



# CL-55 User Manual

Part Number: 1033350-01

Rev Number: A

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# Foreword

The CL-55 adds cellular and Wi-Fi capability to the X-Family consoles. It allows access to the new Topcon Agriculture Platform (TAP), which is a cloud based integrated agronomic management platform. It also provides access to the XTEND feature in the Horizon console operating system.

## General Information

### Description

The CL-55 (Couldlink55) is proposed as a standalone box with a dedicated LINUX-based, ultra-low power, hi-performance processor. It will provide 3G global, LTE cat1 regional, Dual-mode Bluetooth v4.2, WiFi 802/11 b,g,n communication capability along with a multimode positioning system (a-GPS and telephone cell geo-referencing) and an hardware based, highly secure encryption engine, up to 4 CAN Lines and LAN Lines BroadR-Reach automotive and standard Ethernet. The CL-55 is also compatible with a 4G/LTE modems covering different geographical areas and operators (EU/AUS/VZW/JAP). The IP66 plastic box, the industrial grade working temperature range of the electronics and the rugged mechanics, allow the use of CL-55 on any kind of agricultural or construction machine and other on-road and off-road transportation means.

### CL-55 variants

The CL-55 is available in different hardware versions with different MODEM characteristics:

- CL-55 3G
- CL-55 LTE EU
- CL-55 LTE JAP
- CL-55 LTE EU SDF
- CL-55 LTE AUS
- CL-55 LTE VZW
  
- CL-55 3G + RADIO
- CL-55 LTE EU + RADIO
- CL-55 LTE JAP + RADIO
- CL-55 LTE EU SDF + RADIO
- CL-55 LTE AUS + RADIO
- CL-55 LTE VZW + RADIO
  
- CL-55 LITE LTE 3G
- CL-55 LITE LTE EU
- CL-55 LITE LTE JAP
- CL-55 LITE LTE AUS
- CL-55 LITE LTE VZW

The versions for European market are CL-55 3G and CL-55 LTE EU and the corresponding LITE and +RADIO versions. See “Electrical characteristics” for details on every modem.

## Hardware

### Mechanical characteristics

The Mechanical components of CL-55 are:

- Back housing / aluminum carrier
- Plastic front cover with integrated LED-windows
- Mainboard
- Antennas (external & internal)
- Supporting parts (gasket, screws, M8-harness, venting membrane, Label, ...)
- GPS antenna connector: C TYPE BLUE CONNECTOR
- 3G/4G antenna connector: D TYPE BORDEAUX FAKRA CONNECTOR
- Diversity antenna connector: L TYPE CARMINE RED FAKRA CONNECTOR
- RP-SMA CONNECTOR Wi-Fi
- SATEL RTK
- Input connector J7
- LAN connector J6 (4 contacts)
- LAN connector J8 (3 contacts)

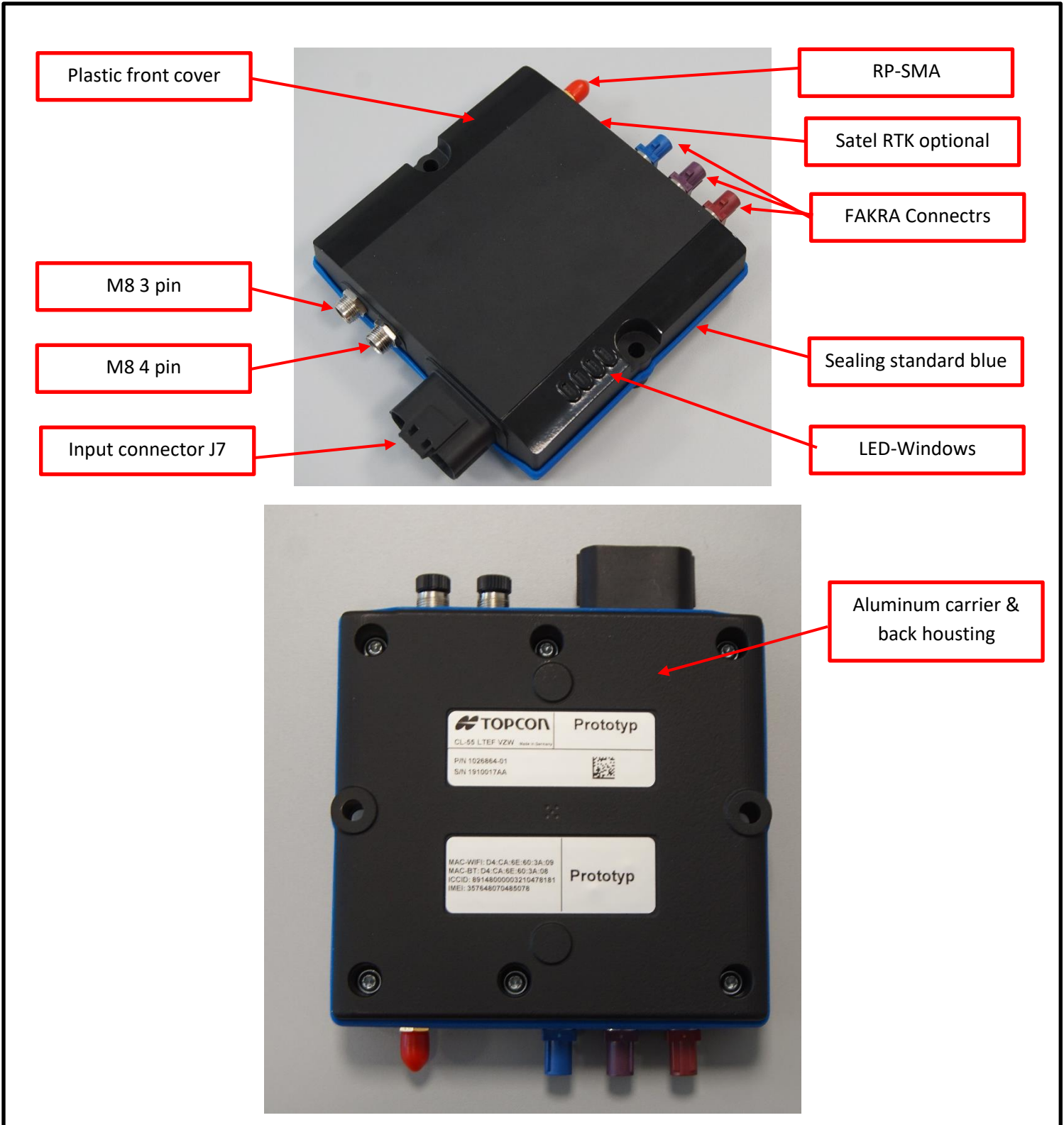


Figure 1



Figure 2



Figure 3

## Cover characteristics

### Back housing / aluminum carrier

- Aluminum die cast
- Supporting the venting membrane and the label field
- Powder coating with structure, matte, RAL 9005

