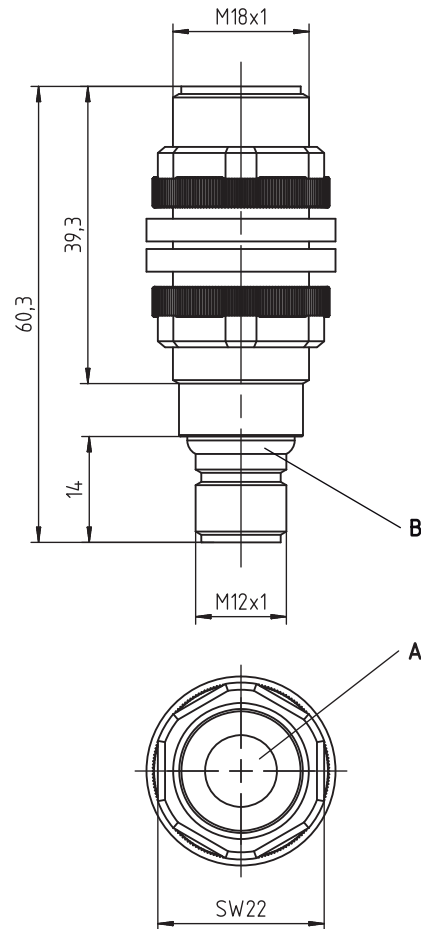


DMU318

Ultrasonic sensors with analog output

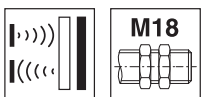
Dimensioned drawing



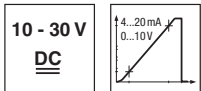
- A Active sensor surface
B Indicator diodes

Electrical connection

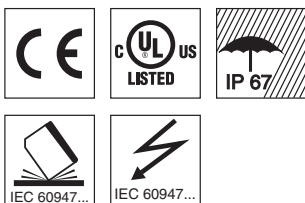
10-30 V DC +	1	BR/BN
Teach-IN	2	WS/WH
GND	3	BL/BU
Analog OUT	4	SW/BK



40 ... 300mm
80 ... 1200mm



- Function largely independent of surface properties, ideal for detection of liquids, bulk materials, transparent media, ...
- Small dead zone at long scanning range
- 1 analog output 0 ... 10V or 4 ... 20mA
- Teachable characteristic curve
- Extra short construction
- **NEW** – Stable plastic design
- **NEW** – Temperature-compensated scanning range



Accessories:

(available separately)

- Mounting systems
- Mounting adapter M18-M30:
BTX-D18M-D30 (Part no. 50125860)
- Cables with M12 connector
(KD ...)
- Teach adapter PA1/XTSX-M12
(Part no. 50124709)

Technical data

Ultrasonic specifications

Scanning range ¹⁾
Adjustment range
Ultrasonic frequency
Typ. opening angle
Resolution
Direction of beam
Reproducibility
Switching hysteresis
Temperature drift

DMU318-300/...-M12

40 ... 300mm ²⁾
40 ... 300mm
300kHz
7° ± 2°
< 2mm
Axial
± 0.5 % ^{1) 3)}
1 % ³⁾
≤ 5 % ⁴⁾

DMU318-1200/...-M12

80 ... 1200mm ²⁾
80 ... 1200mm
200kHz
8° ± 2°
< 2mm
Axial
± 0.5 % ^{1) 3)}
1 % ³⁾
≤ 5 % ⁴⁾

Timing

Readiness delay

< 100ms

< 100ms

Electrical data

Operating voltage U_B ⁵⁾
Residual ripple
Open-circuit current
Analog output

.../C...
.../V...

