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 applies to the induSENSOR MSC7602:

EU Directive 2014/30/EU and EU Directive 2011/65/EU

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 20
- Vibration/Shock: EN 60068-2

You can find more information about the sensor in the operating instructions. They are online at:
http://www.micro-epsilon.de/download/manuals/man--induSENSOR-MSC7xxx--en.pdf

Installation

➡ If required, install a DIN rail bus connector, e.g., ME22,5 TBUS 1,5/4P1S KMGY (Phoenix: 2201732)[1], onto the DIN rail.

➡ If required, connect the mating plug, e.g., MCVR 1.5/5-ST-3.81 (Phoenix: 1827156) [1], with the bus connector.

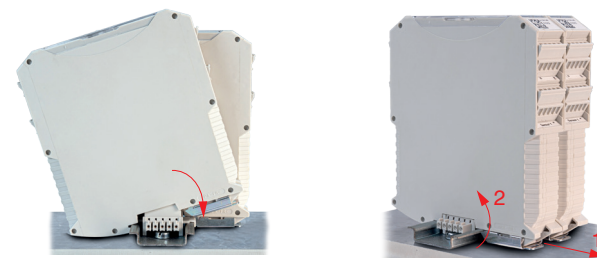➡ Position the MSC7602 controller on the DIN rail and press it down until it snaps in.

Fig. 1 Installation of controller   *Fig. 2 Dismantling of controller*
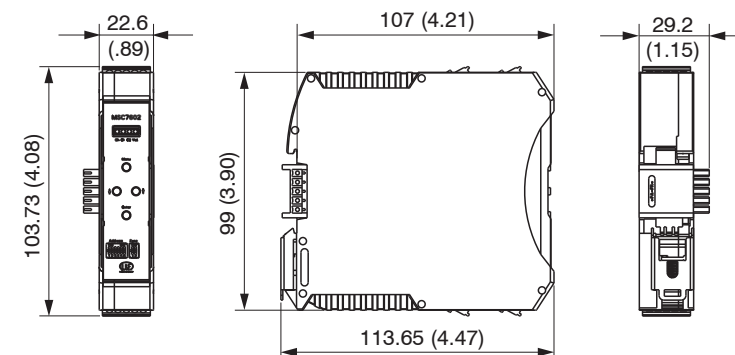1) Also see chapter Optional Accessories in the operating instructions.

Fig. 3 Dimensions of MSC7602 controller, dimensions in mm, not to scale

Dismantling

➡ For dismantling, pull the locking element on the controller forwards, e.g., using a screwdriver ①.

➡ Tilt the controller in order to remove it from the DIN rail ②.

Control and Display Elements

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

Initial Operation

Terminals X1 / X2-2

Terminals X3 / X2-1

➡ 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, also see chapter 5.3.

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	Excitation voltage
DTA-1x		±1 mm	LVDT	5 kHz	550 mV
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	
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. 4 Sensor models and sensor parameters

Power Supply, Sensor and Signal Output

The MSC7602 is designed for multi-channel operation. Therefore, power supply and RS485 must therefore be applied only to one controller and can then be transmitted to the adjacent controller via a DIN rail bus connector on the rear side.

The Sync signal is only available on the DIN rail bus connector and executed in series, i.e., it is not daisy-chained in the bus connector.

All of the connections for the power supply/sensors/signal output are on the controller.

Connections:

Screw terminal connection; AWG 16 up to AWG 24; up to AWG 28 with ferrule

Assignment	Pin X1	Color (cable: PC7400-6/4)
Supply voltage +24 V	1	White
GND Supply/signal ground	2	Brown
Analog output for channel 1	3	Yellow
Analog output for channel 2	4	Green
Cable shield sensor 2 (direct connection to DIN rail)	5	-

Fig. 5 Table for pin assignment of supply and analog output

Assignment	Pin
Supply voltage +24 V	1
Ground 0 V	2
RS485 A	3
RS485 B	4
Sync-signal	5
ME22,5 TBUS 1,5/4P1S KMGY (Phoenix: 2201732) Suitable mating plug: MCVR 1.5/5-ST-3.81 (Phoenix: 1827156)	