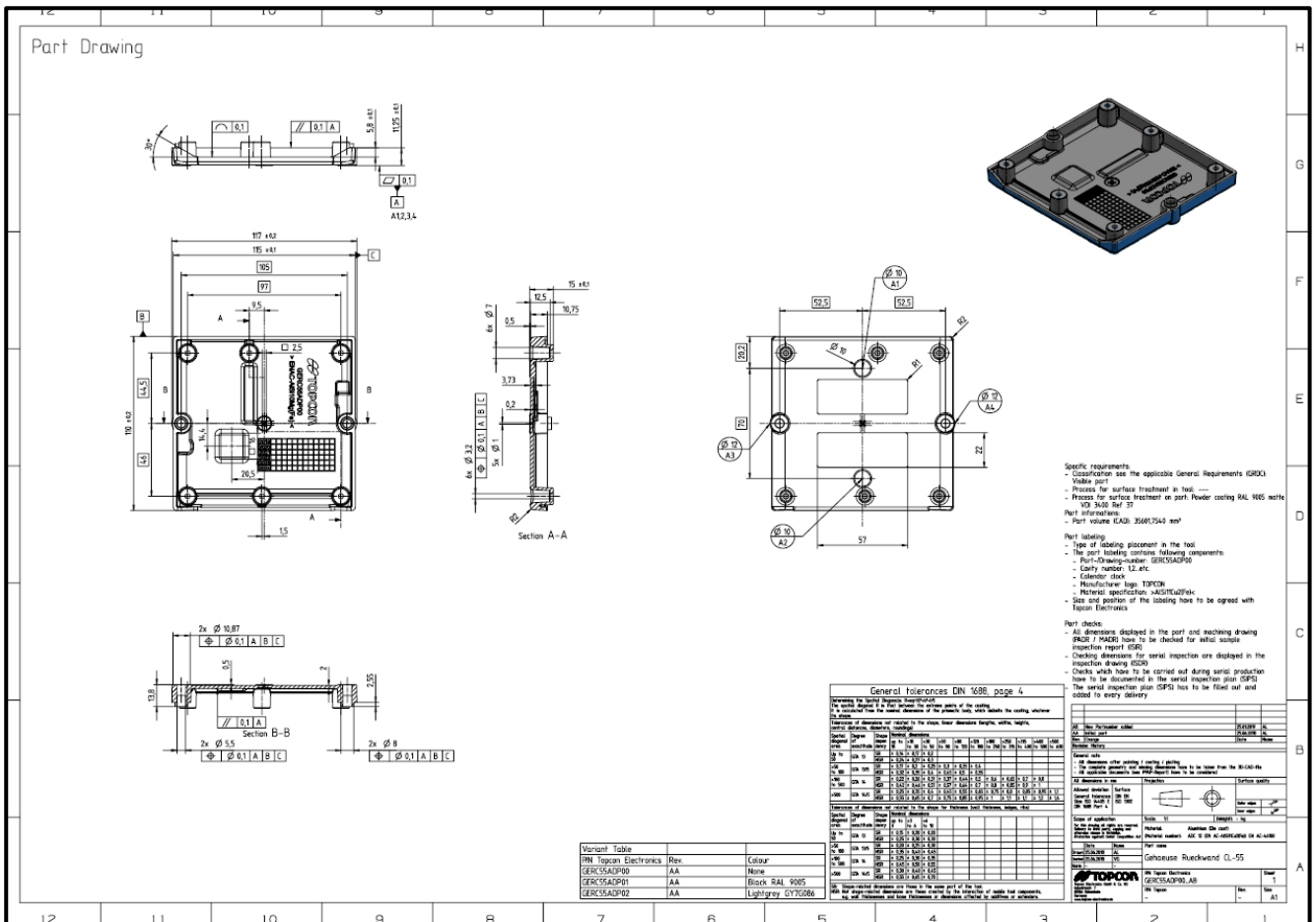


Figure 4

### Plastic Front Cover

- Plastic molded part, visible surfaces etched & polished, no painting
- 4 overmolded or assembled LED windows
- Supporting the external Satel RTK
- Supporting the external WiFi-Antenna
- Supporting the external GPS-Connector, 3G-4G Connector, Diversity-Antenna
- Supporting the M8 4 pin, M8 3 pin Main connector
- Plastic material color 9005, black
- Plastic material color GY7G086, light grey

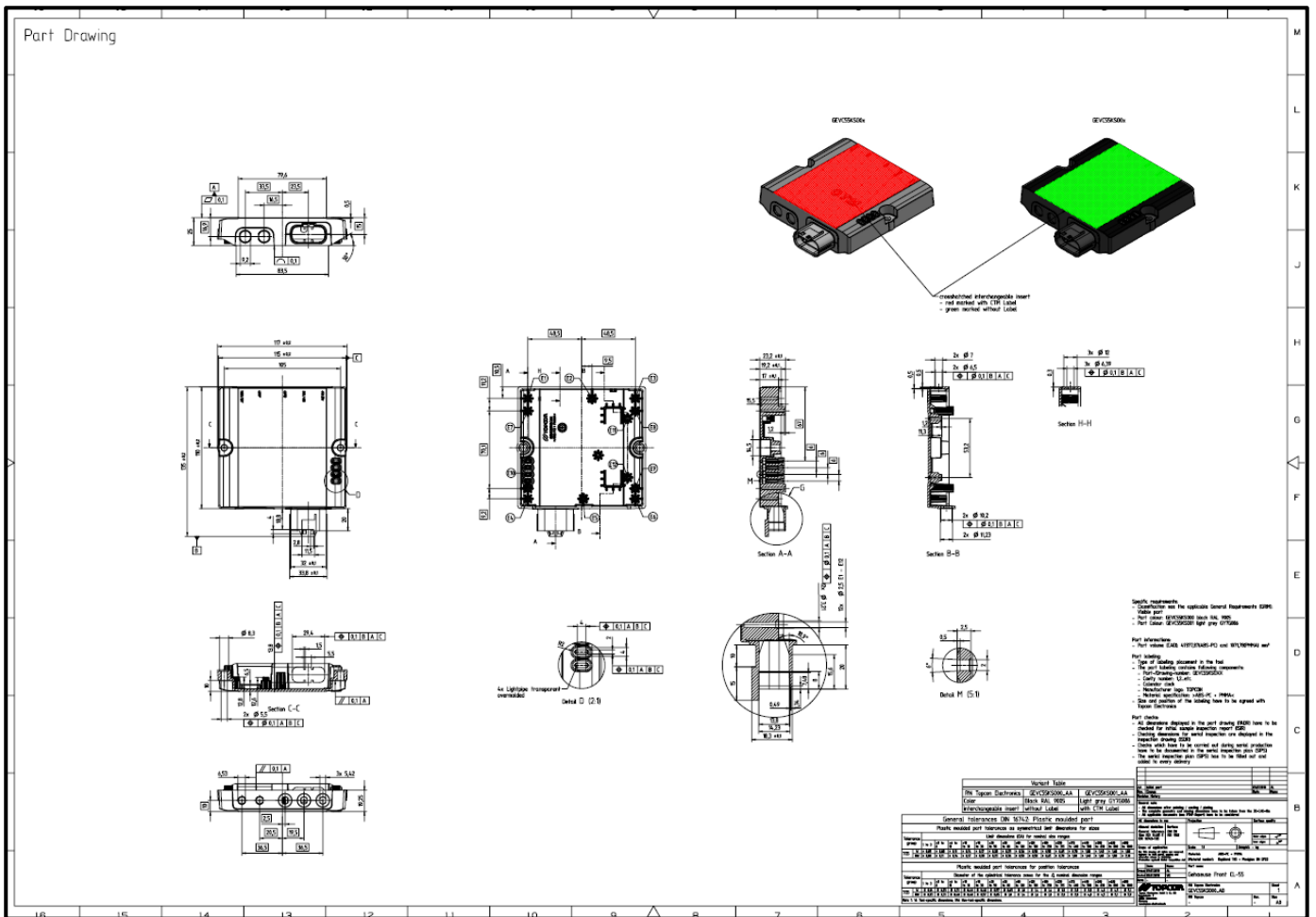


Figure 5

### Mass

The total mass of the CL-55 including the battery and the box is 0,3 kg.

