$599.00

Import charges included

up to 4 x $149.75 with no interest

$20.00 off orders over $159.00

Lightware LW20 / C 100m LiDAR sensor obstacle avoidance and ultra small waterproof

by Ailanda China Store (4.3 | 379 sold)

Color: LW20C

Specifications

Power Source	Other	Inbox adaptor	No
Hign-concerned Chemical	None	Communication method	other
Model Number	Lightware LW20/C	Brand Name	FDROBOT
Power Source	Other	Origin	Mainland China
Certification	CE,FCC,RoHS,UL		

Description

The LW20 is a small size, 100 meter range, laser sensor suitable for small unmanned aerial vehicles and self driving vehicles in an IP67 shell. It includes driver hardware and software for controlling servo driven LiDAR scanners for sensing and avoidance applications.

The maximum measurement range of the LW20 exceeds 100 meters, making it an ideal laser altimeter for small unmanned aerial vehicles. Its weight, size, and power consumption are crucial. For terrain tracking, both the first and last return signals are available, so the drone can track the top of the tree and simultaneously measure the height on the ground.

By adding a small digital servo, the LW20 can be transformed into a miniature LiDAR that can capture 388 points per second while scanning the area in front of the autonomous vehicle. Ideal for sensing, avoidance, and navigation, the LW20 can stream measurement data or make decisions based on preset alarms.

	Range [m]	Update rate [/sec]	Interfaces	Beam type	Features	Mechanical [mm] [g]
 SF11/C	0.2...100	20	TTL serial, I2C & analog	single	long range	30x56x50 35
 SF11/B	0.2...50	40	TTL serial, I2C & analog	single	general purpose	30x56x50 35
 SF30/C	0.2...100	20...20000	TTL serial, I2C & analog	single	high speed long range	30x56x50 35
 SF30/B	0.2...50	20...20000	TTL serial, I2C & analog	single	high speed	30x56x50 35
 LW20/C	0.2...100	20...500	TTL serial or I2C	single	small size long range	19x30x35 20
 SF20/C	0.2...100	20...500	TTL serial or I2C	single	OEM module	19x30x32 10
 LW20/B	0.2...50	20...500	TTL serial or I2C	single	small size	19x30x35 20
 SF20/B	0.2...50	20...500	TTL serial or I2C	single	OEM module	19x30x32 10
SF40/C	0.3...100	20000	TTL serial	single beam 360 degree scanning	collision sensing	79dia x91 270

The LW20 can be used as an altimeter on multi-copter drones to measure the exact height above ground level or to set off alarms when the ground gets too close.

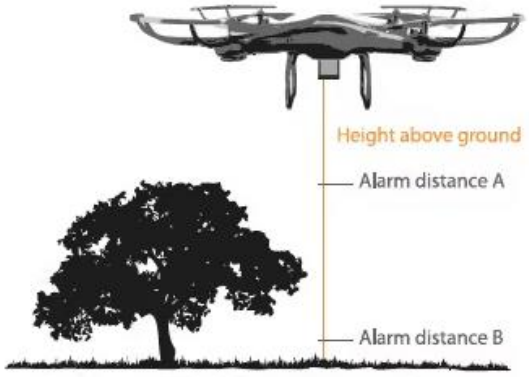


Figure 1 :: Measuring exact height above ground

With a servo attached, the LW20 becomes a low cost, lightweight collision avoidance sensor.

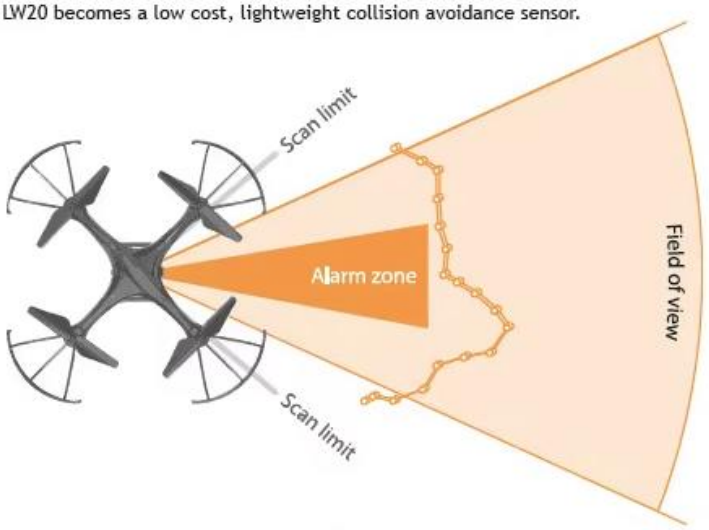
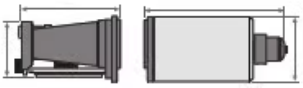


