

Collision Avoidance System CAS-M light

Manual

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1 System Overview

The CAS-M light helps the driver to focus on the track and warns him if a car is approaching from behind. The system provides information about relative speed and distance on the CAN bus. The benefit is even more increased during nighttime or in bad weather conditions.

The interface is very intuitive and adaptable to the drivers liking – so there is no need in special driver trainings.

1.1 Function principle

CAS-M light provides information for distance and relative speed of the closest vehicle behind via two LEDs (left and right) in the driver display. Only the closest vehicle behind is considered. All other objects are suppressed.

In large (green) and medium (yellow) distance both LEDs (left and right) are used in parallel to provide the available information. In close (red) distance a left/right determination is done, and only the appropriate left or right LED is used to provide information about the object behind the driver.

All distance and delta speed thresholds based on the physical raw values to control the object detection and LED visualization can be adjusted individually via CAN (depending on pilot and race category different settings may be required).

CAS-M light contains a pre-defined visualization concept to allow for a quick starting with the system. The pre-defined thresholds are based on Bosch Motorsport know how and experience with the system.

1.2 Hardware

The CAS-M light system consists of a Bosch automotive mid-range radar sensor, shown on the front page and in the following drawing.

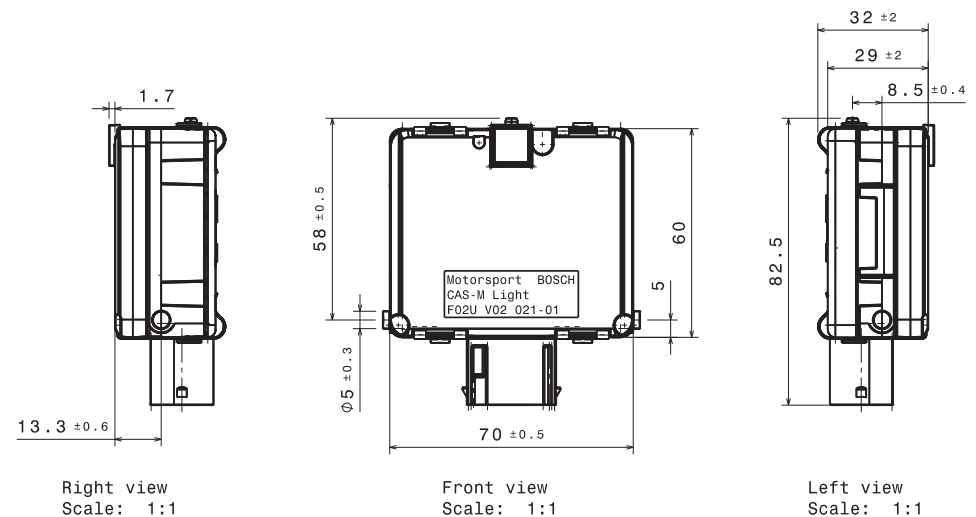
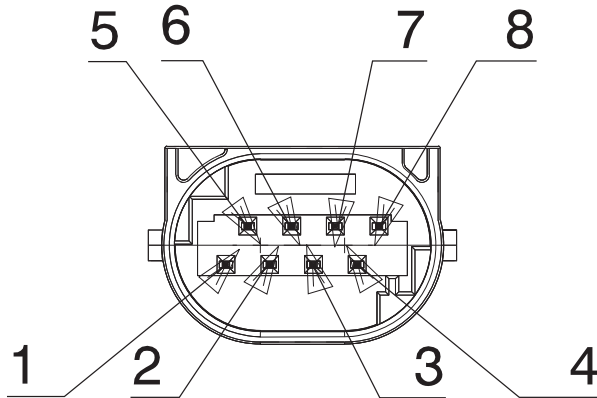


Illustration 1: CAS-M light dimensions

1.3 Wiring

The sensor needs to be connected to the vehicle CAN bus (connection to display needed) and supplied with 12 V from the supply system on board. For the speed calculation of the approaching cars, the sensor needs to know the vehicle's speed.



Pin	Designation	Description
1	GND	Sensor Ground
2	CAN-H	CAN High
3	CAN-L	CAN Low
4	Not connected	Not connected
5	Not connected	Not connected
6	Not connected	Not connected
7	Not connected	Not connected
8	V+	Supply voltage for sensor (12 V)

