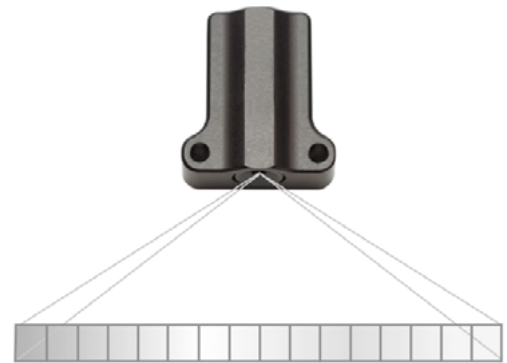


INFRARED TIRE TEMPERATURE SENSOR KIT IRTS-UK-V2

The Izze-Racing infrared sensor is specifically designed to measure the highly transient surface temperature of a tire with spatial fidelity, providing invaluable information for chassis tuning, tire exploitation, and driver development.

Each sensor is capable of measuring temperature at 16, 8, or 4 laterally-spaced points, at a sampling frequency of up to 100Hz, object temperature between -20 to 300 °C, using CAN 2.0A protocol, enclosed in a compact IP66 rated aluminum enclosure, and priced to be affordable to all tiers of motorsport.

The sensor is now offered as a complete kit for any data acquisition system that can log CAN messages. The kit includes four 4, 8, or 16-channel infrared tire temperature sensors with wide (60°) or ultra-wide (120°) field-of-views and a complete motorsport-grade wiring harness.



SENSOR SPECIFICATIONS

Temperature Measurement Range, T_o	-20 to 300 °C
Package Temperature Range, T_p	-20 to 85 °C
Accuracy (Central 10 Channels, Nominal) (16-Ch Sensor)	$\pm 1.0^{\circ}\text{C}$ for $0^{\circ}\text{C} < T_p < 50^{\circ}\text{C}$ $\pm 2.0^{\circ}\text{C}$ for $T_p < 0^{\circ}\text{C}$ and $T_p > 50^{\circ}\text{C}$
Accuracy (First & Last 3 Channels, Nominal) (16-Ch Sensor)	$\pm 2.0^{\circ}\text{C}$ for $0^{\circ}\text{C} < T_p < 50^{\circ}\text{C}$ $\pm 3.0^{\circ}\text{C}$ for $T_p < 0^{\circ}\text{C}$ and $T_p > 50^{\circ}\text{C}$
Noise Equivalent Temperature Difference, NETD	0.5 °C at 16Hz, $\epsilon = 0.85$, $T_o = 25^{\circ}\text{C}$
Field of View, FOV	60° x 8° (wide) 120° x 15° (ultra-wide)
Number of Channels	16, 8, or 4
Sampling Frequency	100 ¹ , 64 ¹ , 32, 16, 8, 4, 2, or 1Hz
Thermal Time Constant	2 ms
Effective Emissivity	0.01 to 1.00 (default = 0.78)
Spectral Range	8 to 14 μm

1 – Optional Extra, 64Hz limit for IRTS-120-V2, 100Hz limit for IRTS-60-V2

ELECTRICAL SPECIFICATIONS (SENSOR)

Supply Voltage, V_s	5 to 8 V
Supply Current, I_s (typ)	30 mA
Features	<ul style="list-style-type: none"> Reverse polarity protection Over-temperature protection (125 °C)

MECHANICAL SPECIFICATIONS (SENSOR)

Weight	20 g
L x W x H (max, 60° FOV)	36.6 x 26.0 x 12.3 mm
L x W x H (max, 120° FOV)	31 x 29.0 x 12.3 mm
Protection Rating	IP66



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CAN SPECIFICATIONS

Standard	CAN 2.0A (11-bit identifier), ISO-11898
Bit Rate	1 Mbit/s
Byte Order	Big-Endian / Motorola
Data Conversion	0.1 °C per bit, -100 °C offset, unsigned
Base CAN ID's (Default)	LF Sensor: 1200 (Dec) / 0x4B0 (Hex) RF Sensor: 1204 (Dec) / 0x4B4 (Hex) LR Sensor: 1208 (Dec) / 0x4B8 (Hex) RR Sensor: 1212 (Dec) / 0x4BC (Hex)
Termination	None