Figure 2 :: Collision avoidance zones

There are two models available, the LW20 and the SF20. The LW20 is a sealed unit suitable for outdoor applications. It can easily be added onto existing products.
The SF20 is an open unit suitable for clean and dry applications or as an OEM component that is built-in as standard equipment.

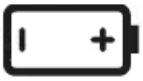


The LW20 housing measures 20 mm x 30 mm x 35 mm.
The SF20 assembly measures 20 mm x 30 mm x 32 mm.

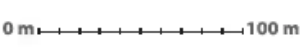
The LW20 is waterproof to IP67 standard. It can be submerged in water to a depth of 1 m for 15 minutes and is protected against dust ingress.
Please note that the SF20 is not waterproof.

The LW20 weighs less than 20 grams (excluding cables). This makes it ideal for applications where the low weight and small size are important.
The open frame SF20 weighs less than 10 grams. Use this module when low mass is the defining specification.

The power supply, communications and servo driver signals are connected to the LW20/SF20 using the built-in cable.
The cable has a shield that should be earthed to reduce electrical interference.



The power supply voltage must be between 4.5 V and 5.5 V and the LW20 draws about 110 mA while measuring.
It is good practice to make sure that the power supply is able to deliver more current than need and to make sure that the voltage is stable and clean from spikes.



The LW20 has a maximum measuring range of 100 m with a resolution of 1 cm. The accuracy of each measurement is ±10 cm.

New measurements are updated at a preset rate from a slowest of 48 readings per second to a maximum of 388 readings per second.
The slower speed measurements give better measuring range and are useful for laser altimeters or static distance measurements. The faster speed measurements are better for scanning applications when the LW20 is attached to a servo.

The LW20 uses a laser to take time-of-flight measurements. The laser is rated Class 1M. Do not view the laser with magnifying optics such as microscopes and telescopes.

When viewed from above, the lower PWM setting turns the servo shaft to the extreme left position and the higher PWM setting turns it to the extreme right. The midpoint position corresponds to the PWM value that is halfway between the two end settings.

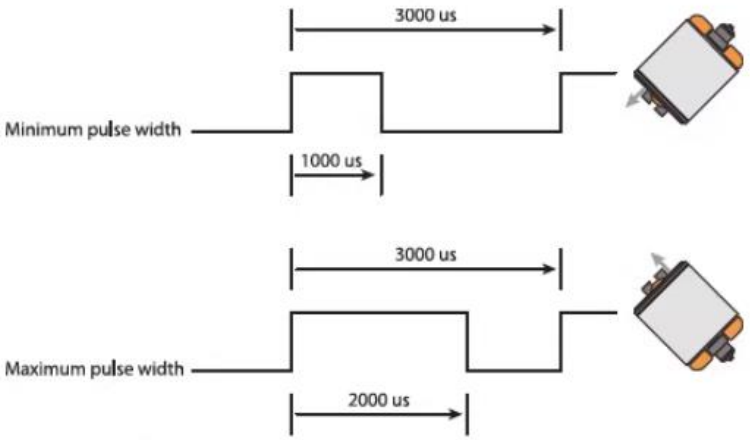


Figure 16 :: Setting the servo's limits of motion using the PWM values

For each degree of motion by the servo, the PWM pulse width needs to change by a specific number of us. This "PWM scale" can usually be found on the data sheet of the servo. Alternatively, you can measure how many degrees the servo moves for a 1000 us change in PWM pulse width and calculate the PWM scale from this result. The default scale value is 10.00 us per degree as shown in the picture below:

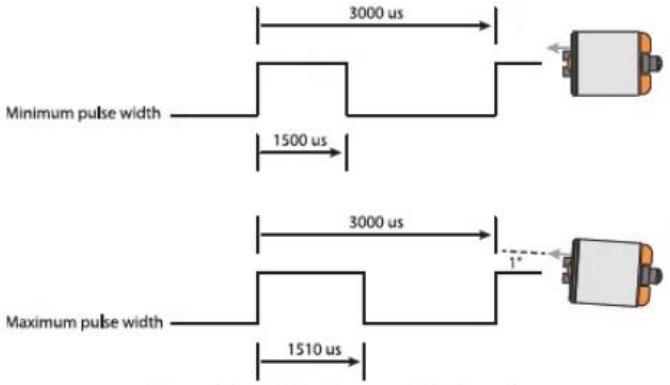


Figure 17 :: Setting the servo's PWM scale

Appendix A :: Dimension drawings

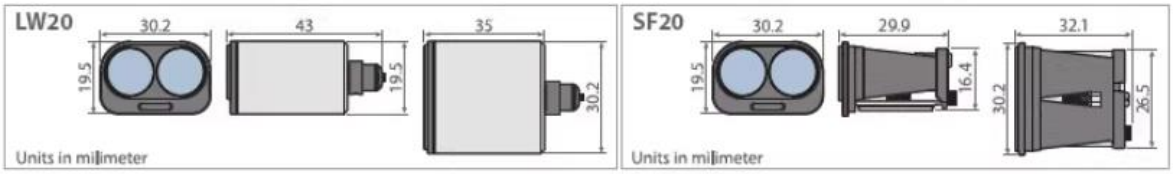


Figure 25 :: Dimension drawings of the LW20 and SF20

	LW20/*** (100 m)	SF20 (100 m)
Weight	20 g (excluding cables)	10 g (excluding cables)
Range	0 ... 100 m	
Resolution	1 cm	
Update rate	48 ... 388 readings per second	
Accuracy	±10 cm	
Outputs & interfaces	LW20/SER: 3.3 V and LW20/I2C: 3.3 V	Serial and I2C: 3.3 V
Power supply voltage	4.5 V ... 5.5 V	
Power supply current	110 mA	
Laser power	<2 mW	
Dimensions	19.5 mm x 30.2 mm x 35 mm, housing only 19.5 mm x 30.2 mm x 43 mm with cable gland	19.5 mm x 30.2 mm x 32.1 mm
Operating temperature	-30 .. +50°C	
Approvals	FDA: 1710193-000 (2017/02)	FDA: 1710193-000 (2017/02)
Housing	Aluminium, ABS plastic and glass	ABS plastic and glass
Optical aperture	28 mm x 15 mm	
Beam divergence	0.2°	
Lens material	Glass	
Connections	Wire tail, 5 core plus shield	
Enclosure rating	IP 67	N/A