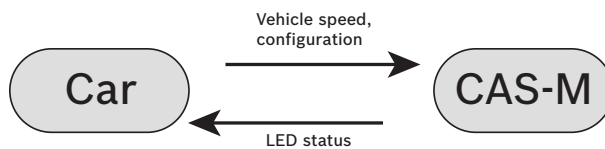
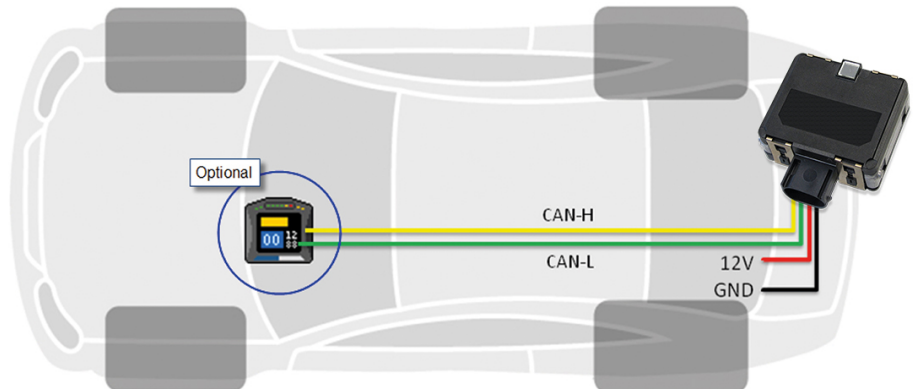


Illustration 2: Wiring schematic

1.4 CAN communication

Since the system provides the information on the CAN bus (car approaching left/right, distances, relative speeds ...), it is mandatory to connect the sensor to it. In addition the sensor needs to get the vehicle's speed via CAN.

CAN Baud rate: 500 kBaud or 1 MBaud

CAN update rate of Sensor: 50 Hz

Vehicle Speed

Information that needs to be send from the car to the system:

Message	CAN ID	Byte order	Value type	Start bit	Length [bit]	Factor	Offset
Speed	0x616	Intel	Unsigned	24	16	0.1	0

Predefined Messages

Information that is send from the sensor to the car:

Message	CAN ID	Byte order	Value type	Start bit	Length [bit]	Factor	Offset
Object_left_dist_range	0x3F3	Intel	Unsigned	58	3	1	0
Object_left_approach_spd_range	0x3F3	Intel	Unsigned	61	3	1	0
Object_right_dist_range	0x3F5	Intel	Unsigned	58	3	1	0
Object_right_approach_spd_range	0x3F5	Intel	Unsigned	61	3	1	0

Raw values

Information that is send from the sensor to the car:

Message	CAN ID	Byte order	Value type	Start bit	Length [bit]	Factor	Offset
Object_left_dx	0x3F3	Intel	Unsigned	0	12	0.0625	0
Object_left_vx	0x3F3	Intel	Signed	12	12	0.0625	0
Object_left_dy	0x3F3	Intel	Signed	24	14	0.015625	0
Object_right_dx	0x3F5	Intel	Unsigned	0	12	0.0625	0
Object_right_vx	0x3F5	Intel	Signed	12	12	0.0625	0
Object_right_dy	0x3F5	Intel	Signed	24	14	0.015625	0

Important note

Do not use the messages 0xB9, 0x757 or 0x7C1 on the sensor CAN. These Messages are not needed but if used the sensor will be affected.

The sensor sends the additional message 0xB9 on the CAN. This message is not needed for the CAS-M light system but already used by the sensor.

2 Technical Data

Application

Operating temperature	-40 to 85°C
Storage temperature	-20 to 95°C
Range	150 m
Tracks	1 Object (nearest)
Interface	CAN
CAN rate	500 kbaud or 1 Mbaud
CAN update rate	50 Hz
Horizontal field of view Radar	85° from 0 to 29 m 70° from 29 to 46 m 50° from 46 to 73 m 42° from 73 to 78 m 20° from 78 to 95 m

Mechanical Data

Weight of radar sensor MRR	199 g
Size	60x70x32 mm
Protection Classification	IP 6K6K (DIN 40 050) IP 6K7 (DIN 40 050)
Max. vibration	Random vibration $a_{eff} = 30.8 \text{ m/s}^2$, 3x8 h (according ISO/DIS 16750-3)

Electrical Data

Supply voltage	6.5 to 18 V
An external fuse has to be provided (rec. 10 A). External overvoltage protection is required (internal overvoltage protection up to 35 V).	
Reverse polarity voltage protection	-14 V max. $t \leq 60 \text{ sec}$

Connectors and Wires

Mating connector	F037.B00.168-01
Pin 1	GND
Pin 2	CAN-H
Pin 3	CAN-L
Pin 4	n.c.
Pin 5	n.c.
Pin 6	n.c.
Pin 7	n.c.
Pin 8	V+

3 Installation Guide

3.1 Mounting the radar sensor

A mounting frame with 4xM6 threaded bushings are delivered with the sensor. An individual concept for each car mounting situation must be developed by the car manufacturer. The following mounting restrictions must be fulfilled to secure a proper function of the system.

