



Fagor Automation S. Coop.

Manual code: 14460150

Manual version: 1501



# ENCODER HAM-D90

**MANUAL DE INSTALACIÓN  
INSTALLATION MANUAL**

**FAGOR AUTOMATION S. COOP.**

**B<sup>a</sup> San Andrés N<sup>o</sup> 19**

**Apdo de correos 144**

**20500 Arrasate/Mondragón**

**- Spain -**

**Web: [www.fagorautomation.com](http://www.fagorautomation.com)**

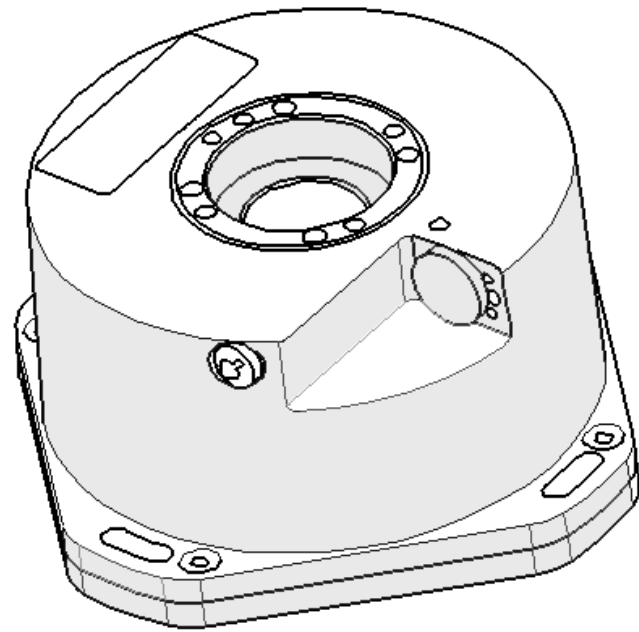
**Email: [info@fagorautomation.es](mailto:info@fagorautomation.es)**

**Tel.: (34) 943 719200**

**Fax: (34) 943 791712**



Fagor Automation S. Coop.



MANUAL

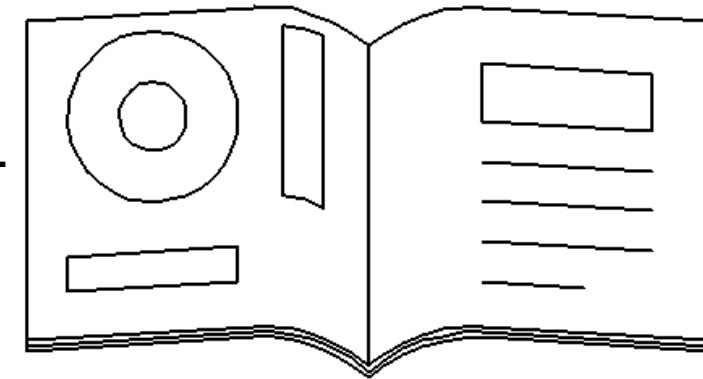
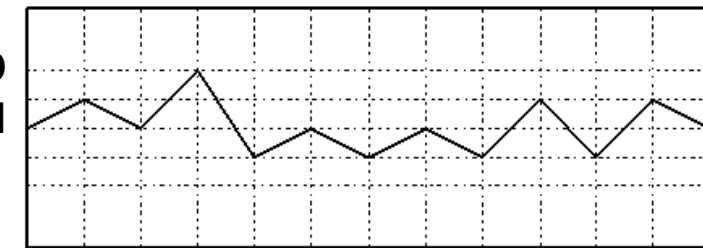
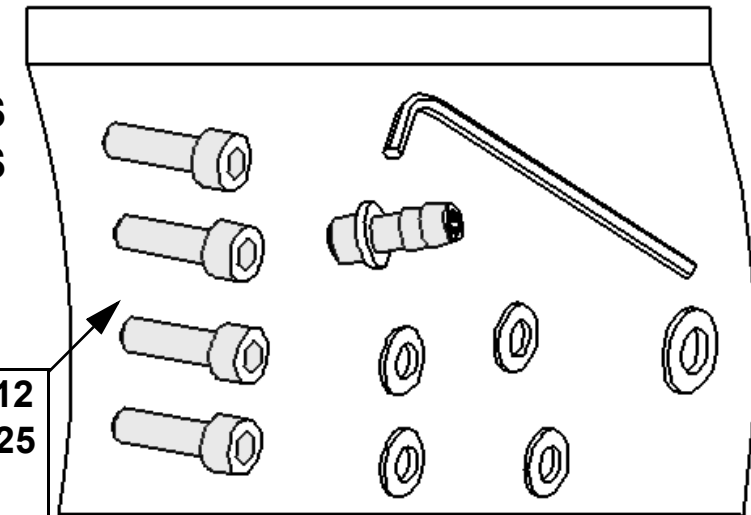


GRÁFICO  
GRAPH



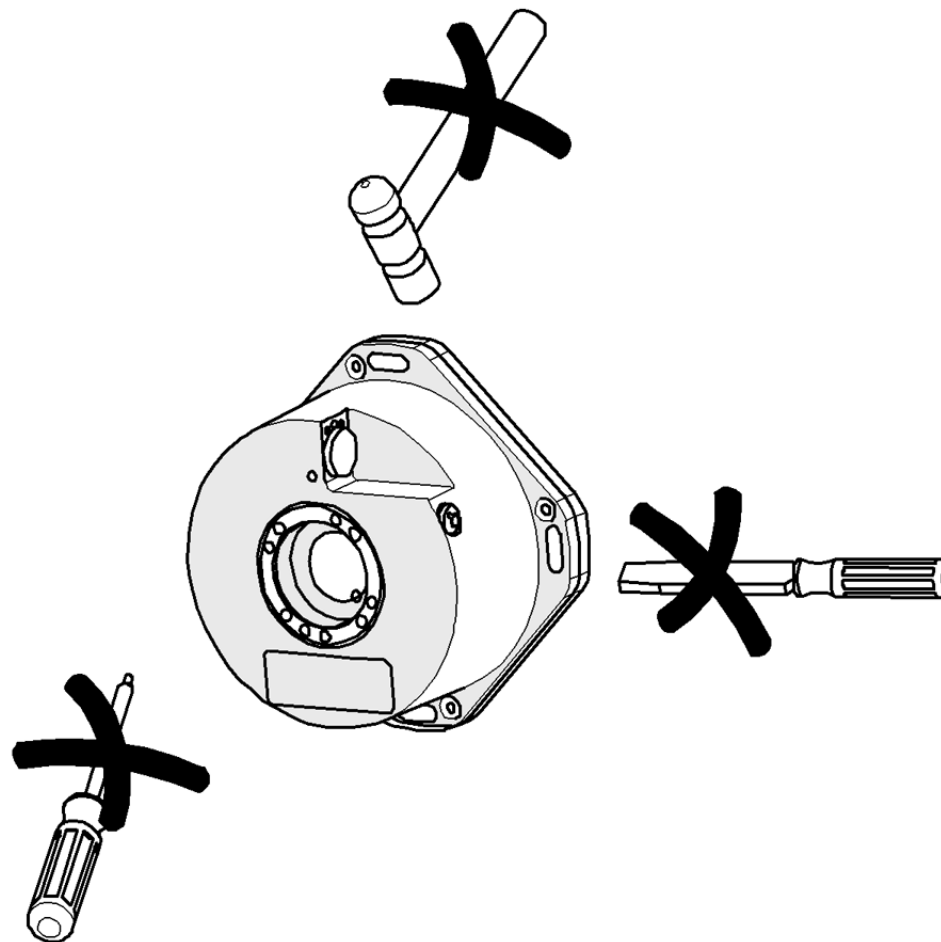
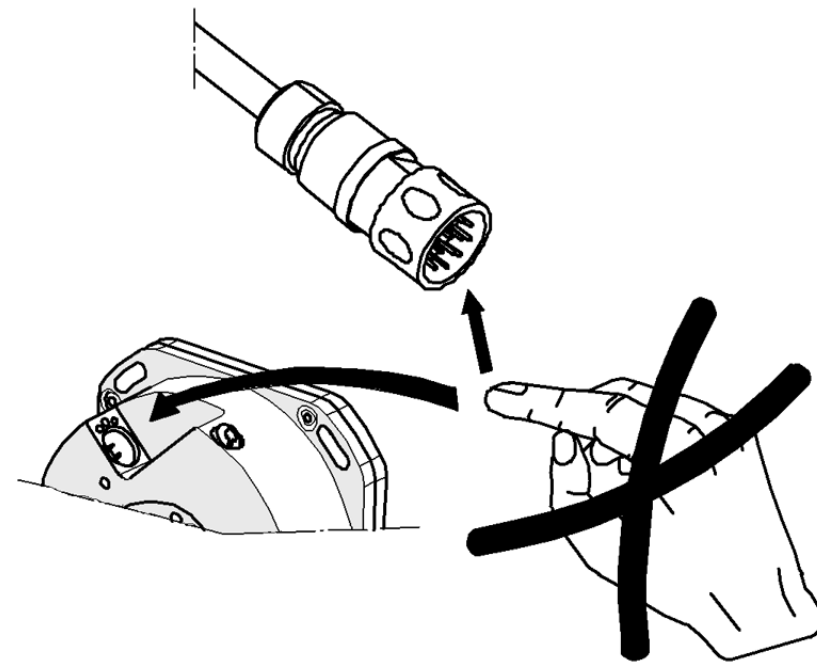
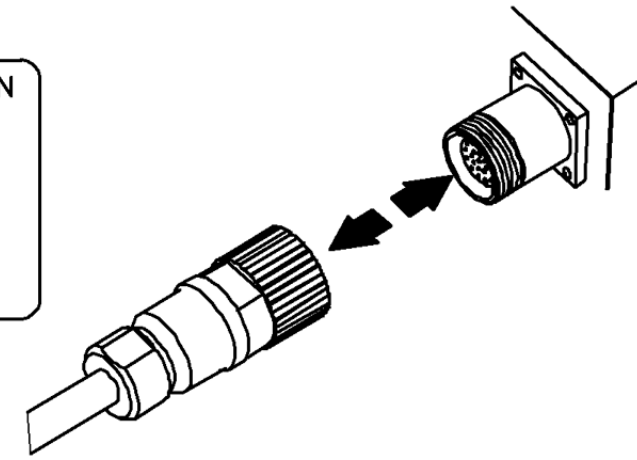
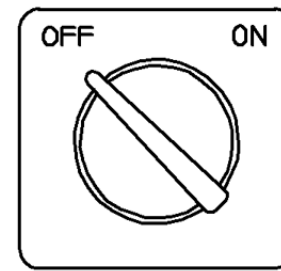
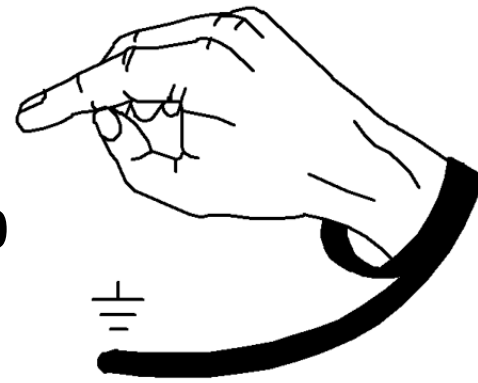
ACCESORIOS  
ACCESSORIES