### Mechanical dimensions

The CL-55 box board can be contained into a prism having the following dimensions:

L: 150,3 mm x W: 119,5 mm x H: 32,2 mm



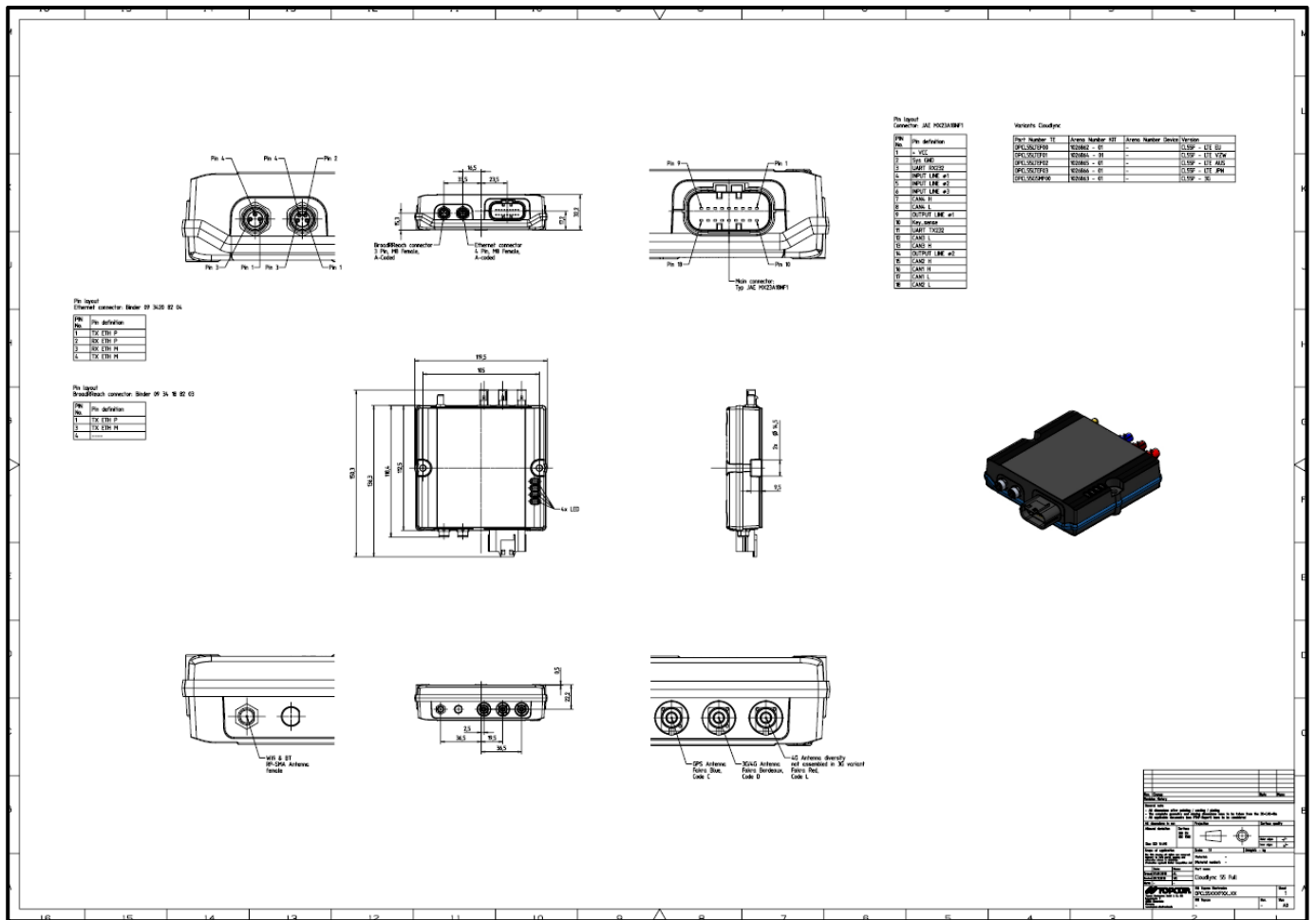


Figure 6 – CL-55 box mechanical drawing

## Fastening

The fastening method of the CL-55 box will be in accordance with Figure 6 above with two screws or bolts/nuts.

The fixation holes diameter is 5,5 mm for M5 screws/bolts. The head plane for screws has a diameter of 10mm and allows mounting with wrench socket up to 15mm diameter. The headplane is recessed 8mm to cover max. locknut with washer high within the cover dimensions. The mounting torque should be 1,75 +/-0,25 Nm.

# Technical Specifications

## Thermal characteristics

### Operating temperature

The CL-55 3G and CL-55 LITE 3G operate in accordance with the specification while exposed to a still air environment at a temperature range of  $-25\text{ °C} < T_{op} < +55\text{ °C}$ .

The CL-55 LTE EU and CL-55 LITE LTE EU operate in accordance with the specification while exposed to a still air environment at a temperature range of  $-25\text{ °C} < T_{op} < +50\text{ °C}$ .

### Storage temperature

The CL-55 will withstand an indefinite storage in an environment at a temperature range of  $-40\text{ °C} < T_s < +85\text{ °C}$ .

### Altitude

The CL-55 meets the specification requirements if kept to an altitude up to 2500 m a.s.l.

### Humidity

The CL-55 operates in accordance with the specification while kept in an ambient of RH included in the range 5% - 85% non-condensing.

## General environmental characteristics

### Protection degree

The CL-55, properly installed and connected, meets the IP66 protection level.

### Vibration and shock

The CL-55, properly mounted and connected, will be able to operate in accordance with the specification while exposed to a 10 – 2000 Hz random vibration profile of 21.3 m/s<sup>2</sup> RMS for 24 hours along each geometrical axis.

The CL-55 will survive the application of 100 impulses of 400 m/s<sup>2</sup> (6 mS each) along each geometrical axis.

## Electrical characteristics

### Electrical architecture

TABLE 1 shows the main hw characteristics.

TABLE 2 lists the CL-55 Functional blocks.

TABLE 3 shows the microprocessor block diagram.

