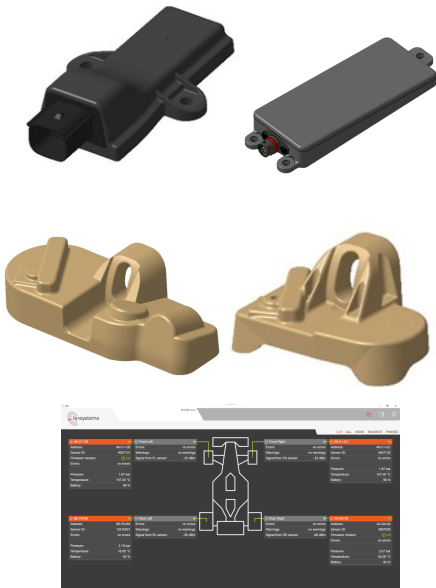# 1SYSTEM

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Tyre Pressure & Temperature Monitoring System

System Features

- **Fit & Forget functionality,** including the **fastest ever sensor learning** which works on all car types including open wheel race cars!

- **Global Certification** of 2.4GHz Radio Frequency means 1SYSTEM® can be used around the world without having to change components

- **Certified for use in multiple countries** including; USA , Europe, UK , Canada , Japan, China, Brazil, Australia & many more.

- **Distributed system architecture** means only four chassis mounted devices

- **Tyre Pressure & Temperature** data from the wheel sensors, plus multiple low-pressure warning are provided via the high speed CAN bus connection

- **Suitable for all race series**, ranging from GTE, GT3 & GT4, through to Indycar, F2, F3, LMH, LMDh, LMP2, TCR, WRC and Dakar

- **Multi-level security protocols** provides unparalleled data privacy preventing your competitors from seeing your tyre data

- **Off car sensor monitoring** via new App removing the requirement for separate hand-held tools

System Benefits & Overview

- **Learning or Positioned System Functionality**
  - Depending on application system can be run either as positioned system (with between one and four ECU Antennas on the vehicle) or as a learning system with four ECU Antennas.

- **Fit and Forget Learning Functionality**
  - Can be run on open wheel race cars!
  - ECU Antenna will automatically detect which sensors are fitted to the car, even when the car is stationary
  - System starts reporting tyre data as soon as the wheel sensors are learned, providing data before the car leaves the box
  - Once fitted, no user intervention is required with no need to manually assign sensors to specific corners on any car type
  - Automatic check of sensors when vehicle starts moving to filter out any non-moving wheels (e.g. spare wheels fitted to the car)
  - System automatically learns new sensors fitted to the car, meaning no user interaction is required

- **Low Pressure Warning Algorithms**
  - The low pressure warnings are calculated using bf1systems pressure loss algorithms, refined over many years in multiple formulae
  - Algorithms will detect small losses of pressure and provide warnings, often before the driver will notice them
  - Algorithms derived to prevent false warnings which could occur when tyre pressures drop, for example when a safety car is deployed

- **Device & System management**
  - Windows based App provides enhanced functionality, replacing the need for dedicated hand-held TPMS tools
  - Supplementary device management and configuration is carried out via our proprietary 1SYSTEM® software, using your Windows laptop or tablet

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TPMS Wheel Sensor

Wheel Sensor Features

- **1SYSTEM® TPMS wheel sensor is available in three configurations, Lite, Pro and Pro Plus**

- **bf1systems lightest ever wheel sensor, weighing just 15g**

- **High accuracy, high data rates and high temperature performance**

- **2.4GHz frequency transmission legal worldwide**

Wheel Sensor Configuration Options

	Part Number	Transmission Rate	Pressure Resolution
TPMS Lite	F1-100-1800-002 F1-XXX-1800-002	0.33Hz	25mbar/bit
TPMS Pro	F1-100-1800-003 F1-XXX-1800-003	1Hz	12.5mbar/bit

Wheel Sensor Specification

Product	Model Range	TP24G1WE
	Dimensions	48 x 32 x 23 mm
	Weight	15 grams
	Housing Material	PEEK
Pressure	Pressure Range	0 - 5.1175 bar gauge
	Pressure Accuracy (mbar)	± 25
Temperature	Internal Temp Measurement	-40 - 150 °C
	Internal Temp Accuracy	±1 °C
	Internal Temp Resolution	1 °C/bit
Environment	Operating Temp Range	+15 to +125 °C (excursions to 150°C < 24hrs over lifetime)
	Max. Centripetal Acceleration	4700 G

