Industrial Sensors

Incremental Optical Encoders, RCI range

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives…

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

RCI 40A-BS
RCI 40A-HS

RCI 58A-BS
RCI 58A-HS

RCI 58A-FS

RCI 90A-HS

RCI 444R-FS

RCI 444ADF-FS

Type	Size mm	Shaft	Shaft size mm/inch	Max Speed Rpm	Max Résolution	Protection Shaft/housing	Termination
RCI 40A - HS	40	Hollow through	4, 6, 1/4"	6000	2500	IP 64/65	Cable
RCI 40A - BS	40	Blind hollow	4, 6, 1/4"	10000	2500	IP 64/65	Cable
RCI 40A - FS	40	Full	4, 6, 1/4"	10000	2500	IP 64/65	Cable
RCI 58A - HS	58	Hollow through	12, 1/2", 14, 15	6000	5400	IP 64/65	Cable/ connector
RCI 58A - BS	58	Blind hollow	12,1/2", 14, 15	10000	5400	IP 64/65	Cable/ connector
RCI 58A - FS	58	Full	6, 1/4", 3/8", 10	10000	5400	IP 64/65	Cable/ connector
RCI 90A - HS	90	Hollow through	20, 25, 1", 30, 42	3000	1024	IP 64/65	Cable/ connector
RCI 444R - FS	115	Full	7, 11	10000	5400	IP 64/65	Cable/connector/ junction box
RCI 444ADF - FS	115	Full	7, 11	10000	5400	IP 66	Junction box

ZODIAC

PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

General information about encoders

What is an incremental encoder?

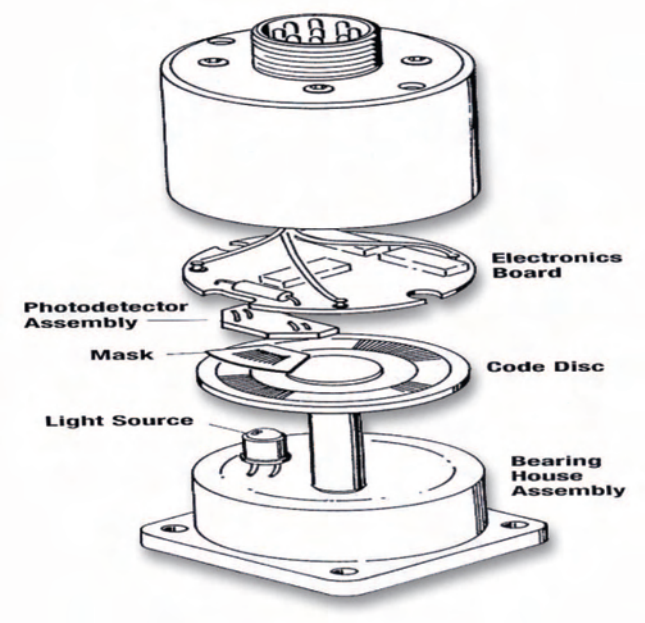
Incremental encoders are sensors capable of generating digital signals in response to rotary movement. They are employed to **convert the rotary movement into electrical signals** and to obtain position and speed measures. The encoder generates a signal for each incremental change in position. In conjunction with mechanical conversion devices, such as rack-and-pinions, measuring wheels or spindles, incremental encoders can also be used to **measure linear movement**.

Our incremental encoders are designed with an optical electronic circuit. With **optical encoders**, a grating disc made of metal or glass associated with a mask interrupts an infrared beam emitted by a transmitting gallium arsenide diode. The number of gratings (increments) determines the system's resolution, i.e. the number of increments per rotation. Every time the infrared beam is interrupted, this is registered by a receiver and then processed electronically. To make the detection less sensitive to the light level, the receiver uses a **differential measure** between two photodiodes: one lighted and the other masked. The result is a **square wave output signal.**

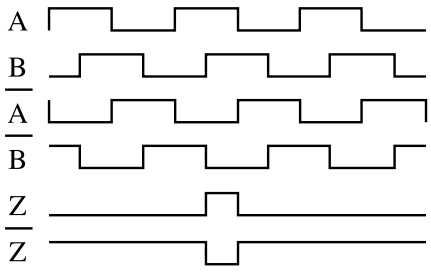
Two shifted photosensitive diode arrays deliver **squared signals (A and B) in quadrature**. The phase shift (90° electric) of signals A and B makes possible to determine the direction of rotation. In one direction, during the going up of the signal A, the signal B is equal to 1. In the other direction, during the going up of the signal A, the signal B is equal to 0.

The **Z or signal zero** comprises only one transparent window delivering one signal by turn. This signal is **gated** in synchronism **with signals A and B.** This zero signal **determines a position of reference** and allows reinitializing the system at each turn.

The electronic treatment delivers signals complementary to A, B and Z and makes possible to remove electric noises by using a differential transmission of the signals.



Output waveforms:
A leads B for clockwise rotation from front size



Double Sens Communication

ZODIAC

PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Industrial Sensors

TYPE RCI 40A - HS

Incremental Optical Encoder with hollow through shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

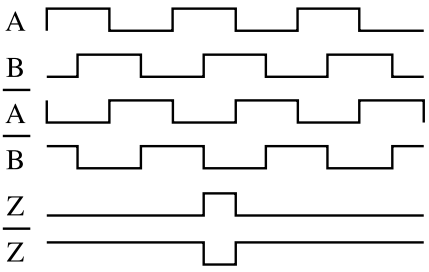
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	4mm, 6mm, 1/4 inch stainless steel hollow through shaft
● Housing diameter	40mm
● Fixation	Spring plate
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048. Others on request, max 2500
● Output signals	A and B with gated Z
● Termination	Radial cable
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections	Cable
A	white
Ā	yellow
B	blue
B̄	orange
Z	green
Z̄	brown
Vcc:	red
0V:	black
Ground case	Drain

