

Tracking Hardware UK Ltd

Cello-IQ™

Advanced Fleet Management Solution with Driver Behavior Monitoring

Cello-IQ is a driver behavior monitoring and eco-driving device, designed to reduce fleet operating costs, improve productivity and increase fleet safety.

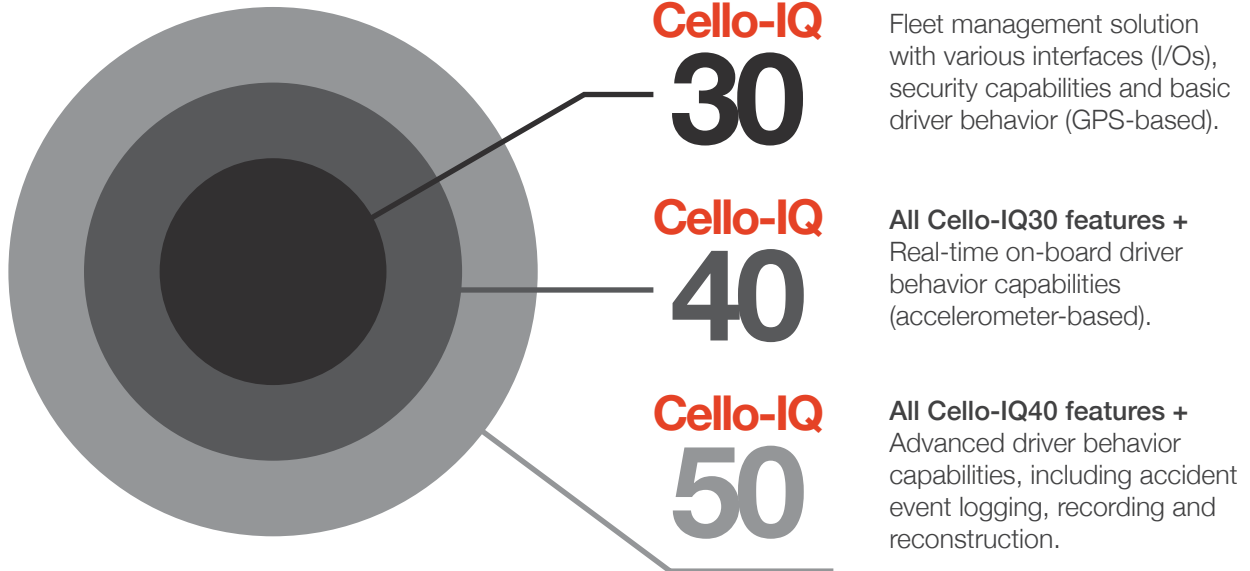
The Cello-IQ processes and interprets vehicle dynamics and driving patterns into a safety score, which reflects the driver's potential of involvement in a road accident, and an Eco score, indicating the vehicle's fuel efficiency and emission footprint.

The Cello-IQ is available in three firmware variants: Cello-IQ 30, Cello-IQ 40 and Cello-IQ 50.



Scalability means Flexibility

Cello-IQ is available in three firmware variants, enabling easy and rapid OTA upgrade to an advanced version.



Highlights

- **Emergency Data Recording (EDR) & Accident Recognition [Cello-IQ 50]** - detects, logs, reports and uploads accident events and accident raw data for crash event reconstruction on the server side.
- **Driver Behavior Management (DBM) [Cello-IQ 40/50]** - detects, processes, logs and reports a wide set of events and raw data related to hazardous or aggressive driving behavior. Providing the following scorings:
 - Maneuver level safety score
 - Trip level safety score
 - Trip level eco-driving score
- **Eco Driving Management [Cello-IQ 40/50]** - detects and reports events which feature uneconomical and environmentally unfriendly driving in terms of fuel consumption, emission and accelerated wear and tear.
- **Onboard Trip Level Scoring [Cello-IQ 40/50]** - provides trip statistics information, including Eco scoring and Safety scoring based on the onboard information gathered and processed during a trip.
- **Proprietary eCall [Cello-IQ 40/50]** - enables automatic dialing of a pre-defined emergency number in case of detected accident.
- **Real-Time Driver Feedback Display (DFD) [Cello-IQ 40/50]** - provides continuous real-time, visual and/or audible (via human speech in various languages) feedback to the driver via a dedicated "Driver Feedback Display" (DFD), indicating to the driver the risk level of their driving.