Dimensions
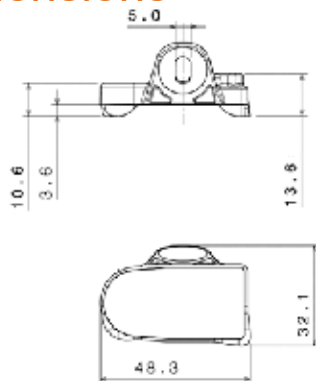
Benefits

- Compatible with same wide range of valves as used previously by bf1systems to suit most wheel rims

- Light weight of 15g means minimal balancing weights required on wheel rim

- Sensors can be interrogated by 1SYSTEM® Windows App which replaces dedicated hand-held tools

- Tested to g loading of over 4700g making it suitable for the highest speed applications

Preliminary information that may be **subject to change** without notice

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IRTPTMS Wheel Sensor

Features
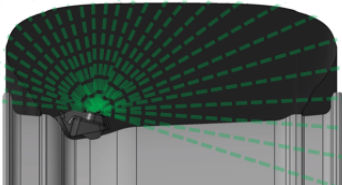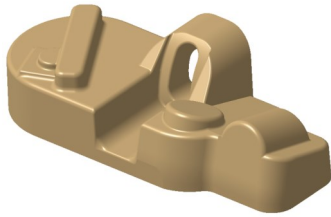
- Market leading 200° Field of View, providing measurements across entire Tyre Wall
- ECU and wireless sensor configuration with Windows software application
- Off car device management using Windows software application
- Interchangeability on car, TPMS and IRTPTMS use same chassis mounted ECU
- High accuracy, High temperature performance
- Multi-Level Security features available for Manufacturers, Teams, Series and Cars
- Enhanced bf1 algorithms refined over many years in Motorsport sector

Wheel Sensor Configuration Options

	Order Code / Part No.	Transmission Rate (IR Temp)	Transmission Rate (Pressure & Temp)	Pressure Resolution	Number of IR Measurement Points
IRTPTMS Lite	F1-100-1850-001 F1-XXX-1850-001	1Hz	1Hz	12.5mbar/bit	8
IRTPTMS Pro	F1-100-1850-002 F1-XXX-1850-002	1Hz	1Hz	5mbar/bit	28

Wheel Sensor Specification

Product	Model Range	IR24G1WE
	Dimensions	64 x 32 x 23 mm
	Weight	33 grams (without valve fitted)
	Housing Material	PEEK
Inner Tyre Carcass Measurement	Field of View	200°
	Pixel Configuration Lite	Lite 8 from 28 (configurable positions via 1SYSTEM Application)
	Pixel Configuration Pro	Pro 28
	IR Temperature Range	-40 to 215 °C
	IR Temperature Resolution	0.25°C/bit
	IR Temperature Accuracy	± 2.5 °
Pressure	Pressure Range	0 - 5.1175 bar gauge
	Pressure Accuracy (mbar)	± 25
Temperature	Internal Measurement	0 - 150 °C
	Internal Accuracy	±1 °C
	Internal Resolution	1 °C / bit
Environment	Operating Temp Range	0 to +125 °C (excursions to 150°C < 24hrs over lifetime)
	Max Centripetal Acceleration	4700 G

Dimensions
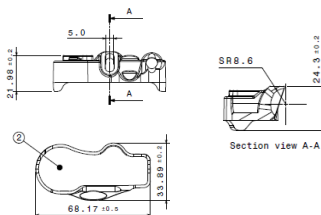
Benefits

- High number of temperature measurement points provides comprehensive set of data to allow for detailed tyre behavior analysis
- Wide Field of View allows for non-contact rim temperature measurement
- Compatible with same wide range of valves as used previously by bf1systems to suit most wheel rims
- Sensors can be interrogated by 1SYSTEM® Windows App which replaces dedicated hand-held tools
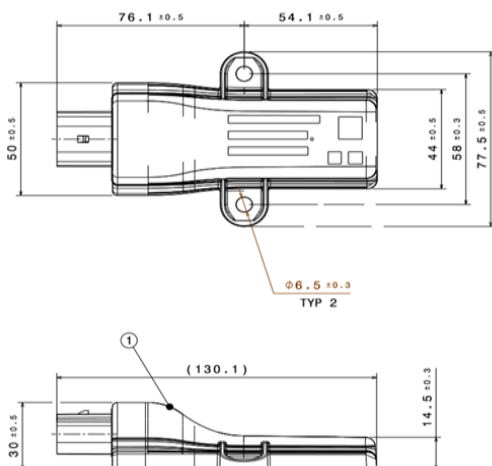
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Lite ECU

