INDUCTIVE LINEAR POSITION SENSORS

ILT 110 Series

"Touchless, Inductive Meaurement Technology"

INDUCTIVE MEASUREMENT | ANALOG INTERFACE | CANopen INTERFACE | SSI INTERFACE | RS-232 / RS-485 INTERFACE | LONG SERVICE LIFE | LED INDICATOR | HIGH ACCURACY

- Inductive measurement technology
- Absolute working principle
- Magnetic field resistant
- Touchless measurement
- Status LED
- Versatile mounting
- 1 µm resolution
- 500 Hz high update rate
- Shock and vibration resistance
- Analog, SSI, CANopen, RS-232 or RS-485 interface
- IP64 protection class

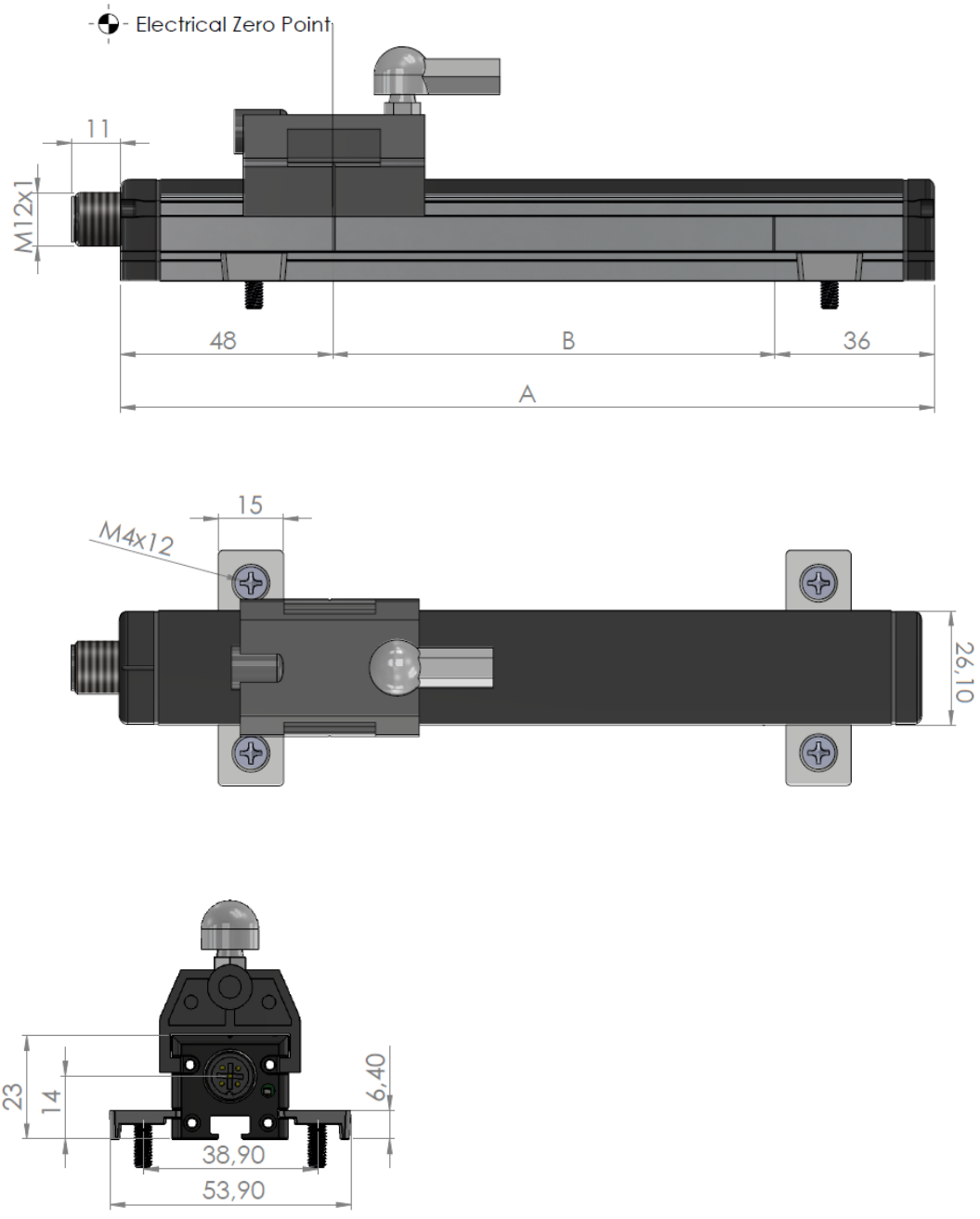
The working principle of ILT 110 series inductive linear position sensors depends on the RLC coupling between the positioning element and the sensor. An output signal is provided according to the position of the positioning element. Thanks to the touchless working principle, they are long-lasting since there are no factors such as wear and tear.

