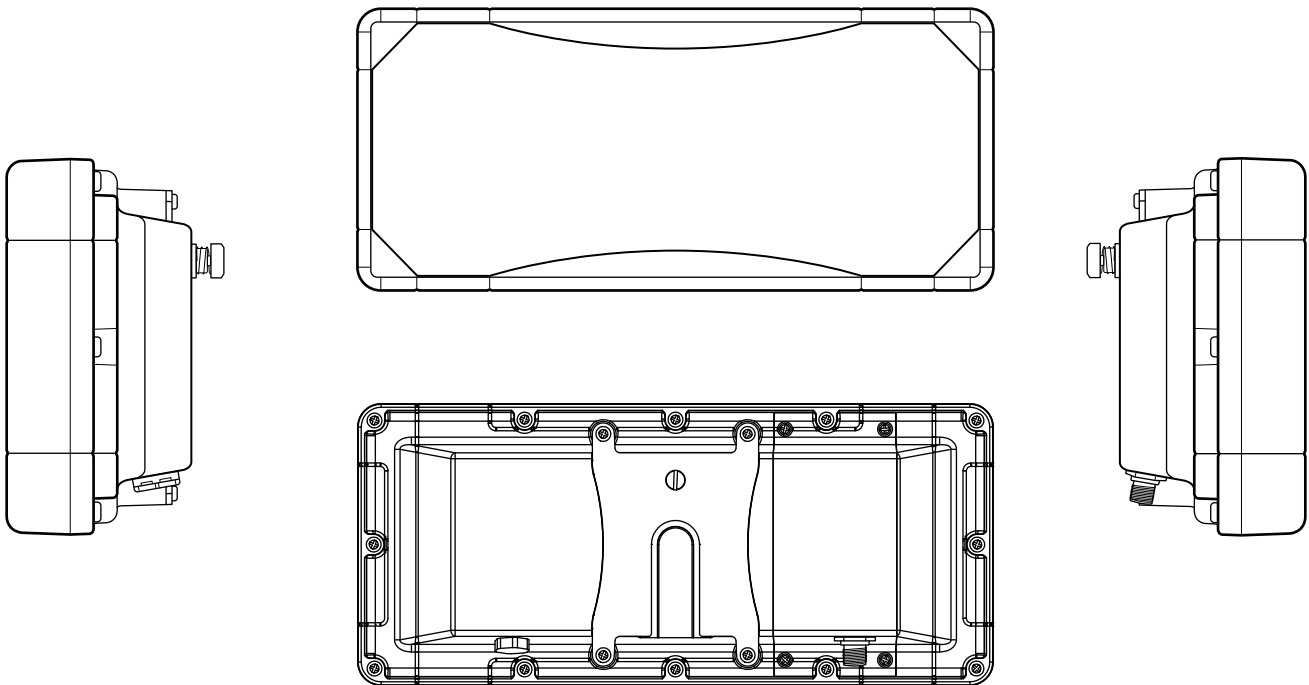


## Side-fire ITS radar sensor

Wavetronix' latest system is a whole new way to look at radar detection. Pair the Expanse XP20 sensor with the Expanse Arc and Expanse desktop software so that you can see and configure all your sensors from your computer. New applications, released periodically, help you get the most from your data.



- Part of the new Expanse system: connect it to an Expanse Arc and use the Expanse software to take advantage of all the great features of the system
- Native IP device: put it on your network and use the software to interact with all the sensors on your system
- Field-replaceable surge card means you can easily replace the surge protection in the field after a surge event
- Uses dual-beam radar to get the most accurate speed, presence, and length data
- Employs Wavetronix' industry-leading radar technology for the highest quality high-definition detection
- The patented auto-configuration process makes setup a snap
- Detects traffic, including lane-changing vehicles, in up to 22 lanes
- Features a GPS receiver for geo-referencing the sensor
- All-weather, all-condition performance



