

# AK58

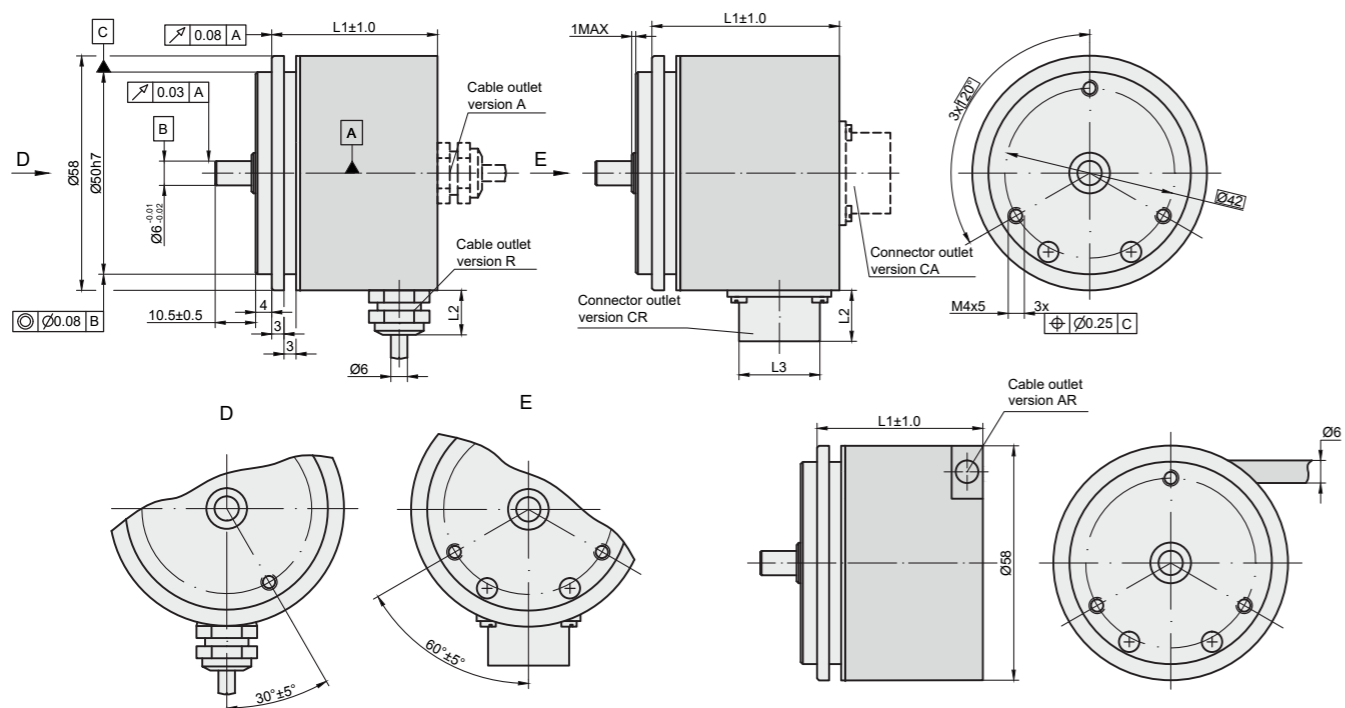
## PHOTOELECTRIC ROTARY ENCODER



Photoelectric absolute singleturn and multiturn rotary encoder series AK58 is constituted of 7 different models - AK58M, AK58B, AK58C, AK58C2, AK58C3, AK58D and AK58 EtherCAT. Encoders use SSI,

BiSS or EtherCAT output signal interfaces and output up to 24 bit singleturn and 40 bit multiturn resolutions through binary or Gray codes.