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

Mechanical characteristics

● Max speed	6000rpm
● Starting torque	≤ 0.5N.cm
● Inertia	6.5gr.cm²
● Weight	100gr
● Protection	IP64 at shaft inlet, IP 65 at housing (IEC 60529)
● Max shock	100g, 6ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

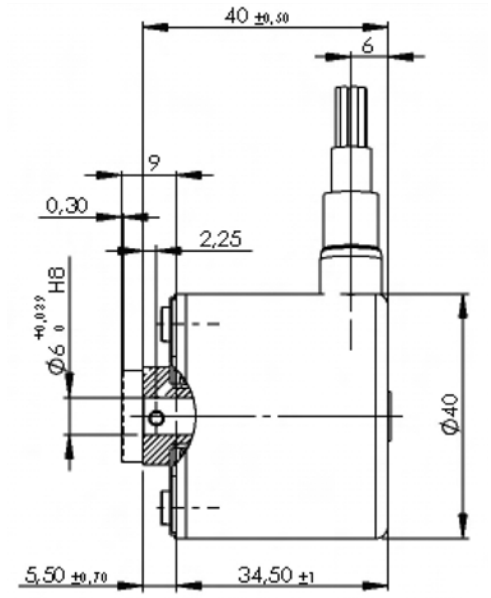
ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

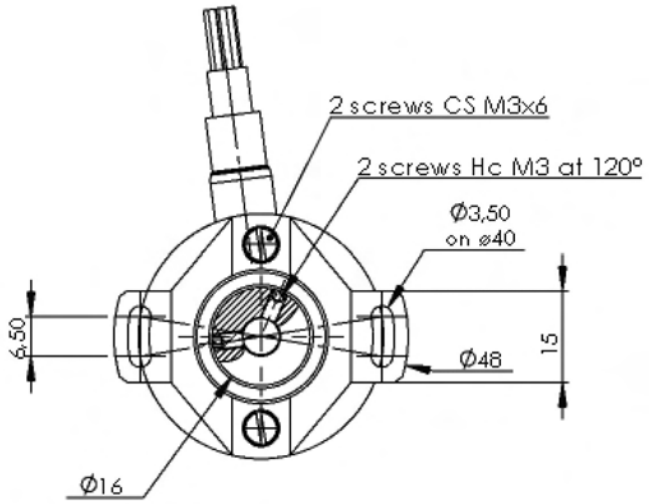
Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Outline drawings





Ordering codes

RCI 40A - HSx - xxxx - x

HSx:
Hollow shaft

HS1: 4mm*
HS2: 6mm
HS3: 1/4 inch

*with reducing ring

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 2500

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Double Sens Communication

ZODIAC

PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Industrial Sensors

TYPE RCI 40A - BS

Incremental Optical Encoder with blind hollow shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

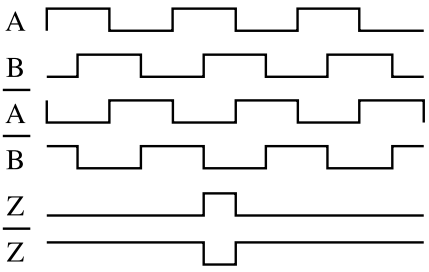
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	4mm, 6mm, 1/4 inch stainless steel blind hollow shaft
● Housing diameter	40mm
● Fixation	Spring plate
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048 Others on request, max 2500
● Output signals	A and B with gated Z
● Termination	Radial cable
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections	Cable
$\overline{A}$	white
A	yellow
$\overline{B}$	blue
B	orange
$\overline{Z}$	green
Z	brown
Vcc:	red
0V:	black
Ground case	Drain

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

Mechanical characteristics

● Max speed	10000rpm
● Starting torque	≤ 0.2N.cm
● Inertia	6.5gr.cm²
● Weight	100gr
● Protection	IP64 at shaft inlet, IP 65 at housing (IEC 60529)
● Max shock	100g, 6ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ZODIAC

PRECILEC

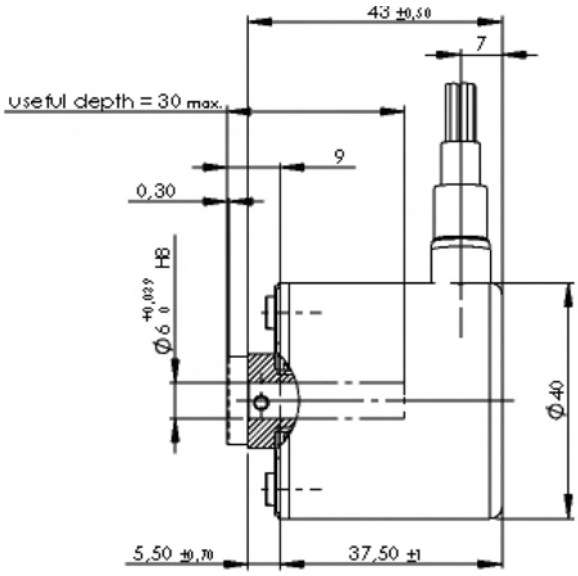
ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

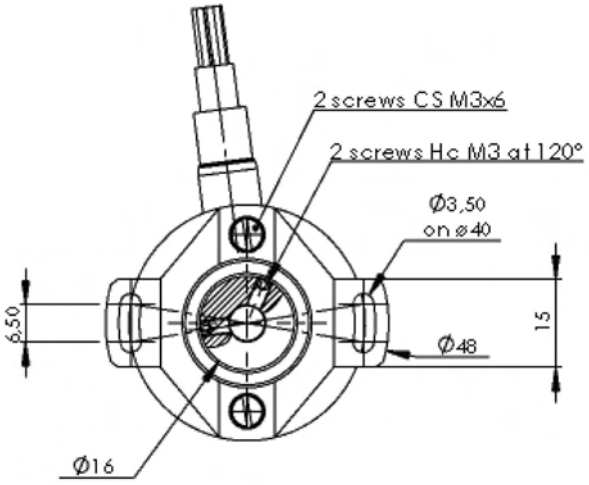
Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Outline drawings