- The radar sensor must be longitudinally and laterally leveled, aligned with the vehicle's longitudinal axis and mounted on the vehicle's lateral centerline. Sensor mounting height of 20 cm to 90 cm off the ground will ensure maximum range.
- The sensor may be mounted flush mounted with the rear fascia.
- It is critical that the radar sensor has an unobstructed (or radar-transparent) view out the rear of the vehicle. Optimum is a mounting without any material in front of the sensor.

If it must be mounted behind, the plane in front of the sensor surface must be free of conductive materials (e.g. a thin layer of vinyl, fiberglass or Kevlar).

The distance between sensor and surface depends on the used material and should be approximately 5 mm.

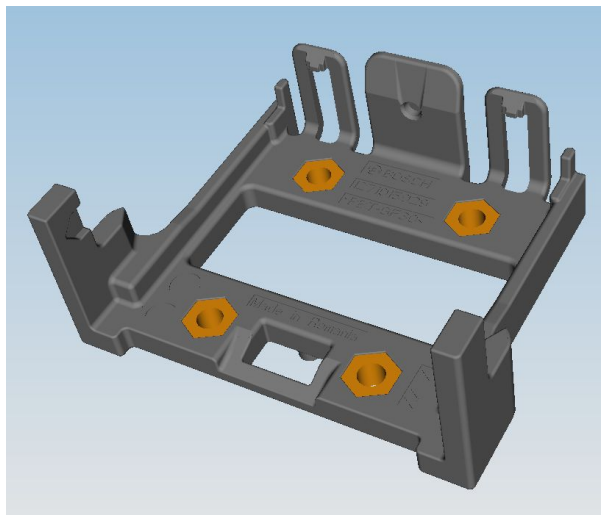


Illustration 3: CAS-M light frame

3.2 Configuration of the system threshold values

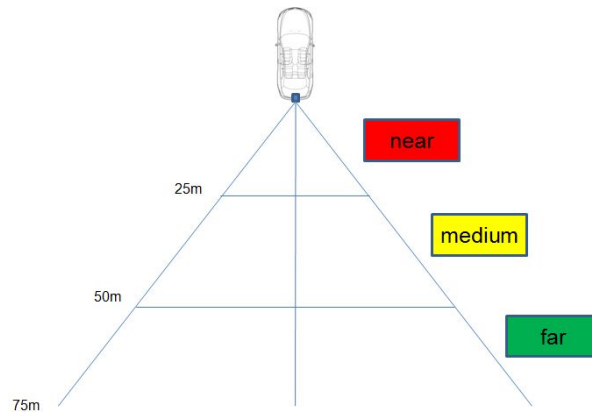


Illustration 4: Distance schematic

Message	CAN ID	Byte order	Value type	Start bit	Length [bit]	Factor	Offset
Distance_Near	0x620	Intel	Unsigned	0	8	1	0
Distance_Medium	0x620	Intel	Unsigned	8	8	1	0
Distance_Far	0x620	Intel	Unsigned	16	8	1	0
Speed_medium	0x620	Intel	Unsigned	24	8	1	0
Speed-high	0x620	Intel	Unsigned	32	8	1	0

Distance thresholds

Description	Comment	Default
Distance_Near	Threshold between near range and medium range [m]	12
Distance_Medium	Threshold between medium range and far range	30
Distance_Far	Threshold between far range and out of range (no warning)	75

Speed thresholds

Description	Comment	Default
Speed_medium	Speed of approaching vehicle [km/h] for low frequency flashing	7.2
Speed_high	Speed of approaching vehicle [km/h] for high frequency flashing	14.4

4 Using the CAS-M light Information

4.1 Predefined messages

The system provides predefined CAN-messages with evaluated values for distance and relative speed.

4.1.1 Configuration distance

Object_left/right_dist_range defines the distance of the car behind into a color for an LED.

Value	Color	Description
0x0	off	inactive
0x1	green	large distance
0x2	yellow	medium distance
0x4	red	close distance

4.1.2 Configuration relative speed

Object_left/right_approach_spd_range defines the relative speed of the car behind into a blinking frequency for an LED.

Value	LED-Status	Description
0x0	off	inactive
0x1	LED on	low relative speed
0x2	LED flash low frequency	medium relative speed
0x4	LED flash high frequency	high relative speed

4.2 Using raw values

As an alternative to the predefined messages it is possible to use the raw values provided by the system. Every value is provided for each side (left and right).

