

## Technical data sheet

### Capacitive sensor

Part no.: 50135689

LCS-1M12M-F04PNC-M12

#### Contents

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- Dimensioned drawings
- Electrical connection
- Circuit diagrams
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For illustration purposes only



## Technical data

### Basic data

|                            |            |
|----------------------------|------------|
| Series                     | LCS-1      |
| Switching distance $S_n$   | 1 ... 4 mm |
| Assured switching distance | 4 mm       |

### Electrical data

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| Protective circuit | Polarity reversal protection<br>Short circuit protected |
|--------------------|---------------------------------------------------------|

### Performance data

|                                          |                        |
|------------------------------------------|------------------------|
| Supply voltage $U_B$                     | 10 ... 30 V, DC        |
| Residual ripple                          | 0 ... 10 %, From $U_B$ |
| Open-circuit current                     | 15 mA                  |
| Temperature drift, max. (in % of $S_r$ ) | 20 %                   |
| Repeatability, max. (in % of $S_r$ )     | 2 %                    |
| Rated operating current                  | 100 mA                 |

### Outputs

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 1 Piece(s) |
|-------------------------------------|------------|

### Switching outputs

|      |                          |
|------|--------------------------|
| Type | Digital switching output |
|------|--------------------------|

|              |    |
|--------------|----|
| Voltage type | DC |
|--------------|----|

### Switching output 1

|            |                     |
|------------|---------------------|
| Assignment | Connection 1, pin 2 |
|------------|---------------------|

|                   |                 |
|-------------------|-----------------|
| Switching element | Transistor, PNP |
|-------------------|-----------------|

|                     |                      |
|---------------------|----------------------|
| Switching principle | NC (normally closed) |
|---------------------|----------------------|

### Time behavior

|                     |        |
|---------------------|--------|
| Switching frequency | 100 Hz |
|---------------------|--------|

### Connection

|                       |            |
|-----------------------|------------|
| Number of connections | 1 Piece(s) |
|-----------------------|------------|

### Connection 1

|          |            |
|----------|------------|
| Function | Signal OUT |
|----------|------------|

|  |                |
|--|----------------|
|  | Voltage supply |
|--|----------------|

|                    |           |
|--------------------|-----------|
| Type of connection | Connector |
|--------------------|-----------|

|             |     |
|-------------|-----|
| Thread size | M12 |
|-------------|-----|

|      |      |
|------|------|
| Type | Male |
|------|------|

|          |         |
|----------|---------|
| Material | Plastic |
|----------|---------|

|             |        |
|-------------|--------|
| No. of pins | 4 -pin |
|-------------|--------|

|          |         |
|----------|---------|
| Encoding | A-coded |
|----------|---------|

### Mechanical data

|                                      |                                               |
|--------------------------------------|-----------------------------------------------|
| Design                               | Cylindrical                                   |
| Dimension ( $\varnothing \times L$ ) | 12 mm x 75 mm                                 |
| Thread size                          | M12 x 1 mm                                    |
| Type of installation                 | Embedded/flush                                |
| Housing material                     | Metal                                         |
|                                      | Stainless steel                               |
| Stainless steel housing              | V2A                                           |
| Sensing face material                | Plastic, Polybutylene (PBT)                   |
| Cover material                       | Plastic, Polybutylene (PBT)/polyamide (PA 12) |
| Net weight                           | 25 g                                          |

### Operation and display

|                                     |                                    |
|-------------------------------------|------------------------------------|
| Type of display                     | LED                                |
| Number of LEDs                      | 2 Piece(s)                         |
| Operational controls                | Multiturn potentiometer (12 turns) |
| Function of the operational control | Sensitivity adjustment             |
| Switching distance, adjustable      | Yes                                |

### Environmental data

|                                |               |
|--------------------------------|---------------|
| Ambient temperature, operation | -25 ... 85 °C |
|--------------------------------|---------------|

### Certifications

|                      |               |
|----------------------|---------------|
| Degree of protection | IP 67         |
| Protection class     | III           |
| Approvals            | c UL US       |
| Standards applied    | IEC 60947-5-2 |