Features	Type	Notes
Modem (3G version)	<p><b>SARA-U201(U-Blox)</b> Global coverage</p> <p><b>Approvals:</b></p> <ul style="list-style-type: none"> <li>● RED</li> <li>● GCF</li> <li>● CE</li> <li>● FCC</li> <li>● RCM(Australia)</li> <li>● CCC (China)</li> </ul>	<p><b>Bands:</b></p> <ul style="list-style-type: none"> <li>● Five Bands UMTS (WCDMA/FDD) Bands: 800, 850, 900, 1900 and 2100 MHz</li> <li>● Quad-Band GSM Bands: 850, 900, 1800 and 1900 MHz</li> <li>● 3GPP Rel.7 Compliant Protocol Stack</li> </ul> <p><b>Data speed:</b></p> <ul style="list-style-type: none"> <li>● HSDPA Cat.8 / HSUPA Cat.6 data rates DL: max. 7.2 Mbps, UL: max. 5.76 Mbps</li> <li>● EDGE Class 12 data rates DL: max. 237 kbps, UL: max. 237 kbps</li> <li>● GPRS Class 12 data rates DL: max. 85.6 kbps, UL: max. 85.6 kbps</li> </ul>
Modem (LTE Cat 1)	<p><b>LARA-R204-Verizon(U-Blox)</b> <b>Local coverage: US</b></p> <p><b>Approvals:</b></p> <ul style="list-style-type: none"> <li>● FCC</li> <li>● GCF</li> <li>● ISED</li> <li>● Verizon certification</li> <li>● RoHS</li> </ul>	<p>LTE (FDD) 3GPP Rel.9 Compliant</p> <p><b>Bands:</b></p> <ul style="list-style-type: none"> <li>● Bands 4,13 (1700 AWS, 700 MHz)</li> </ul> <p><b>Data speed:</b></p> <ul style="list-style-type: none"> <li>● LTE Cat. 1 single layer DL-MIMO DL/UL max: 10.3Mbps / 5.2 Mbps</li> </ul>
Modem (LTE Cat 1)	<p><b>LARA-R211 (EU)</b> <b>LARA-R280 (AUS)</b> <b>LARA-R220 (JAP)</b></p> <p><b>Approvals:</b></p> <ul style="list-style-type: none"> <li>● CE</li> <li>● RED</li> <li>● GCF</li> <li>● RCM(Australia)</li> </ul>	<p>LTE (FDD) 3GPP Rel.9 Compliant Protocol Stack, RX-Diversity</p> <p><b>Bands</b></p> <ul style="list-style-type: none"> <li>● Quad-Band LTE: Bands 2, 4, 5, 12 (700, 850, 1700/2100 (AWS) and 1900 MHz)</li> <li>● Tri-Band UMTS: Bands 5, 4, 2 (WCDMA/FDD 850, 1700/2100 (AWS) and 1900 MHz)</li> </ul> <p><b>Data speed</b></p> <ul style="list-style-type: none"> <li>● LTE Cat.1 DL: max. 10.2 Mbps, UL: max. 5.2 Mbps HSPA+ Cat.8 (ELS61-US) data rates DL: max. 7.2 Mbps, UL: max. 5.76 Mbps</li> <li>● GPRS Class 12 (ELS61-E) DL: max. 85.6 kbps, UL: max 85.6 kbps</li> <li>● SMS text and PDU mode support</li> </ul>
SIM	<p>Global Coverage SIM on Chip (KPN) Verizon SIM on Chip for US</p>	<p>Lock on local provider possible</p>

Features	Type	Notes
GPS	EVA – M8M(uBLOX)	<ul style="list-style-type: none"> <li>72-channel u-blox M8 engine GPS/QZSS L1C/A, GLONASS L1OF, BeiDou B1I, Galileo E1B/C, SBAS L1C/A: WAAS, EGNOS, MSAS, GAGAN</li> <li>FA-GPS and SBAS compliant</li> <li>PPS available</li> </ul>
Multi Radio WiFi/BT	EMMY-W161 (uBLOX) Approval for EU(RED), US (FCC), Canada (IC) and Japan (MIC)	<ul style="list-style-type: none"> <li>IEEE 802.11 a/b/g/n/ac compliant</li> <li>Wi-Fi 2.4 GHz channels 1-13</li> <li>Wi-Fi 5 GHz channels 36-165</li> <li>Station and micro access point operation (up to 8 clients)</li> <li>802.11 PHY data rates up to 72 Mbps</li> <li>LTE coexistence BAW filter included</li> <li>Dual-mode Bluetooth v4.2 with BR/EDR and Bluetooth low energy</li> </ul>
Radio UHF	SATELLINE-M3-TR49	65 MHz tuning range (410-475 MHz and 902-928 MHz) Channel Bandwidth:12.5 and 25 kHz
Processor	iMX6 UL (NXP)	ARM Cortex A7 core (see below the iMX family block diagram)
Flash memory	8 GB in Total	e-MMC
RAM memory	512 MB	DDR3
RTC	External device (PCF8563T)	Wake-up capability
CAN Interface	Up to 4 independent lines	2 Flex CAN, transceiver UJA1162 with wake-up capability + 2 external controller MCP2517FD (CAN FD), transceiver TCAN1042
Serial Line Interface	RS232	115,2 kbps max
Digital I/O	3 in + 2 out programmable I/O lines	<b>Input:</b> <ul style="list-style-type: none"> <li>pull-up</li> <li>pull down</li> <li>digital with hysteresis</li> <li>analog 8 bit</li> <li>Frequency/duty cycle (1 lines)</li> </ul> <b>Output:</b> <ul style="list-style-type: none"> <li>3 x open collector (150 mA max)</li> </ul>
Key on line	1 input line	With wake-up capability
LAN	1 x BroadRReach/100BASE-T1 and 1 x Ethernet 100BASE-TX	With wake-up capability on BroadRReach
Accelerometer + Gyro	LSM6DS3 3-axis	With wake-up capability
Battery	3,2V LiFePO4 1500mAh Rechargeable	On board recharger

Features	Type	Notes
Power supply	12V – 24V SMPS Automotive grade	ISO 7637 compliant as design goal