Features

- Simple, efficient installation requires only four components mounted on the chassis

- Highly tuned learning algorithms allows for learning system to work on all car types including open wheel race cars

- Robust system design allows for ECU to be installed in protected locations around the wheel, preventing damage to parts

Lite ECU Specification

Product	Order Code / Part Number	F1-100-1799-002 or F1-XXX-1799-002 (non FIA Secure TPMS) F1-100-1799-012 or F1-XXX-1799-012 (FIA Secure TPMS)
	bf1 Model Designation	BF24G1EC
	Weight	80g
Environment	IP Protection Rating	6K7
	Operating Temperature Range	0 to +105 °C
Electrical	Power Supply	+12V switched ignition
	Operating Voltage Range	6.5 - 18 V
	Max. current consumption	40 mA
ECU Interface	CAN Bus Data Rate	1Mbaud
	Mating Connector	Molex MX150 Series P/N 334724801 Female
RF	RF Frequency Range	2.4 - 2.48 GHz
	Antenna Type	integrated

Dimensions

Lite ECU Benefits

- Distributed system architecture means only +12V, 0V, CANH and CANL connections are required for each ECU Antenna on the car, simplifying car wiring

- High sensitivity receiver means ECU Antenna can be located in protected areas around the wheel reducing the likelihood of damage to parts

- Advanced learning algorithms provide the fastest ever learning of sensors when fitted to the vehicle

- ECU Antenna is compatible with both TPMS and IRTPTMS wheel sensors, meaning no need to change or reprogram chassis mounted hardware to run different sensor types, just fit and drive

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ECU Pro

Features
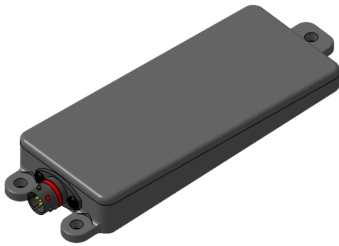
- Compact, lightweight package with ASX connector for motorsport applications

- Ability to use in learning or positioned mode for sensor detection

- Learning mode requires four ECU Pros mounted on the vehicle

- Positioned mode can be run with between 1 &4 ECU Pros mounted on the vehicle

- Highly tuned learning algorithms allows for learning system to work on all car types

Specification

Product	Order Code / Part Number	F1-100-1799-003 or F1-XXX-1799-003 (non FIA Secure TPMS) F1-100-1799-013 or F1-XXX-1799-013 (FIA Secure TPMS)
	bf1 Model Designation	BF24G1EC
	Weight	55g
Environment	IP Protection Rating	6K7
	Operating Temperature Range	0 to +105 °C
Electrical	Power Supply	+12V switched ignition
	Operating Voltage Range	6.5 - 18 V
	Max. current consumption	40 mA
ECU Interface	CAN Bus Data Rate	1M baud
	Connector	TE Connectivity ASX002-06PN-HE
	Mating Connector	TE Connectivity ASX602-06SN-HE
RF	RF Frequency Range	2.4 - 2.48 GHz
	Antenna Type	integrated
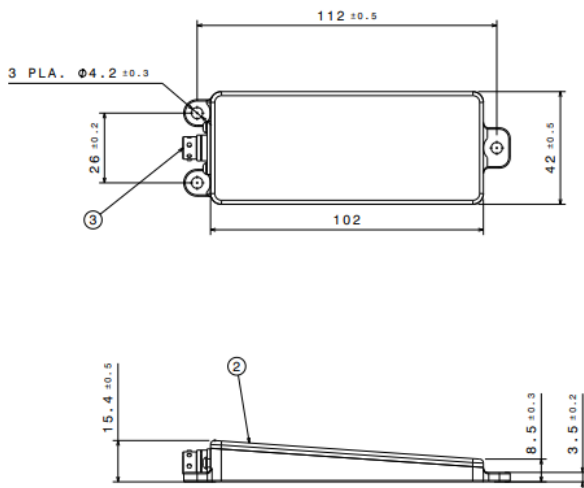
Dimensions

112 ±0.5

3 PLA. Ø4.2 ±0.3

26 ±0.2

42 ±0.5

102

15.4 ±0.5

8.5 ±0.3

3.5 ±0.2

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Pro ECU Benefits

- Small, lightweight, rugged design makes this ECU more suitable for harsher installations or where space is at a premium.