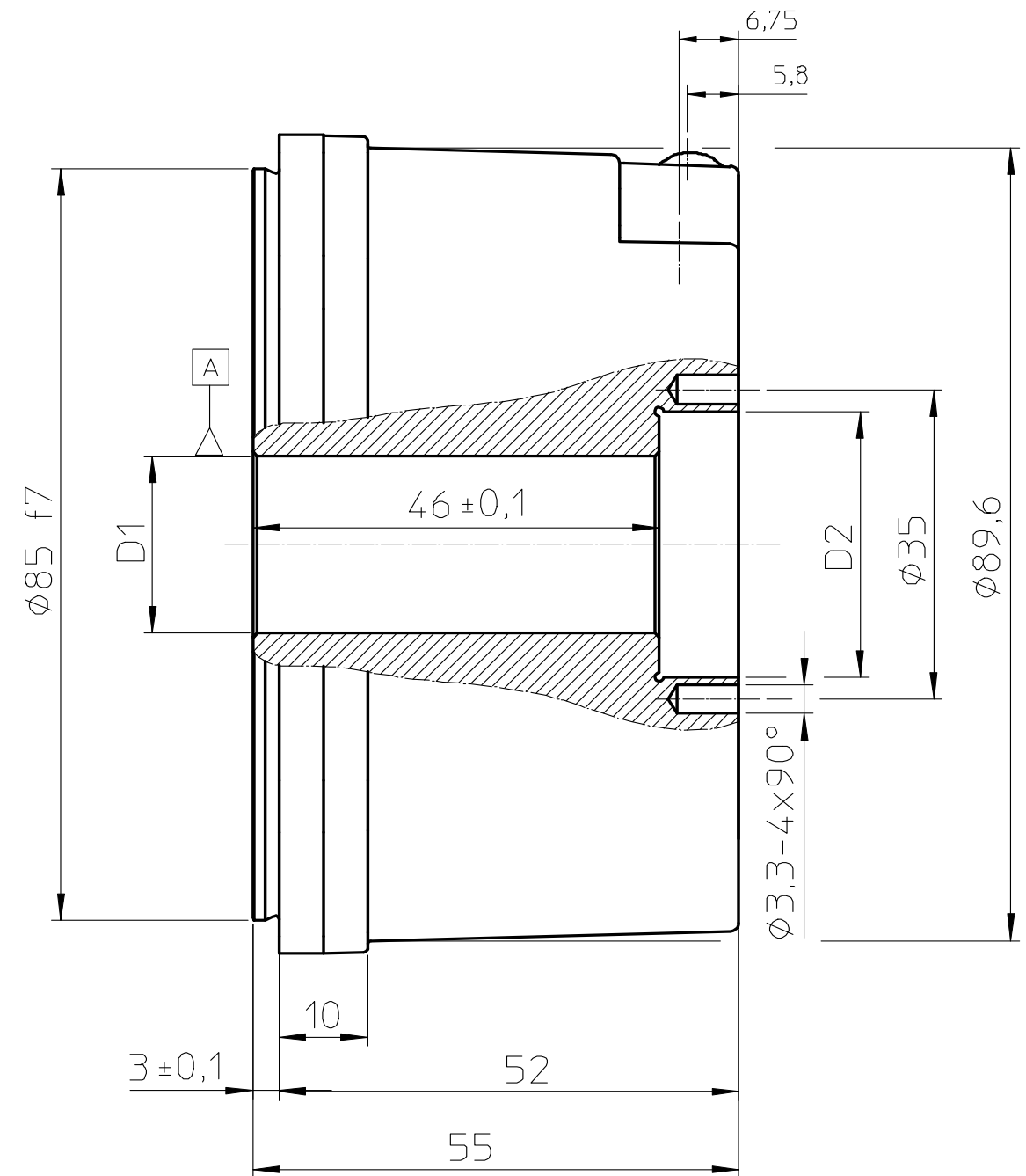
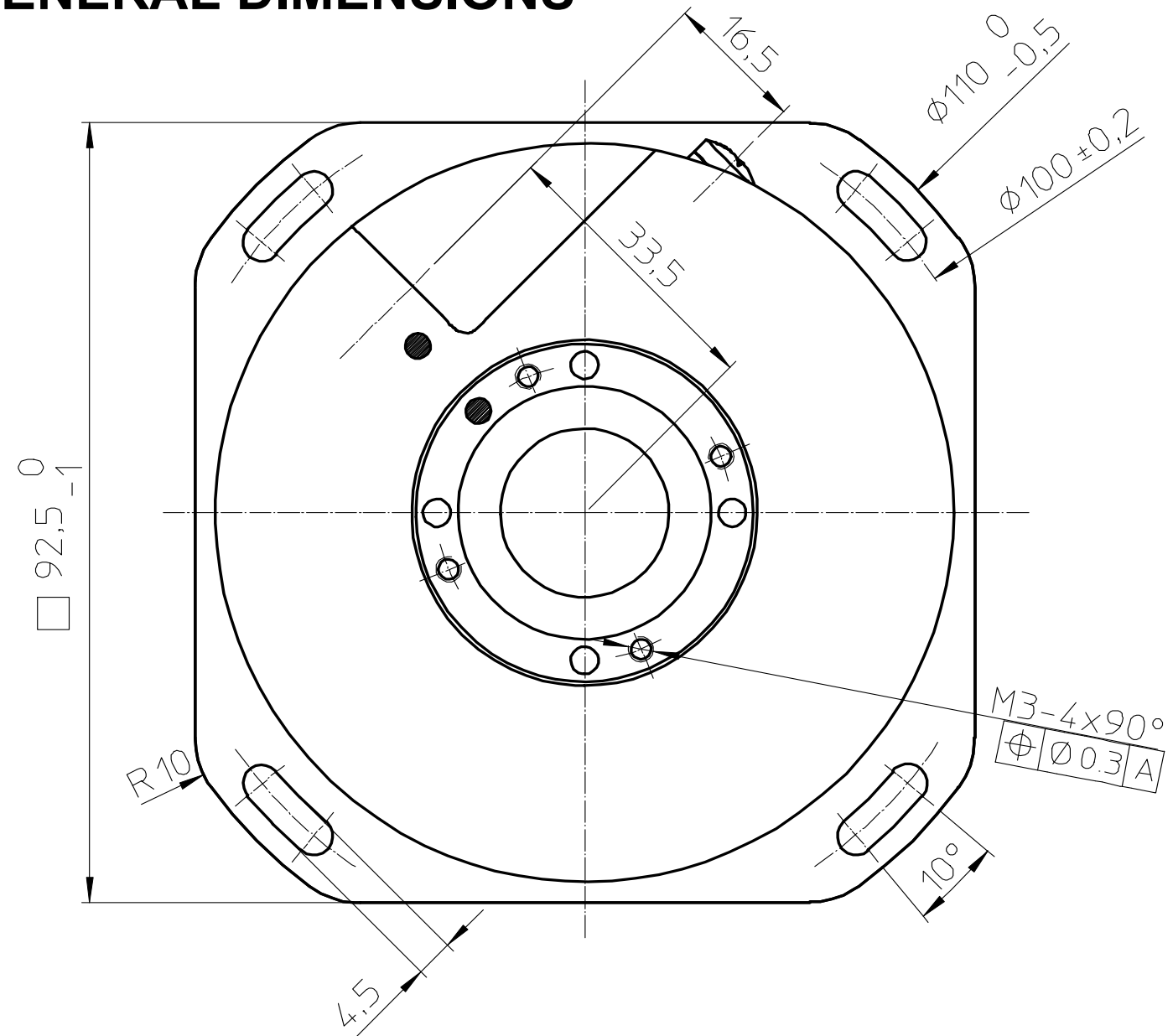
4 tornillos/bolts M4 x 16 DIN 912  
4 arandelas/washers M4 DIN 125  
1 racor de aire / air intake  
1 arandela racor de aire /  
air intake washer  
1 llave Allen / Allen wrench



