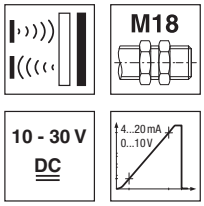
DMU318

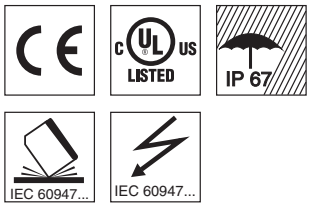
Ultrasonic sensors with analog output

en 01-2017/02 50111303



40 … 300 mm
80 … 1200 mm

- 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

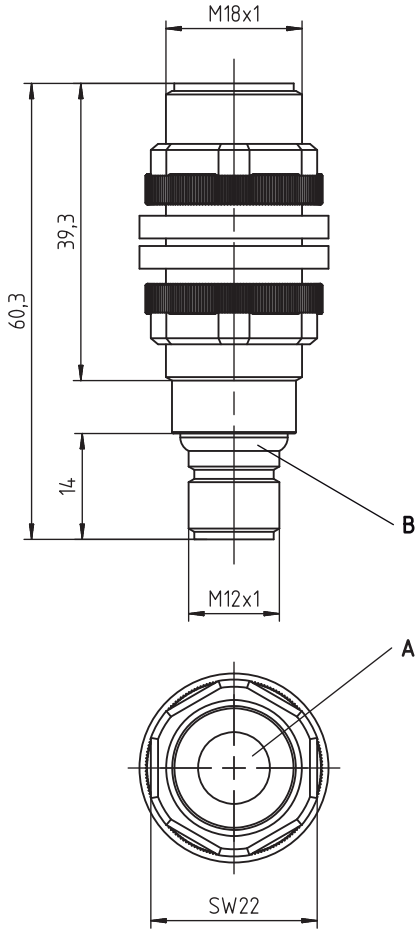


Accessories:

(available separately)

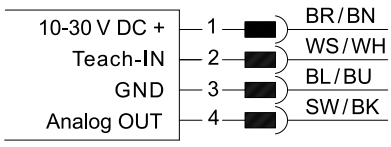
- Mounting systems
- Mounting adapter M18-M30: BTX-D18M-D30 (Part no. 50125860)
- Cables with M12 connector (KD …)
- Teach adapter PA1/XTSX-M12 (Part no. 50124709)

Dimensioned drawing



A Active sensor surface
B Indicator diodes

Electrical connection



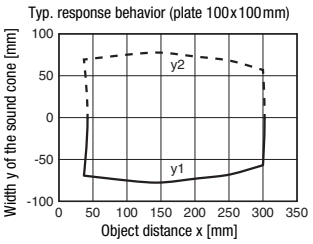
Technical data

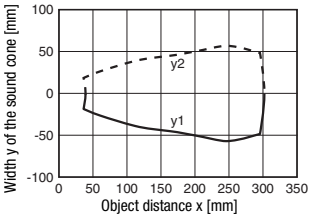
Ultrasonic specifications		DMU318-300/…-M12	DMU318-1200/…-M12
Scanning range [1]		40 … 300mm [2]	80 … 1200mm [2]
Adjustment range		40 … 300mm	80 … 1200mm
Ultrasonic frequency		300kHz	200kHz
Typ. opening angle		7° ± 2°	8° ± 2°
Resolution		< 2mm	< 2mm
Direction of beam		Axial	Axial
Reproducibility		± 0.5% [1] [3]	± 0.5% [1] [3]
Switching hysteresis		1% [3]	1% [3]
Temperature drift		≤ 5% [4]	≤ 5% [4]
Timing			
Readiness delay		< 100ms	< 100ms
Electrical data			
Operating voltage U_B [5]		10 … 30V DC (incl. ± 5% residual ripple)	
Residual ripple		± 5% of U_B	
Open-circuit current		≤ 35mA	
Analog output	…/C…	1 analog output 4 … 20mA	
	…/V…	1 analog output 0 … 10V	
Load resistance		Current output: R_L ≤ 500Ω, Voltage output: R_L ≥ 2kΩ	
Characteristic curve adjustment		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	
Analog output error signal		Distance too small: approx. 3.8mA, Distance too large: approx. 11V / approx. 21mA	
Indicators			
Yellow LED		Analog OUT: object detected	
Yellow and green LEDs flash		Teach-in / teaching error	
Green LED		Object within the scanning range	
Mechanical data			
Housing		Plastic (PBT)	
Active surface		Epoxy resin, glass fiber reinforced	
Weight		65g	
Ultrasonic transducer		Piezoceramic [6]	
Connection type		M12 connector, 4-pin	
Fitting position		Any	
Environmental data			
Ambient temp. (operation/storage)		-20° … +70°C/-20° … +70°C	
Protective circuit [7]		1, 2, 3	
VDE protection class		III	
Degree of protection		IP 67	
Standards applied		EN 60947-5-2	
Certifications		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)

