ARS 430 FM - FlexMount
Long Range Radar Sensor 77 GHz

Object Detection – Auto Calibration – Flexible Mounting
Designed for Moving Vehicles – CAN Interface

- **Maximum Detection Range:** 250 m up to 1200 m
- **Azimuth Coverage:** ±60 ° near range, ±9 ° far range
- **Velocity Range:** -400 km/h ... +200 km/h
- **Communication Interface:** CAN-HS, 500 kbps / 1 Mbps
- **Cycle Time:** ~72 ms
- **Power Supply:** 12 V / 24 V
- **Power Consumption:** 6.6 W / 550 mA
- **Operating Temperature:** -40 °C ... +85 °C
- **Size:** 138 x 91 x 31 mm
- **Weight:** ~ 300 g
- **Robust Housing:** IP 6k 9k

Features

- **Flexible Mounting:** The ARS 430 FM radar can be mounted in any direction (front, rear, side, corner). With input of speed and yaw rate the radar can properly track moving and stationary objects.
- **Auto Calibration:** The auto calibration feature allows the sensor to detect and compensate deviations between configured mounting angle and actual mounting angle.
- **Object Detection:** The high-performance object detection of the ARS430 FM includes object tracking, object validation and classification of cars, trucks, motorcycles, bicycles, and pedestrians.
- **CAN Interface:** The high-speed CAN interface of the ARS430 FM can be configured to 500 kbps or 1 Mbps depending on the external system requirements. A maximum output of up to 100 tracked objects is possible.
- **Object Filtering:** The ARS 430 FM offers various filter options for the object output. The integrated 4-point polygon filter allows a flexible “area of interest” definition to filter out irrelevant objects.

  With additional filter settings, it is possible to filter out further objects with defined properties like velocity, classification, or radar cross section. These filters can be used to reduce the required CAN bus load of a single ARS 430 FM sensor.
- **Area Monitoring:** The radar can monitor up to 8 configurable polygon areas and provides a warning signal in case an object is detected inside these areas.
- **Multi Sensor Setup:** Up to 8 sensors can be set up for operation in the same CAN network without message collision. With the 360 ° flexible mounting on a vehicle, the tracked objects from multiple sensors can directly be output in the same vehicle coordinate system.

Input Data

- **Ego Vehicles Speed and Yaw Rate:** Required input signals to support proper object tracking for sensor usage on moving vehicles
- **Mounting Configuration:** Supports different sensor positions and angles
- **Filter Configurations:** Support of multiple object properties
- **Polygon Filter:** Configuration for flexible area filtering
- **Area Monitoring:** Configuration with polygon zones
- **Sensor Configuration:** Output settings like baud rate, switching off messages, maximum detection range and object sorting

Output Data

- **Sensor Status:** Message including error signals
- **Tracked Objects:** Information including position, velocity, acceleration, radar cross section, classification, and more for up to 100 tracked objects
- **Auto Calibration:** Status and misalignment angles
- **Area Warning:** Output for different zones and objects

Measurement Performance

Measuring performance	Comment	to natural targets (non-reflector targets)
Distance range		0.20 ...250 m far range, 0.20...70m/100m@0…±45° near range and 0.20…20m@±60° near range
Resolution distance measuring	point targets, no tracking	Up to 1.79 m far range, 0.39 m near range
Accuracy distance measuring	point targets, no tracking	±0.40 m far range, ±0.10 m near range
Azimuth angle augmentation	(field of view FoV)	-9.0°...+9.0° far range, -60°...+60° near range
Elevation angle augmentation	(field of view FoV)	14° far range, 20° near range
Azimuth beam width (3 dB)		2.2° far range, 4.4°@0° / 6.2°@±45° / 17°@±60° near range
Resolution azimuth angle	point targets, no tracking	1.6° far range, 3.2°@0° / 4.5°@±45° / 12.3°@±60° near range
Accuracy azimuth angle	point targets, no tracking	±0.1° far range, ±0.3°@0°/ ±1°@±45°/ ±5°@±60°near range
Velocity range		-400 km/h... +200 km/h (- leaving objects...+approximation)
Velocity resolution	target separation ability	0.37 km/h far field, 0.43 km/h near range
Velocity accuracy	point targets	±0.1 km/h
Cycle time		app. 72 ms near and far measurement
Antenna channels / - principle	microstripe	4TX/2x6RX = 24 channels = 2TX/6RX far - 2TX/6RX near / Digital Beam Forming

Operating Conditions

Operating conditions	Comment	to natural targets (non-reflector targets)
Radar operating frequency band	acc. ETSI & FCC	76...77 GHz
Mains power supply	at 12 V DC / 24 V DC	+8,0 V...32 V DC
Power consumption	at 12 V DC / 10 A fuse	6.6 W / 550 mA typ. and 12 W / 1.0 A @max. peak power
Load dump protection internal		disconnection >60 V and re-start returning to <60 V
Operating-/ storage temperature		-40°C... +85°C / -40°C... +90°C
Lifetime	acc. LV124 part 2 - v1.3	10000 h or 10 years (for passenger cars)
Shock	mechanical	500 m/s^2@6 ms half-sine (10 x shock each in +/-X/Y/Z dir.)
Vibration	mechanical	20 $[(m/s^2)^2/Hz]$ @10 Hz / 0,14 $[(m/s^2)^2/Hz]$ @1000Hz (peak)
Protection rating	ISO 16750 Classification (Trucks) for vibration	IP 6k 9k (dust, high-pressure cleaning) IP 6k7 (10 cm under water), ice-water shock test, salt fog resistant, mixed gas EN 60068-2-60

Connections, Housing,

& Other Technical Features

Connections	Comment	to natural targets (non-reflector targets)
Monitoring function		self-monitoring
Interface	up to 8 ID	1 x CAN - high-speed 500 kbit/s / 1 Mbit/s
Housing	**Comment**	**to natural targets (non-reflector targets)**
Dimensions / weight	W * L * H (mm) / (mass)	138 * 91 * 31 / app. 300 g
Material	housing front / backcover	PBT GF 30 black (BASF-Ultradur B4300G6 LS sw 15073) / AC-47100 (AlSi12Cu1(FE)) die cast aluminium or EN AW 5754 (3.535) AlMg3 pressed-formed aluminium
Miscellaneous		
Measuring principle (Doppler‘s principle) in one measuring cycle due basis of FMCW with very fast ramps independent measurement of distance and velocity **Version:** ARS 430 FM **Customization:** Special firmware adaption can be offered on demand.		

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