Harsh Acceleration



Hard Braking



Sharp Cornering



Over Speeding



Wrong Gear Handling



Excessive Idling



Off Road Warning

- **Accessories [Cello-IQ 30/40/50]** - ability to connect to Cellocator's accessories (communication, identification, sensors and application enablers) to suit a wide range of solutions.
- **BT Extender [Cello-IQ 30/40/50]** - serves as Bluetooth dual mode gateway to RS232, supporting the wireless communication channels between the Cello-IQ device and other devices with BT/BLE capabilities:
 - BT Classic - supports the Serial Port Profile (SPP), enabling the usage of any device supporting BT SPP, such as Smartphones and Electronic Logging Devices (ELDs).
 - BLE mode - supports the communication channel between the Cello-IQ and the MultiSenses (additional logic was developed in the Cello-IQ to manage the MultiSense data)





Use Cases

Fleet Operators

Improving driver behavior by using mentoring plans, thus increasing driver safety and operational efficiency, which consequently leads to significantly reduced costs.



Vehicle Insurers

To implement usage-based insurance (UBI) and "pay as you drive (PAYD)" plans.



Car Dealers

Improving customer retention by initiating periodic car maintenance services, while also providing crash detection support and an emergency call-out for customers involved in cases of accidents.



Public Transportation

Monitoring the driving behavior of employees driving public vehicles can have a considerable, positive impact on the organization by reducing costs (fuel, insurance, wear and tear), while enhancing the levels of operational efficiency and increasing passenger safety.



Car Rental / Car Sharing Companies

Effectively verify drivers by identifying who drives which car, while real-time driver behavior feedback enables the rental company to take immediate preventive actions if required.



Cold Chain Shipments

Assures the required environmental conditions (temperature, humidity, etc.) are maintained during shipments of perishable goods or pharmaceuticals, using the MultiSenses which communicate with the Cello-IQ device over BLE. Drivers can receive real-time updates of any breaches of pre-defined thresholds and take action (such as reset the thermostat) to guarantee compliance with cold chain shipment requirements.

Features Comparison Table

Feature	Sub Feature	Cello-IQ 30	Cello-IQ 40	Cello-IQ 50
1 Wire Temperature Sensor support		√	√	√
GNSS (Glonass & GPS) support		√	√	√
Accelerometer-based Ignition sense		√	√	√
Driver Behavior Maneuvers	Speeding		√	√
	Harsh Acceleration	GPS-based events	√	√
	Harsh Brake		√	√
	Harsh Turn		√	√
	Turn & Acceleration	-	-	√
	Turn & Brake	-	-	√
	Off Road	-	-	√
	Slalom	-	-	√
	Excessive RPM	Based on fleet logic	Events only	√
	Crash			√
eCall		-	√	√
Emergency Data Recording (EDR)		-	-	√
OTA Feature Package upgrades		√	√	√
Advanced Recovery (AR)		√	√	√
	DFD	-	√	√
	BT Extender	√	√	√

Cello-IQ 40/50: Accelerometer-based events and maneuvers' scores.

Cello-IQ Specifications

Communication	
2G	GPRS class 10, PDU SMS Quad band: 850, 900, 1800, 1900MHz
3G*	NA: UMTS/HSPA/GSM/GPRS/EDGS: 5.76[UL]/7.2[DL] Mbps, 850/1900 EU: UMTS/HSPA: 5.7[UL]/7.2[DL] Mbps, 900/2100 GSM/GPRS/EDGE: 850/900/1800/1900 MHz
CDMA*	Dual band 800 / 1900 MHz 1xRTT 153.6 kbps UL/DL
Power Output	2W, 1W
SIM	Internal, replaceable, remote PIN code management
Antenna	Internal, multi band GSM antenna
Packet Data	TCP/IP, UDP/IP
SMS	PDU, text SMS for data forwarding
GNSS	
Technology	STM STA8088 Chipset
Sensitivity (tracking)	-162dBm
Acquisition (normal)	Cold <35Sec, Warm<35Sec, Hot<1Sec
Internal Antenna	On board, internal patch antenna
External Antenna (optional)	External Active antenna (2.85V ± 0.5%), SMA connector Firmware controlled receiver antenna source selection
Inputs and Outputs	
Inputs	1 internally pulled down input dedicated for ignition switch 3 internally pulled up Discrete Dry inputs with assignable functionality and configurable threshold for logical high and low states 2 configurable inputs capable to serve as: Frequency counters - configurable resolution; Up to 5kHz input signal; Signal level (3V < Vin ≤ 30V); Accuracy ±2% Analog inputs with variable resolution - 8bit, adapted to 0-2.5V signal, resolution 20mV, accuracy ±20mV; 8bits, adapted to 0-30V signal, resolution 100mV, accuracy ±100mV Discrete Dry – configurable threshold for logical high and low states Discrete Wet - configurable threshold for logical high and low states
Outputs	5 general purpose open drain outputs (250mA max) with assignable functionality.

