microsonic
Ultrasonic Sensors

A comprehensive solution for industrial applications

ULTRASONIC SENSORS

Extract from our online catalogue:

Ics+ ultrasonic sensors

Current to: 2015-01-12

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The new lcs+ ultrasonic sensors come in a very compact square-shaped housing - with analogue or switching output + IO-Link.

Highlights

- **Very compact housing dimensions :::** *only 62.2 mm x 62.2 mm x 36.7 mm*
- **IO-Link interface :::** *for support of the new industry standard*
- **Synchronisation and multiplex mode :::** *for simultaneous operation of up to ten sensors in close quarters*
- **8 m maximum detection range**

Basics

- **1 Push-Pull switching output, or 2 pnp switching outputs**
- **Analogue output 4–20 mA and 0–10 V :::** *with automatic switching between current and voltage outputs*
- **microsonic Teach-in by using button T1 and T2**
- **0.18 mm to 2.4 mm resolution**
- **Temperature compensation**
- **9–30 V operating voltage**
- **LinkControl :::** *for configuration of sensors from a PC*

Description

The Ics+ ultrasonic sensors

have a block-like plastic housing with a base area of only 62.2 x 62.2 mm and four fastening bores.

Two dual colour LEDs

show all operating statuses.

Three output stages are available for selection:

1 Push-Pull switching output with
pnp or npn switching technology

2 pnp switching outputs

1 analogue output 4–20 mA
or 0–10 V

Using the two Teach-in buttons T1 and T2

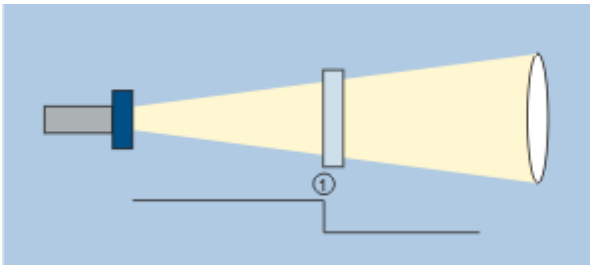
the Ics+ sensors can be easily set.

The Ics+ sensors with switching output have three operating modes:

- Single switching point
- Two-way reflective barrier
- Window mode

Teach-in of a single switching point

- Place object to be detected (1) at the desired distance
- Push button T1 for about 3 seconds
- Then push button T1 again for about 1 second

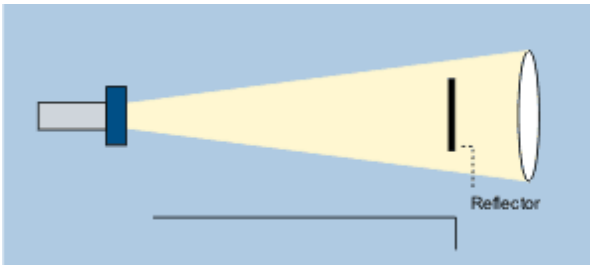


Teach-in of a switching point

Teach-in of a two-way reflective barrier

with a fixed mounted reflector

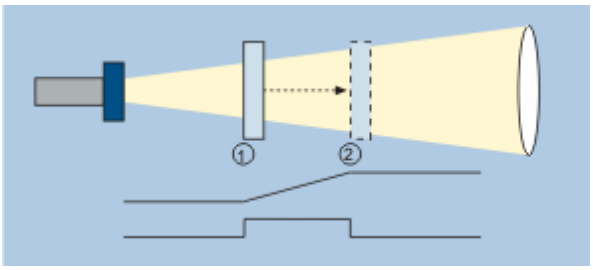
- Push button T1 for about 3 seconds
- Then push button T1 again for about 10 seconds



Teach-in of a two-way reflective barrier

For setting the analogue output

- Initially position the object to be detected to the sensor-close window limit (1)
- Push button T1 for about 3 seconds
- Then move the object to the sensor-distant window limit (2)
- Then push button T1 again for about 1 second



Teach-in of an analogue characteristic or a window with two switching points

For configuration of a window

with two switching points on a single switched output, the procedure is the same as setting the analogue.

Analogue sensors

check the connected working resistance at the output and automatically switch to 4–20 mA current output or 0–10 V voltage output.

NCC/NOC

and rising/falling analogue characteristics can also be set via the buttons.