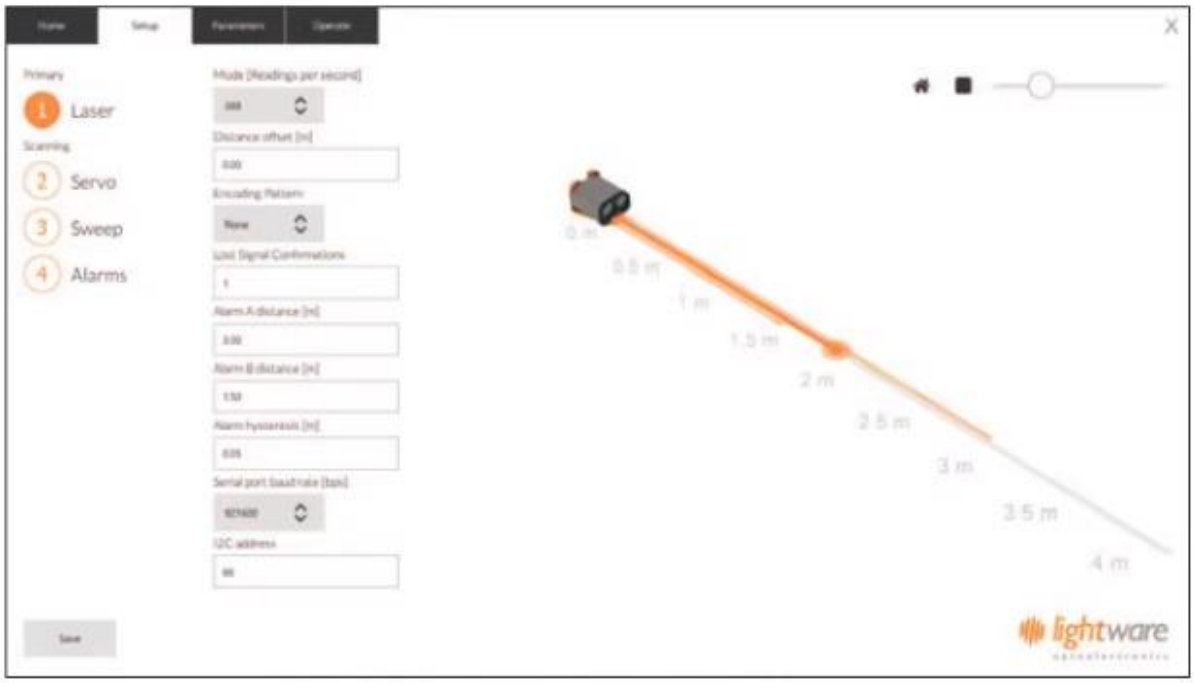


Figure 7 :: The graphical interface Setup screen

Figure 12 :: Arrangement of screens in terminal emulation mode

Figure 12 :: Arrangement of screens in terminal emulation mode

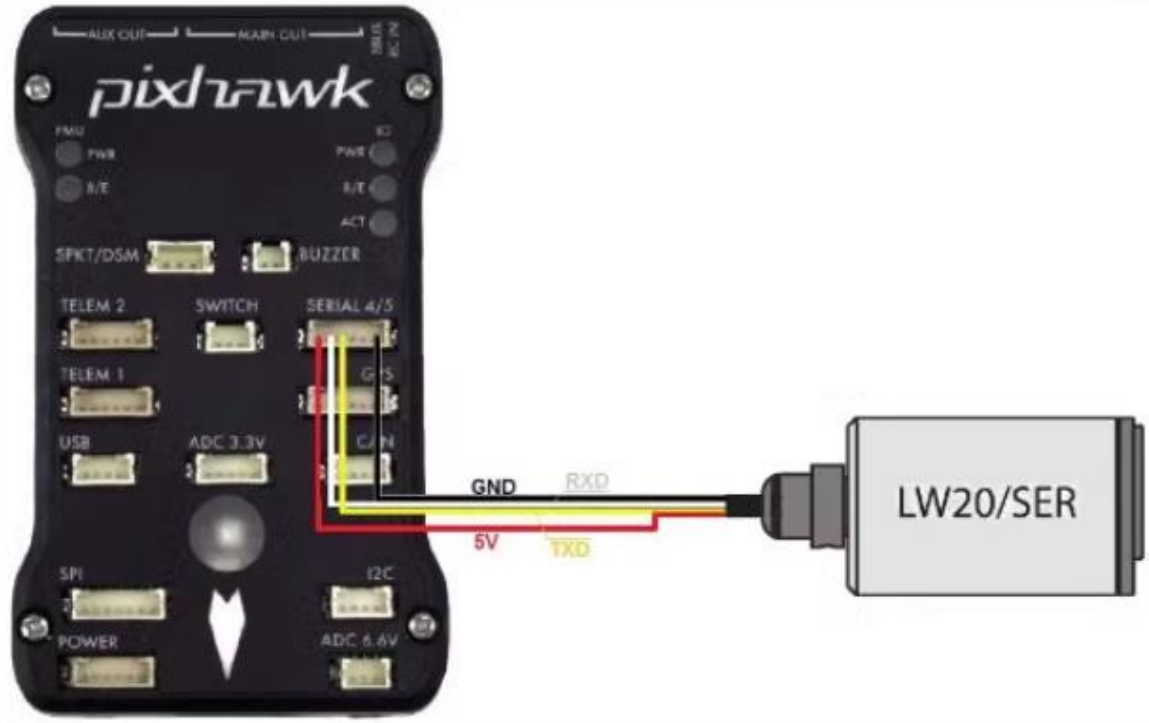
Figure 20 :: Reducing the field of view to avoid detecting the landing legs on a drone