Object_left/right_dx

Distance to the car behind [m]

Object_left/right_vx

Relative speed of the car behind [m/s]

Object_left/right_dy

Position of the car behind (relating to the mid axis of the car) [m]

5 Available Packages

5.1 CAS-M light + connector (500 kBaud)

The CAS-M light system can be ordered without loom and display. The system includes:

- CAS-M light sensor with 500 kBaud CAN speed & mating connector

Part number: F 02U V02 021-01

5.2 CAS-M light + connector (1 MBaud)

The CAS-M light system can be ordered without loom and display. The system includes:

- CAS-M light sensor with 1 MBaud CAN speed & mating connector

Part number: F 02U V02 220-01

5.3 CAS-M light + DDU 9 (500 kBaud)

The CAS-M light system can be ordered directly with a DDU 9. The set includes:

- CAS-M light sensor with 500 kBaud CAN speed + mating connector
- DDU 9

Part number: F 02U V02 591-01

5.4 CAS-M light + DDU 9 (1 MBaud)

The CAS-M light system can be ordered directly with a DDU 9. The set includes:

- CAS-M light sensor with 1 MBaud CAN speed + mating connector
- DDU 9

Part number: F 02U V02 592-01

6 Disposal

Hardware, accessories and packaging should be sorted for recycling in an environment-friendly manner.

Do not dispose of this electronic device in your household waste.

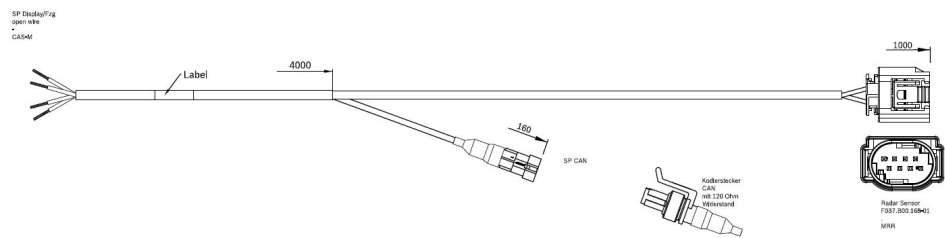
7 Loom Options

7.1 Open End

The open end loom can be used to connect the sensor to an existing display unit. The loom is compatible with the CAS-M light packages F 02U V02 021-01 and F 02U V02 220-01.

The loom includes:

- Sensor matting connector F 037 B00 168-01
- Removable 120 Ω terminating resistor
- Open end loom for display unit



Part number: F 02U V02 105-01

8 Legal

8.1 Legal Restrictions

Due to embargo restrictions, sale of this product in Russia, Belarus, Iran, Syria, Libya, Afghanistan, and North Korea is prohibited.

8.2 Radar Sensor

8.2.1 Regulations

The CAS-M light radar sensor is based on the Bosch Engineering MRRe14HBW radar sensor. The MRRe14HBW meets the following statutory requirements for ground-based vehicles.

Country	Regulations
Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Iceland, Liechtenstein, Norway, Switzerland	Radio Equipment Directive 2014/53/EU Restriction of the use of certain hazardous substances (RoHS) Directive 2011/65/EU Chemical substances (REACH) Regulation (EC) No 1907/2006 ETSI EN 301 091-1 V2.1.1 (2017-01) ETSI EN 301 091-3 V1.1.1 (2017-02) ETSI EN 303 396 V1.1.1 (2016-12) ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.1.1 (2019-03) ETSI EN 301 489-51 V2.1.1 (2019-04) EN 62368-1:2014/AC:2015 IEC 62368-1:2014(2nd Edition) + Cor. 1: 2015 EN 62311 (2008-01) DIN EN ISO 13849-1:2015 DIN EN ISO 13849-2:2012
USA	47 CFR §2.925 47 CFR §15.19 47 CFR §15.21 47 CFR §15.105 47 CFR §95.3331 47 CFR §95.3361 47 CFR §95.3367 47 CFR §95.3379 47 CFR §95.3385 UL 94 40 CFR §761.185 Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - Sect. 1502. Conflict minerals
Canada	Canadian Environmental Protection Act, 1999 (CEPA, 1999) from 19.08.2018 RSS-GEN Issue 4 RSS-102 Issue 5 Section 2.6 RSS-251 Issue 2
Japan	ARIB STD-48 V2.2

Country	Regulations
Australia	Radiocommunications (Low Interference Potential Devices) Class License 2015 - F2016C00432 - Radiodetermination - sensors using radar for measurement, 69. Radiodetermination transmitters 76 - 77 GHz.
New Zealand	Radiocommunications Regulations (Radio Standards) Notice 2016 - Road Transport and Traffic Telematics (76 GHz) – Level A1 conformity based on the ETSI EN 301 091-1 V2.1.1 standard.
United Kingdom	Radio Equipment Regulations 2017 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

If the MRRe14HBW and hence the CAS-M light radar sensor SCU is not operated within this context, it lies within the customer's responsibility to ensure compliance of the application with national regulations and standards, e.g., electromagnetic compatibility and radio spectrum matters.

Link to the up-to-date EU Declaration of Conformity DoC:

<http://eu-doc.bosch.com>

(Please enter the model MRRe14HBW on which CAS-M sensors are based on to find the correct DoC in the database.)