DIN EN 100



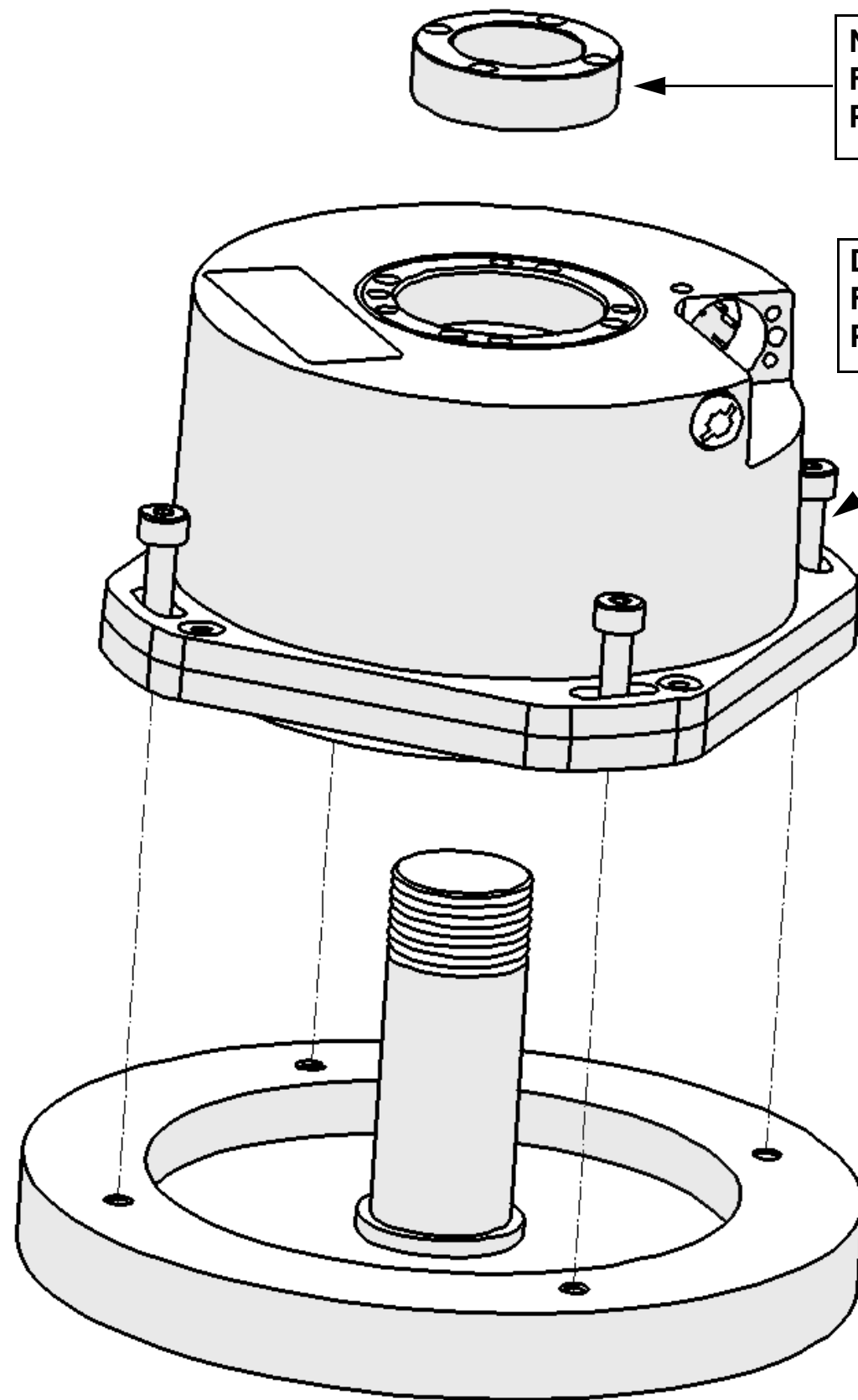
# GENERAL DIMENSIONS



Precisión Accuracy	±2.5"	±5"
D1	$\phi 20 \text{ H6}$	$\phi 20 \text{ H7}$
D2	$\phi 30 \text{ H6}$	$\phi 30 \text{ H7}$