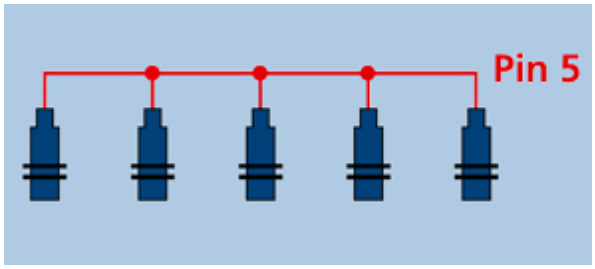
LinkControl

permits comprehensive parameterisation of lcs+ ultrasonic sensors via the LinkControl adapter LCA-2 which connects the sensors to the PC.

Sensor connected to the PC via LCA-2 for programming

Easy to synchronise

If several lcs+ ultrasonic sensors are operated in one application, the can be synchronised via pin 5 to prevent.



Synchronisation using pin 5

If more than 10 sensors must be synchronised, this can be carried out with the SyncBox1, which is available as an accessory. Synchronisation via pin 5 is also possible in IO-Link mode.

IO-Link

Ultrasonic sensors lcs+340/F and lcs+600/F have a Push-Pull switching output and support IO-Link in version 1.0.

Keep your eyes open in data communications!

IO-Link: The new standard at the fieldbus level

The IO-Link interface in the Ics+ sensors gives you everything you need to implement continuous communication on all levels of the system architecture, right down to the sensor. In this way, both machinery and equipment can be run in a more productive manner. IO-Link can enormously simplify the startup and maintenance of either a machine or appliance.

IO-Link in detail

Following every switch-on, Ics+ is in SIO mode (Standard-Input-Output mode) and functions just like any normal ultrasonic proximity switch with Push-Pull output stage.

With the wake-up signal, an IO-Link-enabled controller can transfer the Ics+ into the communication or IO-Link modes. The controller can now exchange both process and service data with the Ics+.

An IO-Link master can have one or a number of inputs and outputs. Only one IO-Link device is attached at each input/output. A standard 3-wire cable joins up the sensors and actuators. This non-shielded line can be up to 20 metres in length.

Mixed operation is possible thanks to complete compatibility with SIO mode: at a master, a number of sensors and actuators can be run in the IO-Link and others in the SIO mode.

Continuous communication permits process/service data to be transmitted between sensors/actuators and the controller.

An IO-Link system consists of IO-Link devices – mainly sensors, actuators or combinations of them – a standard 3-wire sensor/actuator cable and an IO-Link master.

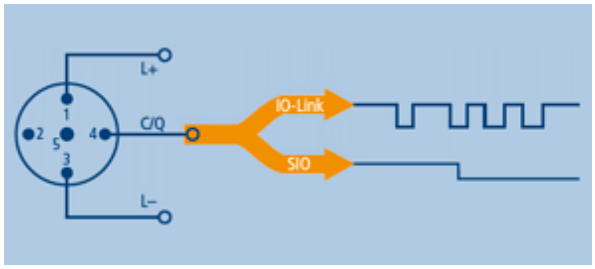
More information on the IO-Link can be found in www.io-link.com

The advantages of IO-Link:

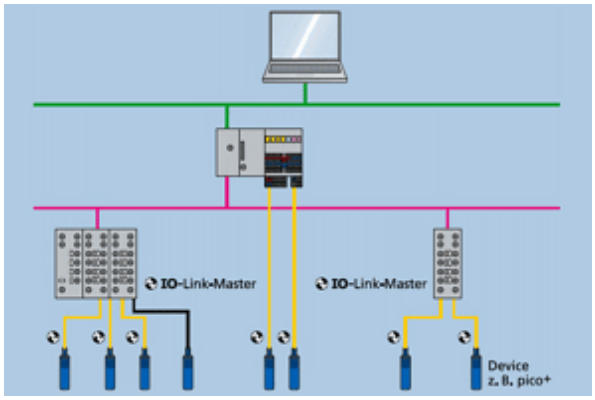
- In the IO-Link mode the distances measured are cyclically transmitted to the master; thus the IO-Link mode can replace an analogue output at no significant expense!
- Following a sensor failure, the controller can automatically re-load all the settings into the new sensor.
- Reduction in planning outlay achieved from a standardised integration of devices into the controller via a

manufacturer-independent IODD description file

- Reduced startup times thanks to a centralized provision of data and parameters in the controller
- Greater equipment availability levels coming from maximum transparency and system-wide diagnosis all the way down into the device itself