TABLE 1 – Main hw characteristics

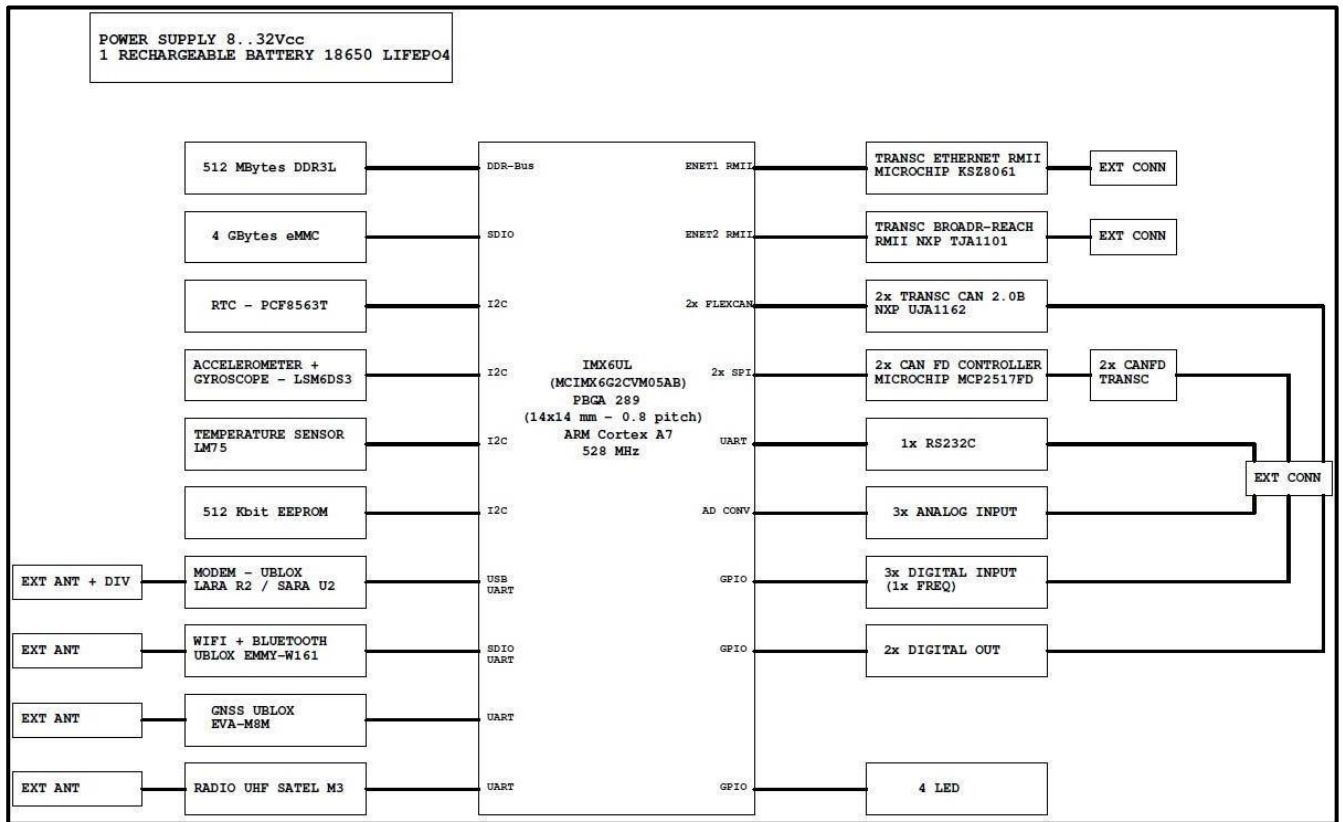


TABLE 2 – Functional blocks

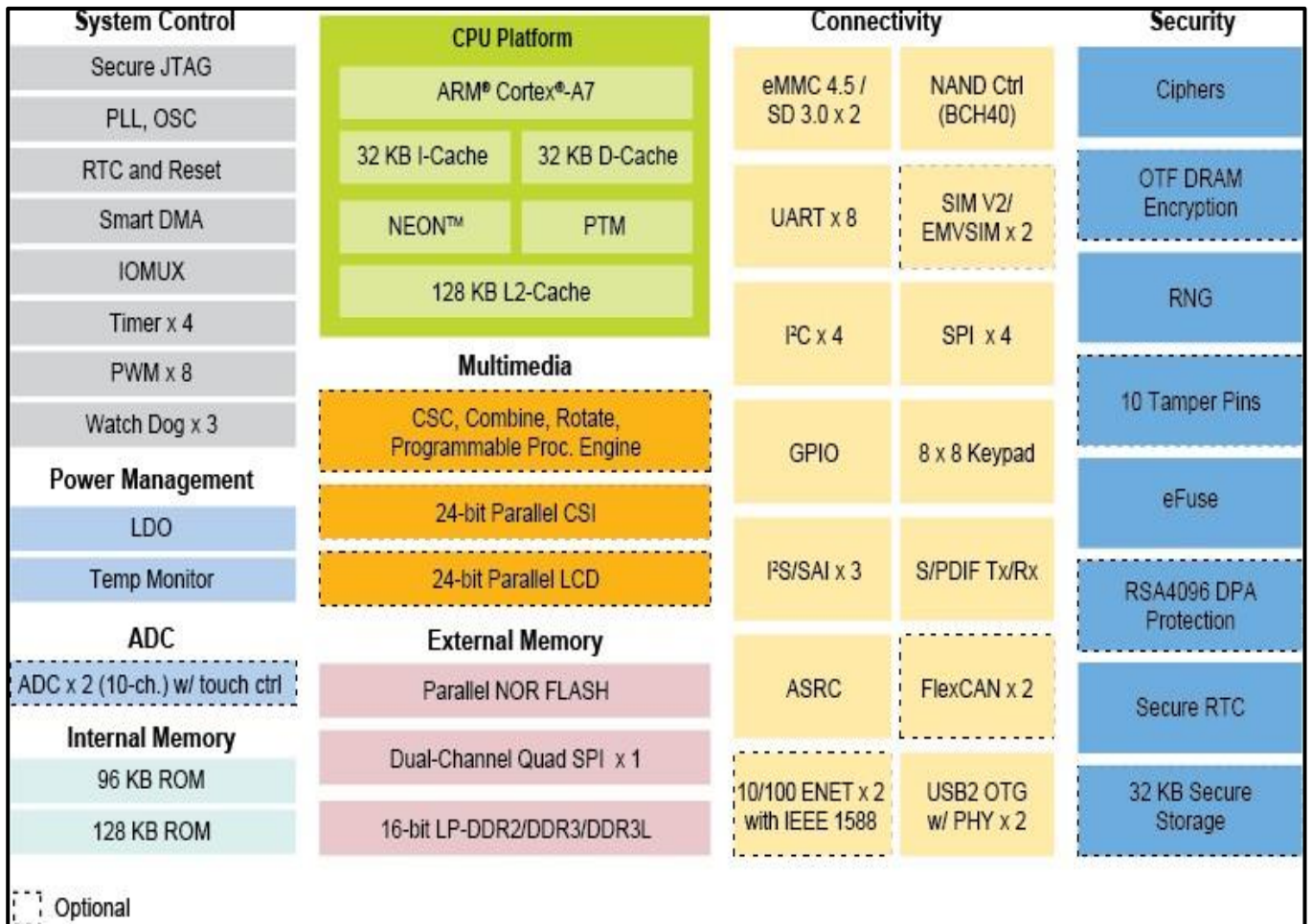


TABLE 3 – Processor functional blocks

## Supply voltage

### Vehicle battery supply

The CL-55, properly connected, will be able to operate in accordance with the specification when the supply voltage will be in the range of 8 - 36 Vdc.

The nominal supply voltage will be 13,6 and 27,2 Vdc (standard +30 automotive range for 12 V and 24 V plant).

The CL-55 is not intended for use during the cranking phase. The I/O lines compliance matches the supply voltage range.

The power supply interface will be compliant with ISO7637-0-1-2 (design goal). The power lines are protected against the polarity inversion.

Refer to para 3.4.7 for the power lines pin assignment.

# Installation – setup

## CL-55 installation

1. Plug the CL-55 into the ethernet port on the rear of the console.



Figure 7

2. Secure the CL-55 in a location in the cab that will prevent damage to the unit and will not cause a trip hazard (for example; under the seat).