For high precision scanning, the servo can be made to scan in one direction only. The resulting image has higher angular repeatability at the expense of increased power consumption by the servo when returning to the start of the scan. Switching from bi-directional to uni-direction scans is done using the "Scan type" selection box.

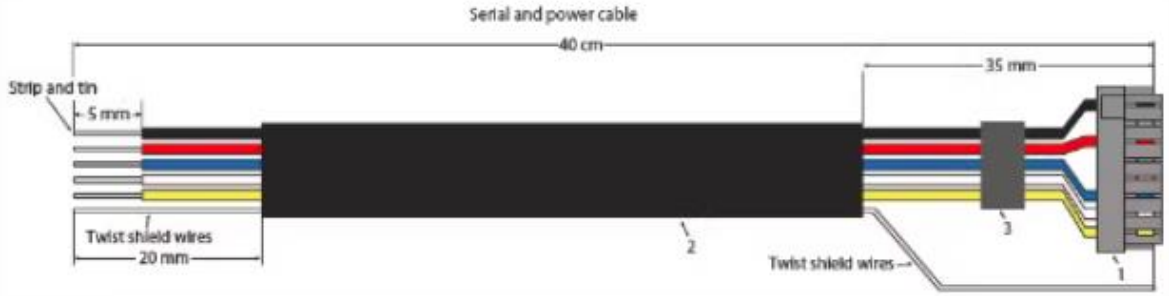
Serial connection

For a serial connection you can use any spare UART. Connect the RX line of the UART to the TX line of the Lidar, and the TX line of the UART to the RX line of the Lidar. Also connect the GND and 5V lines. You do not need flow control pins.

The diagram below shows how to connect to SERIAL4.



If using the caseless SF20 ensure the cable looks like below:



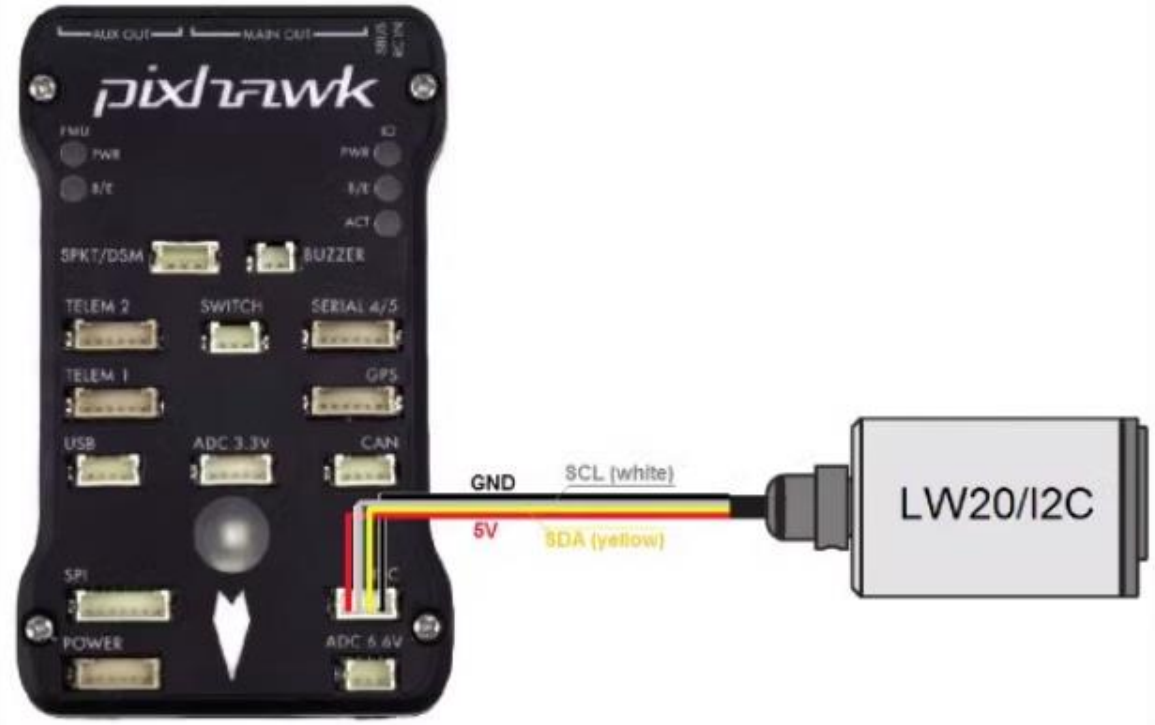
You then need to setup the serial port and rangefinder parameters. If you have used the SERIAL4/5 port on the Pixhawk then you would set the following parameters (this can be done using the *Mission Planner* **Config/Tuning | Full Parameter List** page):

