND	GND	B	A	A	B	GND	GND	+V DC
Pin :	1	2	3	4	5	6	7	8	9	10

Shield must be connected to the cable gland (with the contact surface as large as possible).

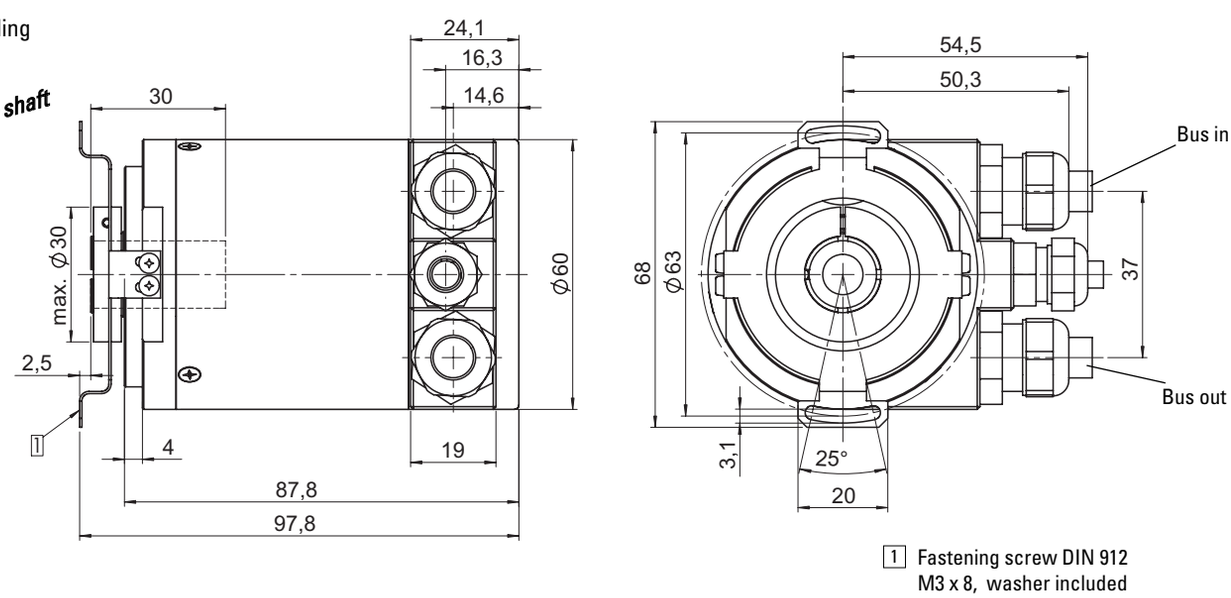
Dimension (Terminal box version)**:**
Blind hollow shaft version
flat bracket with spring element

New: with blind hollow shaft



Blind hollow shaft version
Flat bracket with double-winged
stator coupling

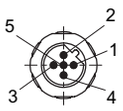
New: with blind hollow shaft



Suitable cable diameter	
Supply voltage, cable diameter	4.5 ... 6.5 mm
Data transmission line, cable diameter	8 ... 10 mm

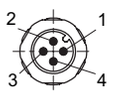
Multiturn Type 5860 Profibus-DP – blind hollow shaft version with M12 connector

Terminal assignment M12 connector version:



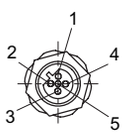
Bus in:

Signal :	–	BUS-A	–	BUS-B	–
Pin:	1	2	3	4	5



Supply voltage:

Signal :	U_B	–	0 V	–
Pin:	1	2	3	4



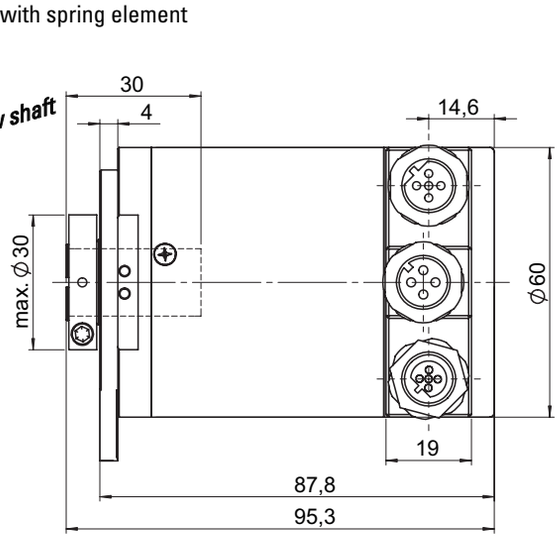
Bus out:

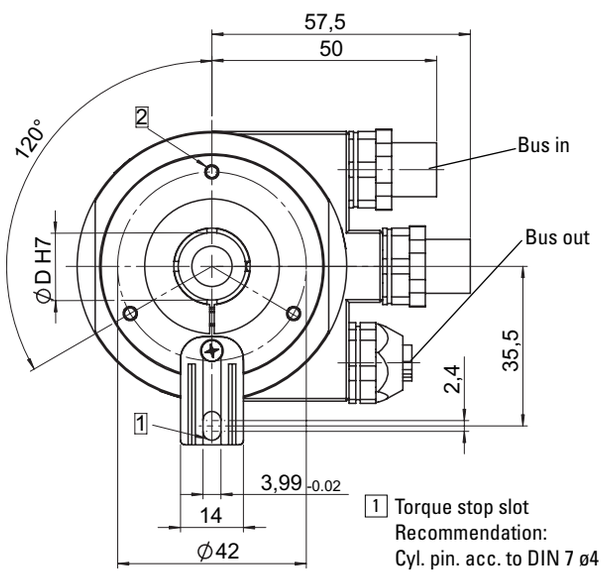
Signal :	BUS_VDC[1)]	BUS-A	BUS_GND[1)]	BUS-B	Shield
Pin:	1	2	3	4	5

[1)]to supply the external Profibus-DP terminating resistor

Dimension (M12 connector version)**:**
Blind hollow shaft version
flat bracket with spring element

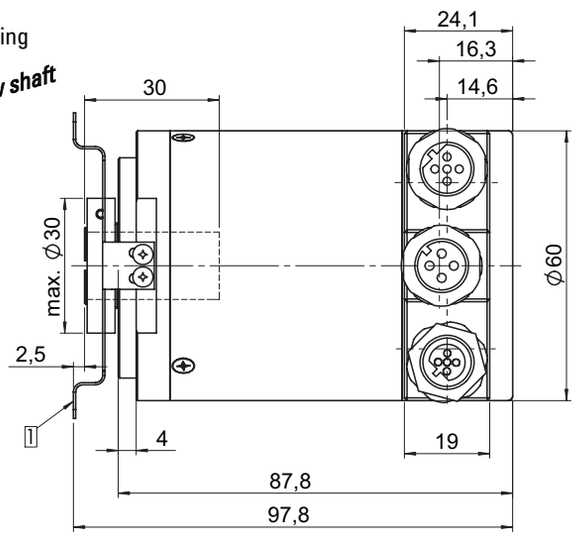
New:
with blind hollow shaft

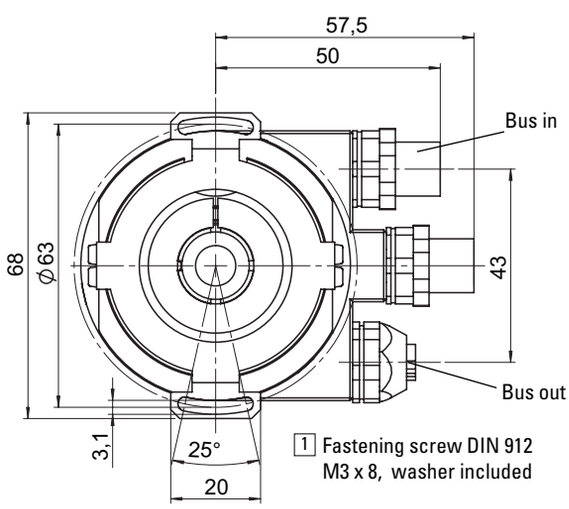




Blind hollow shaft version
Flat bracket with double-winged
stator coupling

New:
with blind hollow shaft





Multiturn Type 5860 Profibus-DP

Kübler is constantly striving **to integrate fully all units** and intelligent sensing systems. Two patented technologies form the basis for our encoders:

Patented Integrative Technology®:

Integrative Technology, developed and patented by Kübler, is a package of measures that ensures compact construction, high signal quality, high shock resistance - up to 2500 m/s2, high reliability and a high level of immunity to EMC.