Push-Pull output stage permits switching from SIO mode to IO-Link mode



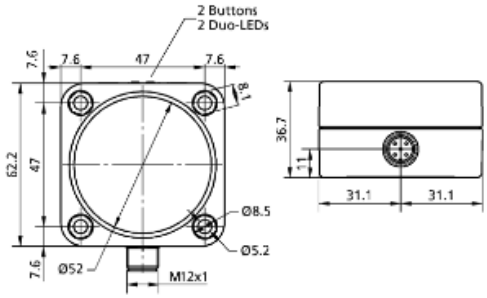
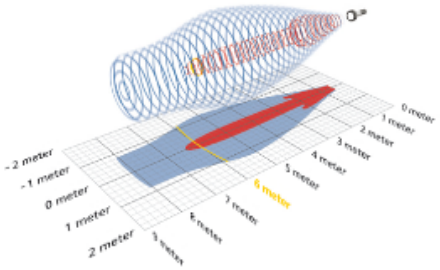
Example of the system architecture

Product name	lcs+
Baud rate	COM 2 (38,400 Bd)
Format of process data	16 Bit, R, UNI16
Content of process data	Bit 0: Q1 switch status; bits 1-15: Distance value with a resolution of 0.1 mm
ISDU parameter	Switch point 1, return detect point 1, switch point 2, return detect point 2, foreground suppression, (NC/NO) operation, filter, filter strength, switching delay, interference noise suppression,
System commands	activation/deactivation of teach-in on pin 5 teaching a switch point, teaching switch point + 8%, teaching a reflective barrier, loading factory settings

Common IO-Link-specific data

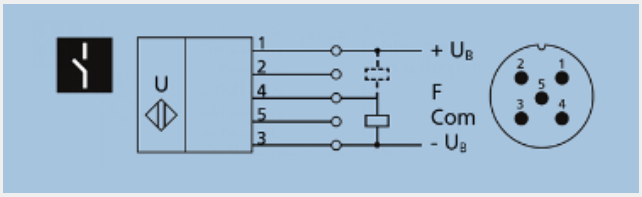
Download IO-Link IODD library

lcs+600/F

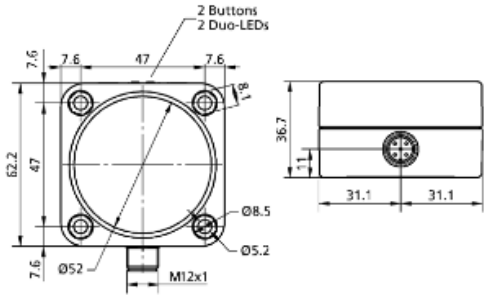
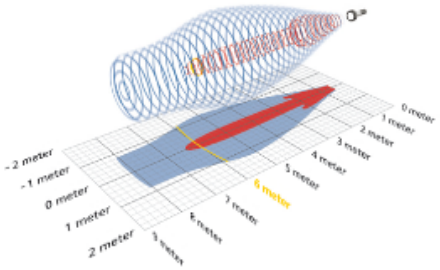
scale drawing	detection zone
	

1 x Push-Pull	**8,000 mm**
operating range	600 - 6,000 mm
design	cuboidal
operating mode	proximity switch/reflective mode reflective barrier window mode
particularities	IO-Link
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	80 kHz
blind zone	600 mm
operating range	6,000 mm
maximum range	8,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA
type of connection	5-pin M12 initiator plug

lcs+600/F

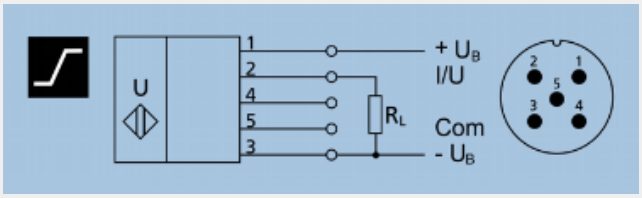
outputs	
output 1	Schaltausgang Push-Pull, U_B-3 V, -U_B+3 V,I_{max} = 100 mA
switching frequency	3 Hz
response time	240 ms
delay prior to availability	< 450 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	240 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl IO-Link
synchronization	yes
multiplex	yes
indicators	2 x three-colour LED
particularities	IO-Link
documentation (download)	
pin assignment	

lcs+600/IU

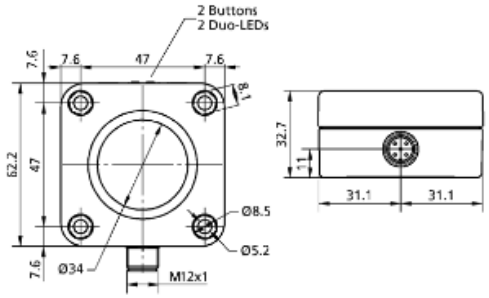
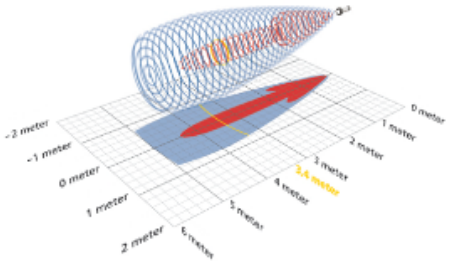
scale drawing	detection zone
	