- Distributed system architecture means only +12V, 0V, CANH and CANL connections are required for each ECU Antenna on the car, simplifying car wiring

- High sensitivity receiver means ECU Antenna can be located in protected areas around the wheel reducing the likelihood of damage to parts

- ECU Antenna is compatible with both TPMS and IRTPTMS wheel sensors, meaning no need to change or reprogram chassis mounted hardware to run different

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Application Software

Application Features
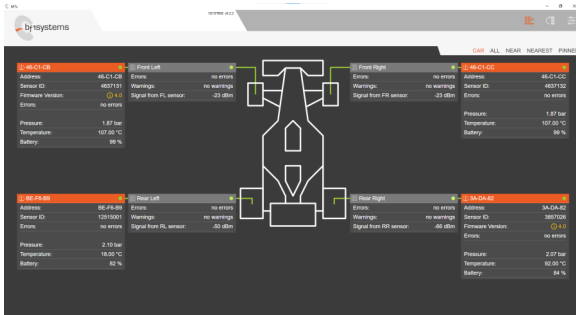
- Management of your Tyre Monitoring devices in the 21st Century!

- Removes the need to trigger wheels to identify Sensors!

- UX Enhancements driven from customer feedback

- UX developed specifically for Motorsport use cases, including Tyre Engineer, Vehicle Engineer and Development Engineer functions.

- Use the 2.4GHz wireless capability to read/write directly with Sensing devices using your tablet or laptop

All NEW Software!

bf1systems has developed a NEW Windows based application software for the management and configuration of all your 1SYSTEM® devices

1SYSTEM® App provides fast, quick, simple and efficient hand-held testing capabilities for wheel sensors, WITHOUT the need for a dedicated TPMS hand-held unit

User configurable security means your tyre data is more secure than ever before

Feature Summary

Application Feature	1SYSTEM® Core	1SYSTEM® Core Plus
License	Free Download	Annual License
ECU Settings & Warnings Configuration	Yes *only when Connected to Car	Yes
ECU & Sensor Firmware Update	Yes *only when Connected to Car	Yes
ECU & Sensor Security (Series, Team, Car)	No	Yes
Sensor Data Display	Yes *only when Connected to Car	Yes
Sensor Configuration	No	Yes
Find Nearest Sensor	No	Yes
Find Nearest 4 Sensors	No	Yes
Pin Nearest Sensors	No	Yes
Tyre Set Management	No	Yes
Project Configuration (Vehicle Management)	No	Yes

1SYSTEM® Application software has many more features to ensure management of your bf1 products is simple, efficient, user friendly and consistent across all products in our evolving 1SYSTEM® range of 2.4GHz devices.
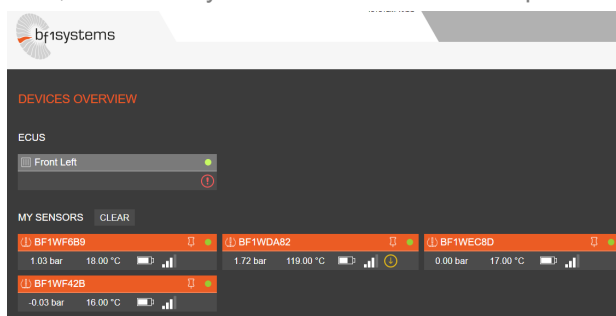
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Certification & Availability

Product Certification

- The 1SYSTEM® range is certified in multiple countries, with more being tested, validated and certified each month.

- Further countries may be added via commercial agreement, please enquire if the country required is not listed.

Country	1SYSTEM® ECU G1	1SYSTEM® TPMS Wheel Sensor	1SYSTEM® IRTPTMS Wheel Sensor
Australia	Certified	Certified	Certified
Bahrain	Certified	Certified	Certified
Belize	Certified	Certified	Certified
Brazil	Certified	Certified	Certified
Canada	Certified	Certified	Certified
China	In Process	In Process	In Process
EU	Certified	Certified	Certified
Hong Kong	Certified	Certified	Certified
Japan	Certified	Certified	Certified
Malaysia	Certified	Certified	Certified
New Zealand	Certified	Certified	Certified
Qatar	Certified	Certified	Certified
Saudi Arabia	Not Required (This Device is not under CITC authorisation)	Not Required (This Device is not under CITC authorisation)	Not Required (This Device is not under CITC authorisation)
Singapore	Certified	Certified	Certified
Thailand	Certified	Certified	Certified
UAE	Certified	Certified	Certified
UK	Certified	Certified	Certified
USA	Certified	Certified	Certified

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