## AK58M



Other mounting versions on pages 32-34

	Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)
Singleturn	L1	41 mm	41 mm	41 mm	63 mm	55 mm	58 mm	41 mm	41 mm	43 mm
Multiturn	L1	62 mm	62 mm	62 mm	63 mm	55 mm	58 mm	62 mm	53 mm	55
Singleturn/multiturn	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singleturn/multiturn	L3	M24	M14	M23	M24	M14	M23	-	-	-

## MECHANICAL DATA

Maximum shaft speed	12000 rpm	Maximum weight without cable	0.35 kg
Maximum shaft load:		Operating temperature	
- axial	10 N (40 N for AK58C2, AK58C3, AK58D)	- singleturn version	-20...+80 °C
- radial (at shaft end)	20 N (60 N for AK58C2, AK58C3, AK58D)	- multiturn version	-10...+70 °C
Starting torque at 20°C	≤ 0.01 Nm	Storage temperature	
Rotor moment of inertia	<15 gcm <sup>2</sup>	- singleturn version	-30...+90 °C
Protection (IEC 529):	IP65 (IP 67 EtherCAT)	- multiturn version	-20...+80 °C
		Maximum humidity (non-condensing)	98 %
		Permissible vibration (55 to 2000 Hz)	≤ 100 m/s <sup>2</sup>
		Permissible shock (11 ms)	≤ 1000 m/s <sup>2</sup>

## ACCESSORIES

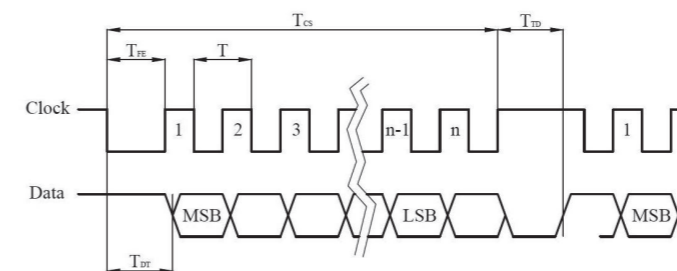
<b>CONNECTORS FOR CABLE</b>	B12 12-pin round connector	C9 9-pin round connector	C12 12-pin round connector	D9 9-pin flat connector	D15 15-pin flat connector	RS10 10-pin round connector	ONC 10-pin round connector
<b>CONNECTORS ON HOUSING</b>	C9 9-pin round connector		C12 12-pin round connector		RS10 10-pin round connector		ONC 10-pin round connector
<b>COUPLING</b>	SC30						

## ELECTRICAL DATA

Resolution:		Incremental signals	sine wave (sin, cos) 1 Vpp (optional)
<b>Singleturn version:</b>		Periods number of signals 1Vpp	4096
- with interface BiSS C	9 ... 20 bit	Accuracy	± 30 arc sec
- with interface SSI	9 ... 20 bit	Supply voltage	+5V ± 5%
<b>Multiturn version:</b>		Light source	LED
- single turn resolution with BiSS C	9 ... 20 bit	Maximum operating frequency	
- multiturn resolution with BiSS C	12/16/20/24 bit	- with interface BiSS C	up to 10 MHz
- single turn resolution with SSI	9 ... 20 bit	- with interface SSI	up to 4 MHz
- multiturn resolution with SSI	9 ... 40 bit	Cable length (standard)	1 m
Output code	Gray, binary		
Data interface	SSI, BiSS C		