1 x analogue 4-20 mA + 0-10 V	8,000 mm
operating range	600 - 6,000 mm
design	cuboidal
operating mode	analogue distance measurements
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	80 kHz
blind zone	600 mm
operating range	6,000 mm
maximum range	8,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm to 2.4 mm, depending on the analogue window
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA
type of connection	5-pin M12 initiator plug

lcs+600/IU

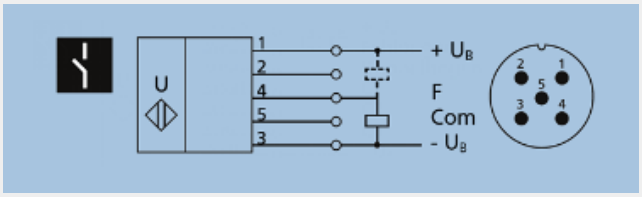
outputs	
output 1	analogue output current: 4-20 mA / voltage: 0-10 V (at U_B ≥ 15 V), short-circuit-proof switchable rising/falling
response time	240 ms
delay prior to availability	< 450 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	240 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl
synchronization	yes
multiplex	yes
documentation (download)	
pin assignment	

lcs+340/F

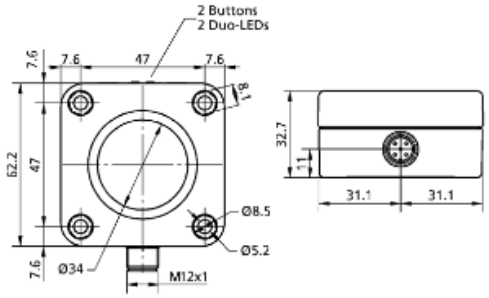
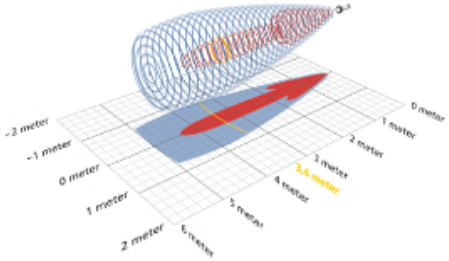
scale drawing	detection zone
	

1 x Push-Pull	5,000 mm
operating range	350 - 3,400 mm
design	cuboidal
operating mode	proximity switch/reflective mode reflective barrier window mode
particularities	IO-Link
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	120 kHz
blind zone	350 mm
operating range	3,400 mm
maximum range	5,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA
type of connection	5-pin M12 initiator plug

lcs+340/F

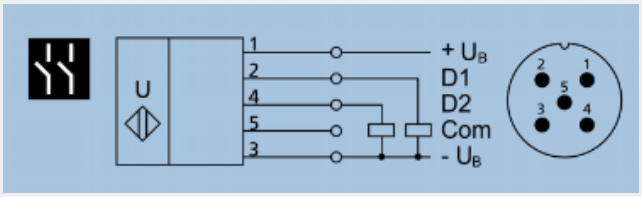
outputs	
output 1	Schaltausgang Push-Pull, U_B-3 V, -U_B+3 V,I_{max} = 100 mA
switching frequency	4 Hz
response time	172 ms
delay prior to availability	< 380 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	180 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl IO-Link
synchronization	yes
multiplex	yes
indicators	2 x three-colour LED
particularities	IO-Link
documentation (download)	
pin assignment	

lcs+340/DD

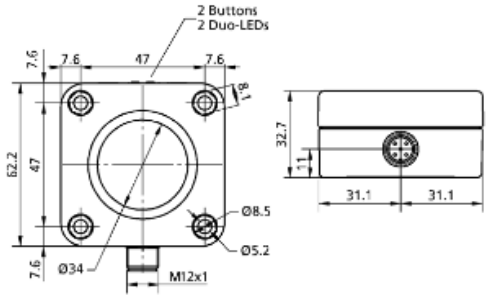
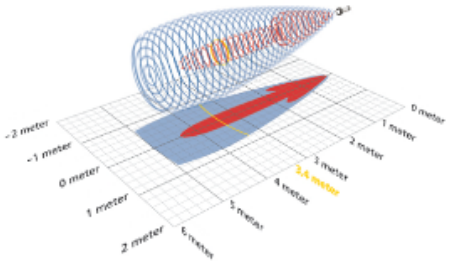
scale drawing	detection zone
	