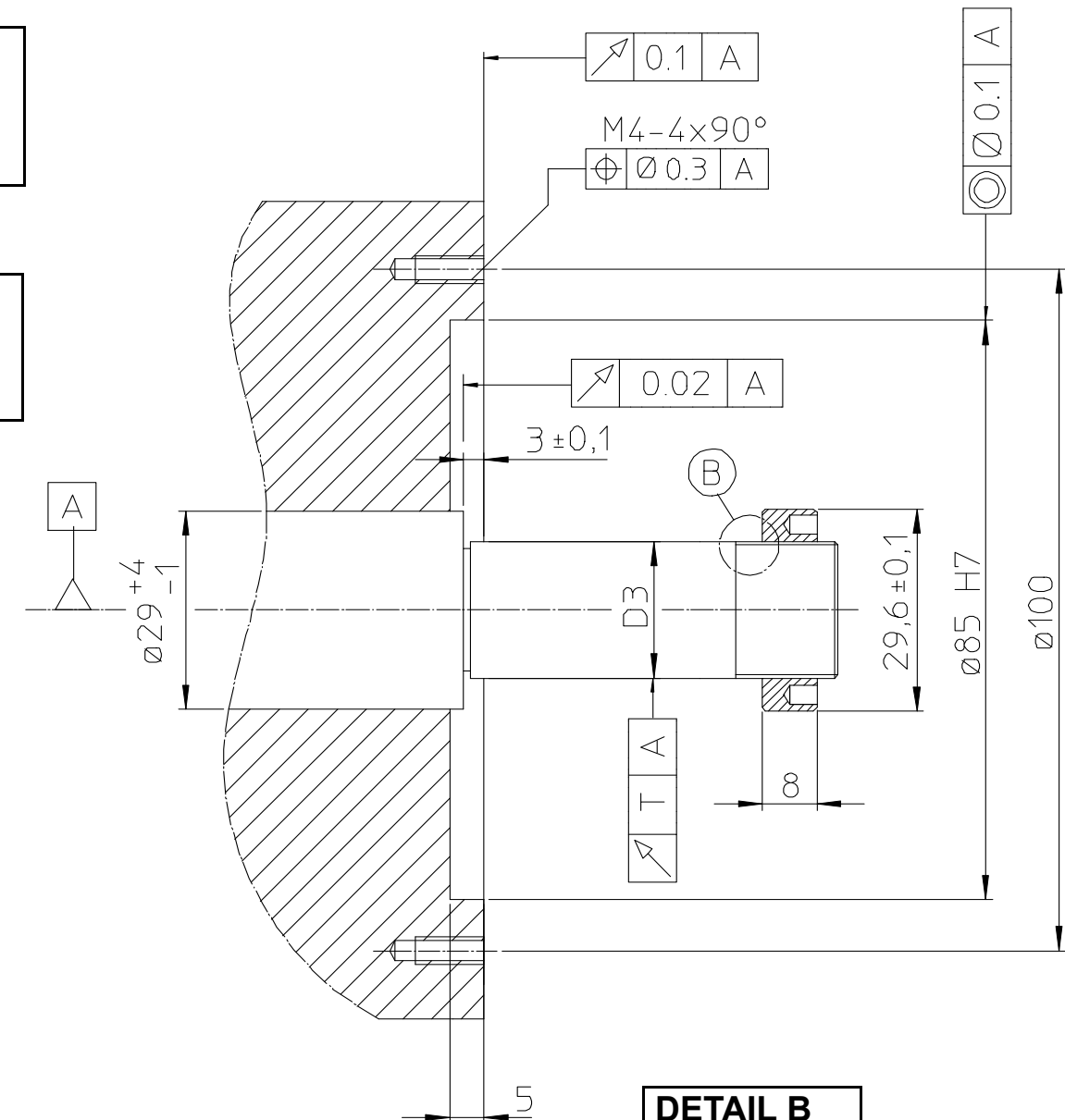
# MONTAJE / MOUNTING

# Cotas de montaje / Mounting dimensions

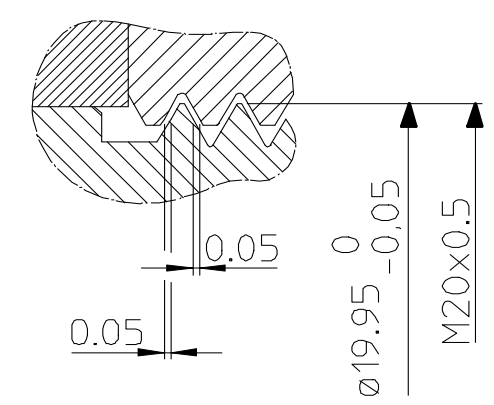


**Nut / Tuerca Ref. T-20**  
**Fastening torque = 20 Nm**  
**Par de apriete = 20 Nm**

**DIN 912 - M4x16**  
**Fastening torque = 2.5 Nm**  
**Par de apriete = 2.5 Nm**



**DETAIL B**  
**DETALLE B**

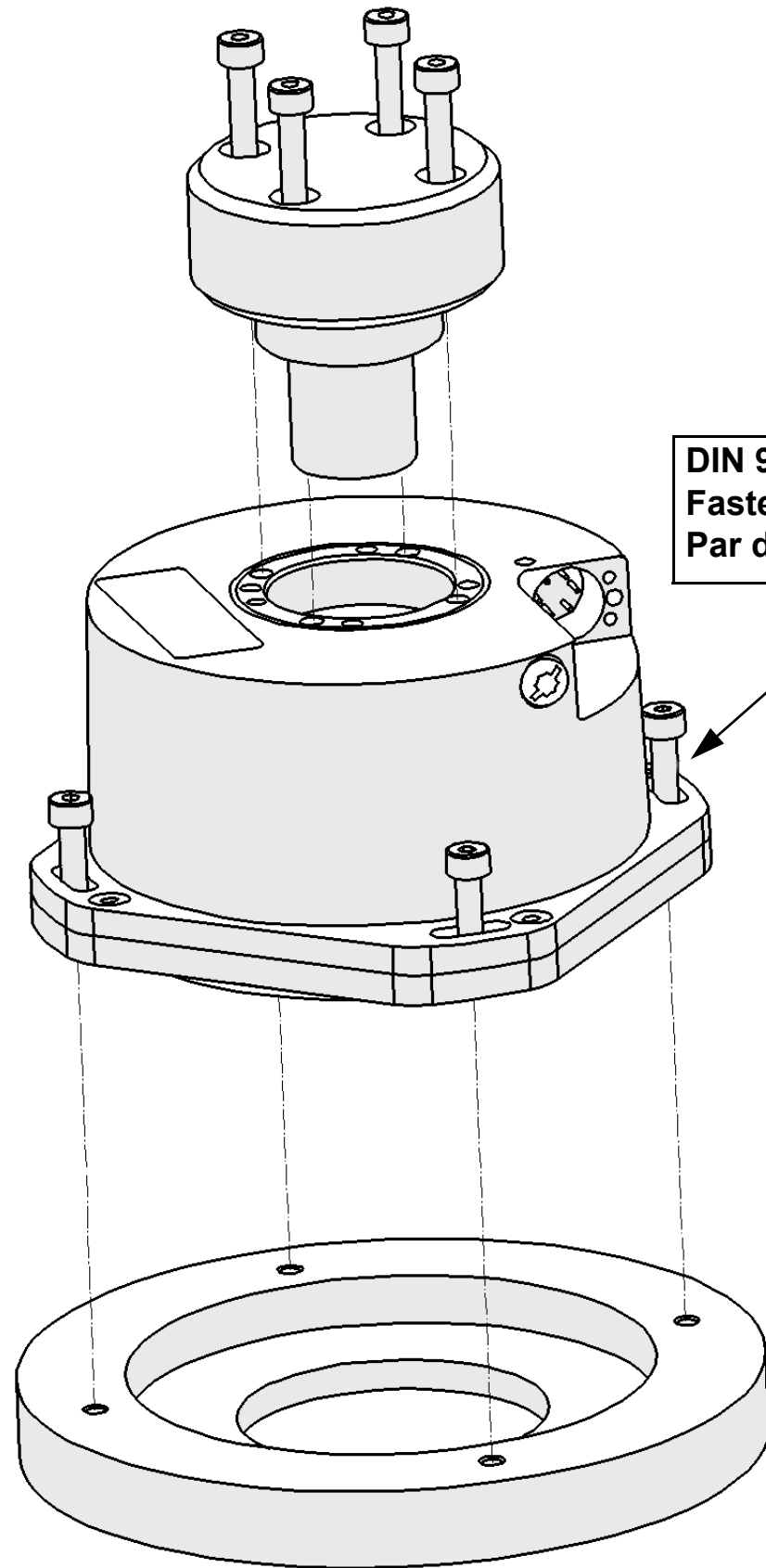


Precisión Accuracy	±2.5"	±5"
D3	ϕ20 g6	ϕ20 g7
T	0.01	0.02

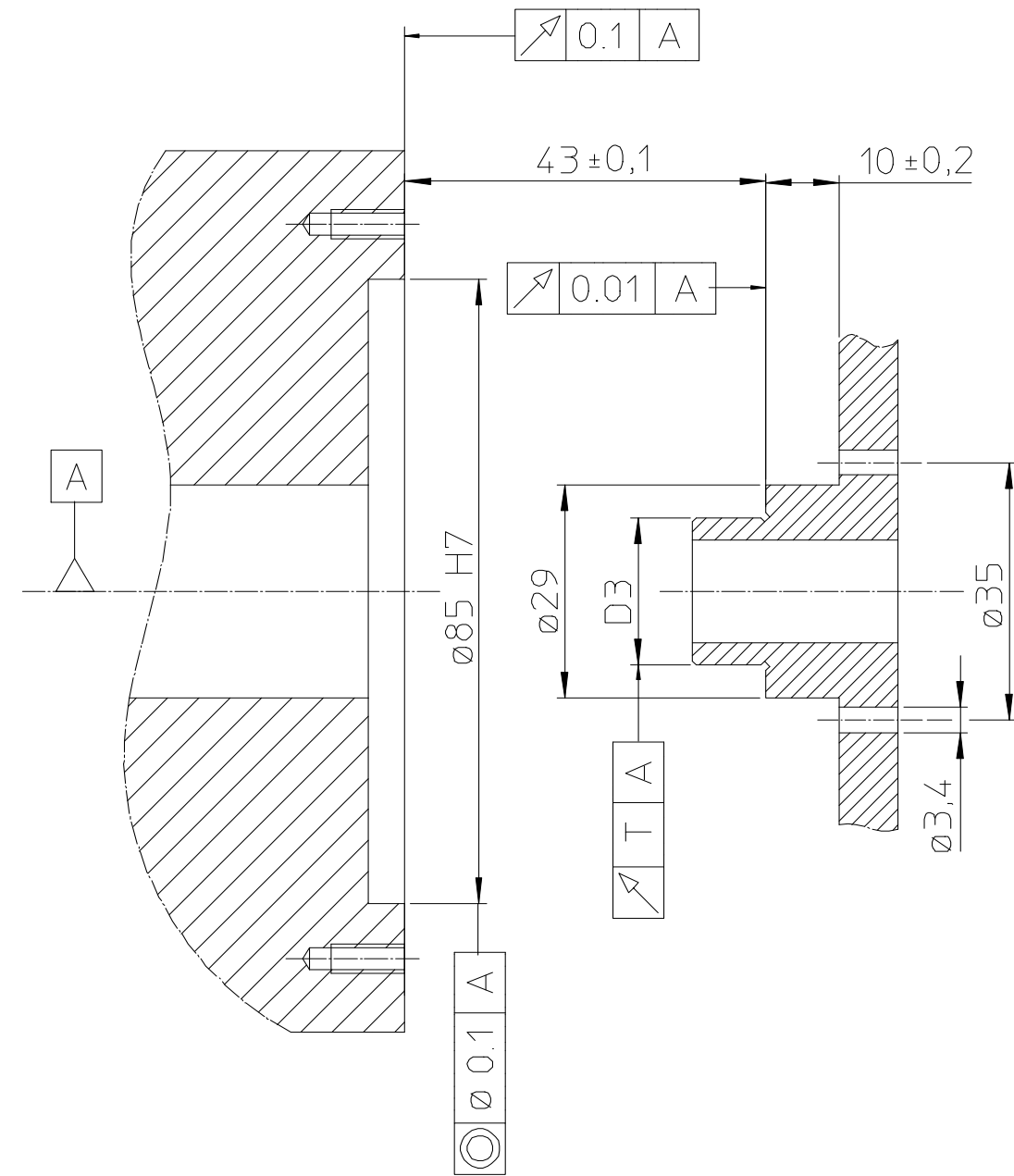
[A] Rodamiento / Roller bearing

# MONTAJE / MOUNTING

# Cotas de montaje / Mounting dimensions



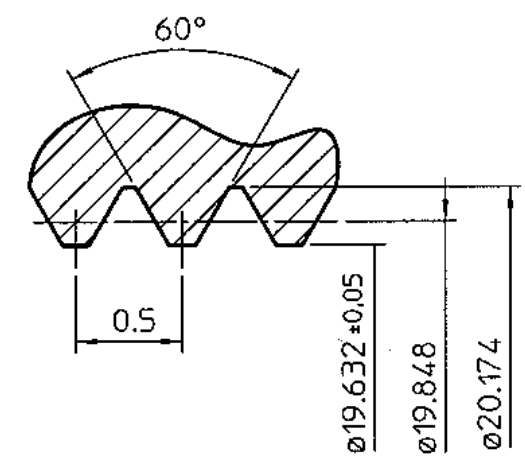
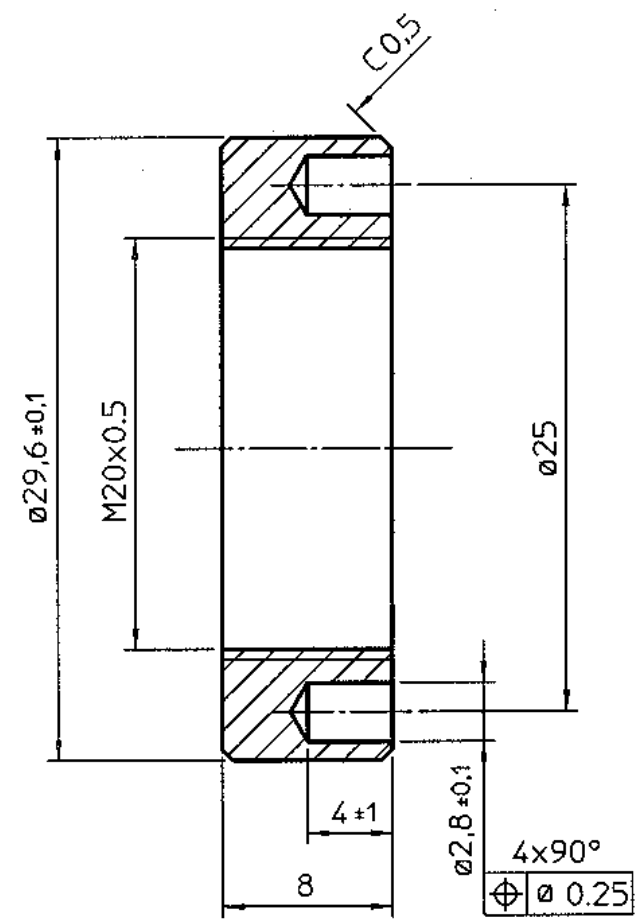
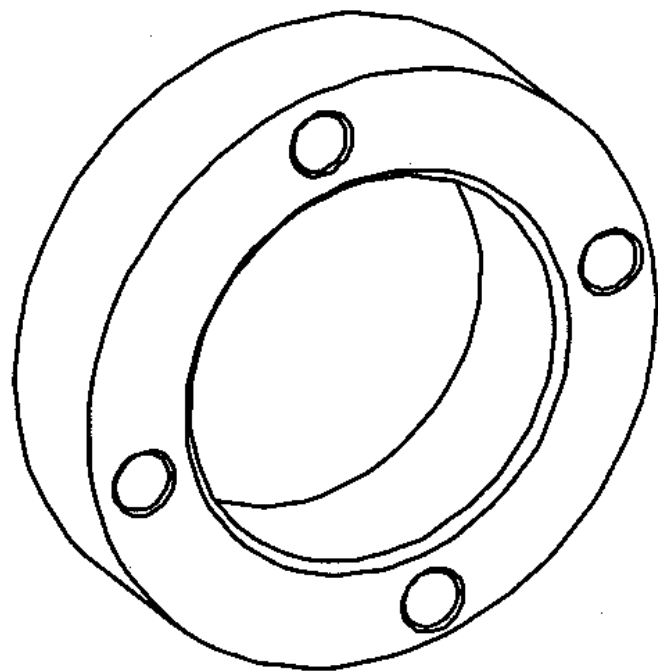
**DIN 912 - M4x16**  
**Fastening torque = 2.5 Nm**  
**Par de apriete = 2.5 Nm**



