Warnings

Connect the power supply and the display/output device according to the safety regulations for electrical equipment.
> Risk of injury, damage to or destruction of the controller and/or the sensor

Avoid shocks and impacts to the sensor and controller.
> Damage to or destruction of the controller and/or the sensor

The supply voltage must not exceed the specified limits.
> Damage to or destruction of the controller and/or the sensor

Protect the sensor cable against damage.
> Destruction of the sensor, failure of the measuring device

Notes on CE Marking

The following apply to the induSENSOR MSC7401:

EU Directive 2014/30/EU and EU Directive 2011/65/EU, "RoHS"

The sensor satisfies the requirements if the guidelines in the operating instructions are maintained in installation and operation.

Proper Environment

- Temperature range:
  - Storage: -40 ... +85 °C (-40 ... +185 °F)
  - Operation: -40 ... +85 °C (-40 ... +185 °F)
- Humidity: 5 - 95% (non-condensing)
- Ambient pressure: Atmospheric pressure
- Protection class: IP 67
- Vibration/shock: EN 60068-2

Installation

➡ Fasten the controller of series MSC7401 by means of two M4 screws.

The position of the mounting holes is shown in the drawing below. The tightening torque for the cover screws is 0.9 Nm. The maximum tightening torque for the WS15 (M12) cable gland is 1.5 Nm and for the WS19 (M16) cable gland it is 3 Nm.

Please note that less torque should be applied for cable glands with various cable sheath materials.
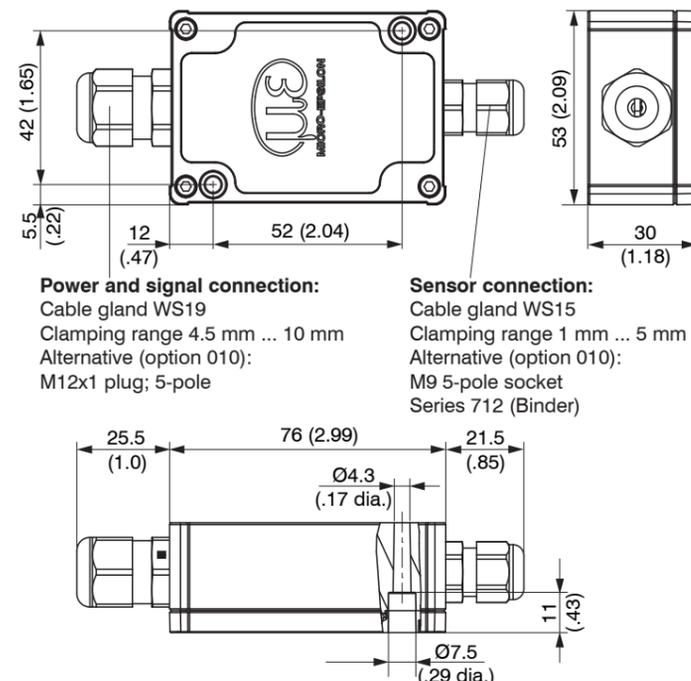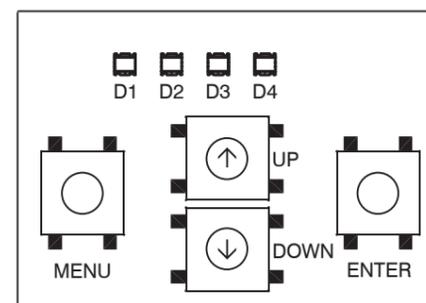> Damage to the cable sheath

Power and signal connection:
Cable gland WS19
Clamping range 4.5 mm ... 10 mm
Alternative (option 010):
M12x1 plug; 5-pole

Sensor connection:
Cable gland WS15
Clamping range 1 mm ... 5 mm
Alternative (option 010):
M9 5-pole socket
Series 712 (Binder)

Fig. 1 Dimensions of the controller MSC7401 [1], dimensions in mm (inches), not to scale
1) Option induSENSOR MSC7401(010) has different dimensions.

Control and Displays Elements

D1 D2 D3 D4

UP

MENU   DOWN   ENTER

Button/LED	Function	Description
MENU button	Enter the menu level	-
ENTER button	Confirmation	-
↑ and ↓ buttons	Parameter selection	-
D1 LED	Channel Display	The channel LED indicates the current channel; Channel 1: green, channel 2: red. It flashes in corresponding color, if the channel is not parameterized.
D2 LED	E1 menu level display	The E1 and E2 LEDs show the current position in the menu or the corresponding settings.
D3 LED	E2 menu level display	
D4 LED	Value display	The Value LED indicates the current value of the selected parameters.