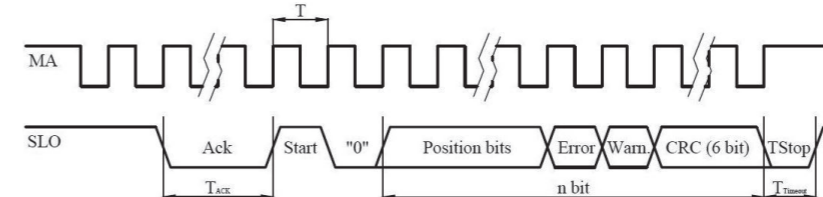
## ELECTRICAL SIGNALS

### SSI TIMING DIAGRAM



Interface	SSI
T <sub>TD</sub>	1,2 μs - 26 μs
Clock frequency	62,5 kHz ÷ 4 MHz

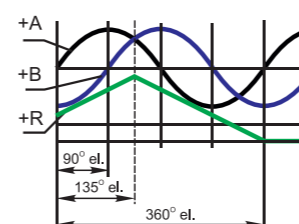
### BISS TIMING DIAGRAM



Interface	BISS C
T <sub>TD</sub>	1,2 μs - 26 μs
Clock frequency	62,5 kHz ÷ 4 MHz

Note: Error and/or parity bits should be determined during order

### Sine wave 1 Vpp signals

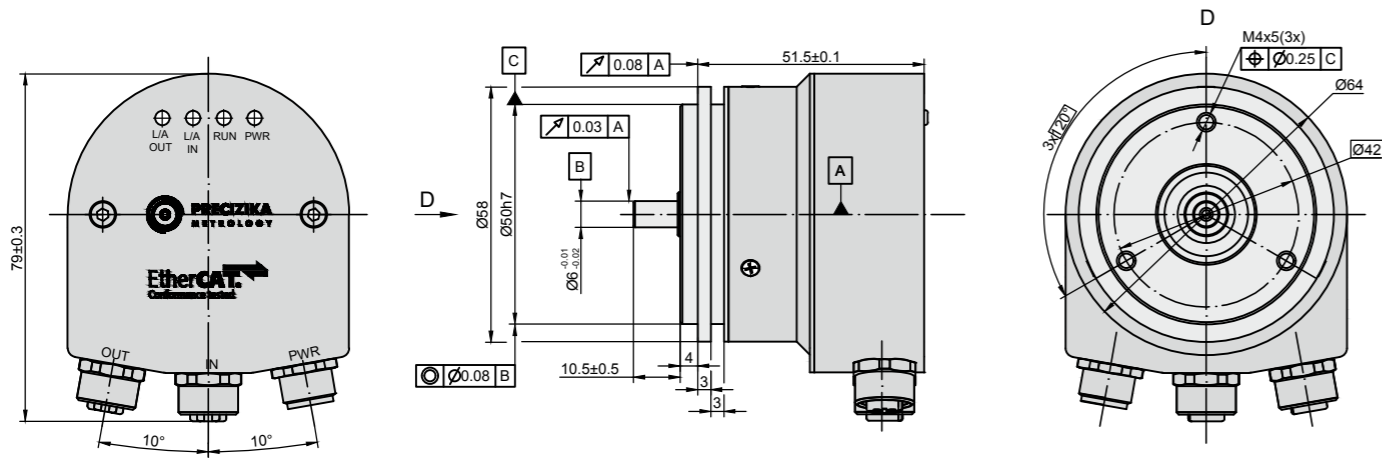


Complementary signals are not shown

# IAK 58 EtherCAT

The EtherCAT encoders support the CANopen communication profile according to "CanOpen Over EtherCAT" (COE) mode of data transfer with "Device profile for encoders", Class 1. For more details please refer to "CiA Draft Standard 406" at [www.can-cia.org](http://www.can-cia.org).

The encoder has resolution up to 20 bit per revolution. Operating principle is photoelectric.



## ELECTRICAL DATA

Resolution per revolution (position number)	2 <sup>20</sup> (1048576)	Connection	3 x M12 connectors
Accuracy	± 30 arc sec	Code	Binary, Gray
Supply voltage	10...30V DC	Protocol	EtherCAT
Maximum consumed current (without load)	110 mA	Operating temperature	-30...+80 °C
		Storage temperature	-30...+90 °C

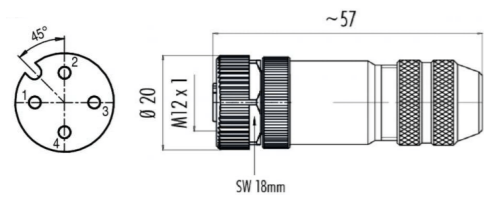
The encoder supports the following operating modes:

- FreeRun - asynchronous mode

- Distributed clock synchronization mode. Minimum cycle time 62.5 μs. Three status LEDs are located in the rear side of the absolute encoder.