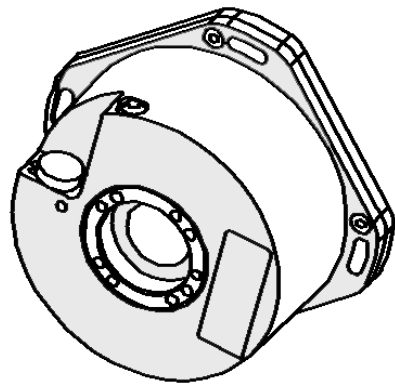
Precisión Accuracy	±2.5"	±5"
D3	∅20 g6	∅20 g7
T	0.01	0.02

**A** Rodamiento / Roller bearing

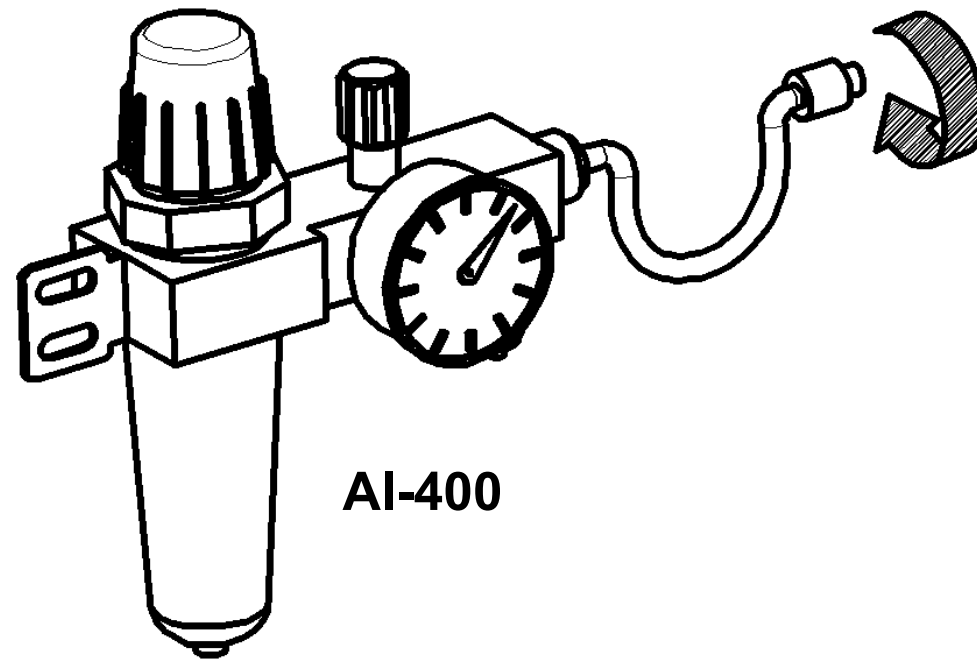
# TUERCA T-20 / T-20 NUT



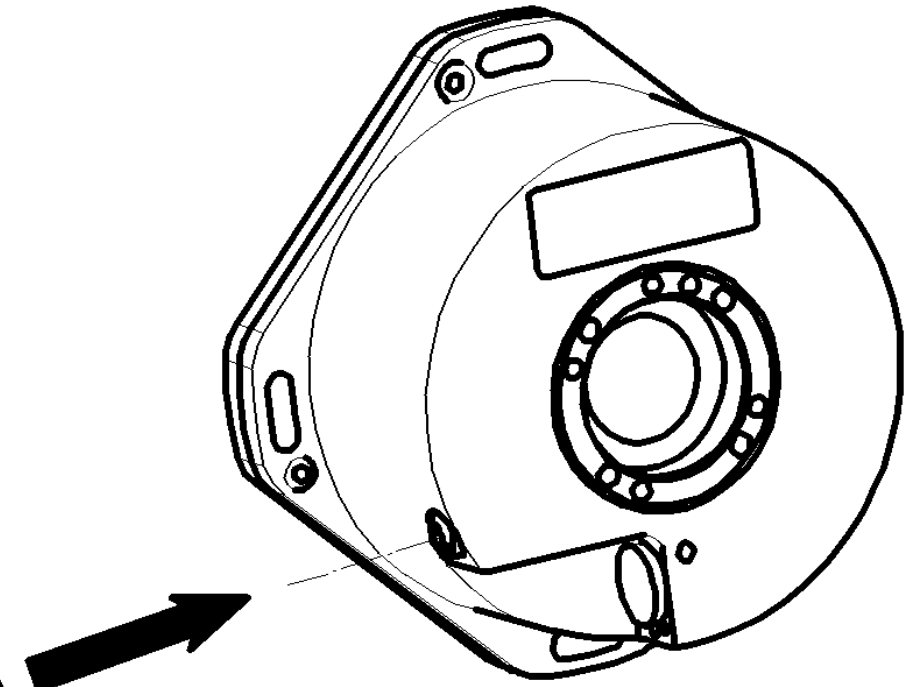
Nivel máximo: IP 64  
Maximum level IP 64



> IP 64



AI-400

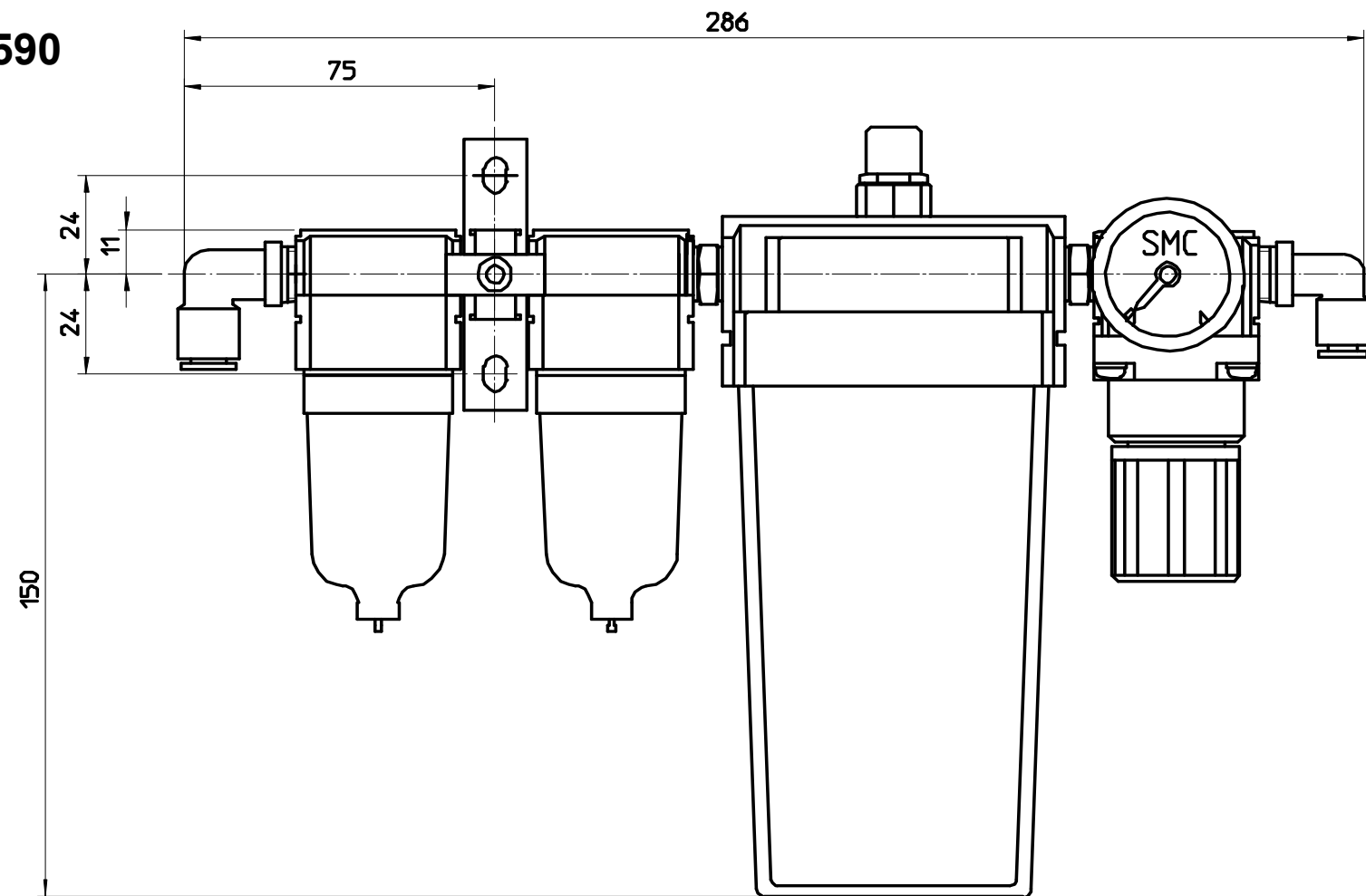


(A)