8.2.2 Intended Use

The application of the MRRe14HBW-based CAS-M light radar sensor under the conditions described in this technical customer documentation and the associated arranged documents to described conditions (environment, application, installation conditions and loads) is a prerequisite for a warranty on the part of Bosch Engineering GmbH, that the product is suitable for the intended or usual application assumed after the contract, or has a certain state or quality.

All contractual requirements - including the aforementioned - are considered as fulfilled if the product passes the test range according to the technical customer documentation and the arranged documents. The safety of the application of the product in the vehicle is in the responsibility of the customer.

All changes in the surroundings of the product, which deviate from the technical customer documentation and the arranged documents, as well as use for applications not released by Bosch Engineering GmbH, are to be indicated to Bosch Engineering GmbH. Such an application or deployment of the product may take place only after release by Bosch Engineering GmbH on the basis of the changed surroundings or variance.

The product safety is ensured only if the permissible conditions are kept.

In the case of failure, the product needs to be replaced exclusively by an authorized body and is not serviceable.

The intended use of the CAS-M light radar sensor is being mounted on ground based vehicles. These include but are not limited to construction equipment (excavators, dump trucks, bulldozers etc.), agriculture equipment (tractors, combine harvesters etc.), material handling equipment (forklifters, mobile industrial robots, cranes etc.), mobile work platforms, trains, trams, light rail vehicles, and automotive vehicles (passenger cars, trucks, busses).

It is not permitted to hand BOSCH ENGINEERING GmbH CAS-M light radar sensors, any documentation about BOSCH ENGINEERING GmbH CAS-M light radar sensors, or any measurements using them to anyone who has not directly obtained the material from Bosch ENGINEERING GmbH.

It is not permitted to re-sell BOSCH ENGINEERING CAS-M light radar sensors unless otherwise agreed upon.

It is not permitted to publish any results using the data from the BOSCH ENGINEERING GmbH CAS-M light radar sensor, where it is publicly available unless otherwise agreed upon.

It is not permitted to use the CAS-M light radar sensor as fixed infrastructure equipment.

It is not permitted to use the CAS-M light radar sensor for military applications.

It is not permitted to operate the CAS-M light radar sensor in any country where frequency homologation type approval is not available.

In the case, frequency homologation is available in a country, it is not permitted to operate the CAS-M light radar sensor in applications not covered by this frequency homologation in said country.

8.2.3 Radio Frequency Homologation

8.2.3.1 Basic information on radio frequency homologation and import requirements

Definitions

- In radio frequency homologation, the MRRe14HBW radar on which the CAS-M light radar sensor is based on falls into the group of Short Range devices (SRD). This classification does not have any relation to the functional classification used for these radars.
- e.g.: a long range radar from Bosch also comes under the Short Range device classification.
- The radar sensor is a component that is part of a ground-based vehicle. The sensor as a component is not brought on to the market. This means that the sensor is not available for purchase by the target user.
- The radar sensor as a component cannot be operated stand alone. For the intended use of the component, a connection to the ground-based vehicle is required (data connection, supply voltage).
- In some countries, components that cannot be operated stand alone and also are designated to be mounted in a vehicle, are exempted from radio frequency licensing.
- The radar sensor intentionally radiates RF energy. Therefore, a radio frequency type approval license may be required for any country in which the sensor is intended to be operated.
- A ground-based vehicle consists of a number of components. Depending on the country, the vehicle may be subject to additional homologation requirements (e.g. registration of components).

- Type approval is the process by which any radio equipment is authorized to be used in a specific country. The equipment's compliance with the applicable standards and regulations has to be checked by the customer (upon request, BEG may assist in this process).

Overview Homologation: tasks and responsibilities

	Radio frequency homologation (component)	Equipment Type Approval / Import license (vehicle)
Required for	Legal operation of the device in a country	Import and sale of a device in a country
Responsible	Bosch Engineering for countries specified in Chapter Regulations [▶ 13]	OEM / (local registered) importer (Bosch Engineering customer)
Certificate holder	Bosch Engineering	OEM / local agent / entity of OEM
Responsible for maintaining the certificate	Bosch Engineering for countries specified in Chapter Regulations [▶ 13]	OEM
Timing	Available with Bosch Engineering SOP of the device	Must be obtained prior to importing of ground-based vehicles in a country

Responsibilities of the vehicle manufacturer

- It is in the responsibility of the ground-based vehicle manufacturer to obtain the required equipment type approvals or import licenses for bringing a ground-based vehicle into the market in a specific country.
- On customer request, Bosch Engineering will provide the necessary technical radio frequency related documentation to the OEM that is required for applying and obtaining the component (equipment) type approval / import license for the radar sensor as a component of the ground-based vehicle in a specific country.
- The maintenance and renewal for the ground-based vehicle type approval certificates and import licenses for the relevant vehicle platforms is in the responsibility of the vehicle manufacturer.