10 ... 30V DC (incl. ± 5 % residual ripple)
± 5 % of U_B
≤ 35mA
1 analog output 4 ... 20mA
1 analog output 0 ... 10V
Current output: $R_L \leq 500\Omega$,
Voltage output: $R_L \geq 2k\Omega$
1-point teach: teach-in (pin 2) 2 ... 7s to GND,
2-point teach: teach-in (pin 2) 7 ... 12s to GND,
Characteristic curve inversion: teach-in (pin 2) > 12s to GND
Distance too small: approx. 3.8mA,
Distance too large: approx. 11V / approx. 21mA

Load resistance

Characteristic curve adjustment

Analog output error signal

Indicators

Yellow LED
Yellow and green LEDs flash
Green LED

Analog OUT: object detected
Teach-in / teaching error
Object within the scanning range

Mechanical data

Housing
Active surface
Weight
Ultrasonic transducer
Connection type
Fitting position

Plastic (PBT)
Epoxy resin, glass fiber reinforced
65g
Piezoceramic ⁶⁾
M12 connector, 4-pin
Any

Environmental data

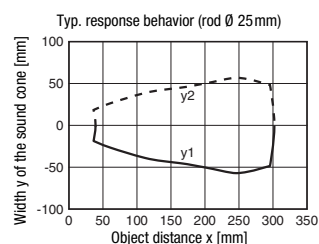
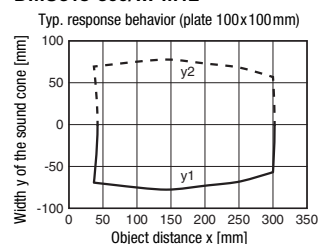
Ambient temp. (operation/storage)
Protective circuit ⁷⁾
VDE protection class
Degree of protection
Standards applied
Certifications

-20° ... +70°C/-20° ... +70°C
1, 2, 3
III
IP 67
EN 60947-5-2
UL 508, CSA C22.2 No.14-13 ^{5) 8)}

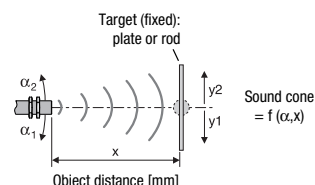
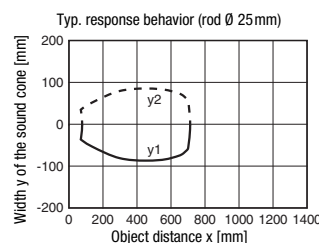
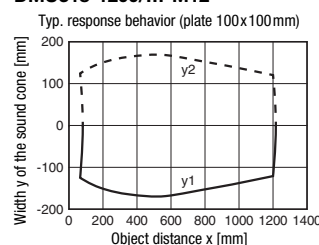
- 1) At 20°C
- 2) Target: 100mm x 100mm plate
- 3) From end value
- 4) Over the temperature range -20°C ... +70°C
- 5) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
- 6) The ceramic material of the ultrasonic transducer contains lead zirconium titanate (PZT)
- 7) 1=short-circuit and overload protection, 2=polarity reversal protection, 3=wire break and inductive protection
- 8) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Diagrams

DMU318-300/...-M12



DMU318-1200/...-M12



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.

DMU318

Ultrasonic sensors with analog output

Part number code

D	M	U	3	1	8	-	1	2	0	0	.	3	/	C	T	-	M	1	2
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Operating principle

HTU	Ultrasonic sensor, scanning principle, with background suppression
DMU	Ultrasonic sensor, distance measurement
RKU	Ultrasonic sensor, retro-reflective ultrasonic sensor principle

Series

318	318 series, cylindrical short M18 design
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Scanning range in mm

300	40 ... 300
1200	80 ... 1200

Equipment (optional)

.3	Teach button on the sensor
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Pin assignment of connector pin 4 / black cable wire (analog OUT/OUT1)

4	PNP output, NO contact preset
P	PNP output, NC contact preset
2	NPN output, NO contact preset
N	NPN output, NC contact preset
C	Analog output 4 ... 20 mA
V	Analog output 0 ... 10 V

Pin assignment of connector pin 2 / white cable wire (Teach-IN)

T	Teach input
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Connection technology