(A) AIR CONDITIONS	
DIN ISO 8573 -1	
Class 1 - Particule Max. 0.1 $\mu$	
Class 4 (7 bar) - Punto rocío / dewpoint 3 °C	
Class 1 - Max. Concentration oil 0.01 mg/m <sup>3</sup>	
Presión / Pressure	1 kg/cm <sup>2</sup>
Flujo / Flow	10 l./min./encoder



**AI 590**

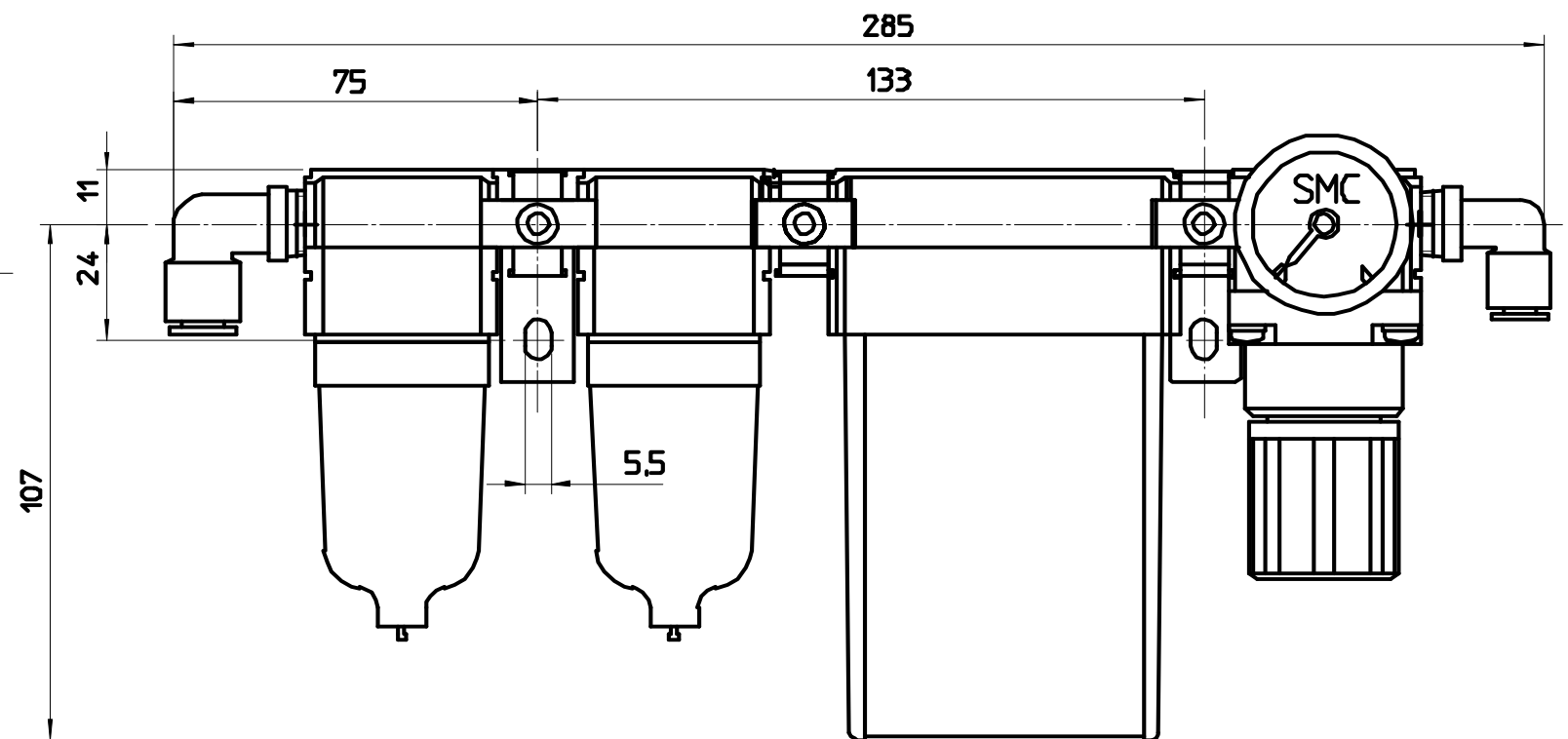
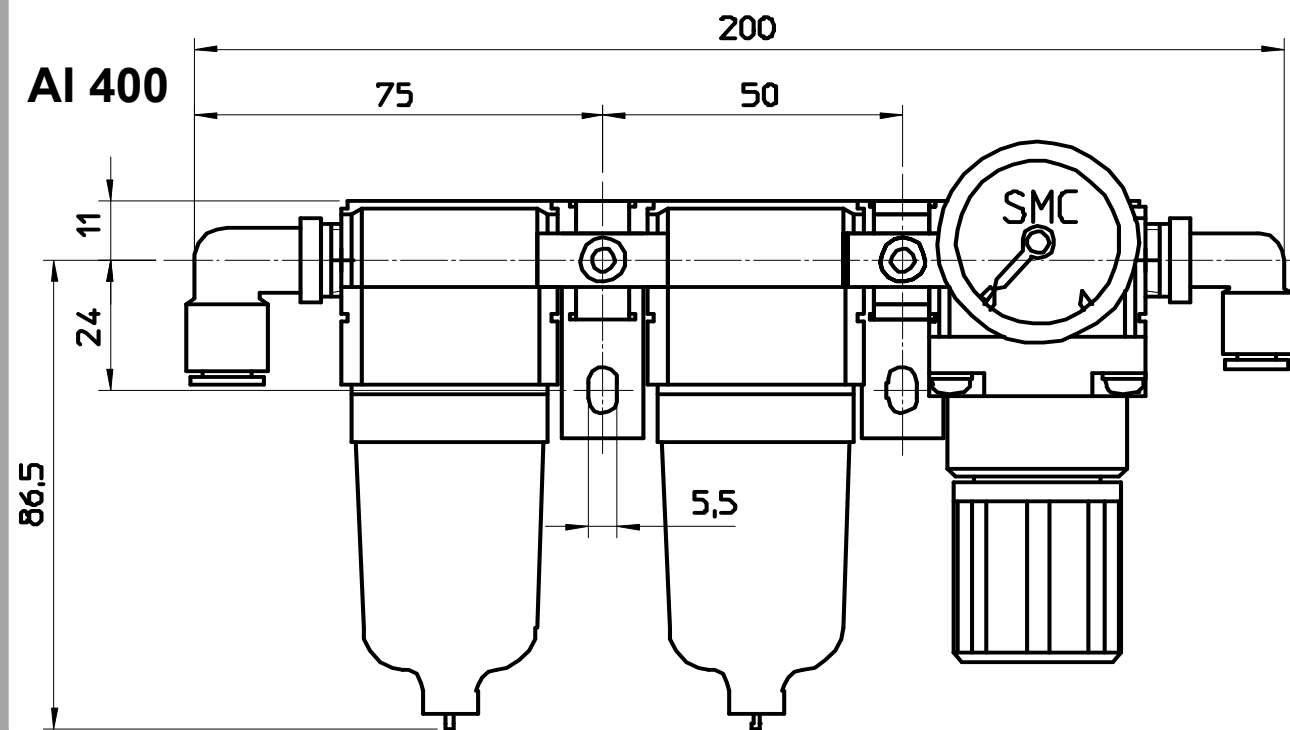