CAN ID: Base ID

Channel 1		Channel 2		Channel 3		Channel 4	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

CAN ID: Base ID+1

Channel 5		Channel 6		Channel 7		Channel 8	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

CAN ID: Base ID+2

Channel 9		Channel 10		Channel 11		Channel 12	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

CAN ID: Base ID+3

Channel 13		Channel 14		Channel 15		Channel 16	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4 (MSB)	Byte 5 (LSB)	Byte 6 (MSB)	Byte 7 (LSB)

WIRING SPECIFICATIONS (SENSOR)

Wire	26 AWG M22759/32, DR25 jacket
Cable Length (typ.)	500 mm
Connector	Deutsch DTM 4P (gold contacts)

Supply Voltage, V _s	Red	(Pin 3)	(twisted)
Ground	Black	(Pin 4)	
CAN +	Blue	(Pin 2)	(twisted)
CAN -	White	(Pin 1)	

INFRARED TIRE TEMPERATURE SENSOR KIT IRTS-UK-V2

SENSOR CONFIGURATION:

To modify the sensor's configuration, send the following CAN message at 1Hz for at least 10 seconds and then reset the sensor by disconnecting power for 5 seconds:

CAN ID: Current Base ID

Programming Constant		New CAN Base ID (11-bit)		Emissivity	Sampling Frequency		Channels	
Byte 0 (MSB)	Byte 1 (LSB)	Byte 2 (MSB)	Byte 3 (LSB)	Byte 4	Byte 5		Byte 6	Byte 7
30000 = 0x7530		1 = 0x001		1 = 0.01	1 = 1Hz	5 = 16Hz	40 = 4Ch	
		⋮		⋮	2 = 2Hz	6 = 32Hz	80 = 8Ch	
		2047 = 0x7FF		100 = 1.00	3 = 4Hz	7 = 64Hz ¹	160 = 16Ch	
					4 = 8Hz	8 = 100Hz ¹		

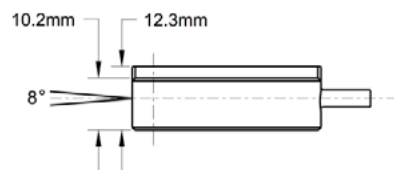
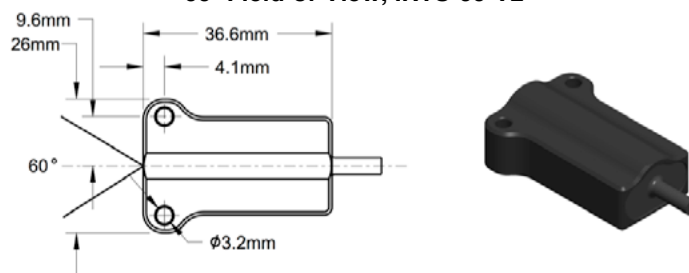
1 – Optional Extra, 64Hz limit for IRTS-120-V2, 100Hz limit for IRTS-60-V2

CAN messages should only be sent to the sensor during the configuration sequence.

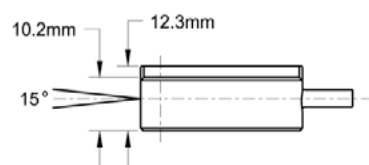
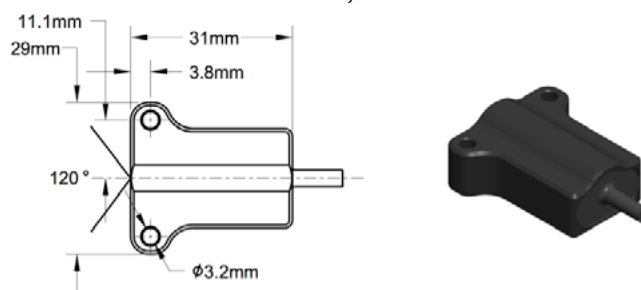
DO NOT continuously send CAN messages to the sensor.