Ordering codes

RCI 40A - BSx - xxxx - x

BSx:
Hollow shaft

BS1: 4mm*
BS2: 6mm
BS3: 1/4 inch

*with reducing ring

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 2500

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Double Sens Communication

ZODIAC

PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Industrial Sensors

TYPE RCI 40A - FS

Incremental Optical Encoder with shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

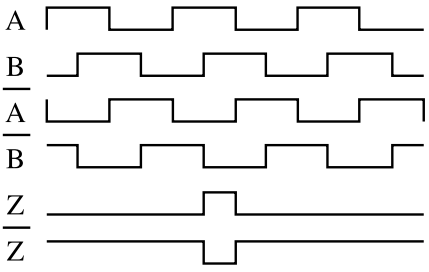
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	6mm, 1/4 inch stainless steel shaft
● Housing diameter	40mm
● Fixation	Clamping, synchro, square flange
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048. Others on request, max 2500
● Output signals	A and B with gated Z
● Termination	Radial cable
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections	Cable
A	white
$\overline{A}$	yellow
B	blue
$\overline{B}$	orange
Z	green
$\overline{Z}$	brown
Vcc:	red
OV:	black
Ground case	Drain

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

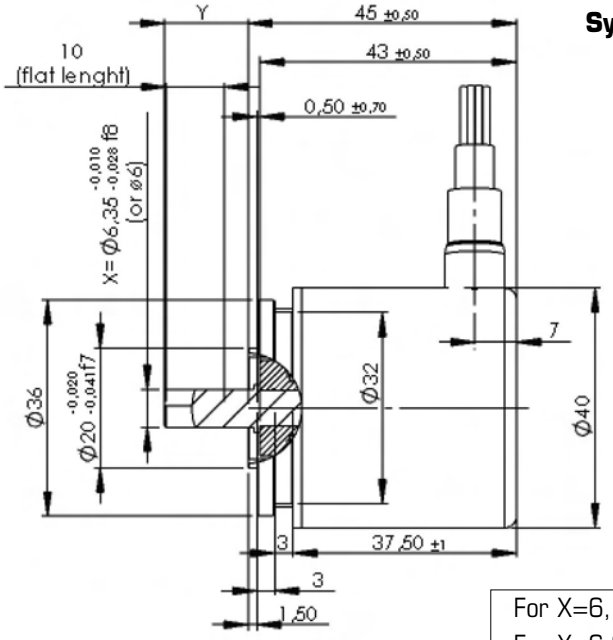
Mechanical characteristics

● Max speed	10000rpm		
● Starting torque	≤ 0.2N.cm		
● Max shaft load	Axial: 10N, Radial: 20N		
● Inertia	6.9gr.cm²		
● Weight	100gr		
● Protection	IP64 at shaft end, IP 65 at housing (IEC 60529)		
● Max shock	100g, 6ms (IEC 68-2-27)		
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)		
● Theoretical bearings life	25% max load	50% max load	100% max load
(x 10^9 revolutions)	2000	350	60

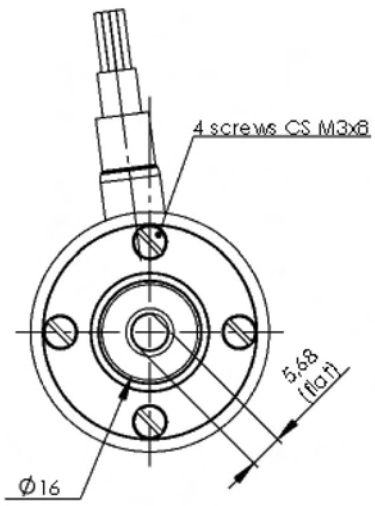
PRECILEC

Rev B, 23/02/06 We reserve the right to modify technical characteristics in the interest of technological advance.

Outline drawings

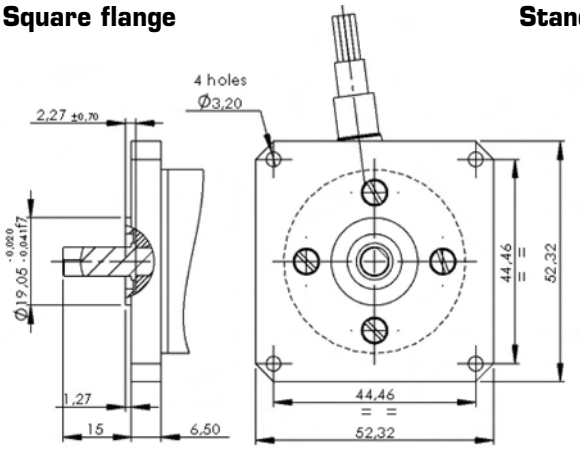


Synchro flange

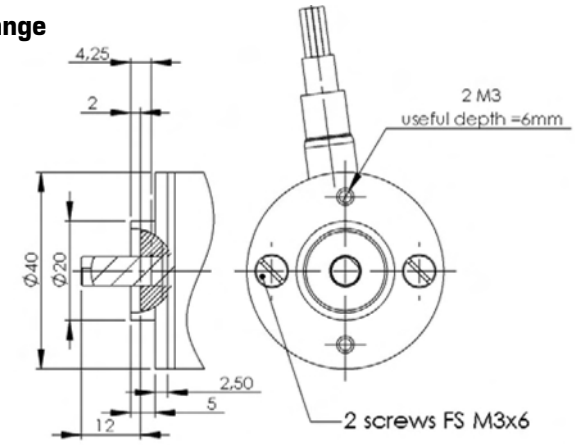


For X=6, Y=10±0.25 with flat of 5.5x10
For X=6.35, Y=14±0.25 with flat of 5.68x10

Square flange



Standard flange



Ordering codes

RCI 40A - FSx - xxxx - x

FSx:
Shaft and flange

FS1: 6mm shaft, standard clamping flange
FS2: 6mm shaft, synchro flange
FS3: 1/4 inch shaft, synchro flange
FS4: 1/4 inch shaft, square flange