**FILTROS DE AIRE / AIR FILTERS**

2200000	AI 400	25 l/min
2200001	AI 525	(25l/min)
2200002	AI 550	(50 l/min)
2200003	AI 590	(90 l/min)

**AI 525 / AI 550**

**AI 400**



## CARACTERÍSTICAS MECÁNICAS MECHANICAL CHARACTERISTICS

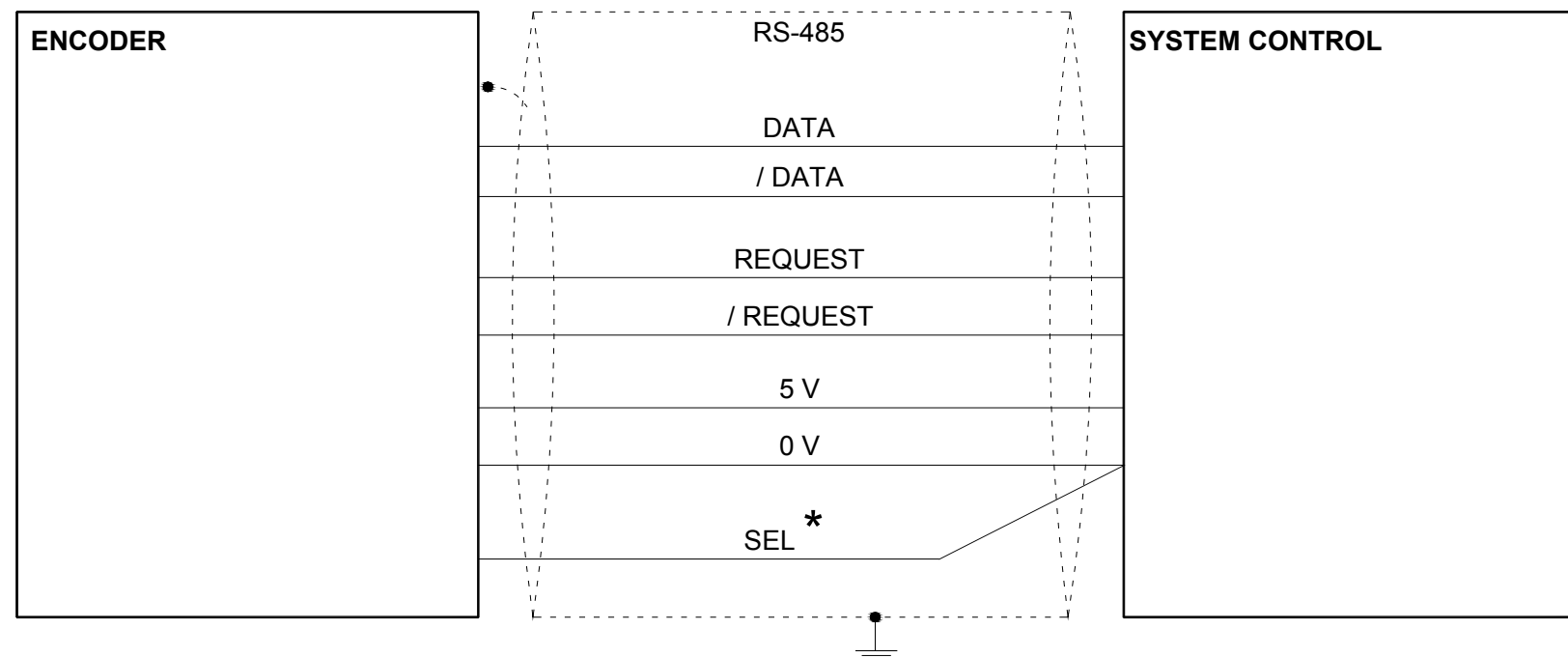
Modelo	HAM-27-D90	HAM-23-D90	Model
Precisión	±2.5"	±5"	Accuracy
Maxima velocidad de giro	3000 rpm *		Max. Turning speed
Momento de inercia del eje	650 gr.cm <sup>2</sup>		Inertia of the rotor
Par (20°C)	< 0.08 Nm		Torque
Frecuencia natural	> 1000 Hz		Natural frequency
Peso	0.9 kg		Weight
Estanqueidad	IP-64 (DIN 40050)		Sealing protection
Vibración (50-2000 Hz)	100 m/sec <sup>2</sup> (IEC 68-2-6)		Vibration (50-2000 Hz)
Impacto (6ms)	1000 m/sec <sup>2</sup> (IEC-68-2-27)		Impact (6 ms)
Temperatura de almacenamiento	-30 °C ... 80 °C (-22 °F ... 176 °F)		Storage temperature
Temperatura de funcionamiento	0 °C ... 50 °C (32 °F ... 122 °F)	-20 °C ... 70 °C (-4 °F ... 158 °F)	Operating temperature

\* Limitación eléctrica = 1500 rpm / *Electrical limitation = 1500 rpm*

# CARACTERÍSTICAS ELÉCTRICAS / ELECTRICAL CHARACTERISTICS

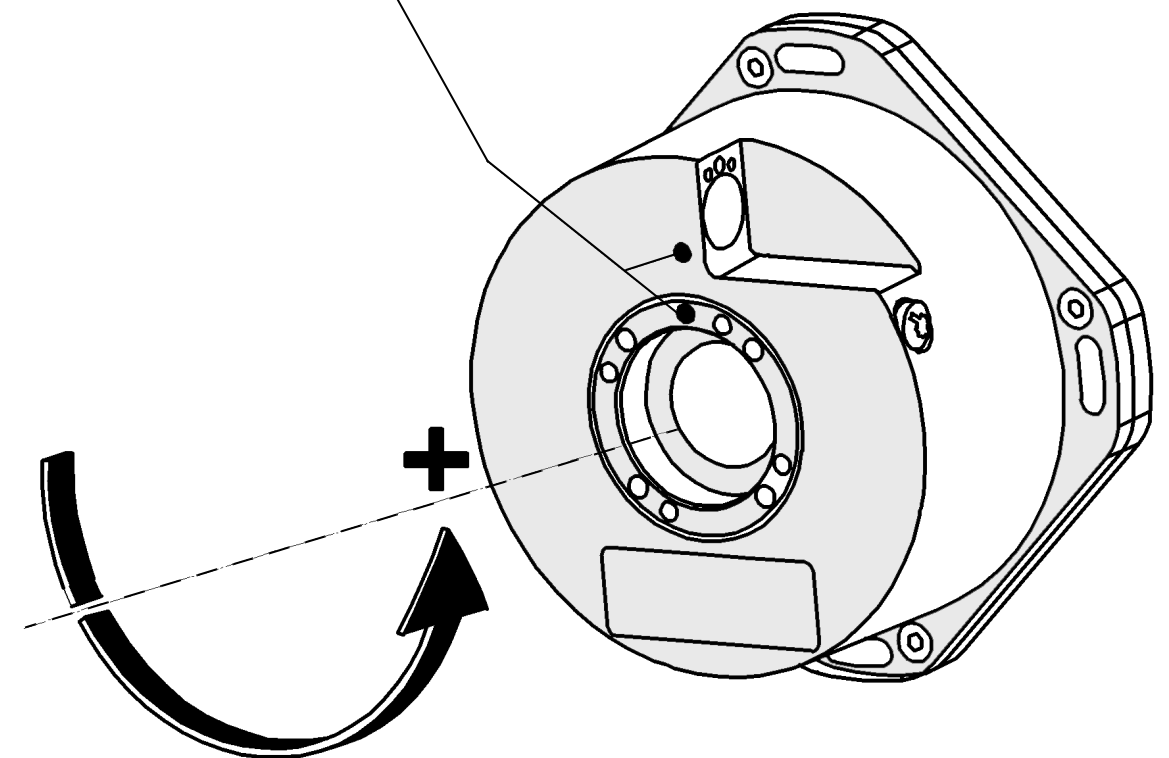
**HAM-D90-23:**  $2^{23}$  (8,388,608) impulsos por vuelta/pulses per turn  
**HAM-D90-27:**  $2^{27}$  (134,217,728) impulsos por vuelta/pulses per turn

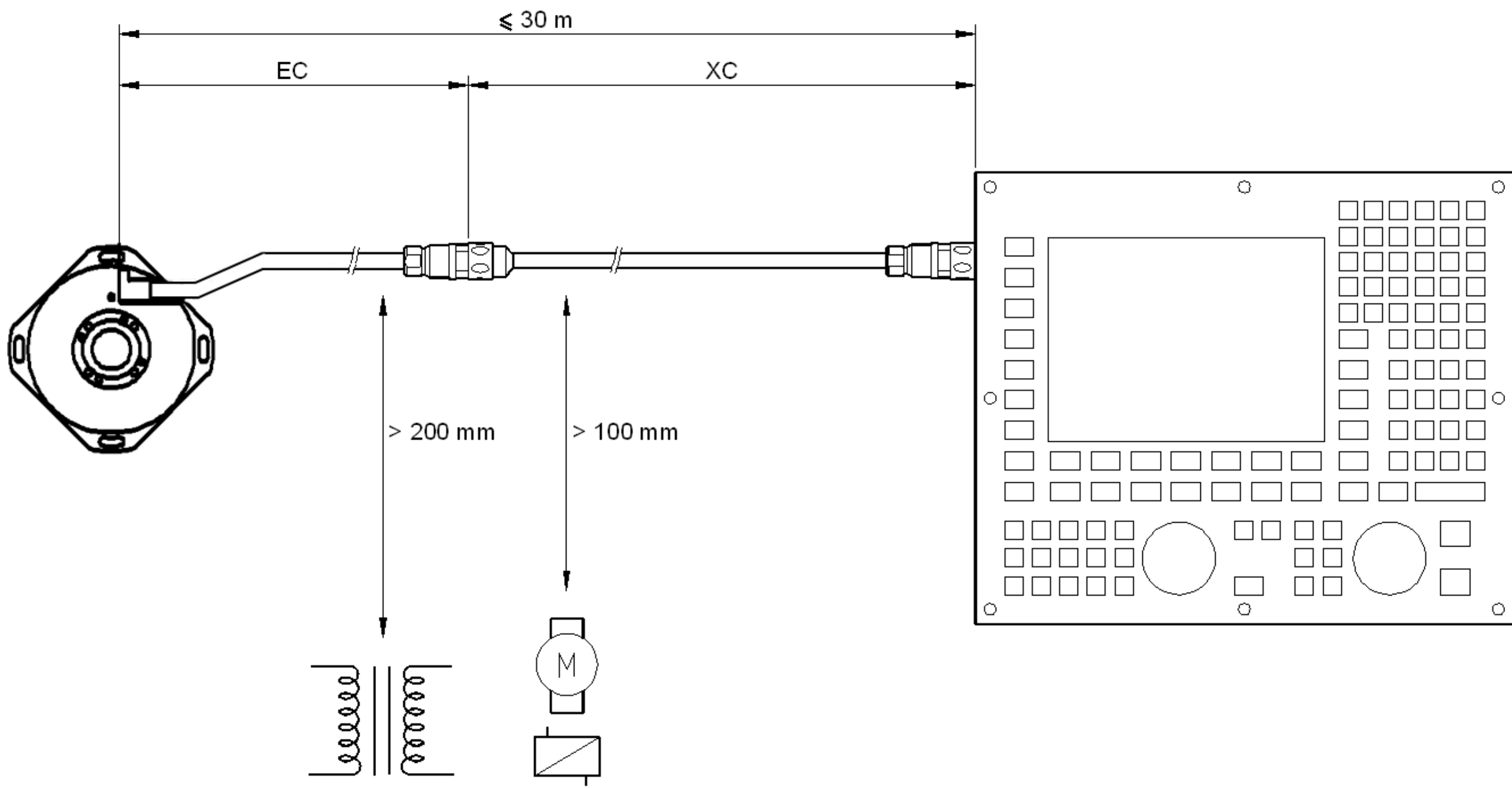
	Min	Max
Tensión de alimentación y Consumo <i>Power supply and Consumption</i>	3.6V	5.25V
Corriente / <i>Current</i>	-	300 mA
RPM eléctricas / <i>Electrical RPM</i>	-	1500
Máx. longitud de cable <i>Max cable length</i>		30 m / 100 ft.