M12	M12 connector, 4-pin
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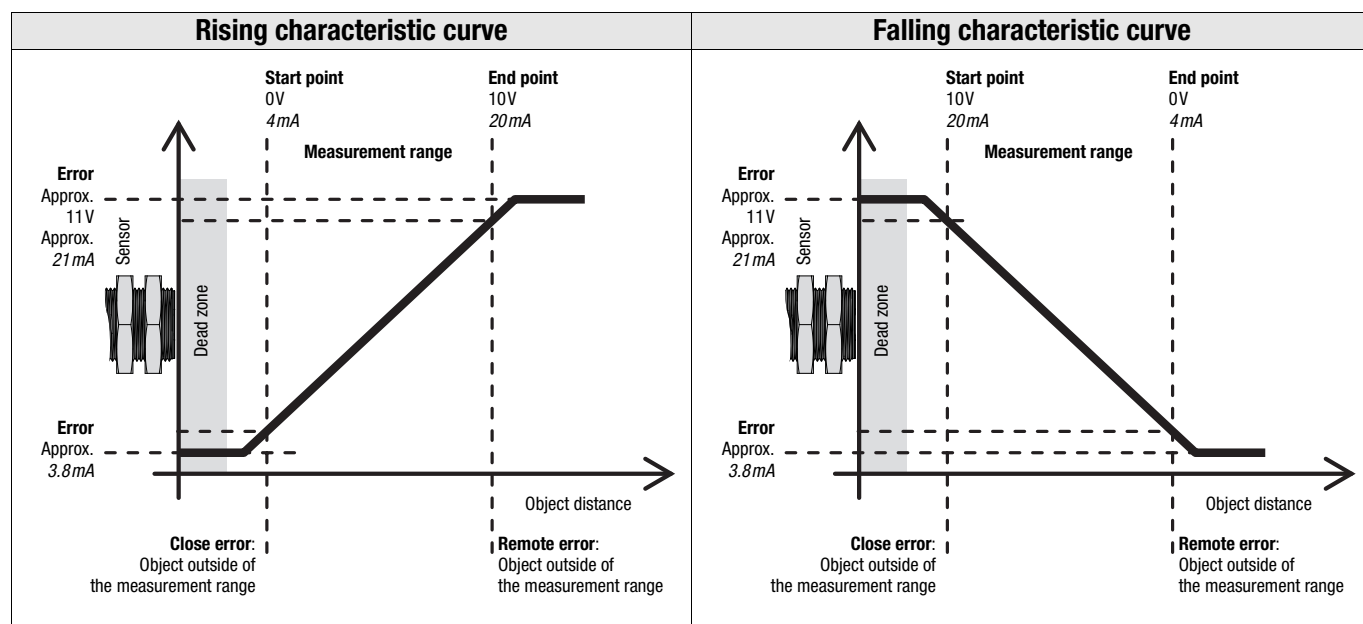
Order guide

The sensors listed here are preferred types; current information at www.leuze.com.

	Designation	Part no.
Scanning range / Analog output		
40 ... 300 mm / current output 4 ... 20 mA	DMU318-300/CT-M12	50136073
40 ... 300 mm / voltage output 0 ... 10 V	DMU318-300/VT-M12	50136072
80 ... 1200 mm / current output 4 ... 20 mA	DMU318-1200/CT-M12	50136077
80 ... 1200 mm / voltage output 0 ... 10 V	DMU318-1200/VT-M12	50136076

Device functions – analog output

Analog output Analog OUT



Note!

When setting the analog output (teach) via the teach input, one **rising characteristic curve** is always taught; with 2-point teach, independent of the selected object distances near/far. The characteristic output curve can be inverted, however.

Setting the analog output (teach) via the teach input

On delivery, the characteristic output curve of the sensor is set as a rising characteristic curve with spread over the entire scanning range: 4 ... 20mA or 0 ... 10V corresponds to an object distance of 40 ... 300mm or 80 ... 1200mm, respectively.