They offer wide temperature tolerance, high repeatability, resolution and linearity. They work stably for a long time without being affected by electromagnetic fields. The are used in applications such as manufacturing engineering, plastic injection molding, textile, packaging, sheet metal working, woodwork, automation technology.

MECHANICAL DATA

Housing Length (A)	B + 84 mm
Electrical Stroke (B)	Between 100 mm… 500 mm in steps of 50 mm Between 500 mm… 1000 mm in steps of 100 mm
Protection Class	IP64
Life	Mechanically unlimited
Mechanical Fixing	Adjustable (movable) mounting clamps
Operating Temperature	-20°C…+70°C
Storage Temperature	-20°C…+70°C
Material	Position Marker: POM
	Housing: Anodized aluminum

MECHANICAL DIMENSIONS (mm)



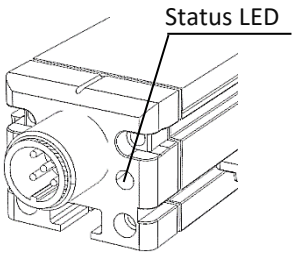
ANALOG INTERFACE

Electrical Specifications

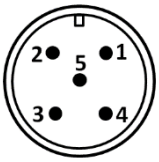
Electrical stroke (B)	Between 100 mm… 500 mm in steps of 50 mm Between 500 mm… 1000 mm in steps of 100 mm
Output Signal	0-10V, 0.5-4.5V, 0-5V, 0-20 mA, 4-20 mA
Number of channel	1
Output update rate	500 Hz max.
Signal propagation delay	2, 3, 4, 5, 6, 8, 10 ms (according to filter selection)
Resolution	16 bit
Absolute Linearity	≤ ± %0.025 FS (min. ± 100 µm) (when the signal propagation delay is 10 ms)
Reproducibility	< ± %0.012 FS (when the signal propagation delay is 10 ms)
Supply voltage	15…33VDC
Supply voltage ripple	≤ %10 Vss
Power consumption (w/o load)	0.5W
Overvoltage protection	33 VDC
Reverse polarity protection	Yes, up to supply voltage max
Short circuit protection	Yes (outputs, GND and supply voltage), Up to 12V

LED Function

Led Color	Description
Off	Sensor is not working – No supply
Green	Sensor is working – Position marker is within measuring range
Blue flash (1sn)	Sensor is working - Position marker is outside od measuring range (±6mm max)
Red flash (1sn)	Sensor is working - Position marker is outside od measuring range
Red fast flash (100ms)	Sensor error



Electrical Connection

		M12 / 5 Pin male connector On the sensor		Extension cable with M12 / 5 pin female connector	
					
Analog Voltage	**Analog Current**	**Pin No**	**Cable Color**	**Pin No**	**Cable Color**
+V	+V	1	Red	1	Brown
N/C	Iout	2	Green	2	White
GND	GND	3	Black	3	Blue
Vout	N/C	4	Yellow	4	Black
Prog	Prog	5	Pink	5	Grey