Impact of import destinations

- Depending on the location of the OEM's manufacturing plants, it needs to be clarified who will act as the importer of the radar sensor component into these countries.
- The importer responsibilities relevant to that country have to be fulfilled by the party accordingly

Responsibilities of Bosch Engineering

- Bosch Engineering only provides radio frequency homologation for the sensor in the countries mentioned in Chapter Regulations [▶ 13].

The radio frequency homologation certificates for the specific sensor for the countries mentioned in Chapter Regulations [▶ 13] are maintained by Bosch Engineering.

8.2.4 Remarks on the Radio Frequency Homologation

8.2.4.1 General Points

- Radio frequency homologation is required to operate 76-77 GHz radar sensors in a country. Frequency homologation in a country must be granted and available prior to selling in a country.
- Granting and defining the requirements for obtaining radio frequency type approvals is a task in the responsibility of a country's telecommunication authority. Rejections of approvals or country specific restrictions are administrative decisions and cannot be influenced by Bosch Engineering.
- Bosch Engineering cannot control the elements involved in the radio frequency type approval process of a country:
 - Incurring costs and fees
 - Lead-time for obtaining the type approval
 - Validity of a type approval certificate
 - Content and requirements for obtaining a type approval certificate
 - Availability of the frequency band for radar sensor operation, as regulation may change
- The requirements and procedures for obtaining radio frequency type approval in a country may change. In case of uncertainty, reconfirmation of the requirements that apply may be necessary.

8.2.4.2 Markings on the Component and Manual Phrases

With receiving frequency homologation for a specific country, certain requirements have to be satisfied regarding

- Marking of the device
- Reproducing specific statements and labels in the vehicle user manual
- The markings to satisfy the homologation requirements of the Bosch Engineering focus countries are printed on the label on the back-cover of the CAS-M light radar sensors
- Some of the countries listed in chapter Regulations [▶ 13] of this document have requirements regarding specific markings and phrases for the vehicle's user manual, which are described in chapter Country Specific User Manual Statements [▶ 18].
- For any country in which no type approval of the CAS-M light radar sensor is available through Bosch Engineering, additional requirements regarding markings and user manual phrases may exist.
- A country may require additional product registration and/or markings to be added on the device or in the user manual, for a ground-based vehicle equipped with a radar sensor. Obtaining this information and the implementation of these requirements is the responsibility of the ground-based vehicle manufacturer.
- Example CAS-M light radar sensor label (located on the back side of the sensor; measures are in millimeters):

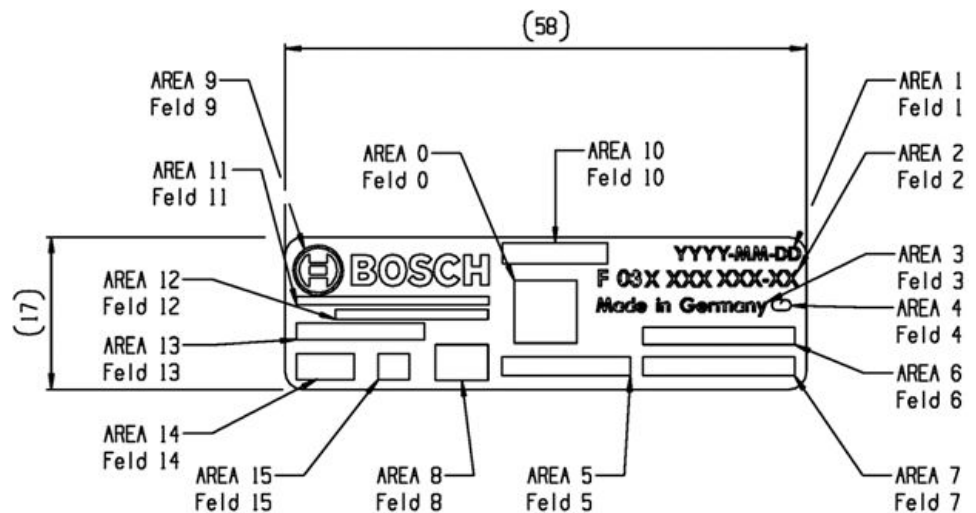


Illustration 5: Markings on the CAS-M light Radar Sensor

Label area	Description
Area 0	Data matrix code
Area 1	Manufacturing date
Area 2	Product part number
Area 3	Designation of origin
Area 4	Business facility
Area 5	Naming
Area 6	Serial number
Area 7	Type naming
Area 8	CE conformity mark
Area 9	Bosch symbol and logotype
Area 10	Manufacturer address
Area 11	Frequency certification label / number USA
Area 12	Frequency certification label / number Canada
Area 13	Frequency certification label / number Japan
Area 14	Frequency certification label / number New Zealand
Area 15	Frequency certification label / number Australia

8.2.4.3 Countries where no type approval is obtained

Application for type approval in countries that are not listed in chapter Regulations [► 13] of this document may be handled on customer request and charged separately. In this case, the availability of the 76 GHz frequency range for ground-based vehicular radar, administrative requirements and incurring costs have to be confirmed by the customer prior to filing an application.