DIMENSIONS:

60° Field-of-View, IRTS-60-V2

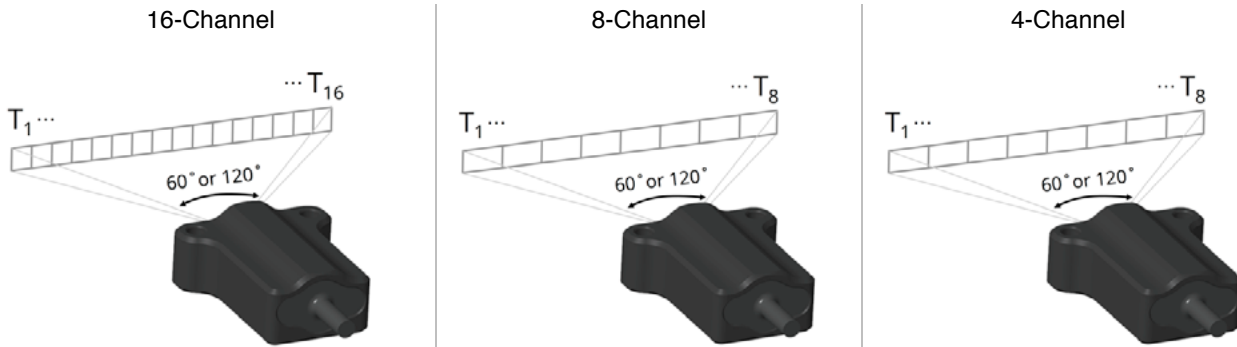


120° Field-of-View, IRTS-120-V2