The analog output can be set by means of 1-point teach or 2-point teach.



Note!

When setting the analog output (teach) via the teach input, one **rising characteristic curve** is always taught; with 2-point teach, independent of the selected object distances near/far. The characteristic output curve can be inverted, however.

1-point teach of the analog output

By selecting an object distance within the scanning range, the characteristic curve of the analog output can be adjusted. Leuze Teach Adapter **PA1/XTSX-M12** can be used for this purpose.

If an object is located outside of the taught measurement range, an error signal is output. A different analog signal is output here by the sensor for the errors "distance too close: object outside of the measurement range" and "distance too far: object outside of the measurement range".

1-point teach - rising characteristic curve

- 1. Place** object at desired distance for the end point of the measurement range.
Note: The **minimum object distance for the end of the measurement range** is as follows:
 scanning range of 300mm: **70mm**
 scanning range of 1200mm: **200mm**
- 2.** To adjust analog output **Analog OUT**, **connect** the **teach-in** input to **GND** for **2 ... 7s** until the **yellow and green LEDs flash simultaneously at 3Hz**.
- 3.** The characteristic curve with plot rising from the start of the range (30 mm or 80 mm) to the set object distance was taught in.
- 4.** Error-free teach: LED states acc. to "Technical data" -> "Indicators".
Faulty teach: green and yellow LEDs flash at 8Hz until an error-free teach is performed.

2-point teach of the analog output

By selecting 2 object distances within the scanning range, the characteristic curve of the analog output can be adjusted. Leuze Teach Adapter **PA1/XTSX-M12** can be used for this purpose.

If an object is located outside of the taught measurement range, an error signal is output. A different analog signal is output here by the sensor for the errors "distance too close: object outside of the measurement range" and "distance too far: object outside of the measurement range".

2-point teach - rising characteristic curve

- 1. Position** the object at the first desired distance (near or far).
- 2.** To adjust analog output **Analog OUT**, **connect** the **teach-in** input to **GND** for **7 ... 12s** until the **yellow and green LEDs flash alternately at 3Hz**.
- 3.** The sensor remains in teach mode and the LEDs continue to flash.
- 4.** Then **position** the object at the second desired distance (far or near).
Note: the **minimum object distance between the start and end point of the measurement range**
 for a scanning range of 300mm is: **30mm**
 for a scanning range of 1200mm is: **120mm**
- 5.** To complete the teach event, **briefly connect** the **Teach-IN** input to **GND** again.
 The characteristic curve with rising plot from the near to the far object distance was taught in.
- 6.** Error-free teach: LED states acc. to "Technical data" -> "Indicators".
Faulty teach: green and yellow LEDs flash at 8Hz until an error-free teach is performed.

Inverting the analog output (falling/rising characteristic curve)

The characteristic curve of the analog output can be inverted, e.g., if a falling characteristic output curve is desired. Leuze Teach Adapter **PA1/XTSX-M12** can be used for this purpose.

Inverting the characteristic curve	
1. To invert the characteristic curve of the analog output Analog OUT , connect the teach-in input to GND for > 12s until the yellow and green LEDs flash alternately .	
2. Disconnect the Teach-IN input from GND . The characteristic curve plot was inverted. The yellow LED indicates the current setting of the analog output: ON = rising characteristic curve OFF = falling characteristic curve	

Resetting to factory settings

The sensor can be reset to the factory setting (rising characteristic curve with spread over the entire scanning range). Leuze Teach Adapter **PA1/XTSX-M12** can be used for this purpose.

Resetting to factory settings	
1. When switching on the power supply (during Power-On), connect the Teach-IN input to GND for > 5s.	
2. Disconnect the Teach-IN input from GND . The green and yellow LEDs flash alternately and very quickly for a brief time. The sensor was reset to the factory setting: 4 ... 20mA or 0 ... 10V corresponds to an object distance of 40 ... 300 mm or 80 ... 1200 mm, respectively.	