Analog Output Settings

Blue or green LED flashes every second in normal operating condition.
Prog pin (pin 5) and GND (pin 3) are short-circuited until the LED on the product starts to flash blue. Thus, programming mode is entered.
Step 1 - Setting the starting point: After the position marker is brought to the desired starting point, Prog pin (pin5) and GND (pin3) are short-circuited for 1 second and the minimum analog value (4mA/0V) is set. In this case, the LED lights up blue for 2 seconds and then proceed to step 2.
Step 2 – Setting the end point: After the position marker is brought to the desired end point, Prog pin (pin5) and GND (pin3) are short-circuited for 1 second. Thus, the max analog value (20mA / 10V) is set and the programming mode is exited.
Return to Factory Settings:
In step 1, if Prog pin(pin5) and GND(pin3) are short-circuited until the LED on the product starts to flash green, the factory settings will be restored (starting 4mA / 0V, ending 20mA / 10V).
In step 2, if Prog pin(pin5) and GND(pin3) are short-circuited until the LED on the product starts to flash green, the factory settings will be restored (start 20mA / 10V, end 4mA / 0V).
Note: After the analog output settings are finished, the Prog pin must be left connected to + V.

Order Code

Model

Filter Selection

02 : 2ms (standard)

*For others see Electrical specifications/signal propagation delay

Electrical Connection

S69M : M12/5 pin male connector

ILT 110	-	XXXX	-	XX	-	XX	-	XXXX

Measuring Lengths (stroke)

Different measuring lengths from 100 mm to1000 mm

*Measuring length can be selected between 100 mm… 500 mm in 50 mm steps, between 500 mm… 1000 mm in 100 mm steps.

Electrical Interface

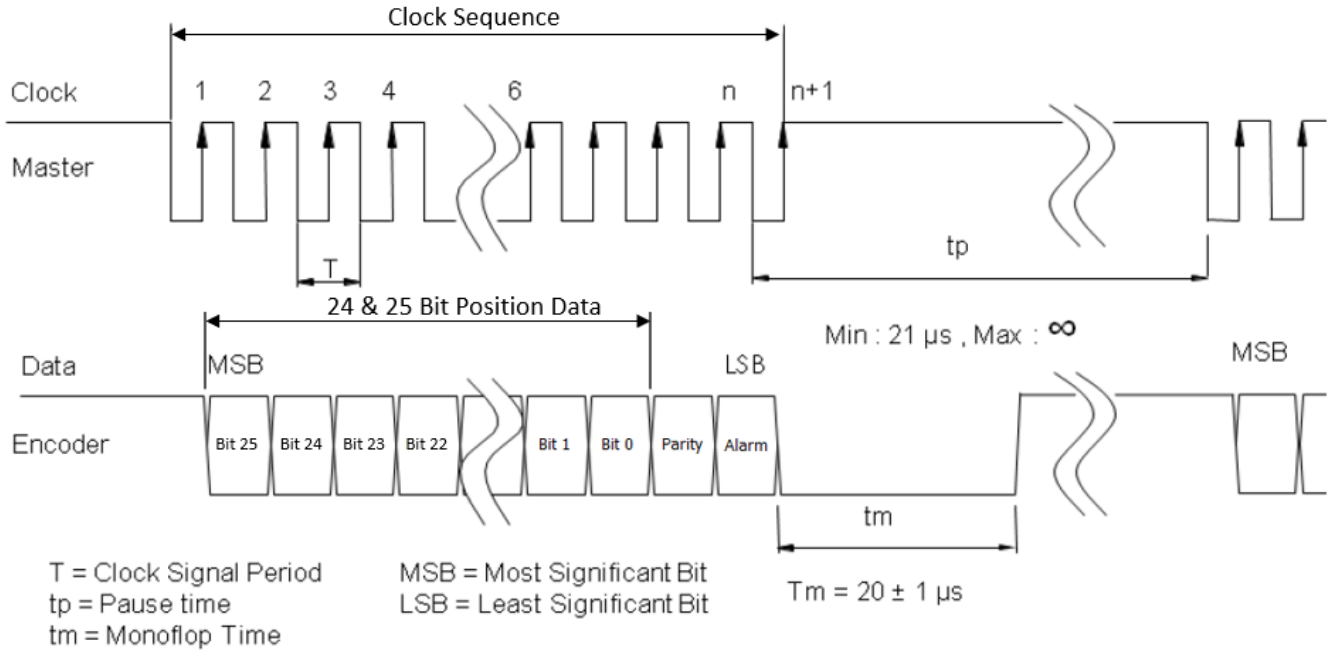
V: 0-10V
V1: 0-5V
V3: 0.5-4.5V
A: 4-20 mA
A0: 0-20 mA