### Correction factors

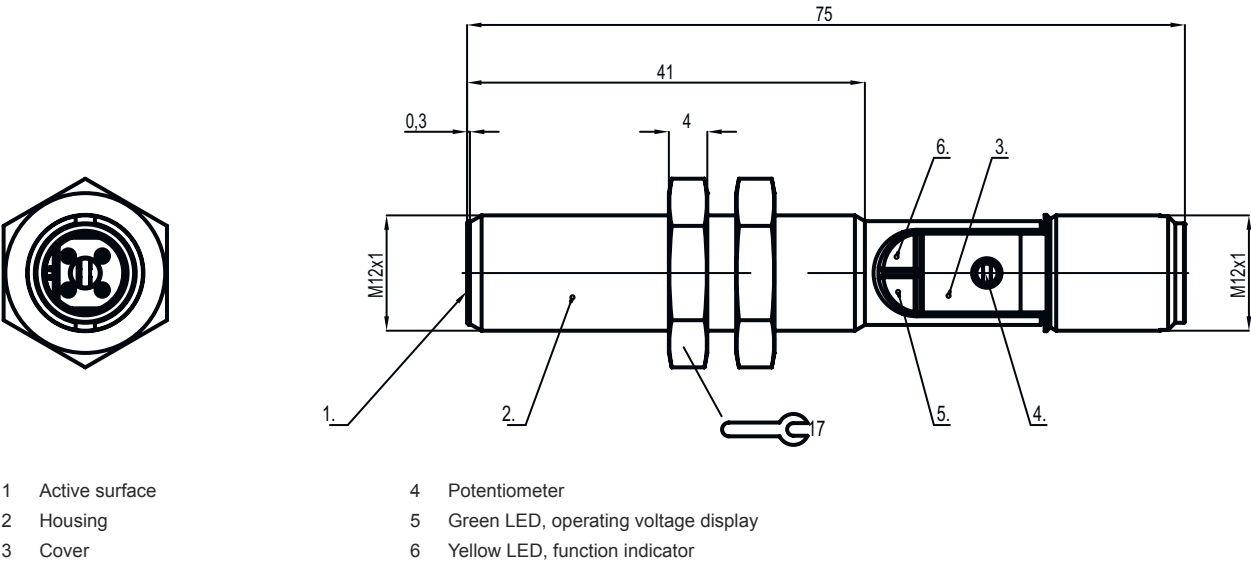
|                            |               |
|----------------------------|---------------|
| Acetone                    | 0.75          |
| Acrylic resin              | 0.1 ... 0.25  |
| Alcohol                    | 0.85          |
| Ammonia                    | 0.7 ... 0.85  |
| Aniline                    | 0.4           |
| Gasoline                   | 0.1           |
| Celluloid                  | 0.15          |
| Liquid chlorine            | 0.1           |
| Ebonite                    | 0.15          |
| Epoxy resin                | 0.15 ... 0.35 |
| Crude oil                  | 0.05          |
| Ethanol                    | 0.85          |
| Ethylene glycol            | 0.93          |
| Freon R22 and 502 (liquid) | 0.35          |
| Grain                      | 0.15 ... 0.3  |
| Glass                      | 0.2 ... 0.55  |
| Glycerin                   | 0.98          |
| Rubber                     | 0.15 ... 0.9  |
| Wood, wet                  | 0.6 ... 0.85  |
| Wood, dry                  | 0.1 ... 0.4   |
| Carbon dioxide             | 0             |
| Air                        | 0             |
| Marble                     | 0.5           |
| Flour                      | 0.05          |
| Melamine resin             | 0.25 ... 0.55 |
| Milk powder                | 0.2           |
| Nylon                      | 0.2 ... 0.3   |
| Oil-containing paper       | 0.25          |
| Paper                      | 0.1           |
| Polyamide                  | 0.3           |
| Polyester resin            | 0.15 ... 0.5  |
| Pressboard                 | 0.1 ... 0.3   |
| PTFE                       | 0.1           |
| Quartz glass               | 0.2           |
| Salt                       | 0.35          |
| Sand                       | 0.15 ... 0.3  |
| Water                      | 1             |
| Cement dust                | 0.25          |
| Sugar                      | 0.15          |

Technical data

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 27270102 |
| ECLASS 8.0            | 27270102 |
| ECLASS 9.0            | 27270102 |
| ECLASS 10.0           | 27270102 |
| ECLASS 11.0           | 27270102 |
| ECLASS 12.0           | 27274201 |
| ECLASS 13.0           | 27274201 |
| ECLASS 14.0           | 27274201 |
| ECLASS 15.0           | 27274201 |
| ECLASS 16.0           | 27274201 |
| ETIM 5.0              | EC002715 |
| ETIM 6.0              | EC002715 |
| ETIM 7.0              | EC002715 |
| ETIM 8.0              | EC002715 |
| ETIM 9.0              | EC002715 |
| ETIM 10.0             | EC002715 |

Dimensioned drawings

All dimensions in millimeters



Electrical connection

Connection 1

|                    |                |
|--------------------|----------------|
| Function           | Signal OUT     |
| Type of connection | Voltage supply |
| Thread size        | Connector      |
| Type               | M12            |
| Material           | Male           |
| No. of pins        | Plastic        |
| Encoding           | 4 -pin         |
|                    | A-coded        |