- SERIAL4_PROTOCOL = 9 (Lidar)
- SERIAL4_BAUD = 115 (115200 baud)
- RNGFND_TYPE = 8 (LightWareSerial)
- RNGFND_SCALING = 1
- RNGFND_MIN_CM = 5
- RNGFND_MAX_CM = **9500**. *This is the distance in centimeters that the rangefinder can reliably read.*
- RNGFND_GNDCLEAR = 10 *or more accurately the distance in centimetres from the range finder to the ground when the vehicle is landed. This value depends on how you have mounted the rangefinder.*

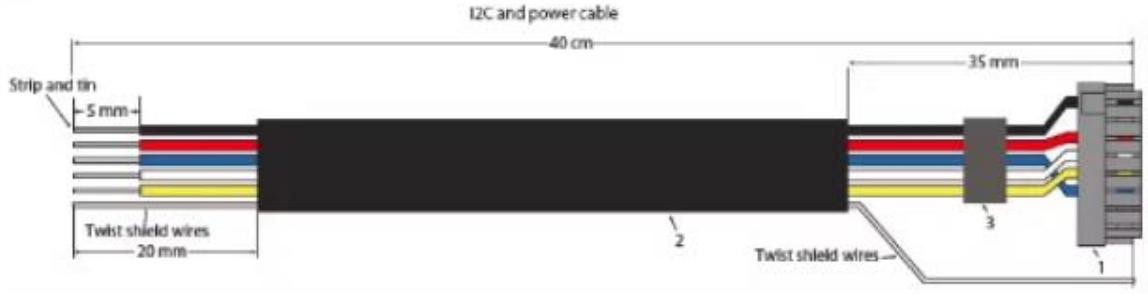
If you instead were using the Telem2 port on the Pixhawk then you would set SERIAL2_PROTOCOL = 9, and SERIAL2_BAUD = 19200

I2C connection

Connect the SDA line of the Lidar to the SDA line of the I2C port on the Pixhawk, and the SCL line of the Lidar to the SCL line of the I2C port. Also connect the GND and 5V lines.



If using the caseless SF20 ensure the cable looks like below:



You then need to configure the rangefinder parameters as shown below (this cn be done suing the *Mission Planner* **Config/Tuning | Full Parameter List** page):

- RNGFND_TYPE = 7 (LightWareI2C)
- RNGFND_ADDR = 102 (I2C Address of lidar in decimal). *Note that this setting is in decimal. The default address is 0x66 hexademical which is 102 in decimal.*
- RNGFND_SCALING = 1
- RNGFND_MIN_CM = 5
- RNGFND_MAX_CM = **9500**. *This is the distance in centimeters that the rangefinder can reliably read.*
- RNGFND_GNDCLEAR = 10 *or more accurately the distance in centimetres from the range finder to the ground when the vehicle is landed. This value depends on how you have mounted the rangefinder.*