Other shafts on request

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 2500

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Industrial Sensors

TYPE RCI 58A - HS

Incremental Optical Encoder with hollow through shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

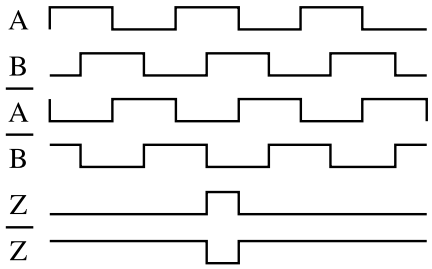
● Shaft type	12, 14, 15mm and 1/2 inch stainless steel hollow through shaft
● Housing diameter	58mm
● Fixation	Spring plate
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048. Others on request, max 5400
● Output signals	A and B with gated Z
● Termination	Radial cable, M23 and MS310 receptacle
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:

A leads B for clockwise rotation from front size



Connections

	Cable	M23	MS310
A	white	5	A
Ā	yellow	6	H
B	blue	8	B
B̄	orange	1	I
Z	green	3	C
Z̄	brown	4	J
Vcc:	red	12	D
0V:	black	10	F
Ground case	Drain	9	G

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

Mechanical characteristics

● Max speed	6000rpm
● Starting torque	≤ 3N.cm
● Inertia	62gr.cm²
● Weight	300gr
● Protection	IP64 at shaft inlet, IP 65 at housing (IEC 60529)
● Max shock	100g, 6ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ZODIAC

PRECILEC

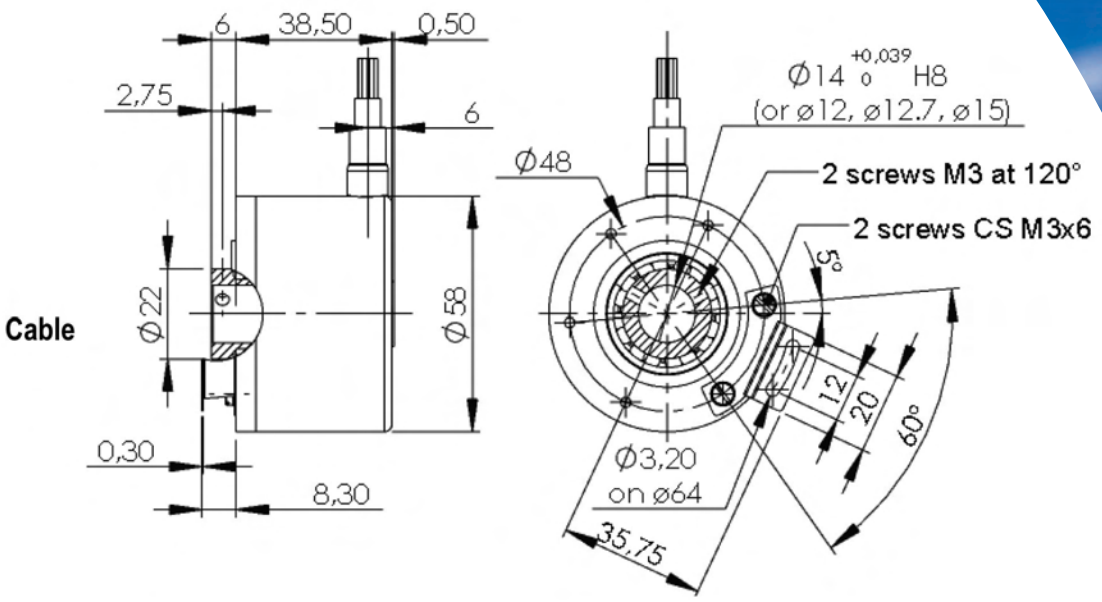
ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

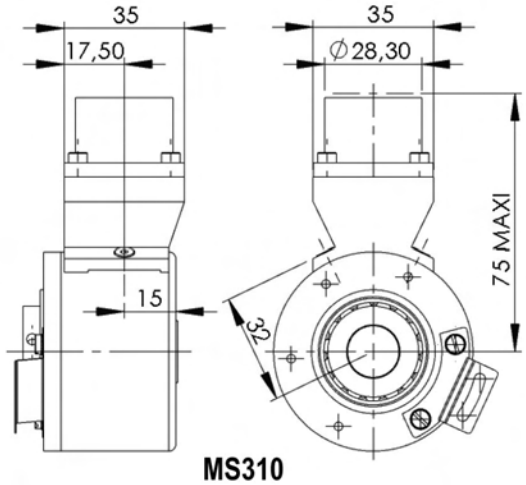
Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

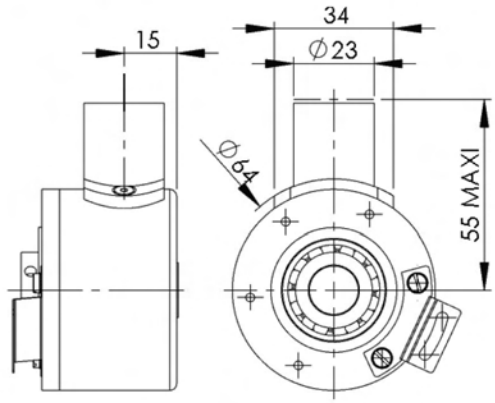
PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Outline drawings





MS310



M23

Ordering codes

RCI 58A - HSx - xxxx - x

HSx:
Hollow shaft

HS1: 12mm
HS2: 1/2 inch*
HS3: 14mm
HS3: 15mm
Other shafts on request

*Cable or MS310 termination only

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 5400

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.
2: M23 12 pins clockwise receptacle*
3: MS310 10 pins receptacle

*Other versions on request

ZODIAC

PRECILEC

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

www.precilec.com

Industrial Sensors

TYPE RCI 58A - BS

Incremental Optical Encoder with blind hollow shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