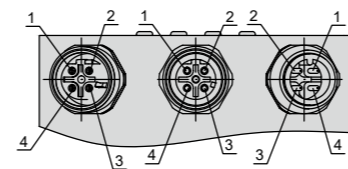
## ELECTRICAL CONNECTION AK58 EtherCAT

### ETHERCAT MATING CONNECTOR

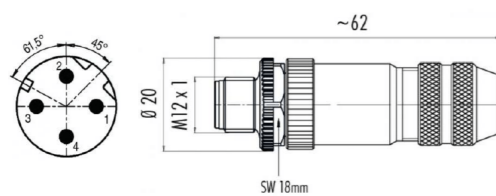


OUT	INN	POWER
M12D	M12D	M12A
Female	Female	Male

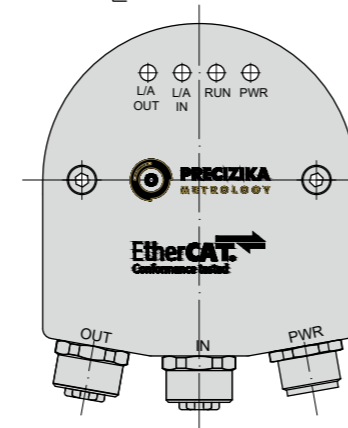
PIN	M12D	M12A
1	Tx Data +	10-30VDC
2	Rx Data +	n.c
3	Tx Data -	0 V
4	Rx Data -	n.c



### SUPPLY MATING CONNECTOR

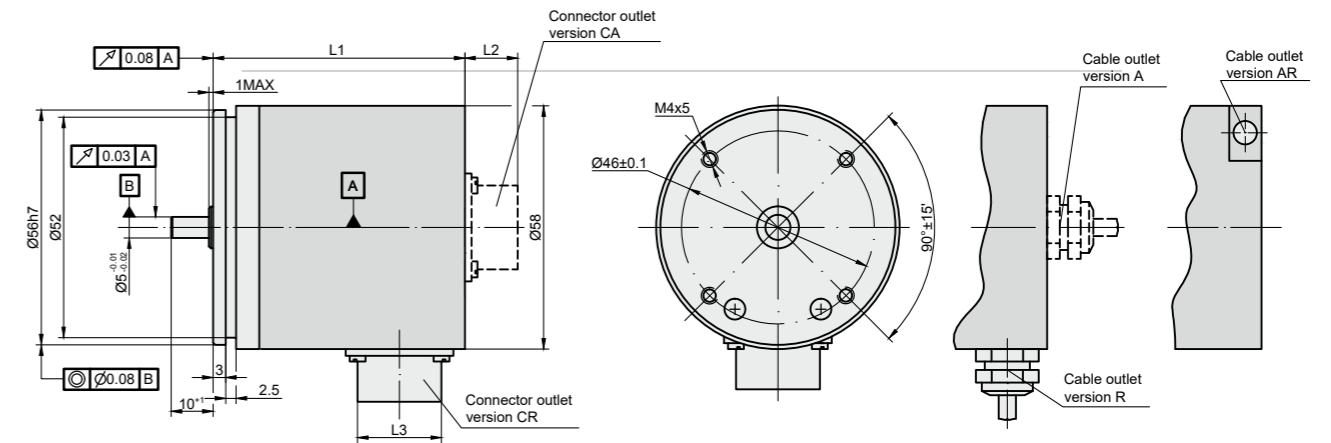


Suitable connection cables must at least meet CAT5 requirements, used in conjunction with an M12 4-pin plug connector D-type. The signal assignments for pins M12D coded socket and M12A coded plug connector are shown in the table. BUS IN and BUS OUT connectors are not interchangeable. IN connector must be placed in the direction of the EtherCAT® master.



