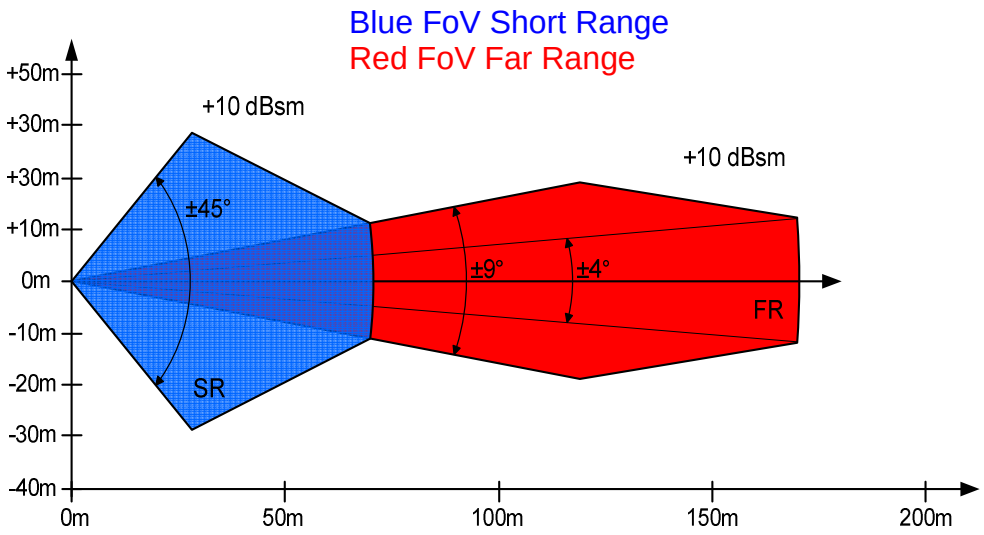
ARS 404-21 Entry
Long Range Radar Sensor 77 GHz



Safe - reliable - robust – very small design

The A.D.C. GmbH offers a new type of radar sensor, the ARS 404-21, as a possible adaption in different application and as entry version of the series 40X.

Typical areas of application:

- **Anti-collision protection for vehicles of every description (particul. autonomous)**
- Headway control also for far range (vehicles of every description, particularly autonomous)
- Area monitoring system for far range, e.g. of hazardous or non-accessible areas
- Classification of objects
- Object detection, e.g. in confusing or unclear areas
- Unremarkable object detection by affix a protection cover before it (radome)

Measuring procedure:

The rugged ARS 404-21 sensor from Continental measures independent the distance and velocity (Doppler's principle) to objects without reflector in one measuring cycle due basis of FMCW (Frequency Modulated Continuous Wave) with very fast ramps, with a real time scanning of 20 / sec.. A special feature of the device is the simultaneously measurement of great distances **up to 170 m**, relative velocity and the angle relation between 2 objects.

Advantages:

- **Fast and safe:** The ARS 404-21 dispels with the apparent contradiction between excellent great measuring performance and a high degree of operational safety. The rugged ARS 404-21 radar sensor is capable of determining the distance to an object in real time scanning and dependent on the driving speed a possible risk of collision.
- **Reliable:** The ARS 404-21 radar sensor is fail-safe and able to recognize troubles of the sensor and sensor environment and display it automatically.
- **Robust and very small design:** By using a radar technology with less complex measuring principle and the development and mass production in automotive supply industry, the design is kept very robust and very small.

Benefit from the unique features of the latest Continental technology!

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Measuring performance		***to natural targets (non-reflector targets)***
Distance range		0.20...170m@0…±4° & 0.20…120m@±9° far range scan, 0.20...70m@0…±9° & 0.20…40m@±45° near range scan
Resolution distance measuring	point targets, no tracking	0.40 m (0.75 m @ large v_ego for 170 m range ability to separate targets and objects 1.5…2 x resolution
Accuracy distance measuring	point targets, no tracking	±0.10 m (0.20 m @ large v_ego for 170 m range
Azimuth angle augmentation	(field of view FoV)	-9.0°...+9.0° far range, -45°...+45° near range
Elevation angle augmentation	(field of view FoV)	18° at 6 dB two way for far and near range
Azimuth beam width (3 dB)	6 dB values 1.4 x larger	4.6° @0° far range, 9.2°@0°…13.0°@±45° near range
Elevation beam width	6 dB two way	18° at 6 dB two way for far and near range
Resolution azimuth angle	point targets, no tracking	3.3° far range, 6.6° @0°…9.3°@±45° near range ability to separate targets and objects 1.5…2 x resolution
Accuracy azimuth angle	point targets, no tracking	0.1°@±6°…0.2°@±9° far range 0.6°@0°…2.0°@±45° near range
Velocity range		-400 km/h...+200 km/h (- leaving objects...+approximation)
Velocity resolution	target separation ability	0.28 km/h
Velocity accuracy	point targets	±0.1 km/h
Sensitivity (min. RCS@x m)		$10m^2$@170 m far range $1m^2$@40 m & 0°...±45° near range
Cycle time		app. 50 ms near and far measurement
Antenna channels / -principle	planar	6 channels = 2TX/2RX near + 2TX/1RX*+2RX far - *1RX double column = higher bundling / Digital Beam Forming
Operating conditions		
Radar operating frequency band	compliant ETSI & FCC	76...77 GHz
Transmission capacity	average / peak EIRP	<12 dBm@77GHz /<35.5 dBm - sweep bandwidth 500 MHz
Mains power supply	at 12 V DC / 24 V DC	+8,0 V...32 V DC – B-Version for truck & passenger cars
Power consumption	at 12 V DC / 10 A fuse at 24 V DC / 10 A fuse	4.5 W / 375 mA typ. and 12 W / 1.0 A peak – sleep <100 µA 200 mA typ. – sleep <200 µA
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
Life time	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)	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		
Monitoring function		self monitoring (fail-safe designed)
Interface	up to 8 ID	1 x CAN - high-speed 500 kbit/s
Housing		
Dimensions / weight	L * W * H (mm) / (mass)	136.25 * 68.4 * 33.75 / app. 172 g – B-type screw mounted
Material	housing front / rear side	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 404-21	sensor for the industry	CAN protocol for free communication
		The version -21 allows to set maximum 8 ID's and maximum 8 collision avoidance regions and to change the sensitivity between low and high sensitivity by the user continuously

Interfaces:
The device is fitted with one CAN bus interface. Further interfaces as converter, software adaption are possible on demand and in case of assumption of costs.

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