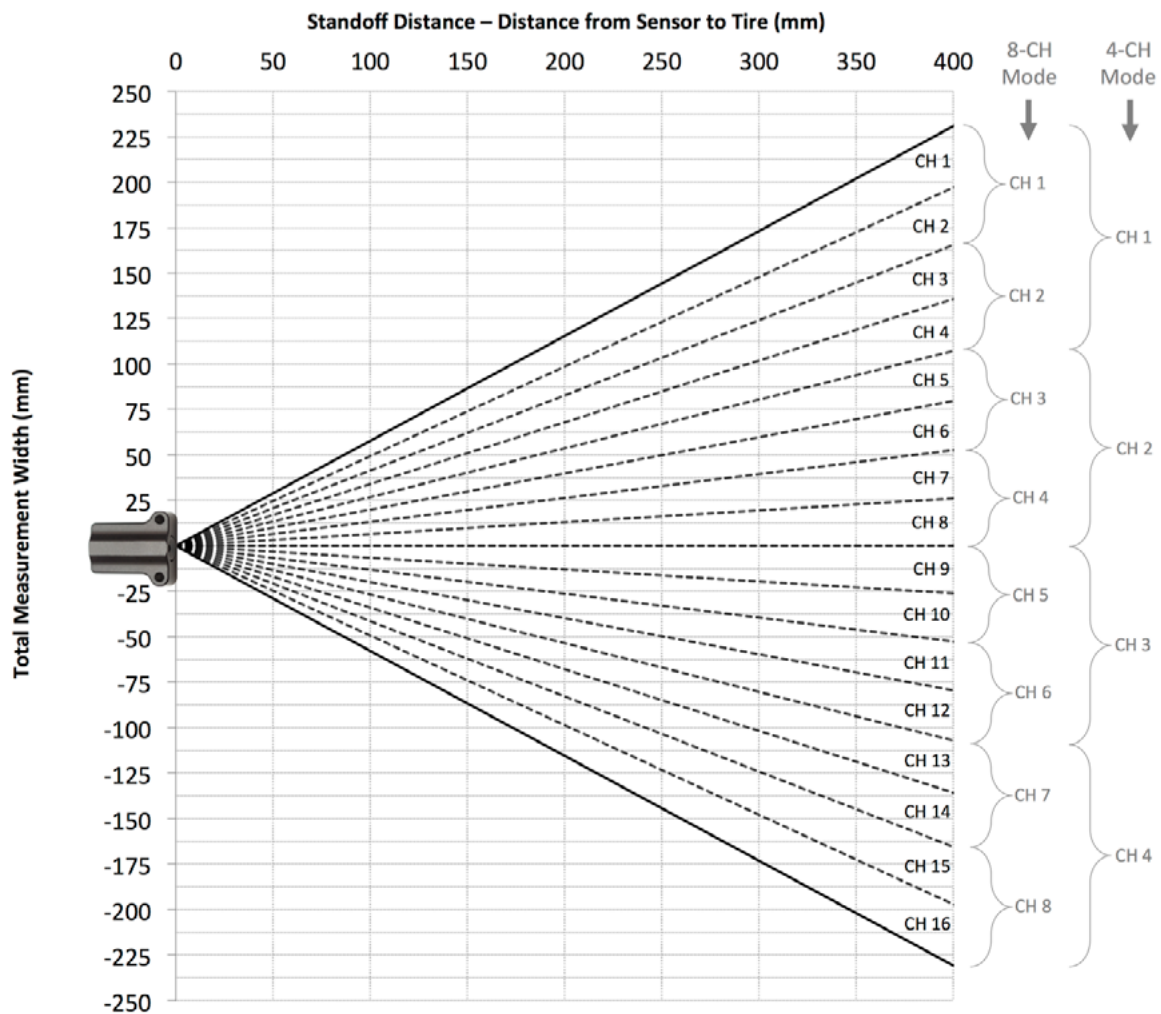


INFRARED TIRE TEMPERATURE SENSOR KIT
IRTS-UK-V2

Field of View (FOV):



60° Field-of-View, IRTS-60-V2:

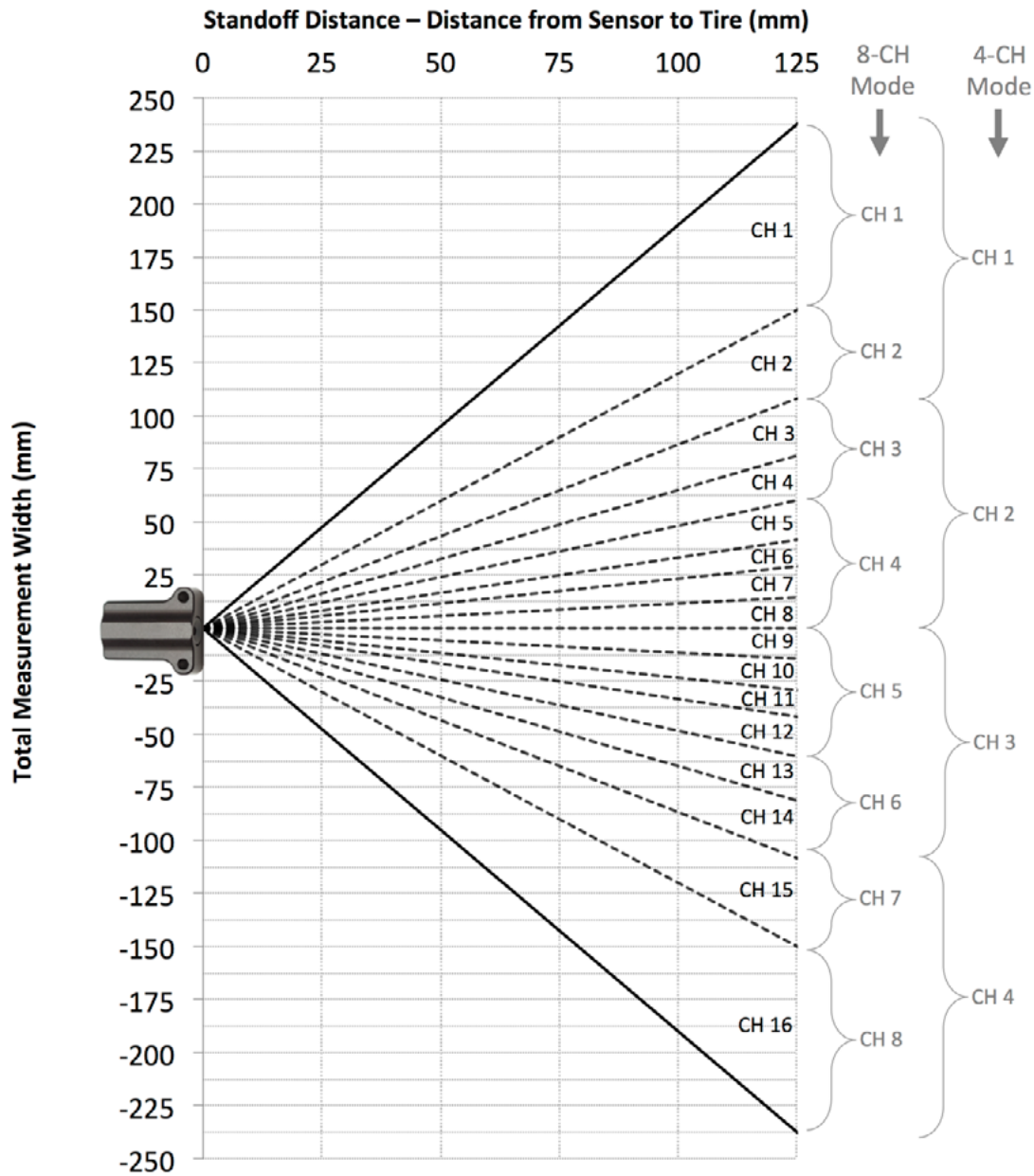


(Approximate. Angle offset (z-axis rotation) between -5° and +5°, mounts should allow adjustment accordingly)

INFRARED TIRE TEMPERATURE SENSOR KIT
IRTS-UK-V2



120° Field-of-View, IRTS-120-V2:



(Approximate. Angle offset (z-axis rotation) between -5° and +5°, mounts should allow adjustment accordingly)



INFRARED TIRE TEMPERATURE SENSOR KIT IRTS-UK-V2

WIRING SPECIFICATIONS (HARNESS):

Wire	22 AWG M22759/32, DR25 jacket, ATUM boots
Cable Length (typ.)	1.8-2.1m trunk segments, 0.5m branches
Connectors	Deutsch DTM 4P (gold contacts)