## Layout diagrams

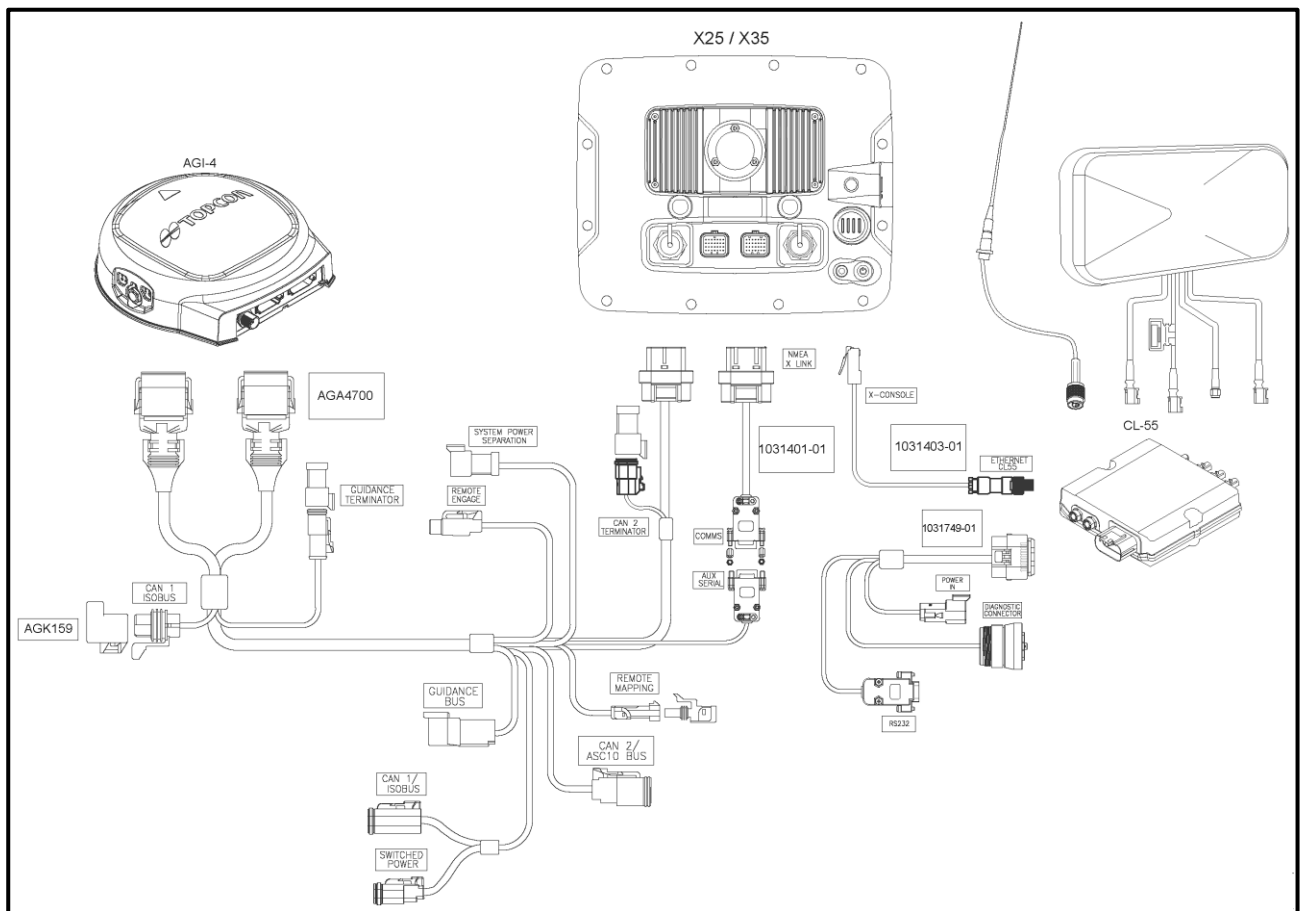


Figure 8

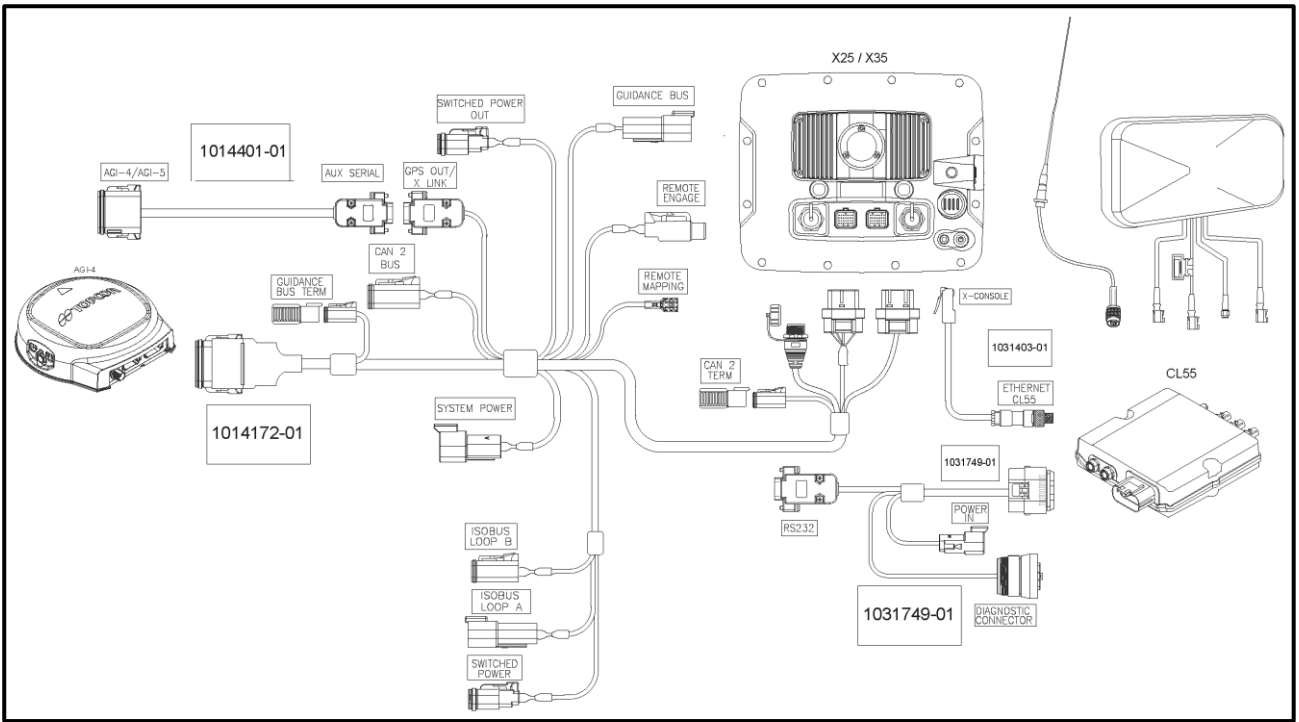


Figure 9

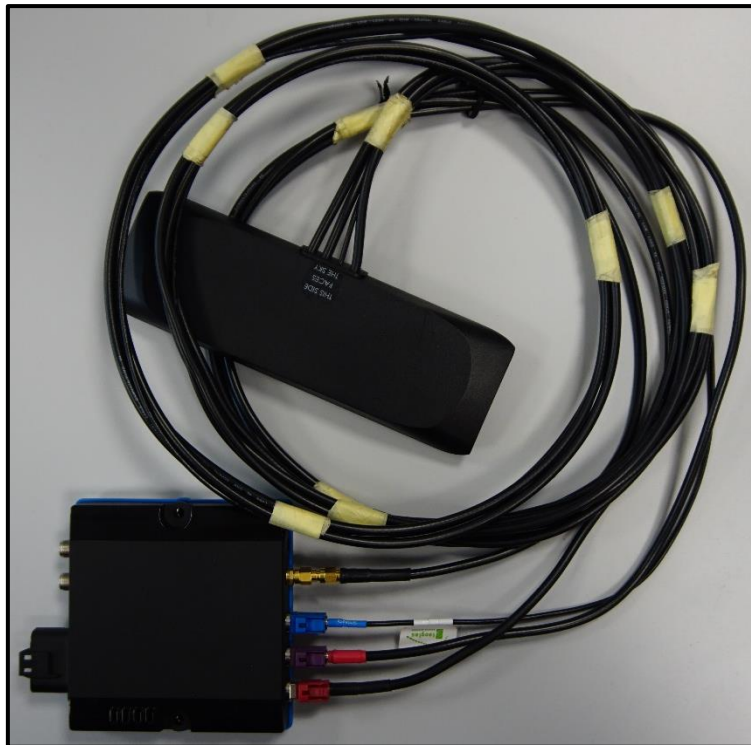
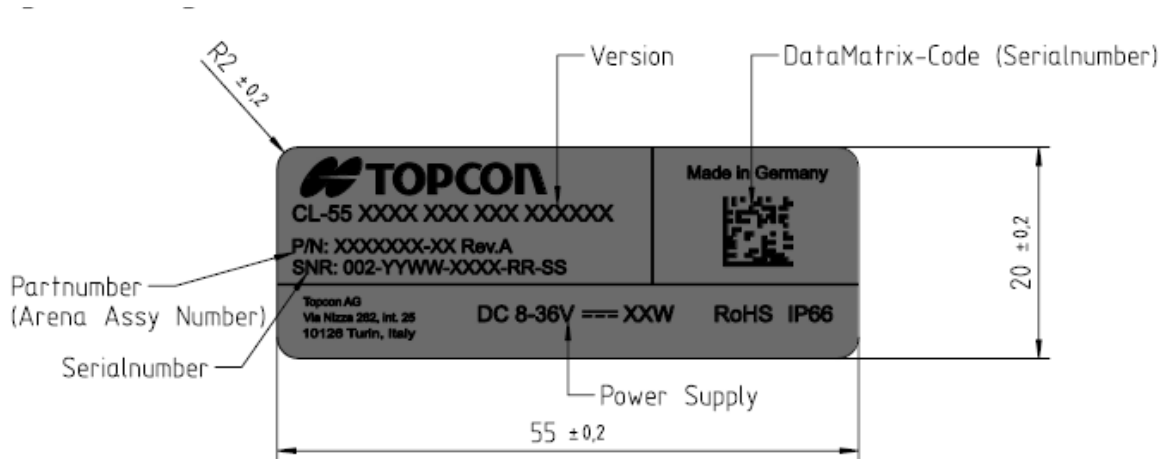


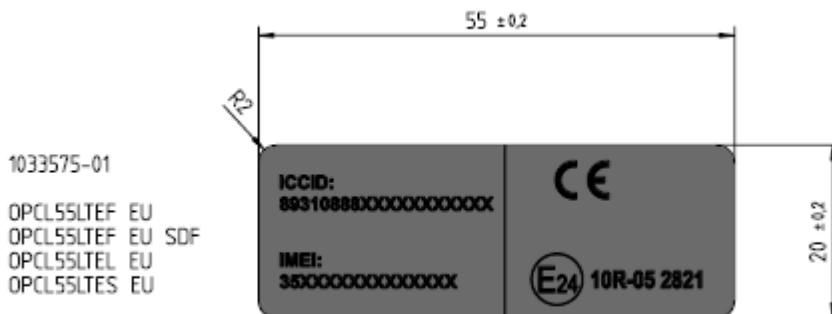
Figure 10



# Label



Variant Table				
Version	Part Number TE	Arena Assy Number	Arena Label Number	Power Supply
CL-55 3G	OPCL55GSMF00	1032096-01	1032816-01	DC 8-36V 5W
CL-55 LTE EU	OPCL55LTEF00	1032097-01	1032817-01	DC 8-36V 5W
CL-55 LTE EU SDF	OPCL55LTEF10	1032144-01	1032821-01	DC 8-36V 5W
CL-55 LTE VZW	OPCL55LTEF01	1032099-01	1032819-01	DC 8-36V 5W
CL-55 LTE AUS	OPCL55LTEF02	1032098-01	1032818-01	DC 8-36V 5W
CL-55 LTE JAP	OPCL55LTEF03	1032100-01	1032820-01	DC 8-36V 5W
CL-55 3G + RADIO	OPCL55GSMS00	1032101-01	1032822-01	DC 8-36V 10W
CL-55 LTE EU + RADIO	OPCL55LTES00	1032102-01	1032823-01	DC 8-36V 10W
CL-55 LTE EU SDF + RADIO	OPCL55LTES10	1032145-01	1032827-01	DC 8-36V 10W
CL-55 LTE VZW + RADIO	OPCL55LTES01	1032104-01	1032825-01	DC 8-36V 10W
CL-55 LTE AUS + RADIO	OPCL55LTES02	1032103-01	1032824-01	DC 8-36V 10W