Setting

The controller can be easily set using buttons, LEDs or a software (see operating instructions, Chap. A3).

Sensor model		Measuring range	Sensor type	Supply frequency	Amplitude
DTA-1x		±1 mm	LVDT	5 kHz	
DTA-3x		±3 mm		5 kHz	
DTA-5x		±5 mm		5 kHz	
DTA-10x		±10 mm		2 kHz	
DTA-15x		±15 mm		1 kHz	
DTA-25x		±25 mm		1 kHz	
LDR-10		10 mm	LDR	21 kHz	550 mV
LDR-25		25 mm		13 kHz	
LDR-50		50 mm		9 kHz	
LVP-3		3 mm		18 kHz	
LDR-14	With 8 mm drawbar	14 mm		23 kHz	
	With 10 mm drawbar			23 kHz	
LVP-25	With 8 mm drawbar	25 mm		16 kHz	
	With 10 mm drawbar			16 kHz	

Fig. 2 Sensor models and sensor parameters

You can download a PDF of detailed operating instructions from our website:

http://www.micro-epsilon.de/download/manuals/man--induSENSOR-MSC7xxx--en.pdf

Power Supply, Sensor and Signal Output

The minimum bending radius of the PC7400-6/4 and PC5/5-IWT power supply and output cables (available as accessories) is ten times the cable diameter. All of the connections for the power supply/sensors/signal output are on the controller.

Connections
- Power supply/output side:
  - Cable gland: WS19; clamping range 4.5 mm ... 10 mm
    Screw terminals; AWG 16 up to AWG 24; up to AWG 28 with ferrule
  - Alternatively: Connector M12x1, 5-pole, A-coded
- Sensor side:
  - Cable gland: WS15; clamping range 1 mm ... 5 mm
    Screw terminals; AWG 16 up to AWG 24; up to AWG 28 with ferrule
  - Alternatively: female connector M9; 5-pole, series 712, Co. Binder

Wiring
The housing must be open to connect the sensors and wire the output and power supply cable.

➡ Loosen the screws.
➡ Pass the sensor and signal cables through the cable glands.
➡ Connect the cables to the terminals according to the pin assignments.

Terminal block X	Pin	Cable [1] DTA-x-CA-x DTA-x-CR-x C701-x	Wire [1] DTA-x-LA-x	Solder pin [1] DTA-x-TA-x	Cable [1] DTA-xG8-x
Sensor cable shield	1	Shield	-	-	Shield
Secondary center tap	2	Gray	Gray	5	Gray
Secondary +	3	White	White	1	Black
Secondary -	4	Brown	Black	2	White
Primary +	5	Green	Green	3	Blue
Primary -	6	Yellow	Yellow	4	Brown

Fig. 3 Table of the pin assignment for the sensor at terminal block X2, full bridge

Terminal block X2	Pin	Cable [1] LDR-x-CA LVP-25-Z20-x	Connector LDR-x-SA	Sensor cable [1] C7210-x
Sensor cable shield	1	-	-	-
Secondary center tap	2	Green	4	Black
Secondary +	3	White	1	Brown
Secondary -	4	Brown	3	Blue
Primary +	5	-	-	-
Primary -	6	-	-	-

Fig. 4 Table of the pin assignment for the sensor at terminal block X2, half bridge
1) The colors and pins listed refer to MICRO-EPSILON MESSTECHNIK GmbH & Co. KG sensors.

The pin assignment for the terminal blocks can also be found in the following table.

More information and graphics can be found in the operating instructions, Chap. 4.3.

Instructions on operation can be found in the operating instructions starting at Chap. 5.3.

Pin	Terminal block X2: Sensor connection	Terminal block X3: Digital interface RS485	Terminal block X1: Power supply and signal
1	Housing/shield	RS485 A	Analog output
2	Secondary center tap	RS485 B	Supply voltage
3	Secondary +	-	GND supply/signal ground
4	Secondary -	-	Housing/shield
5	Primary +	-	-
6	Primary -	-	-

Fig. 5 Pin assignment for terminal blocks

| Pin assignment for power supply and signal	
Pin	Description
1	Supply voltage
2	-
3	GND supply/signal ground
4	Analog output
5	-

View on pin side

Fig. 6 Pin assignment for power supply and signal, 5-pin housing connector M12x1 (A-coded)

Sensor pin assignment	
Pin	Description
1	Secondary +
2	Secondary -
3	Primary +
4	Primary -
5	Secondary center tap

View on pin side

Fig. 7 Pin assignment for sensor, 5-pin housing socket M9 (Binder, series 712)

Initial Operation
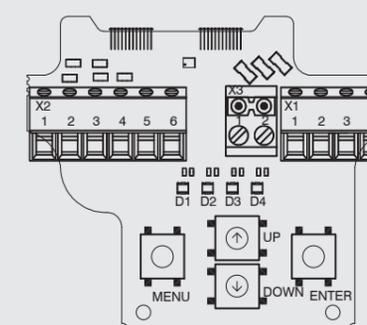
➡ Connect the sensor before starting the controller.
➡ Ensure that the wiring of the sensor connections, signal cable and power supply connections are correct before connecting the controller to the power supply and turning it on.
➡ Then switch on the power supply.
➡ Set the controller to its basic setting.