## XP20 technical specifications

### Physical properties

- Weight: 3.0 lbs (1.6 kg)
- Dimensions: 13.3 in. × 5.9 in. × 3.2 in. (33.8 cm × 15 cm × 8.1 cm)
- Enclosure:
  - Lexan EXL polycarbonate
  - Resistant to corrosion, fungus, moisture deterioration, and ultraviolet rays
  - Outdoor weatherable: UL 746C rated
  - Withstands 5-ft. (1.5-m) drop
  - Housing withstands wind loads exceeding 120 mph
  - Watertight by NEMA 250 standard
  - Connector: M12 T-code male connector
- Accelerometer detects abnormalities in sensor position and mounting
- GPS receiver for georeferencing/locating sensor
- Magnetometer for sensor direction
- Included components:
  - XP20 Surge field-replaceable surge card (installed)
  - Cable connector (needed to terminate the sensor cable)

### Radar design

- Type of radar: Dual-beam
- No manual tuning to circuitry
- Uses frequency modulated continuous wave (FMCW) radar
- Operating frequency: 24.0–24.25 GHz (K-band)
- Transmit bandwidth: 245 MHz
- Bandwidth stable within 1%
- Un-windowed resolution: 2 ft. (0.6 m)
- Antennas:
  - Printed circuit board antennas
  - Vertical 6 dB beam width (two-way pattern): 65°
  - Horizontal 6 dB beam width (two-way pattern): 6°
  - Two-way sidelobes: -40 dB
  - Gain: 14 dB
  - EIRP: 18.1 dBm
- RF channels: 4
- No temperature-based compensation necessary

### Detection area

- Detection range: 6 to 250 ft. (1.8 m to 76.2 m)
- Number of lanes: up to 22
- Any lane spacing is supported
- Detection over barriers is supported

### Measured quantities

- Per-lane interval data:
  - Volume
  - Average speed

## Ordering information

XP20  
**101-0451**

### Optional accessories (sold separately)

**102-0482** – XP20 Surge

**101-0457** – Expanse Sensor Mount

**101-0461** – Expanse 36-Inch Mount

**101-0468/0469/0470** – Expanse Link Cable, 5000'/1000'/500' spool

**101-0463/0464/0465** – Expanse Link S Cable, 5000'/1000'/500' spool

**102-0555** – M12-T Cable Junction Box

### Contact us

801.734.7200  
sales@wavetronix.com  
www.wavetronix.com

- Occupancy
- Classification counts
- 85th percentile speed
- Average headway
- Average gap
- Speed bin counts
- Direction counts
- Per-vehicle data:
  - Speed
  - Length
  - Class
  - Lane assignment
  - Range
- Presence data in 22 lanes
- Classification bins: 8
- Interval speed bins: 15

### Data protocols

- Protocol support for:
  - Interval data
  - Event data
  - Presence data

- Interval data for each lane:

- Station ID
- Timestamp
- Volume
- Average speed
- Occupancy
- Classification counts
- Speed bin counts
- Direction counts
- Average headway
- Average gap
- 85th percentile speed

- Event data for each detection:

- Station ID
- Timestamp
- Lane assignment
- Speed
- Length
- Class
- Range

- Presence data for each lane:

- Sensor ID
- Per-lane presence

- Data protocol document available free of charge

## Power

- Power consumption: 9 W (at maximum cable length), 8 W (typical)
- Operating voltage: 37.2–60 VDC
- Onboard, field-replaceable surge protection

## Communication

- Ethernet speed: 10/100 Mbps
- Communicates to cabinet via Ethernet over single twisted pair
- Firmware upgradability over the Ethernet port

## Configuration

- Graphical user interface with traffic pattern display
- Auto-configuration of lanes/detection zones:
  - Internal to the sensor
  - Uses positions of the vehicles
  - Based on probability density function estimation
- Manual configuration supported
- Lane boundary increment: 1 ft. (0.3 m)
- Pointing assistant for horizontal alignment
- Supported operating systems:
  - Windows 7
  - Windows 8
  - Windows 10
- Software-supported functionality:

- TCP/IP connectivity
- Sensor configuration back-up and restore
- Virtual sensor connections

## Data buffering

- Intervals timestamped using NTP synchronized clock

## Manufacturing

- Manufactured in the USA
- Surface mount and wave solder assembly
- Operational testing:
  - Sub-assembly test
  - 48-hour unit level burn-in
  - Final unit test (unit test results available)
- IPC-A-610C Class 2–compliant

## Testing

- NEMA:
  - NEMA TS 2-2016
  - NEMA 250 type 4X-compliant
- FCC:
  - Part 15, Subpart B (47 CFR15)
  - 47 CFR Part 15 Subpart C 15.249
  - ISSED RSS-210
  - FCC regulation—compliant for life of the sensor
  - FCC certification on product label
- CE:
  - EN 55032:2015
  - AS/NZS CISPR 32:2015
  - IEC 62368-1:2018
  - ETSI EN 300 400 V2.2.1 (2018-07)
- Testing documentation available upon request

## Operating conditions

- Ambient operating temperature: -29.2°F to 165°F (-34°C to 74°C)
- Humidity: up to 95% RH (non-condensing)
- Accurate performance in:
  - Rain up to 2 in. (5.08 cm) per hour
  - Freezing rain
  - Dry and moist snowfall
  - Wind
  - Dust
  - Fog
  - Changing temperature
  - Changing lighting (even direct light on sensor at dawn and dusk)
  - Ice and dry snow buildup up to 0.2 in. (0.5 cm) on sensor front
- Resumes vehicle detection automatically after resumption of power

**Performance**

- Per-direction volume accuracy:
  - Typical: 98%–99%
  - Minimum: 95%
- Per-lane volume accuracy:
  - Typical: 98%–99%
  - Minimum: 90%
- Classification accuracy:
  - Typical: 90%
  - Minimum: 80%
- Percentage of vehicles generating per-vehicle speed measurements:
  - Typical: 98%
  - Minimum: 95%
- Per-direction average speed accuracy:  $\pm 3$  mph (5 kph)
- Per-lane average speed accuracy:  $\pm 3$  mph (5 kph)
- Per-vehicle speed measurement accuracy:  $\pm 3$  mph (5 kph) for 90% of measurements
- Method of speed measurement: dual radar speed trap
- Per-direction occupancy accuracy:  $\pm 10\%$
- Per-lane occupancy accuracy:  $\pm 20\%$
- Minimum separation between two vehicles: 5.5 ft. (1.67 m)

**Maintenance**

- No cleaning or adjustment necessary
- No battery replacement necessary
- No recalibration necessary
- Mean time between failures: 10 years (estimated based on manufacturing techniques)

**Support**

- Training and tech support available
- Training includes:
  - Knowledgeable trainers
  - Presentation materials
  - Classroom and in-field instruction
  - Installation and configuration instruction to ensure accurate performance
  - Instruction in use of computer and other necessary equipment
  - Virtual configuration
- Tech support includes:
  - Technical representatives available for installation and

configuration

- Ongoing troubleshooting and maintenance support
- Documentation:
  - Installation guide
  - Configuration guide
  - Quick start guide

**Warranty**

- Five-year warranty against material and workmanship defect

*The advertised detection accuracy of the company's sensors is based on both external and internal testing, as outlined in each product's specification document. Although our sensors are very accurate by industry standards, like all other sensor manufacturers we cannot guarantee perfection or assure that no errors will ever occur in any particular applications of our technology. Therefore, beyond the express Limited Warranty that accompanies each sensor sold by the company, we offer no additional representations, warranties, guarantees or remedies to our customers. It is recommended that purchasers and integrators evaluate the accuracy of each sensor to determine the acceptable margin of error for each application within their particular system(s).*