Electrical connection

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1   | +10...30 V DC  | Brown           |
| 2   | n.c.           | -               |
| 3   | GND            | Blue            |
| 4   | OUT            | Black           |



Circuit diagrams



Operation and display

| LED | Display                  | Meaning                          |
|-----|--------------------------|----------------------------------|
| 1   | Green, continuous light  | Ready                            |
| 2   | Yellow, continuous light | Switching output/switching state |

Part number code

Part designation: LCS-ABBBC-DDDEFF-GHHHIJJJ KK

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LCS | <b>Operating principle</b><br>LCS: capacitive sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| A   | <b>Series</b><br>1: series 1 "Extended"<br>2: series 2 "Advanced"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BBB | <b>Design</b><br>M12: series with M12 x 1 external thread<br>M18: series with M18 x 1 external thread<br>M30: series with M30 x 1.5 external thread<br>Q40: series in cubic design, length 40 mm<br>Q54: series in cubic design, length 54 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| C   | <b>Housing material</b><br>B: Brass<br>M: metal<br>P: plastic/PBT<br>T: PTFE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DDD | <b>Measurement range / type of installation</b><br>F03: typ. range limit 3.0 mm / embedded/flush installation<br>F04: typ. range limit 4.0 mm / embedded/flush installation<br>F05: typ. range limit 5.0 mm / embedded/flush installation<br>F06: typ. range limit 6.0 mm / embedded/flush installation<br>F08: typ. range limit 8.0 mm / embedded/flush installation<br>F10: typ. range limit 10.0 mm / embedded/flush installation<br>F15: typ. range limit 15.0 mm / embedded/flush installation<br>F20: typ. range limit 20.0 mm / embedded/flush installation<br>N06: typ. range limit 6.0 mm / non-embedded/non-flush installation<br>N08: typ. range limit 8.0 mm / non-embedded/non-flush installation<br>N10: Typ. range limit 10.0 mm / non-embedded/non-flush installation<br>N15: typ. range limit 15.0 mm / non-embedded/non-flush installation<br>N25: typ. range limit 25.0 mm / non-embedded/non-flush installation<br>N30: typ. range limit 30.0 mm / non-embedded/non-flush installation |

## Part number code

|            |                                                                                                  |
|------------|--------------------------------------------------------------------------------------------------|
| <b>E</b>   | <b>Output function</b><br>B: NC and NO contact<br>N: NPN<br>P: PNP                               |
| <b>FF</b>  | <b>Switching</b><br>NC: Normally closed contact<br>NO: normally open contact<br>NP: programmable |
| <b>G</b>   | <b>Connection cable</b><br>K: Cable<br>n/a: no cable                                             |
| <b>HHH</b> | <b>Cable length</b><br>020: length 2,000 mm<br>003: length 300 mm<br>n/a: no cable               |
| <b>I</b>   | <b>Cable material</b><br>P: PUR<br>T: PTFE<br>V: PVC                                             |
| <b>JJJ</b> | <b>Electrical connection</b><br>M08: M8 connector, 3-pin<br>M12: M12 connector, 4-pin (plug)     |
| <b>KK</b>  | <b>Special equipment</b><br>L: IO-Link interface<br>T: teach-in<br>n/a: no special equipment     |

## Note



↗ A list with all available device types can be found on the Leuze website at [www.leuze.com](http://www.leuze.com).

## Notes



## Observe intended use!



- ↗ This product is not a safety sensor and is not intended as personnel protection.
- ↗ The product may only be put into operation by competent persons.
- ↗ Only use the product in accordance with its intended use.

## Accessories

## Connection technology - Connection cables

|                                                                                     | Part no. | Designation        | Article          | Description                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------|----------|--------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50130654 | KD U-M12-4A-P1-020 | Connection cable | Application: Oil and lubricant resistant<br>Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 2,000 mm<br>Sheathing material: PUR |

## Accessories

|                                                                                   | Part no. | Designation        | Article          | Description                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|----------|--------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50130657 | KD U-M12-4A-P1-050 | Connection cable | Application: Oil and lubricant resistant<br>Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PUR |

## Mounting technology - Other

|                                                                                   | Part no. | Designation | Article | Description                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------|----------|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50111499 | MC 012K     | Clamp   | Diameter, inner: 12 mm<br>Design of mounting device: Mounting clamp<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Rigid<br>Material: Plastic |

### Note



A list with all available accessories can be found on the Leuze website in the Download tab of the article detailed page.