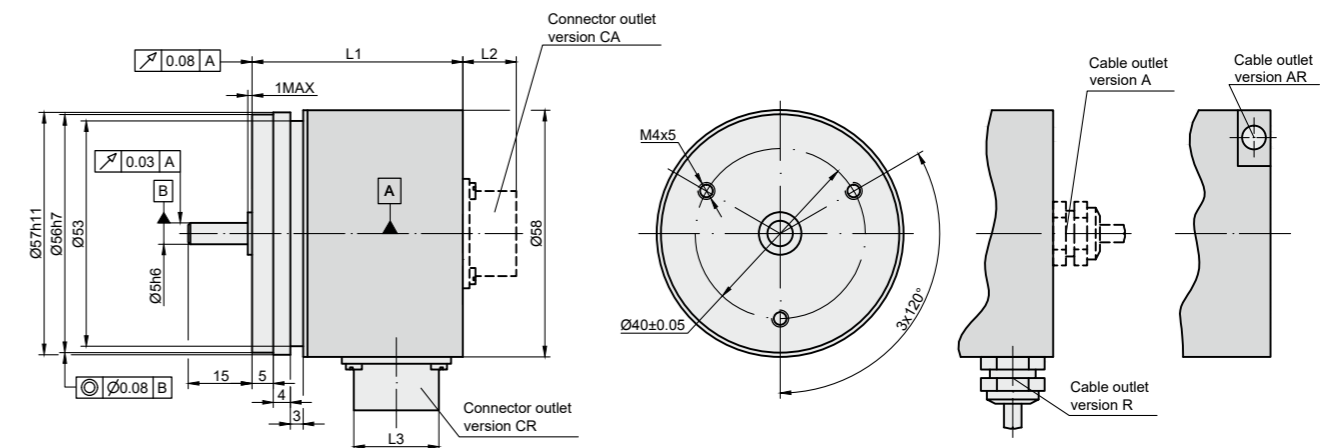
PIN	EtherCAT Mating connector	Supply mating connector
Connector type	M12 D-coded	M12 A-coded
Contacts	4-pin, gold	4-pin, gold
Cable outlet	6-8 mm	6-8 mm
Locking system	Bolted	Bolted
Termination	Screw	Screw
Protection	IP 67	IP 67

# IAK58B



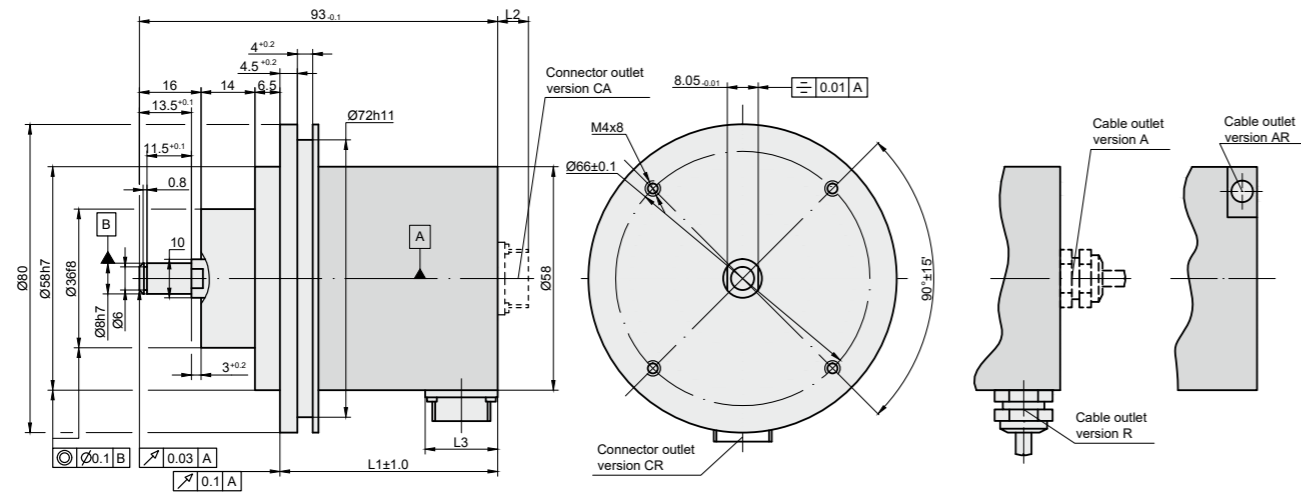
	Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)
Singleturn	L1	44,5 mm	44,5 mm	44,5 mm	66,5 mm	58,5 mm	61,5 mm	44,5 mm	47,5 mm	46,5 mm
Multiturn	L3	65,5 mm	65,5 mm	65,5 mm	66,5 mm	58,5 mm	61,5 mm	65,5 mm	56,5 mm	58,6
Singleturn/multiturn	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singleturn/multiturn	L3	M24	M14	M23	M24	M14	M23	-	-	-