SSI INTERFACE

Electrical Specifications

Electrical stroke (B)	Between 100 mm… 500 mm in steps of 50 mm Between 500 mm… 1000 mm in steps of 100 mm
Protocol	SSI 24 and 25 bit (ask for others)
Parity Bit	Even / Odd / None (default)
Alarm Bit	Active High / Active Low / None (default)
Process data area	Bit 0… Bit 19
Inputs	RS422
Monofloptime (tm)	20 µs
Encoding	Gray, Binary
Output update rate	500 Hz (depends on the filter)
Resolution (LSB)	Selectable between 1…1000 µm
Signal propagation delay	2, 3, 4, 5, 6, 8, 10 ms (according to filter selection)
Reproducibility	< ± %0.012 FS (when the signal propagation delay is 10 ms)
Absolute Linearity	≤ ± %0.025 FS (min. ± 100 µm) (when the signal propagation delay is 10 ms)
Supply voltage	8…33 VDC
Supply voltage ripple	≤ %10 Vss
Power consumption (w/o load)	0.5W
Overvoltage protection	33 VDC
Reverse polarity protection	Yes, up to supply voltage max
Short circuit protection	Yes (outputs, GND and supply voltage up to 7V)
Ohmic load at outputs	>120Ω
Max. Clock rate	1 MHz

SSI TIMING DIAGRAM



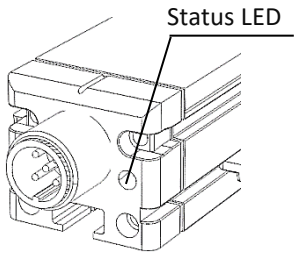
If the device resolution is less than 24 or 25 Bits, the remaining bit fields from the MSB are filled with 0.

The device indicates this status with the Alarm bit at power-on after the lock state.

Alarm: 1 (alarm) MCU lock up alarm MCU watchdog alarm
0 (no alarm)

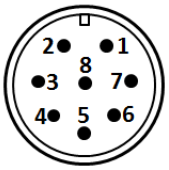
LED Function

Led Color	Description
Off	Sensor is not working – No supply
Green	Sensor is working – Position marker is within measuring range
Blue flash (1 sn)	Sensor is working - Position marker is outside od measuring range (±6mm max)
Red flash (1 sn)	Sensor is working - Position marker is outside od measuring range
Red fast flash (100 ms)	Sensor error



Electrical Connection

Signal	Cable	M12 / 8 pin male connector
Clk+	White	Pin 1
Data+	Yellow	Pin 2
Clk-	Blue	Pin 3
N/C	N/C	Pin 4
Data-	Green	Pin 5
GND	Black	Pin 6
+V (Supply Voltage)	Red	Pin 7
N/C	N/C	Pin 8



Order Code

Model

Resolution
Selectable between 1…1000 µm

Electrical Interface
SSI : SSI

Parity Bit
E: Even
O: Odd
N: None (default)

Electrical Connection
S14M : M12/8pin male connector

ILT 110	-	XXXX	-	XXXX	-	XX	-	XXX	-	XXX	-	X	-	X	-	XXXX

Measuring Lengths (stroke)
Different measuring lengths from 100 mm to1000 mm
*Measuring length can be selected between 100 mm… 500 mm in 50 mm steps, between 500 mm… 1000 mm in 100 mm steps.