This is achieved using an Opto ASIC, a multilayer board and an especially shock resistant and space-saving method of mounting the sensor unit. In addition the use of a highly optimized interface ASIC ensures the integration of several hundred individual components. Components that had previously been needed to balance the system, such as balancing potentiometers, can be dispensed with.

Patented Intelligent-Sensing-Technology (IST)®

An innovative principle of operation based on a non-contact electronic multiturn stage overcomes system disadvantages previously associated with encoders that had mechanical gears or with traditional electronic gear technology.

Advantages:
- High operational reliability
- Logic filter and innovative principle of operation compensate for high EMC interference
- Free from wear

Profibus DP encoder, integrated in the network
Also suitable for mounting on our draw wire devices.

Use Couplings for the connection BUS-IN and Connectors for the connection BUS-OUT.

Compatible self-assembly connectors:
Bus-In: Coupling 05.BMWS.8151-8.5
Bus-Out: Connector 05.BMSWS.8151-8.5

Terminating resistor: 05.RSS4.5-PDP-TR
Power supply: 05.BMSWS-0
See Connection Technology section for cable assemblies and additional connectors.

Order code:

8.5860.XXXX.3001

Range	
Bracket for shaft [1]	
	1 = Clamping bracket
	2 = Servo bracket
Bracket for blind hollow shaft [1]	
	A = with spring element
	B = with double-winged stator coupling
Shaft[1]	
	1 = Shaft ø 6 x 10 mm
	2 = Shaft ø 10 x 20 mm
Blind hollow shaft[1]	
	A =ø 10 mm
	B = ø 12 mm
	C = ø 14 mm
	D = ø 15 mm
	E = ø 3/8" (9.525 mm)
	F = ø 1/2" (12.7 mm)
Interface and supply voltage	
	3 = Profibus-DP, Class 2 10 ... 30 V DC

[1] Figures and letters can not be combined

Field bus profile:	
3001 =	Profibus-DP Class 2
Type of connection	
1 =	Terminal box with M16
2 =	M12 connector

Preferred types are indicated in ***bold***

Includes:
GSD-file and documentation on CD

Use Couplings for the connection BUS-IN and Connectors for the connection BUS-OUT.

Compatible self-assembly connectors:
Bus-In: Coupling 05.BMWS.8151-8.5
Bus-Out: Connector 05.BMSWS.8151-8.5

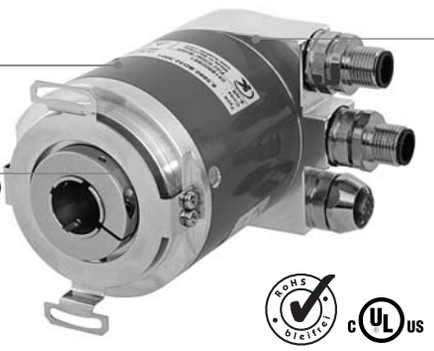
Power supply: 05.H8141-0
See Connection Technology section page 263 for cable assemblies and additional connectors.

Multiturn Type 5860 CANopen/DeviceNet

- **Very compact (only 87.8 mm installation depth); Ideal for dynamic applications thanks to its non-contact multiturn stage**
- **Solid shaft or blind hollow shaft**
- **Long service life thanks to high shock and vibration resistance**
- **CANopen according to Profile DSP 406 with additional functions or DeviceNet Profile for Encoders Release V 2.0**

Compact and Rugged:
– minimal installation depth
– high shock and vibration values

Versatile and Easy:
– Many options (no need for adapter sleeves)
– Fully programmable
– Integrated Fieldbus node with T-Coupler



Fast and Safe:
– Certificated connection technology
– Plug & Play cable assemblies
– Diagnostics and alarm functions

- **also available as explosion proof Zones 2 and 22**

New: Now also with blind hollow shaft

Mechanical characteristics:

Speed[1]:	max. 6000 min^{-1}
Rotor moment of inertia:	approx. 1.8 x 10^{-6} kgm^2
Starting torque shaft version:	< 0.01 Nm
Load capacity of shaft at shaft extension[3]:	radial: 80 N, axial: 40 N
Weight:	approx. 0.7 kg
Protection acc. to EN 60 529:	IP 65
Working temperature:	–20° C ... +80 °C[2]
Operating temperature:	–20° C ... +85 °C[2]
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	2500 m/s^2, 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s^2, 10 ... 2000 Hz

[1] For continuous operation 3000 min^{-1} at the max. temperature
[2] Non condensing
[3] Solid shaft version

CANopen
DeviceNet

Electrical characteristics:

Supply voltage (U_B):	10 ... 30 V DC
Current consumption:	max. 0.29 A
Recommended fuse:	T 0,315 A
Divisions:	up to 8192 (13 bits) per revolution, 4096 (12 bits) revolutions
Linearity:	± 1/2 LSB (±1 LSB at resolution 13, 14, 25 Bit)
Code:	Binary
Interface:	CAN HIGH-Speed to ISO/DIS 11898, Basic and Full-CAN; CAN specification 2.0 B (11 and 29 Bit Identifier)
Protocols:	**CANopen Profile DSP 406 with additional function DeviceNet Profile for Encoder Release V 2.0**
Baud rate:	programmable via DIP switches 10 ... 1000 Kbits/s CAN DNET 125/250/500 kBit/s
Basic identifier/node number:	programmable via DIP switches
Conforms to CE requirements acc. to EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3	
Performance against magnetic influence acc. to EN61000-4, 8, severity of inspection 5	

Multiturn Type 5860 CANopen/DeviceNet

CANopen - Device Profile:

General description
The CANopen Device Profiles describe the functionality of the communication and of that part of the CANopen fieldbus system specific to the manufacturer. Device Profile DSP 406 applies to encoders and defines the individual objects independently of the manufacturer. In addition the profile makes provision for additional extended functions specific to the manufacturer; using devices that interface with CANopen offers the advantage of acquiring systems today that are prepared for the needs of the future.

The following functionality is integrated:
- Class C2 functionality
- NMT Slave
- Diagnostics (internal)
- CAN-LED for Bus status
- CAN-LED for operating mode
- Additional Event Mode

The following parameters can be programmed:
- Polling mode or auto mode with adjustable time
- Direction
- Scaling factor
  - Number of pulses/rotation 1 ... 8192
  - Total resolution
- Number of revolutions 1 ... 4096
- Preset value
- Diagnostics mode
- Reset Mode action
- Event Mode action

DeviceNet Encoder Profile:
General description:
The DeviceNet Device Profile describes the functionality of the communication and of that part of the DeviceNet fieldbus system specific to the manufacturer. The Encoder Profile applies to encoders and defines the individual objects independently of the manufacturer. In addition the profile makes provision for additional extended functions specific to the manufacturer.

The following parameters can be programmed:
- Direction of rotation
- Scaling factor
  - Number of pulses/rotation 1 ... 8192
  - Total resolution
- Number of revolutions 1 ... 4096
- Preset value
- Diagnostics mode

The following functionality is integrated:
- Galvanic isolation of the Fieldbus-stage with DC/DC converter
- Addressing via DIP switches or software
- Diagnostics LED network and mode
- Baud rate 125, 250 and 500 kbit/s programmable via DIP switches
- Node address 0 … 63 and baud rate programmable via DIP switches
- Polled mode
- Cyclic mode
- Change of state mode (COS)
- Combination of Polled mode and Cyclic mode
- Combination of Polled mode and COS mode
- Offline connection set
- Device heartbeat

"Out of box" Configuration
- MAC-ID and Baud rate preset value MAC-ID = 63
- Baud rate = 125 kBit/s
- 2 I/O Assembly
  Position value
  Position value and status

Fieldbus encoders can be used in the following applications:

Elevators, construction machines, cranes, agricultural vehicles, special-purposes vehicles, industrial automatisation