# IAK58C



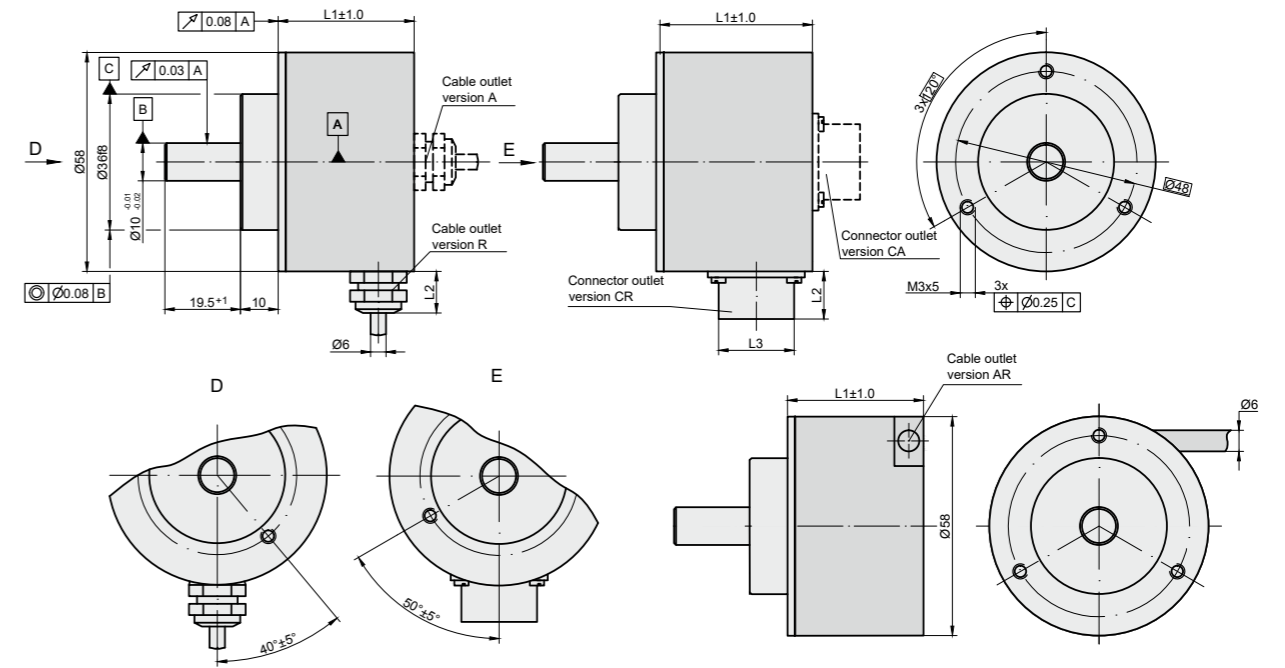
	Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)
Singleturn	L1	47 mm	47 mm	47 mm	69 mm	61 mm	64 mm	47 mm	50 mm	49 mm
Multiturn	L3	68 mm	68 mm	68 mm	69 mm	61 mm	64 mm	68 mm	59 mm	61
Singleturn/multiturn	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singleturn/multiturn	L3	M24	M14	M23	M24	M14	M23	-	-	-