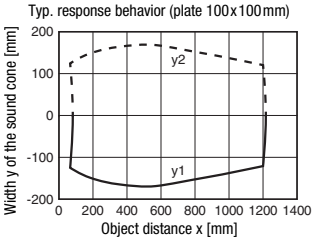
Diagrams

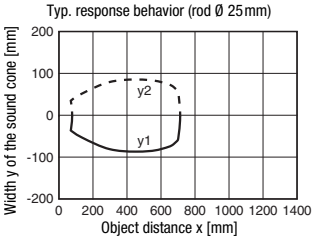
DMU318-300/…-M12

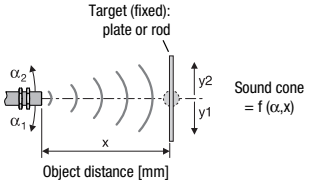




DMU318-1200/…-M12







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

Scanning range in mm

300	40 … 300
1200	80 … 1200

Equipment (optional)

.3	Teach button on the sensor

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

Connection technology

M12	M12 connector, 4-pin

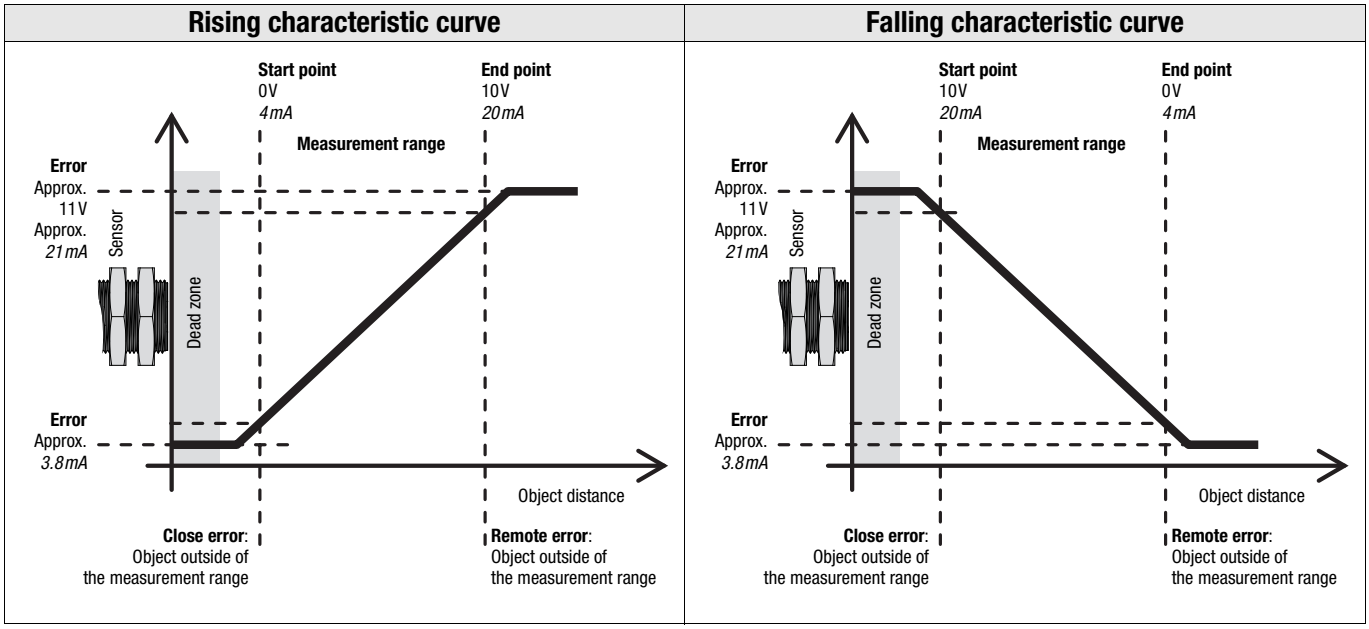
Order guide

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.