Filter Selection
02 : 2ms (standard)
*For others see Electrical specifications/signal propagation delay

Output Signal
24G : SSI 24 bit, Gray
25G: SSI 25 bit, Gray
24B: SSI 24 bit, Binary
25B : SSI 25 bit, Binary
*Ask for others.

Alarm Bit
H: Active high
L: Active low
N: None (default)

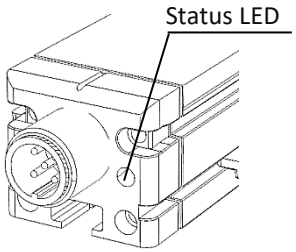
CANopen INTERFACE

Electrical Specifications

Measured variables	Position, speed and temperature
Electrical stroke (B)	Between 100 mm… 500 mm in steps of 50 mm Between 500 mm… 1000 mm in steps of 100 mm
Measuring range speed	0…5 m/s
Protocol	CANopen protocol to CiA DS-301 V4.2.0, Device profile DS-406 V3.2
Programmable parameter	nod-id, baud-rate
Node-ID	1…127 (default 127)
Baud rate	10 … 1000 kBaud
Output update rate	500 Hz
Position resolution **Speed resolution**	1 µm min. 10 µm/s min.
Signal propagation delay	2, 3, 4, 5, 6, 8, 10 ms (according to filter selection)
Reproducibility	< ± %0.012 FS (when the signal propagation delay is 10 ms)
Absolute Linearity	≤ ± %0.025 FS (min. ± 100 µm) (when the signal propagation delay is 10 ms)
Supply voltage	8…33 VDC
Supply voltage ripple	≤ %10 Vss
Power consumption (w/o load)	0.5W
Overvoltage protection	33 VDC
Reverse polarity protection	Yes, up to supply voltage max
Short circuit protection	Yes (outputs, GND and supply voltage max.)
Termination resistance	No (optional internal 120 Ω load resistance)

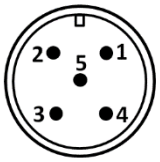
LED Function

Led Color	Description
Off	Sensor is not working – No supply
Green	Sensor is working – Position marker is within measuring range
Blue flash (1 sn)	Sensor is working - Position marker is outside od measuring range (±6mm max)
Red flash (1 sn)	Sensor is working - Position marker is outside od measuring range
Red fast flash (100 ms)	Sensor error

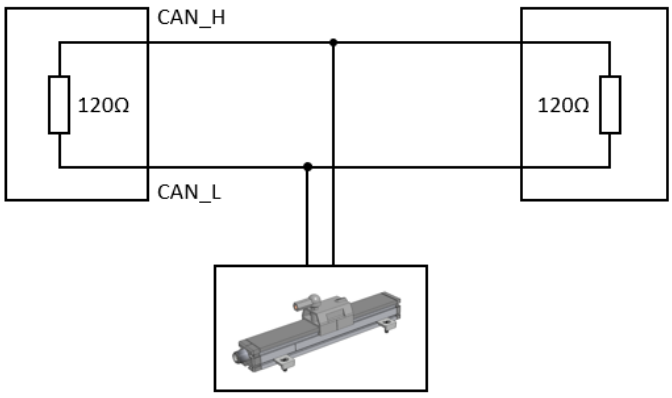


Electrical Connection

M12 / 5 Pin male connector



Signal	Cable Color	Pin No
CAN SHIELD	CAN SHIELD	1
+V (Supply Voltage)	Red	2
GND	Black	3
CAN_H	Yellow	4
CAN_L	Green	5



Order Code

Model

Electrical Interface

C: CANopen

ILT 110	-	XXXX	-	X	-	XXXX

Measuring Lengths (stroke)

Different measuring lengths from 100 mm to1000 mm

*Measuring length can be selected between 100 mm… 500 mm in 50 mm steps, between 500 mm… 1000 mm in 100 mm steps.