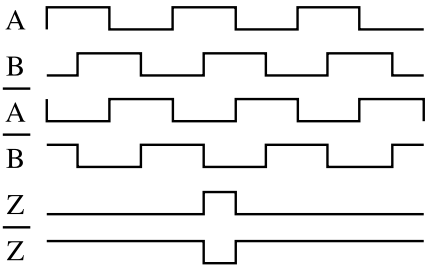
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	12, 14, 15mm and 1/2 inch stainless steel blind hollow shaft
● Housing diameter	58mm
● Fixation	Spring plate
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048. Others on request, max 5400
● Output signals	A and B with gated Z
● Termination	Radial cable, M23 and MS310 receptacle
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections

	Cable	M23	MS310
A	white	5	A
Ā	yellow	6	H
B	blue	8	B
B̄	orange	1	I
Z	green	3	C
Z̄	brown	4	J
Vcc:	red	12	D
0V:	black	10	F
Ground case	Drain	9	G

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

Mechanical characteristics

● Max speed	10000rpm
● Starting torque	≤ 0.5N.cm
● Inertia	62gr.cm²
● Weight	300gr
● Protection	IP64 at shaft inlet, IP 65 at housing (IEC 60529)
● Max shock	100g, 6ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ZODIAC

PRECILEC

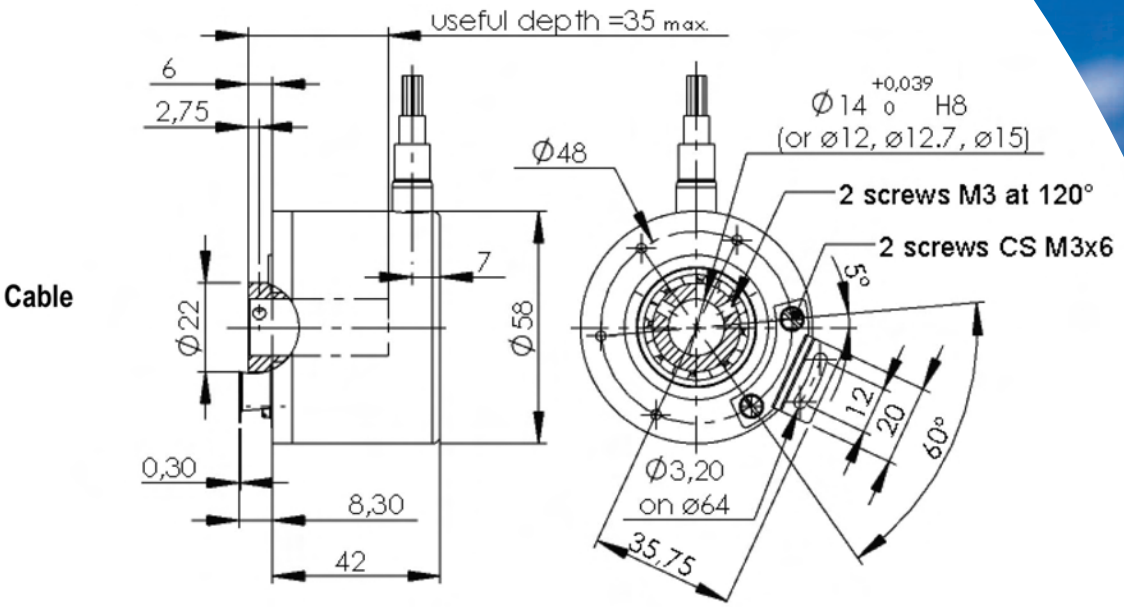
ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

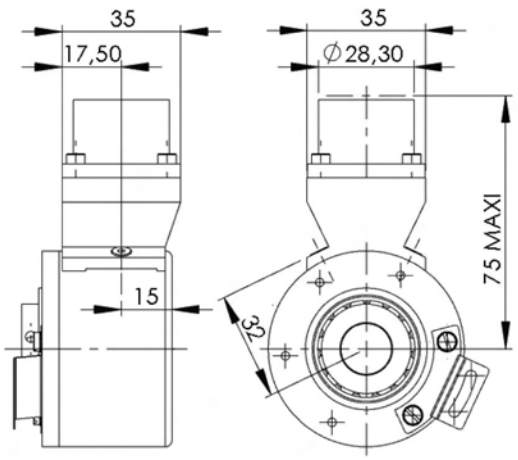
Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

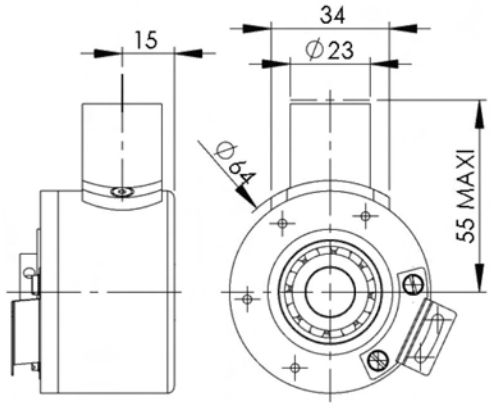
PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Outline drawings





MS310



M23

Ordering codes

RCI 58A - BSx - xxxx - x

BSx:
Hollow shaft

BS1: 12mm
BS2: 1/2inch*
BS3: 14mm
BS4: 15mm

Other shafts on request

*Cable or MS310 termination only

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 5400

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.
2: M23 12 pins clockwise receptacle*
3: MS310 10 pins receptacle

*Other versions on request

ZODIAC

PRECILEC

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

www.precilec.com

Industrial Sensors

TYPE RCI 58A - FS

Incremental Optical Encoder with shaft

Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

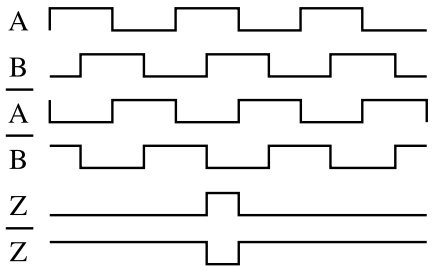
● Shaft type	6, 10mm and 1/4, 3/8 inch stainless steel shaft
● Housing diameter	58mm
● Fixation	Clamping, synchro, square flange
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048.Others on request, max 5400
● Output signals	A and B with gated Z
● Termination	Radial cable, M23 and MS310 receptacle
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:

A leads B for clockwise rotation from front size



Connections

	Cable	M23	MS310
A	white	5	A
Ā	yellow	6	H
B	blue	8	B
B̄	orange	1	I
Z	green	3	C
Z̄	brown	4	J
Vcc:	red	12	D
OV:	black	10	F
Ground case	Drain	9	G

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

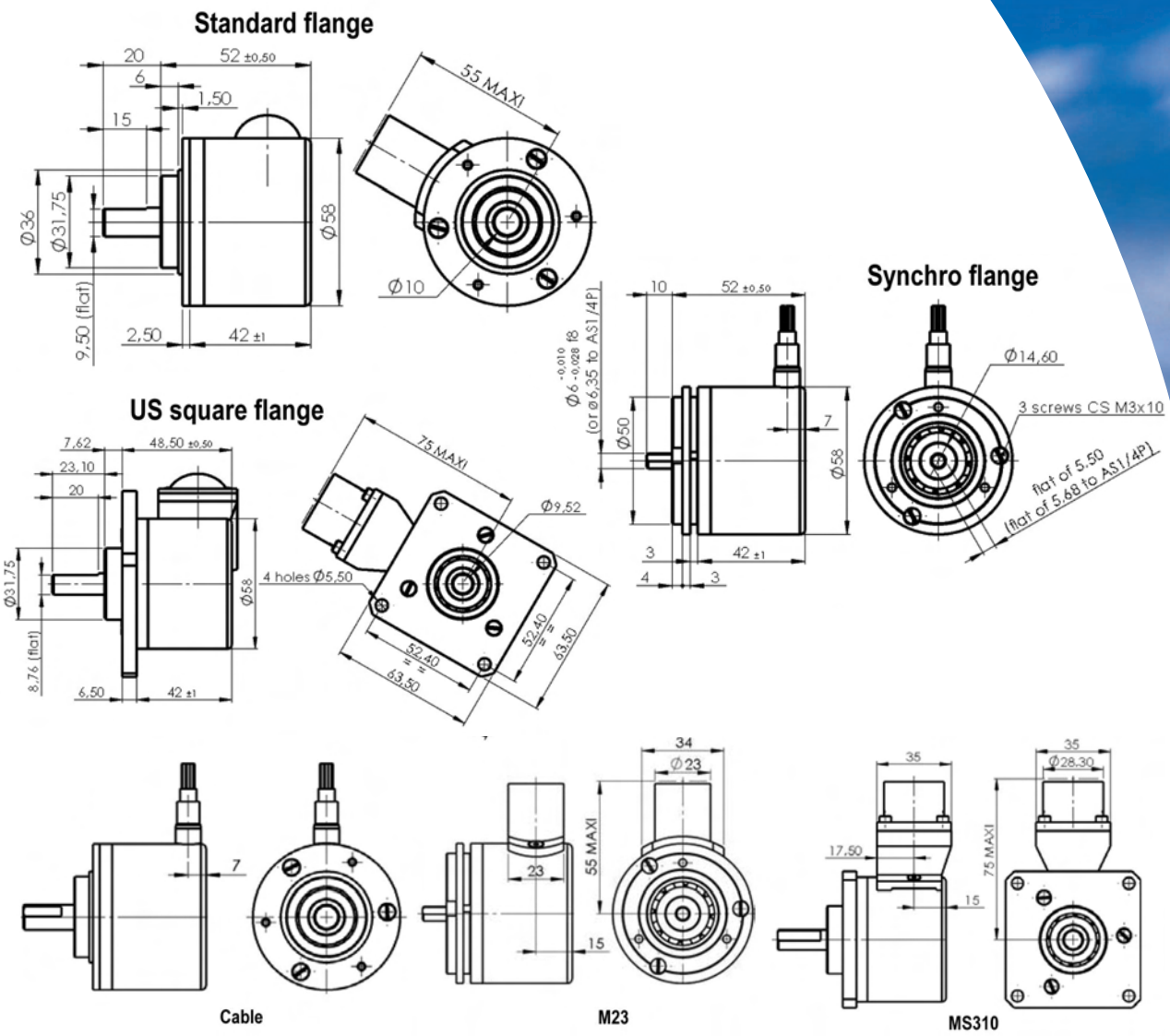
Mechanical characteristics

● Max speed	10000rpm		
● Starting torque	≤ 0.5N.cm		
● Max shaft load	Axial: 40N, Radial: 80N		
● Inertia	70gr.cm²		
● Weight	300gr		
● Protection	IP64 at shaft end, IP 65 at housing (IEC 60529)		
● Max shock	100g, 6ms (IEC 68-2-27)		
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)		
● Theoretical bearings life	25% max load	50% max load	100% max load
(x 10^9 revolutions)	1300	230	40

PRECILEC

Rev B, 23/02/06 We reserve the right to modify technical characteristics in the interest of technological advance.

Outline drawings



Ordering codes

RCI 58A - FSx - xxxx - x

FSx:
Shaft and flange

FS1: 6mm shaft, synchro flange

FS2: 1/4 inch shaft, synchro flange*

FS3: 3/8 inch shaft, US square flange*

FS4: 10mm shaft, standard clamping flange

Other shafts on request

*Cable or MS310 termination only

xxxx:
Pulses per turn

1024

2048

Other resolutions on request, from 0001 to 5400

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.