CL-55 LTE JAP + RADIO	OPCL55LTES03	1032105-01	1032826-01	DC 8-36V 10W
CL-55 LITE 3G	OPCL55GSML00	1033469-01	1033474-01	DC 8-36V 5W
CL-55 LITE LTE EU	OPCL55LTEL00	1033470-01	1033475-01	DC 8-36V 5W
CL-55 LITE LTE VZW	OPCL55LTEL01	1033472-01	1033477-01	DC 8-36V 5W
CL-55 LITE LTE AUS	OPCL55LTEL02	1033471-01	1033476-01	DC 8-36V 5W
CL-55 LITE LTE JAP	OPCL55LTEL03	1033473-01	1033478-01	DC 8-36V 5W



1033576-01  
OPCL55LTEF AUS  
OPCL55LTEL AUS  
OPCL55LTES AUS

<b>ICCID:</b> 89310888XXXXXXXXXX	
<b>IMEI:</b> 350000000000000	 10R-05 2821





1033577-01  
OPCL55LTEL VZW

<b>ICCID:</b> 89310888XXXXXXXXXX	<b>Contains</b>
<b>IMEI:</b> 350000000000000	PCCID: XPY1EIQK2HN IC: 8996A-1EIQK2HN





1033578-01  
OPCL55LTES VZW

<b>ICCID:</b> 89310888XXXXXXXXXX	<b>Contains</b>
<b>IMEI:</b> 350000000000000	PCCID: XPY1EIQK2HN IC: 8996A-1EIQK2HN PCCID: 2A9VE-CL88 IC: 24991-CL88 PCCID: W98BATEL-TA37 IC: 2422A-8ATELTA37

1033583-01  
OPCL55LTEF JAP

<b>ICCID:</b> 89310888XXXXXXXXXX		 D179138883
<b>IMEI:</b> 350000000000000		 893-179219
※製品情報には電波法に基づく、 技術基準適合証明等 を受けた特定無線機器を記載している。		 207-1028MY
		10R-05 2821