Electrical Connection

S13M : M12/5 pin male connector

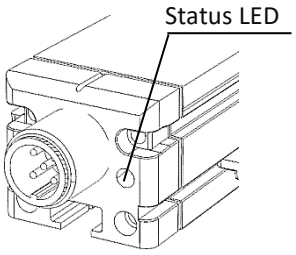
RS-232 / RS485 INTERFACE

Electrical Specifications

Electrical stroke (B)	Between 100 mm… 500 mm in steps of 50 mm Between 500 mm… 1000 mm in steps of 100 mm
Communucation Protocols	Modbus RTU, Modbus ASCII, ASCII (every 100 ms)
Baud Rate	600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 MODBUS RTU / MODBUS ASCII Default: 19200 ASCII Default: 9600
Data Bits	MODBUS ASCII: 7 ASCII / MODBUS RTU: 8
Parity	None, Odd, Even Default: None
Address	Between 1 and 247 Default: 1
Output update rate	500 Hz
Signal propagation delay	2, 3, 4, 5, 6, 8, 10 ms (according to filter selection)
Resolution	16 bit
Reproducibility	< ± %0.012 FS (when the signal propagation delay is 10 ms)
Absolute Linearity	≤ ± %0.025 FS (min. ± 100 µm) (when the signal propagation delay is 10 ms)
Supply voltage	8…33 VDC
Supply voltage ripple	≤ %10 Vss
Power consumption (w/o load)	0.5W
Overvoltage protection	33 VDC
Reverse polarity protection	Yes, up to supply voltage max
Short circuit protection	Yes (outputs, GND and supply voltage max.)

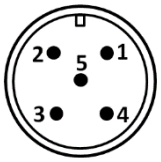
LED Function

Led Color	Description
Off	Sensor is not working – No supply
Green	Sensor is working – Position marker is within measuring range
Blue flash (1 sn)	Sensor is working - Position marker is outside od measuring range (±6mm max)
Red flash (1 sn)	Sensor is working - Position marker is outside od measuring range
Red fast flash (100 ms)	Sensor error



Electrical Connection

M12 / 5 Pin male connector



Signal	Cable Color	Pin No
SHIELD	SHIELD	1
+V (Supply Voltage)	Red	2
GND	Black	3
(RS232 - Rx) / (RS485 - A)	Yellow	4
(RS232 - Tx) / (RS485 - B)	Green	5

ASCII DATA FRAME FORMAT (Sent every 100 ms)

Pos Data 8	7	6	5	4	3	2	Pos Data 1 digit	CRC H	CRC L	1F (0x0A)

Position Data

Should be calculated with CRC-16 Maxim Algorithm

[Click for sample CRC calculation algorithm with C#]

RS-232 / RS-485 ASCII output telegram:

8 character digit + 16 bit CRC High Byte + 16bit CRC Low Byte + LF (0x0A)

Order Code

Model

Electrical Interface

S1 : RS-232
S2 : RS-485

Electrical Connection

S13M : M12/5 pin male connector

ILT 110	-	XXXX	-	XX	-	XXXX	-	XXXX

Measuring Lengths (stroke)

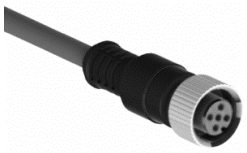
Different measuring lengths from 100 mm to1000 mm

*Measuring length can be selected between 100 mm… 500 mm in 50 mm steps, between 500 mm… 1000 mm in 100 mm steps.