2: M23 12 pins clockwise receptacle*

3: MS310 10 pins receptacle

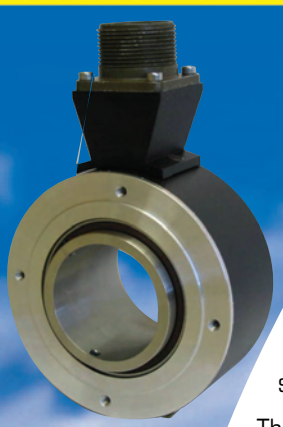
*Other versions on request

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Industrial Sensors

TYPE RCI 90A - HS

Incremental Optical Encoder with hollow through shaft



Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

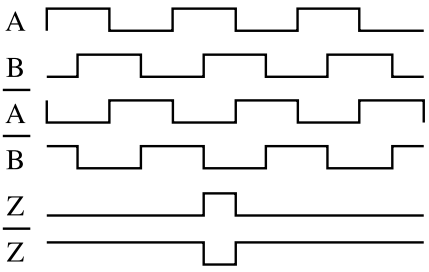
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	20, 25, 30, 42mm and 1 inch stainless steel hollow through shaft
● Housing diameter	115mm
● Fixation	Spring plate
● Body	Aluminium
● Pulses per turn	Standard 1024 Others on request
● Output signals	A and B with gated Z
● Termination	Radial cable
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections

	Cable	M23	MS310
A	white	5	A
Ā	yellow	6	H
B	blue	8	B
B̄	orange	1	I
Z	green	3	C
Z̄	brown	4	J
Vcc:	red	12	D
0V:	black	10	F
Ground case	Drain	9	G

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

Mechanical characteristics

● Max speed	3000rpm
● Starting torque	≤ 30N.cm
● Inertia	970gr.cm² without reducing ring
● Weight	560gr without reducing ring
● Protection	IP64 at shaft inlet, IP 65 at housing (IEC 60529)
● Max shock	100g, 6ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ZODIAC

PRECILEC

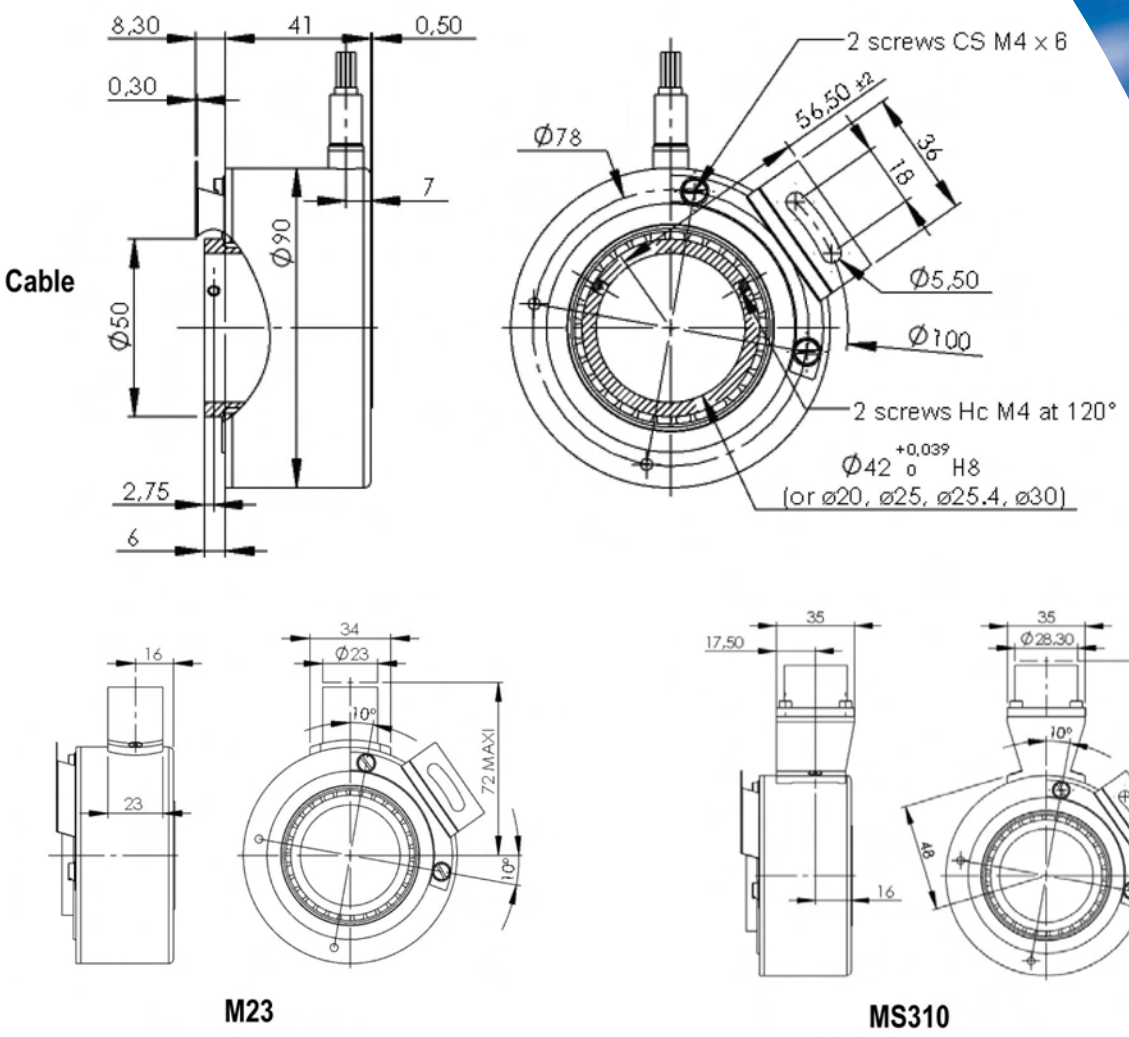
ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

Outline drawings



M23 MS310

Ordering codes

RCI 90A - FSx - xxxx - x

HSx:
Hollow shaft

HS1: 20mm*
HS2: 25mm*
HS3: 1 inch*,[1]
HS4: 30mm*
HS5: 42mm
Other shafts on request

*with reducing ring
[1]Cable or MS310 termination only

xxxx:
Pulses per turn

1024

Other resolutions on request,

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.
2: M23 12 pins clockwise receptacle*
3: MS310 10 pins receptacle

*Other versions on request

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

ZODIAC

PRECILEC

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

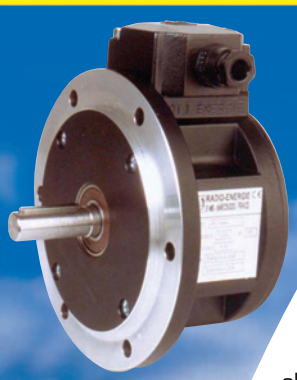
PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

Industrial Sensors

TYPE RCI 444R - FS

Incremental Optical Encoder with RE.0444 tacho flange



Main features

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives...