8.2.5 Country Specific User Manual Statements

The below mentioned countries have requirements regarding specific phrases that have to be reproduced in the vehicle user's manual. The specific phrases and labels result from the radio type approval requirements of those countries. The phrases have to be included in a conspicuous location in the vehicle user manual and accurately reprinted as indicated in the following sub-chapters:

8.2.5.1 Europe

8.2.5.1.1 Registration Name

MRRRe14HBW

8.2.5.1.2 Required owner manual entry (DoC translations mentioned below)

Hereby, Bosch Engineering GmbH declares that the radio equipment type CAS-M light radar sensor is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: <http://eu-doc.bosch.com>

Please enter the model MRRRe14HBW to find the correct DoC in the database. The CAS-M light radar sensor is based on the MRRRe14HBW sensor mentioned in the declaration of conformity.

This Radio Equipment can be operated without member country restrictions related to Article 10(10) of the RE-D in the EU.

This Radio Equipment is constructed so that it can be operated in all EU member states without infringing applicable requirements with regard to the requirements on the use of radio spectrum.

Declaration of the technical parameters of the Radio Equipment under RE-D Article 10(8).

Frequency band	76-77 GHz
Nominal radiated power: e.i.r.p. (peak detector)	32 dBm
Nominal radiated power: e.i.r.p. (RMS detector)	27 dBm

8.2.5.1.3 Declaration of Conformity Translations

Following are the translations of the simplified DoC above in all EU languages.

Hereby, Bosch Engineering GmbH declares that the radio equipment type MRRRe14HBW is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: <http://eu-doc.bosch.com>

С настоящото Bosch Engineering GmbH декларира, че този тип радиосъоръжение MRRRe14HBW е в съответствие с Директива 2014/53/ЕС.

Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес: <http://eu-doc.bosch.com>

Por la presente, Bosch Engineering GmbH declara que el tipo de equipo radioeléctrico MRRRe14HBW es conforme con la Directiva 2014/53/UE.

El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente: <http://eu-doc.bosch.com>

Tímto Bosch Engineering GmbH prohlašuje, že typ rádiového zařízení MRRRe14HBW je v souladu se směrnicí 2014/53/EU.

Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese: <http://eu-doc.bosch.com>

Hermed erklærer Bosch Engineering GmbH, at radioudstyrstypen MRRe14HBW er i overensstemmelse med direktiv 2014/53/EU.

EU-overensstemmelseserklær ingens fulde tekst kan findes på følgende internetadresse: <http://eu-doc.bosch.com>

Hiermit erklärt Bosch Engineering GmbH, dass der Funkanlagentyp MRRe14HBW der Richtlinie 2014/53/EU entspricht.

Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: <http://eu-doc.bosch.com>

Käesolevaga deklareerib Bosch Engineering GmbH, et käesolev raadioseadme tüüp MRRe14HBW vastab direktiivi 2014/53/EL nõuetele.

ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil: <http://eu-doc.bosch.com>

Με την παρούσα ο/η Bosch Engineering GmbH, δηλώνει ότι ο ραδιοεξοπλισμός MRRe14HBW πληροί την οδηγία 2014/53/ΕΕ.

Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο: <http://eu-doc.bosch.com>

Le soussigné, Bosch Engineering GmbH, déclare que l'équipement radioélectrique du type MRRe14HBW est conforme à la directive 2014/53/UE.

Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante: <http://eu-doc.bosch.com>

Bosch Engineering GmbH ovime izjavljuje da je radijska oprema tipa MRRe14HBW u skladu s Direktivom 2014/53/EU.

Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi: <http://eu-doc.bosch.com>

Il fabbricante, Bosch Engineering GmbH, dichiara che il tipo di apparecchiatura radio MRRe14HBW è conforme alla direttiva 2014/53/UE.

Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet: <http://eu-doc.bosch.com>

Ar šo Bosch Engineering GmbH deklarē, ka radioiekārta MRRe14HBW atbilst Direktīvai 2014/53/ES.

Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē: <http://eu-doc.bosch.com>

Aš, Bosch Engineering GmbH, patvirtinu, kad radijo įrenginių tipas MRRe14HBW atitinka Direktyvą 2014/53/ES.

Visas ES atitikties deklaracijos teksto prieinamas šiuo interneto adresu: <http://eu-doc.bosch.com>

Bosch Engineering GmbH igazolja, hogy a MRRe14HBW típusú rádióberendezés megfelel a 2014/53/EU irányelvnek.

Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen: <http://eu-doc.bosch.com>

B'dan, Bosch Engineering GmbH, niddikjara li dan it-tip ta' tagħmir tar-radju MRRe14HBW huwa konformi mad-Direttiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej: <http://eu-doc.bosch.com>

Hierbij verklaar ik, Bosch Engineering GmbH, dat het type radioapparatuur MRRe14HBW conform is met Richtlijn 2014/53/EU.

De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres: <http://eu-doc.bosch.com>

Bosch Engineering GmbH niniejszym oświadcza, że typ urządzenia radiowego MRRe14HBW jest zgodny z dyrektywą 2014/53/UE.
Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym: <http://eu-doc.bosch.com>

O(a) abaixo assinado(a) Bosch Engineering GmbH declara que o presente tipo de equipamento de rádio MRRe14HBW está em conformidade com a Diretiva 2014/53/UE.
O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: <http://eu-doc.bosch.com>

Prin prezenta, Bosch Engineering GmbH declară că tipul de echipamente radio MRRe14HBW este în conformitate cu Directiva 2014/53/UE.
Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet: <http://eu-doc.bosch.com>

Bosch Engineering GmbH týmto vyhlasuje, že rádiové zariadenie typu MRRe14HBW je v súlade so smernicou 2014/53/EÚ.
Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese: <http://eu-doc.bosch.com>

Bosch Engineering GmbH potrjuje, da je tip radijske opreme MRRe14HBW skladen z Direktivo 2014/53/EU.
Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu: <http://eu-doc.bosch.com>

Bosch Engineering GmbH vakuuttaa, että radiolaitetyyppi MRRe14HBW on direktiivin 2014/53/EU mukainen.
EU-vaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: <http://eu-doc.bosch.com>

Härmed försäkras Bosch Engineering GmbH att denna typ av radioutrustning MRRe14HBW överensstämmer med direktiv 2014/53/EU.
Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress: <http://eu-doc.bosch.com>

8.2.5.1.4 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

8.2.5.2 United Kingdom

8.2.5.2.1 Registration Name

MRRe14HBW

8.2.5.2.2 Required owner manual entry

Hereby, Bosch Engineering GmbH declares that the radio equipment type CAS-M light radar sensor is in compliance with the relevant statutory requirements.

The full text of the EU declaration of conformity is available at the following internet address: <http://gb-doc.bosch.com>

Please enter the model MRRe14HBW to find the correct DoC in the database. The CAS-M light radar sensor is based on the MRRe14HBW sensor mentioned in the declaration of conformity.

This Radio Equipment can be operated without restrictions on putting into service or requirements for authorisation of use in the United Kingdom with respect to Section 14 of the Radio Equipment Regulations 2017.

This radio equipment has been constructed so that it can be operated without causing an infringement of the applicable requirements on the use of the radio spectrum according to Section 8 of the Radio Equipment Regulations 2017

Declaration of the technical parameters of the Radio Equipment according to Section 13 of the Radio Equipment Regulations 2017.

Frequency band	76-77 GHz
Nominal radiated power: e.i.r.p. (peak detector)	32 dBm
Nominal radiated power: e.i.r.p. (RMS detector)	27 dBm

8.2.5.2.3 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

8.2.5.3 USA

8.2.5.3.1 Registration Name

2AM6A-MRRE14HBW

8.2.5.3.2 Required owner manual entry

User manual statement according to §15.19:

NOTICE:

This device complies with Part 15 of the FCC Rules

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

User manual statement according to §15.21:

Changes or modifications made to this equipment not expressly approved by Bosch Engineering GmbH may void the FCC authorization to operate this equipment.

User manual statements according to §15.105:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF Exposure Information according 2.1091 / 2.1093 / KDB 447498 / OET bulletin 65:

Radiofrequency radiation exposure Information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

8.2.5.3.3 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

8.2.5.4 Canada

8.2.5.4.1 Registration Name

23203-MRRE14HBW

8.2.5.4.2 Required owner manual entry

User manual statement according to RSS-GEN

NOTICE:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device must not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure Information according to RSS-102

Radiofrequency radiation exposure Information:

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

8.2.5.4.3 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

8.2.5.5 Japan

8.2.5.5.1 Registration Name

202-LSF075

8.2.5.5.2 Required owner manual entry

This device is granted pursuant to the Japanese Radio Law (電波法) under the grant ID n° (認証番号): 202-LSF075

This device should not be modified (otherwise, the granted designation number will become invalid)

本製品の改造は禁止されています。（適合証明番号などが無効となります。）

8.2.5.5.3 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

8.2.5.6 Australia

8.2.5.6.1 Registration Name

n/a

8.2.5.6.2 Required owner manual entry

The minimum height of the RCM mark should be 3 mm.



8.2.5.6.3 Homologation Label of Device

The homologation label is placed on the sensor label on its back side.

Bosch Engineering GmbH

Motorsport

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74232 Abstatt

Germany

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