Fig. 6 Table for pin assignment of DIN rail bus connector

Assignment	Pin X2-x	DTA-x-CA-x DTA-x-CR-x Cable C701-x	DTA-x-CA-x	DTA-xG8-x
Secondary center tap	1	Gray	Gray	Gray
Secondary +	2	White	White	Black
Secondary -	3	Brown	Black	White
Primary +	4	Green	Green	Blue
Primary -	5	Yellow	Yellow	Brown
Cable shield sensor 1 + 2, see X1 and X3				

Fig. 7 Table for pin assignment sensor 1 + 2 (DTA/LVDT)

Assignment	Pin X2-x	LDR-x-CA LVP-25-Z20-x	Cable C7210-x
Secondary center tap	1	Green	Black
Secondary +	2	White	Brown
Secondary -	3	Brown	Blue
Primary +	4	-	-
Primary -	5	-	-
Cable shield sensor 1 + 2, see X1 and X3			

Fig. 8 Table for pin assignment sensor 1 + 2 (LDR)

Assignment	Pin X3	Color (IF7001)
A (RS485)	1	Brown
B (RS485)	2	White
-	3	-
-	4	-
Cable shield sensor 1 (direct connection to DIN rail)	5	-

Fig. 9 Table for pin assignment of digital interface X3

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

Address Assignment

Address		Switch setting						
Sensor 1	Sensor 2	S1	S2	S3	S4	S5	S6	Binary
126 [1][2]	125 [1][2]	0	0	0	0	0	0	000000
2	1	1	0	0	0	0	0	000001
4	3	0	1	0	0	0	0	000010
6	5	1	1	0	0	0	0	000011
...	...	...	...	...	...	...	...	...
124	123	0	1	1	1	1	1	111110
126	125	1	1	1	1	1	1	111111

Fig. 10 Address assignment on the induSENSOR MSC7602 controller

1) Factory settings
2) The address can be set using the sensorTOOL, see operating instructions, chapter A3.

0 = OFF, 1 = ON

Requirements:
- Each address is only permitted once on the same bus.
- Address channel 1: even value; address channel 2: odd value
- Master address of Micro-Epsilon products: "1"

Synchronization

Switch setting		Operation	
S1	S2	Sensor 1	Sensor 2
0 [1]	0 [1]	Independent	Independent
0	1	Master	Slave
1	0	Slave	Independent
1	1	Slave	Slave

Fig. 11 DIP switch on the induSENSOR MSC7602 for synchronization

1) Factory settings

0 = OFF, 1 = ON

The prerequisites for sync operation are described in the operating instructions, chapter 5.5.2.

Menu Structure for the MSC7602 Controller

D1: Channel	D2: E1	D3: E2	D4: Value	Next menu
MENU (3 sec.) — G / ↑↓ / R	**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
	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 / **R** Current; **G** 0...10 V / **O** 2...10 V / **R** 0...5 V / **R(flash)** 0.5...4.5 V; Current: **G** 4...20 mA / **O** 0...20 mA / **R** 0...10 mA → ENTER	→ E1 level
	R(flash) Sensor parameter → ENTER	**R** Sensor type ↑↓: **G** DTA (LVDT) / **R** LDR		

Sensor parameter (continued):

ENTER

	Frequency (**G**)	DTA	LDR
G		1 kHz	9 kHz
O		2 kHz	13 kHz
R		5 kHz	16 kHz
R(flash)		10 kHz	21 kHz
O(flash)		13 kHz	23 kHz

ENTER

Amplitude (**O**)		→ E1 level
G	550 mV	
O	350 mV	
R	150 mV	ENTER
R(flash)	75 mV	

Legend of the Menu Structure

O	LED orange	**R**	LED red
G(flash)	LED orange flashing	**R(flash)**	LED red flashing
G	LED green	(blank)	LED off
G(flash)	LED green flashing	SMR	Start of measuring range
		MMR	Mid of measuring range
		EMR	End of measuring range

Menu Structure for the MSC7602 Controller, Adjustment Mode: 2-point Adjustment

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

Fig. 12 Menu structure for the MSC7602 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 MSC7602 Controller, Adjustment Mode: Zero-point Search

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

Fig. 13 Menu structure for the MSC7602 controller, adjustment mode: Zero-point search

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