2 x pnp	**5,000 mm**
operating range	350 - 3,400 mm
design	cuboidal
operating mode	proximity switch/reflective mode reflective barrier window mode
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	120 kHz
blind zone	350 mm
operating range	3,400 mm
maximum range	5,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA

lcs+340/DD

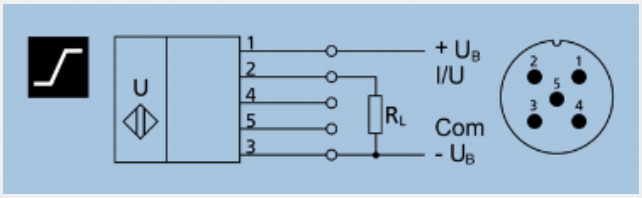
outputs	
output 1	switching output pnp: I_{max} = 200 mA (U_B-2V) NOC/NCC adjustable, short-circuit-proof
output 2	switching output pnp: I_{max} = 200 mA (U_B-2V) NOC/NCC adjustable, short-circuit-proof
switching hysteresis	50 mm
switching frequency	4 Hz
response time	172 ms
delay prior to availability	< 380 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	180 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl
synchronization	yes
multiplex	yes
indicators	2 x three-colour LED
documentation (download)	
pin assignment	

lcs+340/IU

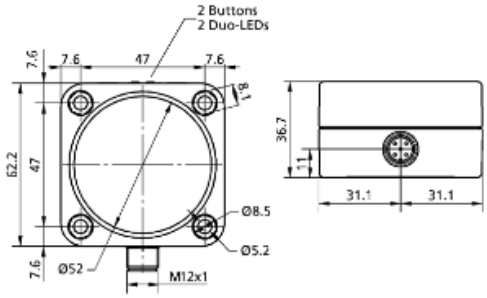
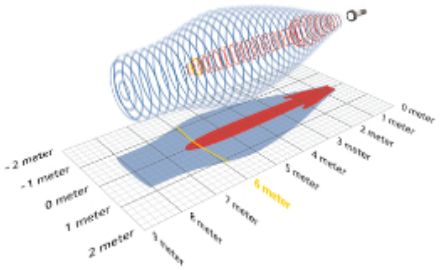
scale drawing	detection zone
	

1 x analogue 4-20 mA + 0-10 V	5,000 mm
operating range	350 - 3,400 mm
design	cuboidal
operating mode	analogue distance measurements
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	120 kHz
blind zone	350 mm
operating range	3,400 mm
maximum range	5,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm to 1.5 mm, depending on the analogue window
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA
type of connection	5-pin M12 initiator plug

lcs+340/IU

outputs	
output 1	analogue output current: 4-20 mA / voltage: 0-10 V (at U_B ≥ 15 V), short-circuit-proof switchable rising/falling
response time	172 ms
delay prior to availability	< 450 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	180 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl
synchronization	yes
multiplex	yes
documentation (download)	
pin assignment	

lcs+600/DD

scale drawing	detection zone
	

2 x pnp	8,000 mm
operating range	600 - 6,000 mm
design	cuboidal
operating mode	proximity switch/reflective mode reflective barrier window mode
ultrasonic -specific	
means of measurement	echo propagation time measurement
transducer frequency	80 kHz
blind zone	600 mm
operating range	6,000 mm
maximum range	8,000 mm
angle of beam spread	please see graphics detection zone
resolution/sampling rate	0.18 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)
electrical data	
operating voltage U_B	9 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 60 mA
type of connection	5-pin M12 initiator plug

lcs+600/DD

outputs	
output 1	switching output pnp: I_{max} = 200 mA (U_B-2V) NOC/NCC adjustable, short-circuit-proof
output 2	switching output pnp: I_{max} = 200 mA (U_B-2V) NOC/NCC adjustable, short-circuit-proof
switching hysteresis	100 mm
switching frequency	3 Hz
response time	240 ms
delay prior to availability	< 450 ms
inputs	
input 1	com input synchronisation input
housing	
material	PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	240 g
technical features/characteristics	
temperature compensation	yes
controls	2 push-buttons
scope for settings	Teach-in via push-button LCA-2 with LinkControl
synchronization	yes
multiplex	yes
indicators	2 x three-colour LED
documentation (download)	
pin assignment