1033580-01  
OPCL55LTEL JAP

<b>ICCID:</b> 89310888XXXXXXXXXX		 D179138883
<b>IMEI:</b> 350000000000000		 893-179219
※製品情報には電波法に基づく、 技術基準適合証明等 を受けた特定無線機器を記載している。		10R-05 2821

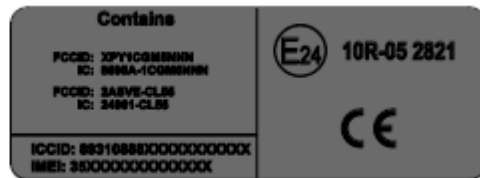
1033579-01  
OPCL55LTEF VZW

<b>ICCID:</b> 89310888XXXXXXXXXX	<b>Contains</b>
<b>IMEI:</b> 350000000000000	PCCID: XPY1EIQK2HN IC: 8996A-1EIQK2HN PCCID: 2A9VE-CL88 IC: 24991-CL88

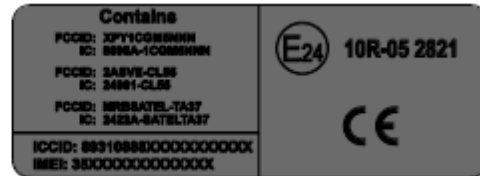
1033581-01  
OPCL55LTES JAP

<b>ICCID:</b> 89310888XXXXXXXXXX		 D179138883
<b>IMEI:</b> 350000000000000		 893-179219
※製品情報には電波法に基づく、 技術基準適合証明等 を受けた特定無線機器を記載している。		 207-1028MY
		 893-179997
		10R-05 2821

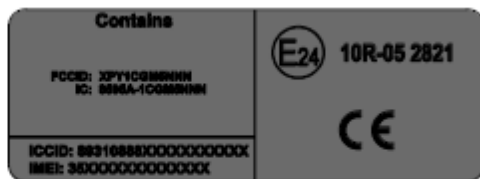
1033574-01  
OPCL55GSMF



1033573-01  
OPCL55GSMS



1033572-01  
OPCL55GSML



Label position:



Figure 11

## User interface

The LED's meaning is configurable and default implementation is:

- Green is ON for Key-on Status and OFF in Key off
- Blue is ON for connectivity (MODEM/Wi-Fi/BT)
- Yellow is ON for GPS fix
- Red is ON for a general error to be investigated

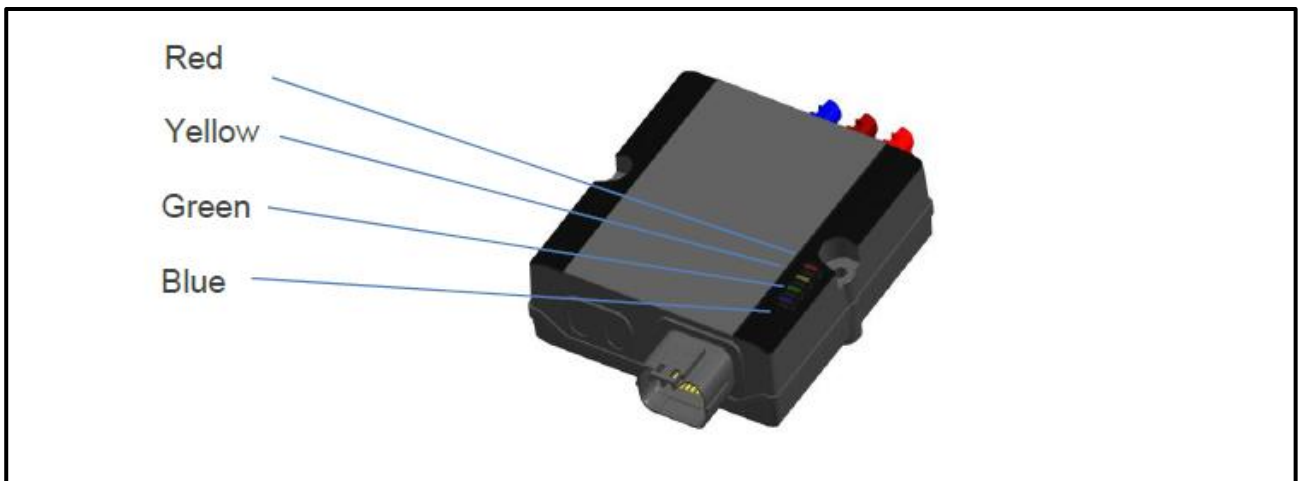


Figure 12

## Product warranty

Topcon Agriculture warrants that the electronic components shall be free of defects in materials and workmanship for a period of two years from the original date of shipment to the dealer. Warranty does not cover damages due to an improper use of the device and/or to the non-compliance with the indications contained in this document.

## Assistance and repair

For assistance and repair please contact:

Topcon Agriculture S.p.A., Nizza Street 262, Lingotto 10126, Turin Italy, +390110243907

Email: [TAG\\_eu\\_conformity@topcon.com](mailto:TAG_eu_conformity@topcon.com)

## Use restrictions and warnings (RED)

The device complies with the harmonized european standard:

EN62311:2008 “Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)”.

The exposure limit set by the standard is respected for distances  $\geq 30$  cm from the device.

## Use restrictions and warnings (FCC / ISED)

1.Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2.Device model CL-55 3G:

CONTAINS FCC ID: 2ASVE-CL-55 IC: 24901-CL-55

CONTAINS: FCC ID: XPY1CGM5NNN IC: 8595A-1CGM5NNN

CONTAINS: FCC ID: MRBSATEL-TA37 IC: 2422A-SATELTA37

Device model CL-55 LTE VZW:

CONTAINS FCC ID: 2ASVE-CL-55 IC: 24901-CL-55

CONTAINS: FCC ID: XPY1EIQN2NN IC: 8595A-1EIQN2NN

CONTAINS: FCC ID: MRBSATEL-TA37 IC: 2422A-SATELTA37

3.Responsible party's contact located in the United States:

FERDINAND RIODIQUE

7400 NATIONAL DRIVE, LIVERMORE, CA, USA 94550

Phone no: 925-245-8516

Email address: [friodique@topcon.com](mailto:friodique@topcon.com)

4.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.

5. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6. Responsible party's contact located in the Canada:

STEPHEN ROSENEGGER  
106-7326-10<sup>th</sup> Street N.E., Calgary, AB T2E8W1 Canada  
Phone no: +1.403.450.4262  
Email address: [srosenegger@topcon.com](mailto:srosenegger@topcon.com)

7. This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/recepteur exempt de licence contenu dans le present appareil est conforme aux CNR d'Innovation, Sciences et Developpement economique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

8. ICES-003 Class B Notice -Avis NMB-003 Classe B :

This Class B digital device complies with Canadian ICES-003

Cet appareil numerique classe B est conforme à la norme Canadien NMB-003.

CAN ICES-3(B) /NMB-3(B)

## **RF Radiation Exposure statement**

This product complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 30 cm between the radiator and your body.

Cet appareil est conforme aux limites d'exposition aux rayonnements de l'ISED pour un environnement non contrôlé. L'antenne doit être installé de façon à garder une distance minimale de 30 centimètres entre la source de rayonnements et votre corps.