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

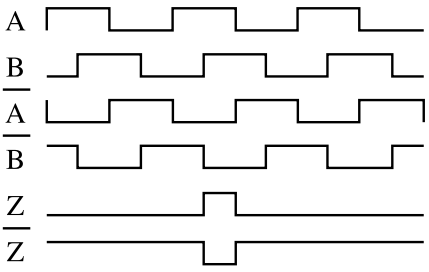
Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

● Shaft type	7 and 11mm stainless steel shaft
● Housing diameter	115mm
● Fixation	Standard REO 444 flange
● Body	Aluminium
● Pulses per turn	Standard 1024, 2048. Others on request, max 5400
● Output signals	A and B with gated Z
● Termination	Radial cable, M23 and MS310 receptacle, junction box
● Operating temperature range (encoder body)	- 25° C / + 85° C

Electrical characteristics

● Supply voltage	4,5 to 30V DC with reverse polarity protection
● No load supply current	100mA under 4.5V – 25mA under 24V
● Output signals	Universal complementary push pull, short circuit protected (7272) RS422 compatible with 5V supply voltage
● Max output frequency	300 kHz
● Max load current per channel	20mA
● EMC	According to EN 61000-6-2 and EN 61000-6-4

● Output waveforms:
A leads B for clockwise rotation from front size



Connections

	Cable	M23	MS310	Jonction box
A	white	5	A	3
Ā	yellow	6	H	6
B	blue	8	B	4
B̄	orange	1	I	7
Z	green	3	C	5
Z̄	brown	4	J	8
Vcc:	red	12	D	2
OV:	black	10	F	1
Ground case	Drain	9	G	

Cable: 8 AWG24 (0.22mm²) wires globally shielded, UL approved

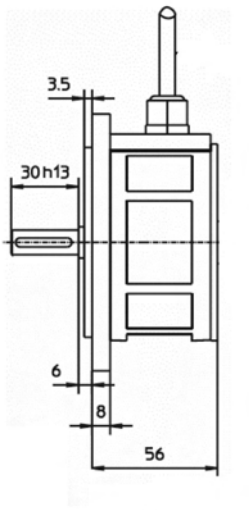
Mechanical characteristics

● Max speed	10000rpm
● Starting torque	≤ 0.5N.cm
● Max shaft load	Axial: 40N, Radial: 80N
● Inertia	70gr.cm²
● Weight	700gr
● Protection	IP64 at shaft end, IP 65 at housing (IEC 60529)
● Max shock	30g, 11ms (IEC 68-2-27)
● Max vibrations	10g, 10-2000Hz (IEC 68-2-6)

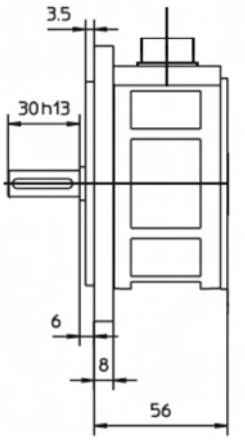
● Theoretical bearings life	25% max load	50% max load	100% max load
(x 10⁹ revolutions)	1300	230	40

PRECILEC

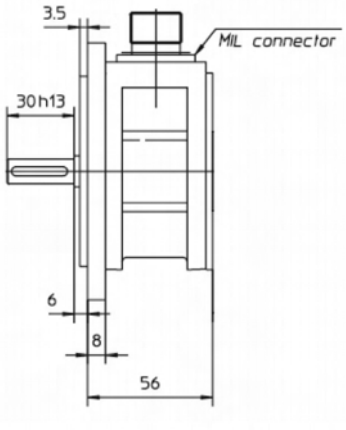
Outline drawings



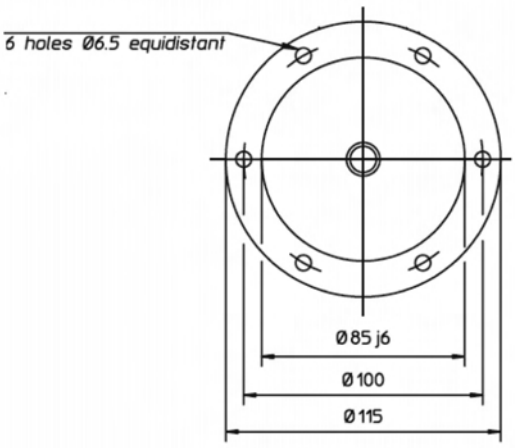
Cable

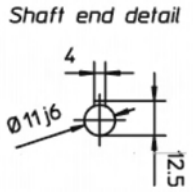


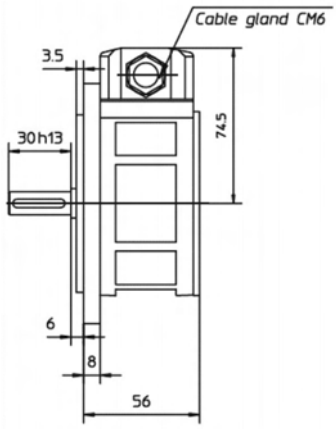
M23



MS310







Junction Box

Ordering codes

RCI 444R - FSx - xxxx - x

FSx:
Shaft

FS1: 7mm
FS2: 11mm

xxxx:
Pulses per turn

1024
2048

Other resolutions on request, from 0001 to 5400

x:
Termination

1: cable, one meter standard length.
Other lengths on request, from 0.5 to 10 meters. Beyond 10 meters a cable with twisted pairs must be used.
2: M23 12 pins clockwise receptacle*
3: MS310 10 pins receptacle
4: Junction box
*Other versions on request

Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Double Sens Communication

ZODIAC

PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com