Comm. Protocol

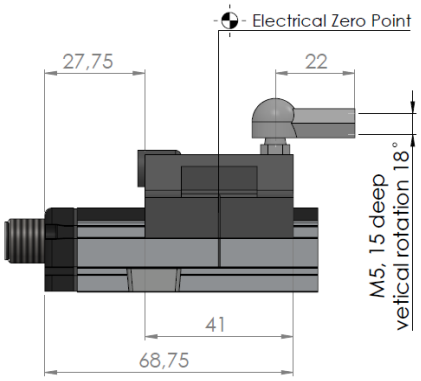
MR : Modbus RTU
MA : Modbus ASCII
AS : ASCII (every 100 ms)

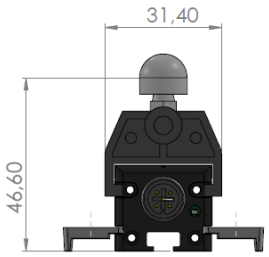
OPTIONAL PRODUCTS

Product	Code	Description	Pin Configuration
	M12/P5 CONNECTOR 5MT 90'	M12/5 pin female connector, with 5 meters cable, 90° (For connection with M12/5 pin male connector on the sensor)	**Pin1 :** Brown **Pin2 :** White **Pin3 :** Blue **Pin4 :** Black **Pin5 :** Grey
	M12/P5 CONNECTOR 5MT STRAIGHT	M12/5 pin female connector, with 5 meters cable, straight (For connection with M12/5 pin male connector on the sensor)	

POSITION MARKER SELECTION

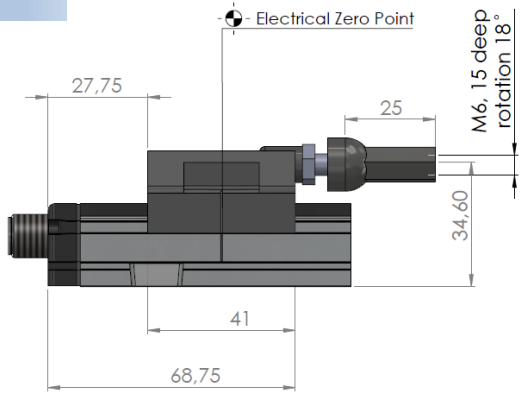
GPM-U (Guided and Top Joint)

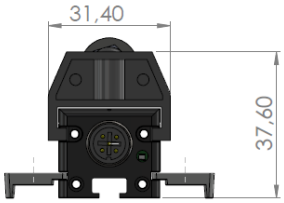




	GPM-6-U	GPM-10-U
Stroke Used	100 … 600 mm	700 … 1000 mm
Housing Material	POM	
Joint Material	Igumid G / iglide® L280 (W300)	
Weight	~20 gr	

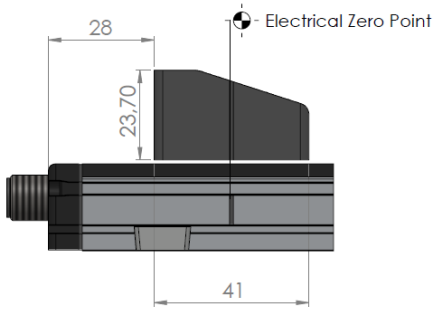
GPM-Y (Guided and Side Joint)

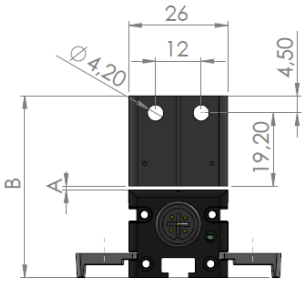




	GPM-6-Y	GPM-10-Y
Stroke Used	100 … 600 mm	700 … 1000 mm
Housing Material	POM	
Joint Material	Igumid G / iglide® L280 (W300)	
Weight	~22 gr	

FPM (Floating and independent)





	FPM-6	FPM-10
Stroke Used	100 … 600 mm	700 … 1000 mm
Working Distance (A)	0,3 mm	
Mounting Dimension (B)	47 mm	
Perm. Lateral offset	± 0,5 mm	
Housing Material	POM	
Weight	~23 gr	

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Metrolog Controles de Medição

Address / Endereço:

Rua Sete de Setembro, 2656
13560-181 - São Carlos - SP
Brazil / Brasil

Phone / Telefone:

+55 (16) 3371-0112
+55 (16) 3372-7800

Internet:

www.metrolog.net
metrolog@metrolog.net