\* La comunicación por defecto es full duplex.  
*Full duplex is the default communication.*  
 Para comunicación half duplex contactar con Fagor.  
*Contact Fagor for half duplex communication.*

**Posición del origen 0°**  
**0° origin position**  
**Girar eje para alinear puntos**  
**Turn the shaft lining up the dots**



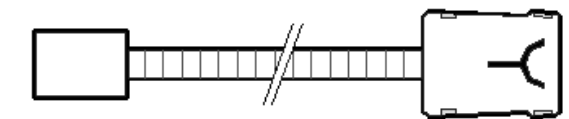


# MITSUBISHI: CONEXIONES / CONNECTIONS

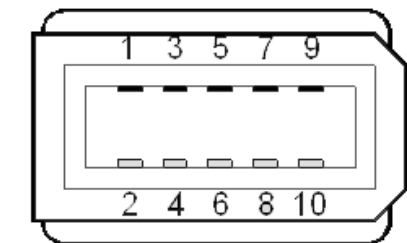
## EC...AM...MB :

Cable para **conexión directa** a sistemas absolutos MITSUBISHI full duplex. Con ferrita. Disponible en 1, 3, 6 and 9 metros.  
 Cable for **direct connection** to full-duplex MITSUBISHI absolute systems. With ferrite. Available in 1, 3, 6 and 9 meters.

<b>PIN</b>	7	8	3	4	1	2	Carcasa / Housing
<b>SEÑAL SIGNAL</b>	SD	/SD	REQ	/REQ	+5V	0V	Tierra / Ground
<b>COLOR</b>	Verde Green	Amarillo Yellow	Gris Grey	Rosa Pink	Marrón + Violeta Brown + Purple	Blanco+Negro+Azul White+Black+Blue	Malla / Shield



EC - ...AM - MB



## Alargaderas / Extension cables

CABLE		EXTENSION CABLE / ALARGADERA			TOTAL LENGTH LONGITUD TOTAL
Reference	Connector	Connector	Reference	Connector	
EC-1B-C9-F	C9	C8	XC-C8-x-MB	Mitsubishi	* 30 m
EC-1B-C9-N-F	Round 17-PM/RM	Round 17-PH/RH	XC-C8-xF-C9	C9-Round 17-PM/RM	

Round = Circular, PM = Male pins; RM = Male thread, PH = Female pins, RH = Female thread, M = Male, H = Female  
 PM = Pines macho, RM = Rosca Macho, PH = Pines hembra, RH = Rosca hembra, M= Macho, H = Hembra

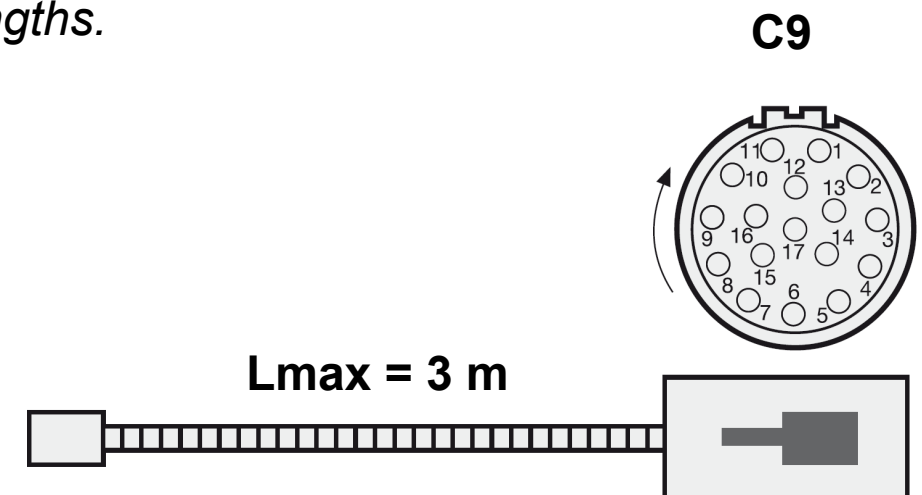
# mitsubishi: CONEXIONES / CONNECTIONS

También se puede utilizar la combinación de un cable EC...B...C9-F con una alargadera XC...C8...MB para otras longitudes.  
*A combination of EC...B...C9-F cable and an XC...C8...MB extension cable may be used for other lengths.*

**EC...B...C9-F** Cable disponible en 1 y 3 metros con ferrita. Contactar con FAGOR para otras longitudes.  
*Cable available in 1 and 3 meters with ferrite. Contact FAGOR for other lengths.*

**Conector (C9) macho circular 17 male connector**

<b>PIN</b>	14	17	8	9	7	1	10	4	Caperuza Housing	
<b>SEÑAL SIGNAL</b>	DATA	/DATA	REQ	/REQ	+5V	+5V sensor	0V	0V sensor	Tierra Ground	
<b>COLOR</b>	Gris Grey	Rosa Pink	Negro Black	Violeta Purple	Marrón Brown	Verde claro Light green	Blanco White	Naranja Orange	Malla externa External shield	



## XC...C8...MB

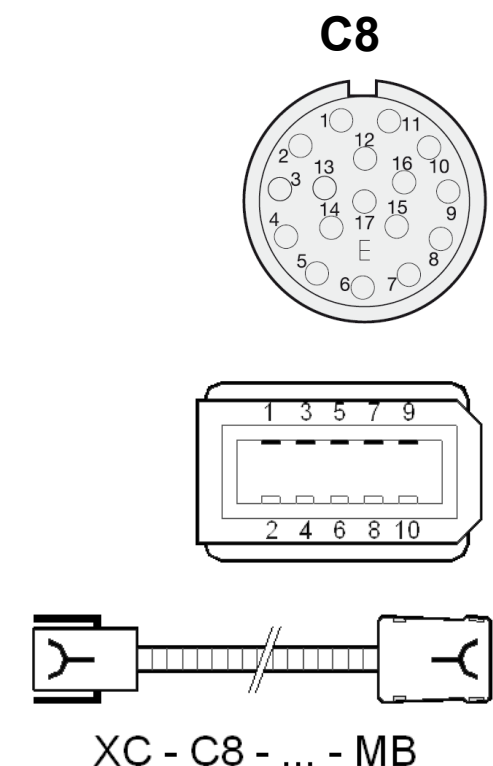
Alargadera para conexión directa a sistemas absolutos MITSUBISHI full duplex.  
 Disponible en 5, 10, 15, 20 y 25 metros.  
*Extension cable for direct connection to MITSUBISHI full-duplex absolute systems.  
 Available in 5, 10, 15, 20 and 25 meters.*

**Conector (C8) hembra circular 17 female connector**

<b>PIN</b>	8	9	14	17	7	1	10	4	12	Caperuza Housing
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**Conector (MB) hembra rectangular female rectangular connector**

<b>PIN</b>	7	8	3	4	1	1	2	2	2	16
<b>SEÑAL SIGNAL</b>	SD	/SD	REQ	/REQ	+5V	+5V Sensor	0V	0V sensor	SEL	Tierra Ground
<b>COLOR</b>	Gris Grey	Rosa Pink	Violeta Purple	Amarillo Yellow	Marrón-verde Brown-green	Azul Blue	Blanco-verde White-green	Blanco White	Negro Black	Malla Shield



## GARANTIA

- \*Plazo: 12 meses a partir de la fecha de expedición de fábrica.
- \*Cubre gastos de Materiales y Mano de Obra de reparación en FAGOR AUTOMATION.
- \*Los gastos de desplazamiento son a cargo del cliente.
- \*No cubre averías por causas ajenas a FAGOR AUTOMATION, como: golpes, manipulación por personal no autorizado, etc.

## DECLARACION DE CONFORMIDAD

**Fabricante: Fagor Automation, S. Coop.**  
Barrio de San Andrés 19, C.P. 20500, Mondragón -Guipúzcoa- (ESPAÑA)

Declaramos bajo nuestra exclusiva responsabilidad la conformidad del producto al que hace referencia este manual

**Nota.** Algunos caracteres adicionales pueden seguir a las referencias de los modelos indicados en este manual. Todos ellos cumplen con las siguientes normas:


### COMPATIBILIDAD ELECTROMAGNÉTICA:

EN 61000-6-2:2005 Norma de Inmunidad en entornos industriales  
EN 61000-6-4:2007 Norma de Emisión en entornos industriales

De acuerdo con las disposiciones de la Directiva Comunitaria: 2004/108/CE de Compatibilidad Electromagnética.

Mondragón a 1 de noviembre de 2011

Fagor Automation, S. Coop.

  
Director Gerente  
Pedro Ruiz de Aguirre

## WARRANTY

- \*Term: 12 months from factory invoice date.
- \*It covers parts and labor at FAGOR AUTOMATION.
- \*Travel expenses are payable by the customer.
- \*Damages due to causes external to FAGOR AUTOMATION, such as unauthorized handling, blows, etc. are not covered.

## DECLARATION OF CONFORMITY

**Manufacturer: Fagor Automation, S. Coop.**  
Barrio de San Andrés 19, C.P. 20500, Mondragón -Guipúzcoa- (SPAIN)

We declare under our exclusive responsibility the conformity of the product referred to in this manual.

**Note.** Some additional characters may follow the model references indicated in this manual. They all comply with the following regulations:

### ELECTROMAGNETIC COMPATIBILITY:

EN 61000-6-2:2005 Standard on immunity in industrial environments  
EN 61000-6-4:2007 Standard on emission in industrial environments

According to the European Directive: 2004/108/CE on electromagnetic compatibility.

Mondragón November 1st 2011

## NOTAS DE USUARIO / USER NOTES

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**NOTAS DE USUARIO / USER NOTES**

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