Assembly Instructions
induSENSOR
MSC7401

Menu Structure for the MSC7401 Controller

D1: Channel	D2: E1		D3: E2		D4: Value		Next menu
	[G] Adjustment	ENTER ↑↓	[R] 2-point adjustment / [G] Factory settings / [O] Zero-point search	ENTER	⇒ Go to the adjustment modes, 2-point adjustment, see Fig. 8 or zero-point search, see Fig. 9.	ENTER	⇒ E1 level
	↑						
[ ] MENU (3 sec.)	[R] Automatic sensor recognition	ENTER	[G] Successful / [R] Failed / [G] Manually set		[G] Successful / [R] Failed / [ ] Manually set		⇒ E1 level / ⇒ Sensor parameter / Display only
	↓						
	[O] Signal	ENTER ↑↓	[G] Automatic / [O] Voltage / [R] Current	ENTER	**Voltage:** [O] Voltage, [■] Current, [■] 0 ... 10 V, [O] 2 ... 10 V, [■] 0 ... 5 V, [R flashing] 0.5 ... 4.5 V; **Current:** [■] 4 ... 20 mA, [O] 0 ... 20 mA, [■] 0 ... 10 mA	ENTER	⇒ E1 level
[G]	↓						
	[R flashing] Sensor parameter	ENTER	[R] Sensor type	↑↓	[■] DTA (LVDT) / [■] LDR		
			ENTER				
			[G] Frequency	↑↓	DTA / LDR: [■] 1 kHz / 9 kHz, [O] 2 kHz / 13 kHz, [■] 5 kHz / 16 kHz, [R flashing] 10 kHz / 21 kHz, [O flashing] 13 kHz / 23 kHz		
			ENTER				
			[O] Amplitude	↑↓	[■] 550 mV, [O] 350 mV, [■] 150 mV, [R flashing] 75 mV	ENTER	⇒ E1 level

Legend of the Menu Structure

[O]	LED orange	[R]	LED red	
[G flashing]	LED orange flashing	[R flashing]	LED red flashing	
[G]	LED green	[ ]	LED off	
[G flashing]	LED green flashing	SMR	Start of measuring range	
		MR	Midrange	
		EMR	End of measuring range	

Menu Structure for the MSC7401 Controller, Adjustment Mode: 2-point Adjustment

D1: Channel	D2: E1	D3: E2		D4: Value
	[G flashing]	[R]		
	⇒ Move the measuring object to position X1, and change the output signal U1 with ↑↓			[G flashing] Flashes orange when the measuring object is in the electrical center of the sensor.
[G]			ENTER	
	[G]	[R flashing]		
	⇒ Move the measuring object to position X2 [1], and change the output signal U2 with ↑↓			[G flashing] Flashes orange when the measuring object is in the electrical center of the sensor.

Fig. 8 Menu structure for the MSC7401 controller, adjustment mode: 2-point adjustment

1) Position X_2 must be > 10 % of the measuring range away from X_1.

Menu Structure for the MSC7401 Controller, Adjustment Mode: Zero-point Search

D1: Channel	D2: E1	D3: E2		D4: Value
	[G flashing]	[O]		
	⇒ Set the output signal U_0. ↑↓			[ ] LED off
	6 VDC or 12 mA is preset.			
			ENTER	
	[G flashing]	[O]	The LED flashes and color changes depending on the output signal (green = too low, red = too high).	[O] Lights orange when the measuring object is in the electrical center of the sensor.
[G]	⇒ Move the measuring object to position X_0 until the output has reached U_0.			
			ENTER	
	[G]	[G flashing]	The LED color changes depending on the position of the measuring object.	[G flashing] Flashes orange when the measuring object is in the electrical center of the sensor.
	⇒ Move the measuring object to position X_2 [1] and change the output signal U_2 with ↑↓			

Fig. 9 Menu structure for the MSC7401 controller, adjustment mode: Zero-point search

1) Position X_2 must be > 10 % of the measuring range away from X_1.