Multiturn Type 5860 CANopen – shaft version

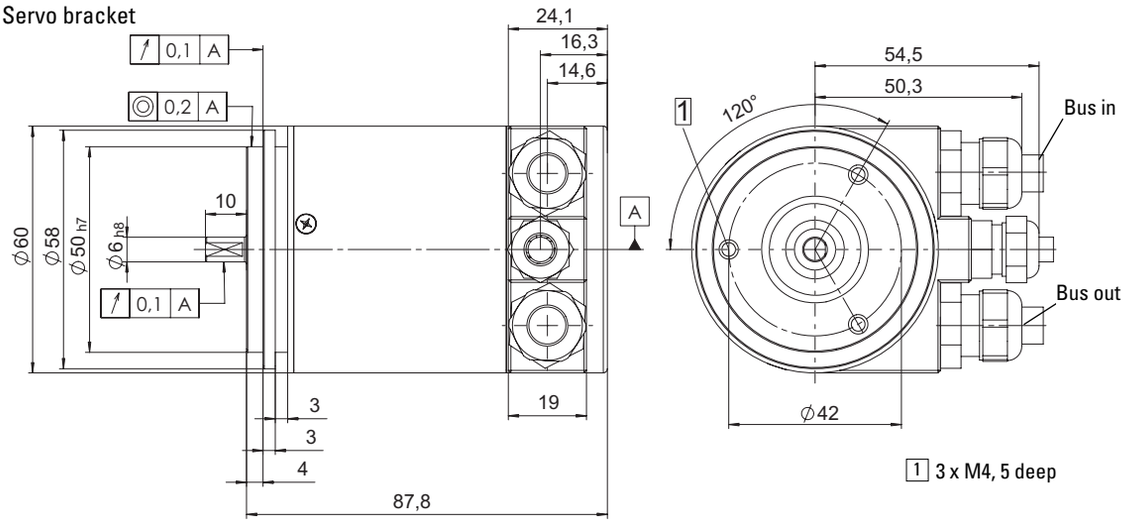
Terminal assignment with terminal box:

Signal :	ENC.		BUS IN			BUS OUT			ENC.	
	+V DC	GND	GND	CAN_H	CAN_L	CAN_L	CAN_H	GND	GND	+V DC
Clip :	1	2	3	4	5	6	7	8	9	10

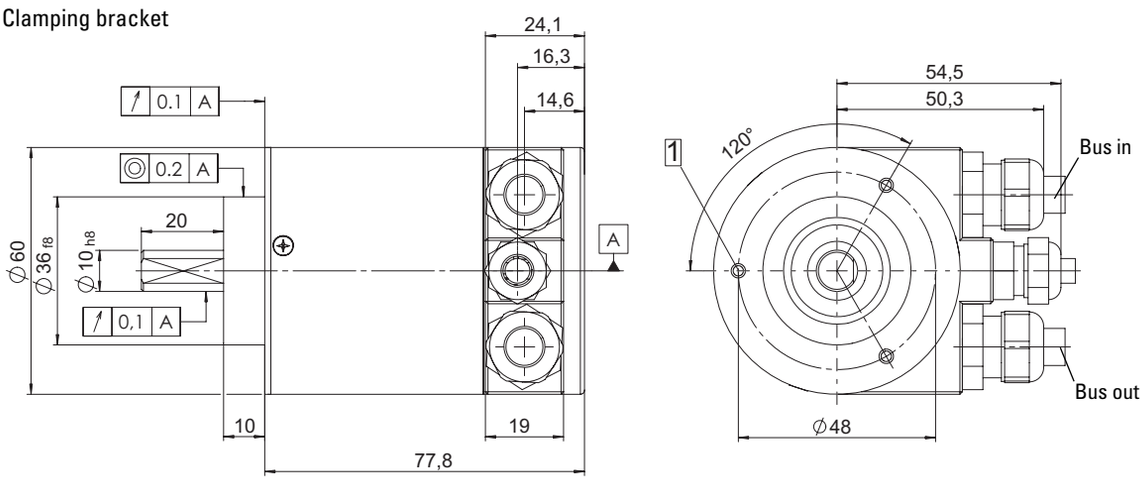
Shield must be connected to the cable gland (with the contact surface as large as possilbe).