# AK58C2



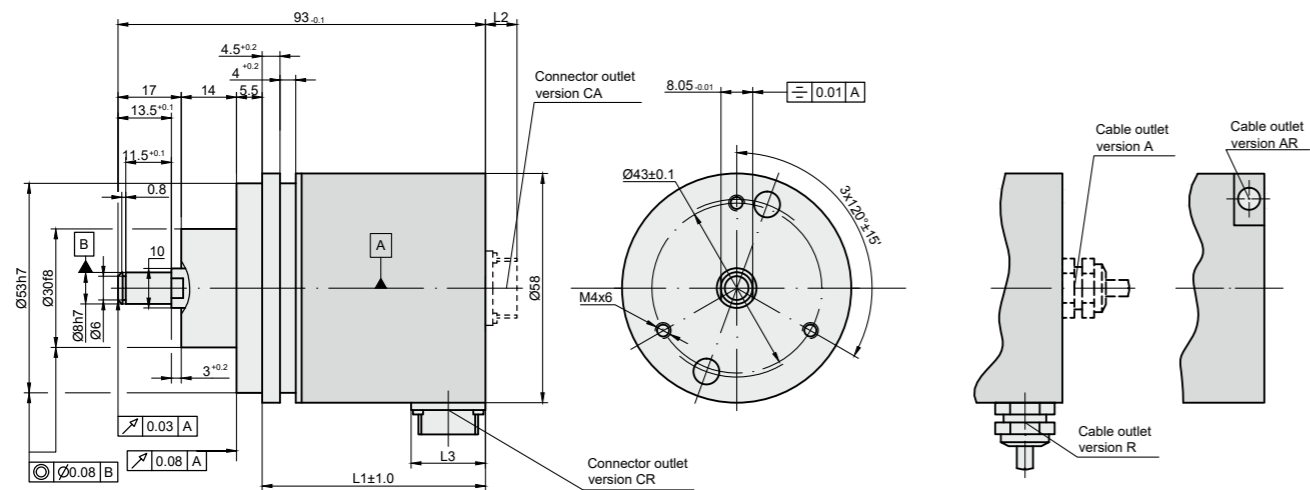
Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)	
Singletum	L1	44,5 mm	44,5 mm	44,5 mm	no	58,5 mm	61,5 mm	44,5 mm	47,5 mm	46,5 mm
Multitum	L3	65,5 mm	65,5 mm	65,5 mm	no	58,5 mm	61,5 mm	65,5 mm	56,5 mm	58,5 mm
Singletum/multitum	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singletum/multitum	L3	M24	M14	M23	M24	M14	M23	-	-	-

# AK58D



Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)	
Singletum	L1	37,5 mm	37,5 mm	37,5 mm	no	51,5 mm	54,5 mm	37,5 mm	40,5 mm	39,5 mm
Multitum	L3	58,5 mm	58,5 mm	58,5 mm	no	51,5 mm	54,5 mm	58,5 mm	49,5 mm	51,5 mm
Singletum/multitum	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singletum/multitum	L3	M24	M14	M23	M24	M14	M23	-	-	-

# AK58C3



Connector type / cable outlet	ONC axial	PC10 axial	C12, C9 axial	ONC radial	PC10 radial	C12, C9 radial	Cable axial (ver. A)	Cable radial (ver. R)	Cable axial-radial (ver. AR)	
Singletum	L1	44,5 mm	44,5 mm	44,5 mm	no	58,5 mm	61,5 mm	44,5 mm	47,5 mm	46,5 mm
Multitum	L3	65,5 mm	65,5 mm	65,5 mm	no	58,5 mm	61,5 mm	65,5 mm	56,5 mm	58,5 mm
Singletum/multitum	L2	16 mm	9 mm	22 mm	16 mm	9 mm	22 mm	12 mm	12 mm	-
Singletum/multitum	L3	M24	M14	M23	M24	M14	M23	-	-	-

## ORDER FORM

AK58 X - X - XX - XXX/XXX - X - X - XXX/XXX - X

TYPE:	VERSION:	OUTPUT SIGNAL INTERFACE:	SINGLETUM NUMBER*:	MULTITUM NUMBER*:	CODE:	INCREMENTAL SIGNALS:	CABLE LENGTH AND OUTLET OR FLANGE SOCKET ON CASE OUTLET:	CONNECTOR:	COUPLING:
M - AK58M	ST - singletum	S - SSI	B9 - 9	M0 - 0 (for singletum version)	B - Binary	V - 1Vpp*	A01 - 1m (A-axial cable) ..... R01 - 1m (R-radial cable) ..... AR01 - 1m (AR-universal cable outlet) .....	W - without connector D9 - flat, 9 pins C9 - round, 9 pins C12 - round, 12 pins RS - 10-round, 10 pins ONC - round, 10 pins M12D - D-coded M12A - A-coded	0 - without coupling 1 - with coupling
B - AK58B	MT - multitum	B - BISS C	B10 - 10	M9 - 9	G - Grey	N - no incremental signal			
C - AK58C		EC - EtherCAT	B11 - 11	M10 - 10		* only for singletum version			
C2 - AK58C2			B12 - 12	M11 - 11					
C3 - AK58C3			.....	.....					
D - AK58D			B20 - 20	M40 - 40					

ORDER EXAMPLES: 1) AK58M-ST-S-B9/M0-B-N-AR02/W-0  
2) AK58D-MT-B-B20/M12-G-N-AR01/W-1