* This variant possess different I/Os - please contact our sales department for more information.

Interfaces

Voice Interface	Cellocator HF compliant Full duplex Echo cancelation Noise suppression Spy listening option Auto-answer option Volume control by single button or two buttons Distress voice call and plain call generation
COM port (RS232)	Selectable baud rate (9600, 19200 or 115000bps) True RS232 levels 8 bit, 1 Stop Bit, No Parity MDT Interface Garmin™ Interface PSP™ (Car Alarm) Interface Cellocator Serial Protocol Transparent data mode Configuration update Firmware upgrade
Debug port (RS232 out)	External Monitoring of Modem-CPU dialog 115000bps True RS232 levels 8 bit, 1 Stop Bit, No Parity
1-Wire™ (Dallas port)	DS1990A, DS1971 compliant DS18B20 compliant Extended bus current source with 7 mA driving capability Driver management (up to 100 driver IDS) Car Alarm Authorization
Accelerometer	3D, ±8g range, 12 Bit representation, 1mg resolution, I2C interface
Connectors	20pin Molex, Automotive SMA switch for optional external GPS Antenna

Power

Input Voltage	7-32VDC
Average Current Consumption	Normal: 45mA Economic: 16mA Hibernation: <2.1mA Shipment (Off): <20uA (Internal Battery)
Internal Battery	Li-Ion Polymer, 3.7V, 1000mAh, rechargeable Up to 200 Tx @ 1Msg/min @ 25°C Operating Temperature: -20 (65% charge) to 60°C Battery Monitoring: Temperature (NTC) & voltage Autonomy: Up to 200 Tx @ 1Msg/min @ 25°C Protections: over current, overcharge and over discharge

Environment

Temperature, operation	-30°C to +70°C full performance -40°C to +85°C – degraded communication
Temperature, storage	-40°C to +85°C
Humidity	95% non-condensing
Ingress Protection	IP40
Vibration, Impact	ISO 16750
Vehicle power transient	ISO 7637 Test level 4 (e-mark directives compliant)
Mounting	Tie-wraps and/or two sided adhesive

Certifications

FCC	Part 15 Subpart B, part 22/24 compliant
CE	CE EMC & R&TTE according to 89/336/EEC or 1999/5/EC CE Safety EN60950-1:2001+A11:2004 CE number - CE 1177,1909 Automotive Directive 2004/104/EC (E-Mark)
IC	Industrial Canada
PTCRB	TRP, TIS, Spurious and harmonics emission
EN12830 Compliance With 1-wire Temperature Sensor	Suitability: T Climatic environment: w/o Cello Protector – B with Cello Protector – D Accuracy class: -10°C to +85°C - 1 <-10°C, > +85°C - 2 Range: -55°C to +125°C

Dimensions & Weight

Dimensions	91x73x23mm
Weight	110gr

DFD Specifications

Interfaces

COM1 Port (RS232)	True RS232 Levels 8 bit; 1 Stop Bit; No Parity, 115200 BPS. Proprietary Serial Protocol
Connectors	4 pin connector: GND, Power Supply, RS232 TX, RS232 RX

Power

Input Voltage	7-32VDC
Power Consumption	Hibernation: 760uA at 12 V Operational : up to 5.4 W assuming all LEDs are illuminating

Display

LED Array	12 white LEDs
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Audio

Recorded Messages	128Mbytes SDCARD holding voice recordings
Loudspeaker	1W
Recording Format	Sampling rate: 16Khz Encoding: Signed 16 Bit PCM RAW data file format

Environment

Temperature, operating	-15°C to +65°C full performance
Temperature, storage	-20°C to +85°C
Humidity	95% non-condensing
Protection	IP40

Certifications

FCC	Part 15 Subpart B, part 22/24 compliant
CE	CE EMC & R&TTE according to 89/336/EEC or 1999/5/EC CE Safety EN60950-1:2001+A11:2004 Automotive Directive 2004/104/EC (E-Mark)
IC	Industrial Canada

Mechanical Attributes

Dimensions	~ 73 x 47x 18.6 mm
Weight	~ 62 grams
Stand	Manually adjustable view angle with screw
Mounting	Double-sided adhesive tape or screws
Cable	4 wires, 28 Gauge, 30 cm long
Connector	4 Pins, 2.54 mm Pitch, Single row

Tracking Hardware UK

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