Dimension (Terminal box version)**:**

Servo bracket



Clamping bracket



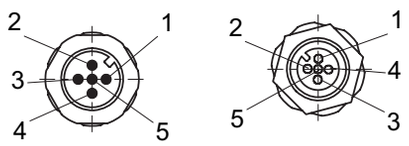
Suitable cable diameter	
Supply voltage, cable diameter	4.5 ... 6.5 mm
Data transmission line, cable diameter	8 ... 10 mm

Multiturn Typ 5860 CANopen/DeviceNet – hollow shaft version

Terminal assignment M12:

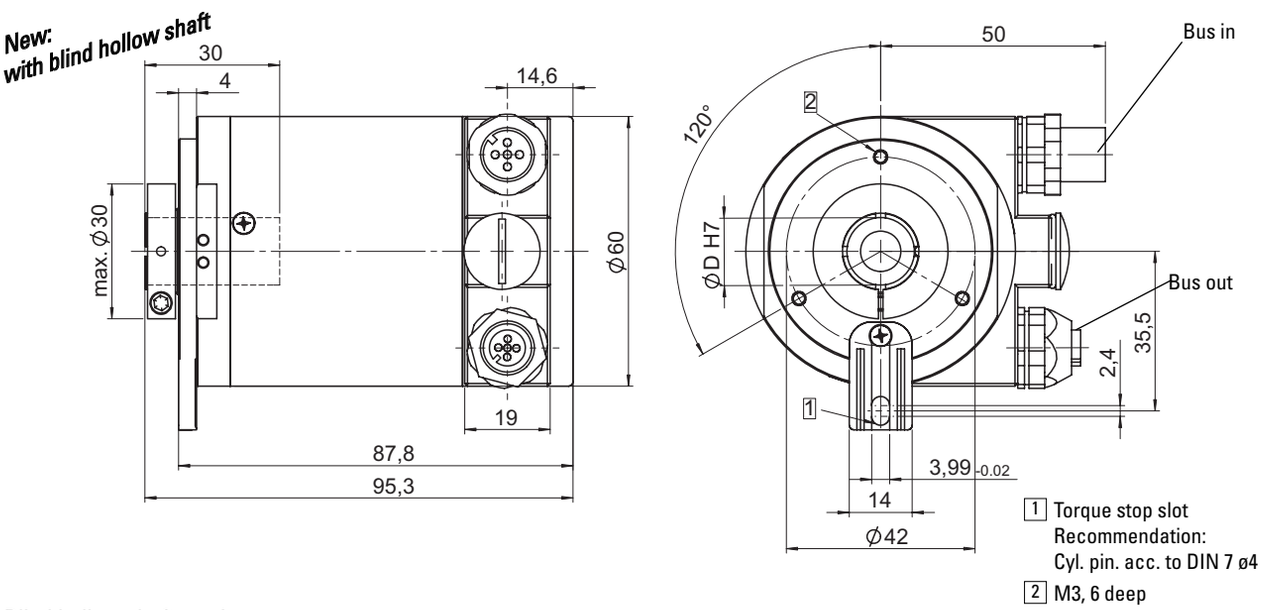
Direction:	OUT					IN				
Signal:	CAN Ground/Drain	CAN_Low (-)	CAN_High (+)	0 Volt supply	+UB supply	0 V supply	+UB supply	CAN_Low (-)	CAN_High (+)	CAN Ground
Short symbol:	CG	CL	CH	0 V	+V	0 V	+V	CL	CH	CG
M12 PIN:	1	5	4	3	2	3	2	5	4	1

Bus in: Bus out:

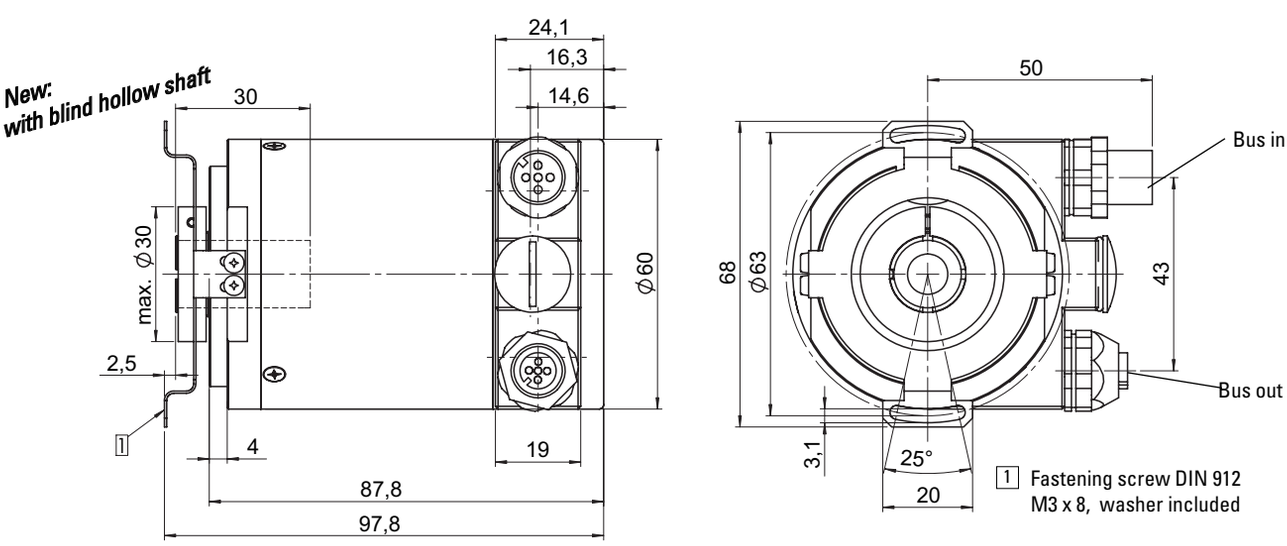


Dimension

Blind hollow shaft version
flat bracket with spring element



Blind hollow shaft version
Flat bracket with double-winged stator coupling



Multiturn Type 5860 CANopen/DeviceNet

Kübler is working consistently **on high integration of all units** and intelligent sensing systems. The basics of our encoders are two patented technologies:

Patented Integrative Technology®:

Integrative Technology, developed and patented by Kübler, is a package of measures that ensures compact construction, high signal quality, high shock resistance - up to 2500 m/s2, high reliability and a high level of immunity to EMC.

This is achieved using an Opto ASIC, a multilayer board and an especially shock resistant and space-saving method of mounting the sensor unit. In addition the use of a highly optimized interface ASIC ensures the integration of several hundred individual components. Components that had previously been needed to balance the system, such as balancing potentiometers, can be dispensed with.

Patented Intelligent-Sensing-Technology (IST)®

An innovative principle of operation based on a non-contact electronic multiturn stage overcomes system disadvantages previously associated with encoders that had mechanical gears or with traditional electronic gear technology.

Advantages:

- High operational reliability
- Logic filter and innovative principle of operation compensate for high EMC interference
- Free from wear

Order code:

8.5860.XXXX.X001

Range

Bracket for shaft[1)]
- 1 = Clamping bracket
- 2 = Synchronous bracket

Bracket for blind hollow shaft[1)]
- A = with spring element
- B = with stator coupling

Shaft
- 1 = Shaft Ø 6 x 10 mm
- 2 = Shaft Ø 10 x 20 mm

Blind hollow shaft[1)]
- A = ø 10 mm
- B = ø 12 mm
- C = ø 14 mm
- D = ø 15 mm
- E = ø 3/8" (9.525 mm)
- F = ø 1/2" (12.7 mm)

Interface and supply voltage
- 1 = DeviceNet 10 ... 30 V DC.
- 2 = CANopen 10 ... 30 V DC

[1)] Figures and letters can not be combined

Field bus profile
- 1001 = DeviceNet 2.0
- 2001 = CANopen Encoder Profile DSP 406

Type of connection
- 1 = Terminal box with M16[2)]
- 2 = M12-connector

[2)] only at CANopen version

Preferred types are indicated in ***bold***

Includes:
EDS-file and documentation on CD

Use Couplings for the connection BUS-IN and Connectors for the connection BUS-OUT.

Compatible self-assembly connectors:
Connector (BUS-OUT): 05.B8251-0/9
Coupling (BUS-IN): 05.B8151-0/9

See also Connection Technology page 263 section for cable assemblies.