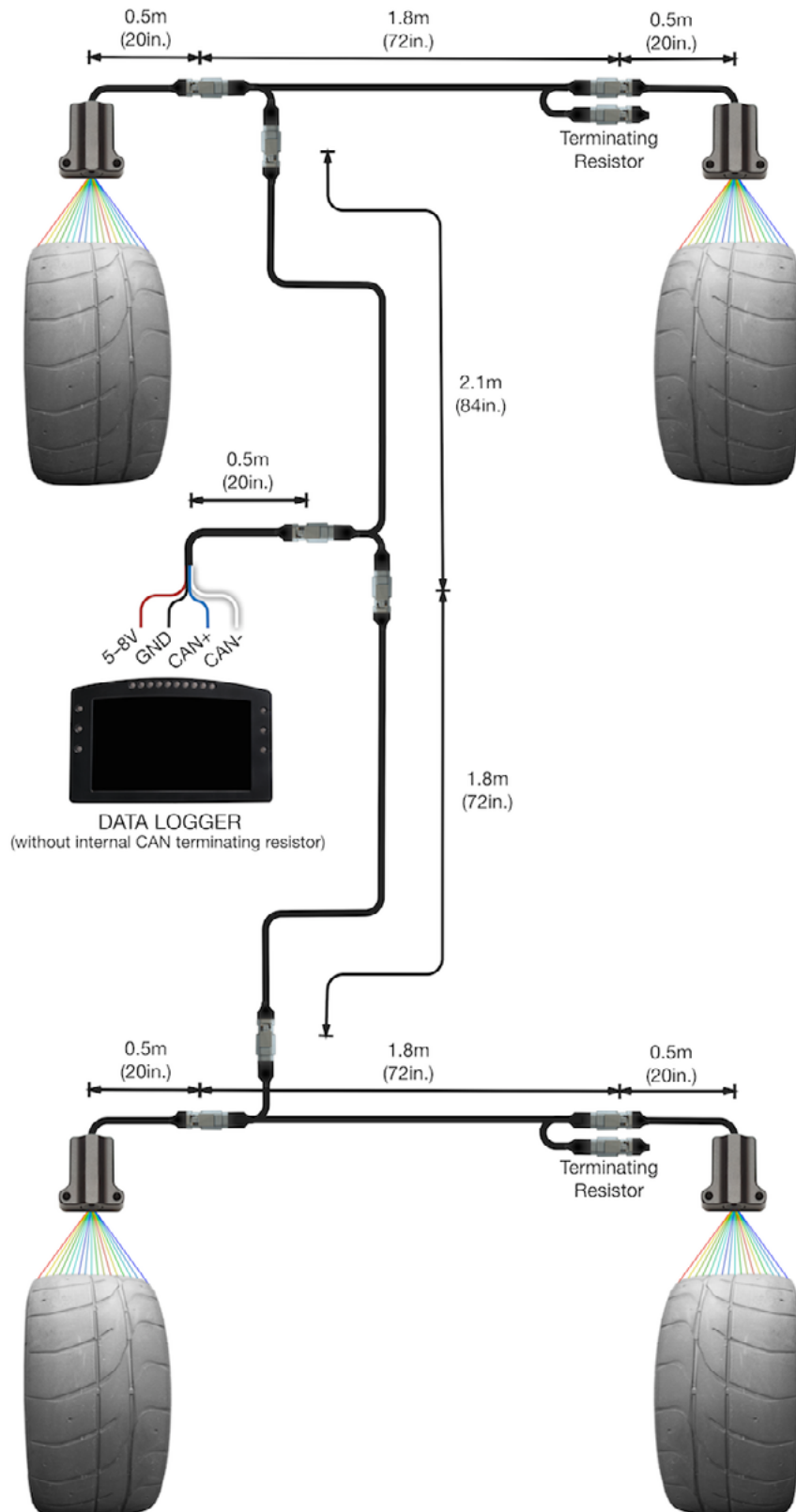
Supply Voltage, V _s	Red	(Pin 3)	(twisted)
Ground	Black	(Pin 4)	
CAN +	Blue	(Pin 2)	(twisted)
CAN -	White	(Pin 1)	

- The default wiring harness layout is shown in the first diagram below and is designed for data loggers without an internal CAN terminating resistor (MoTeC, Cosworth, Bosch, Stack, 2D, AEM, RaceCapture/Pro systems).
 - The harness can be modified upon request for data loggers with an internal CAN terminating resistor (AiM systems). The layout of this harness is shown in the second diagram below.
- The harness needs to be powered with 5-8 volts (120mA) but may be extended to 6.5-36 volts upon request.
- The CAN terminating resistors are integrated into the short Deutsch DTM connectors. Resistor value is 120Ω.
- Female pins for MoTeC Tyco/AMP Superseal connectors or female pins (38943-22) for AS Deutsch Autosport connectors (e.g., AS620-35SN connector for C185, C187, L180, ADL/EDL) may be added to the flying leads for the data logger upon request.
- Additional CAN sensors (strain gauge amplifiers, brake temperature sensors, etc.) may be added to the harness by using a y-harness at each corner.
- Harness lengths may be modified upon request. Please contact us if you would like to modify the wiring harness / kit; we are glad to accommodate your specific requirements.

INFRARED TIRE TEMPERATURE SENSOR KIT
IRTS-UK-V2

DEFAULT WIRING HARNESS LAYOUT:

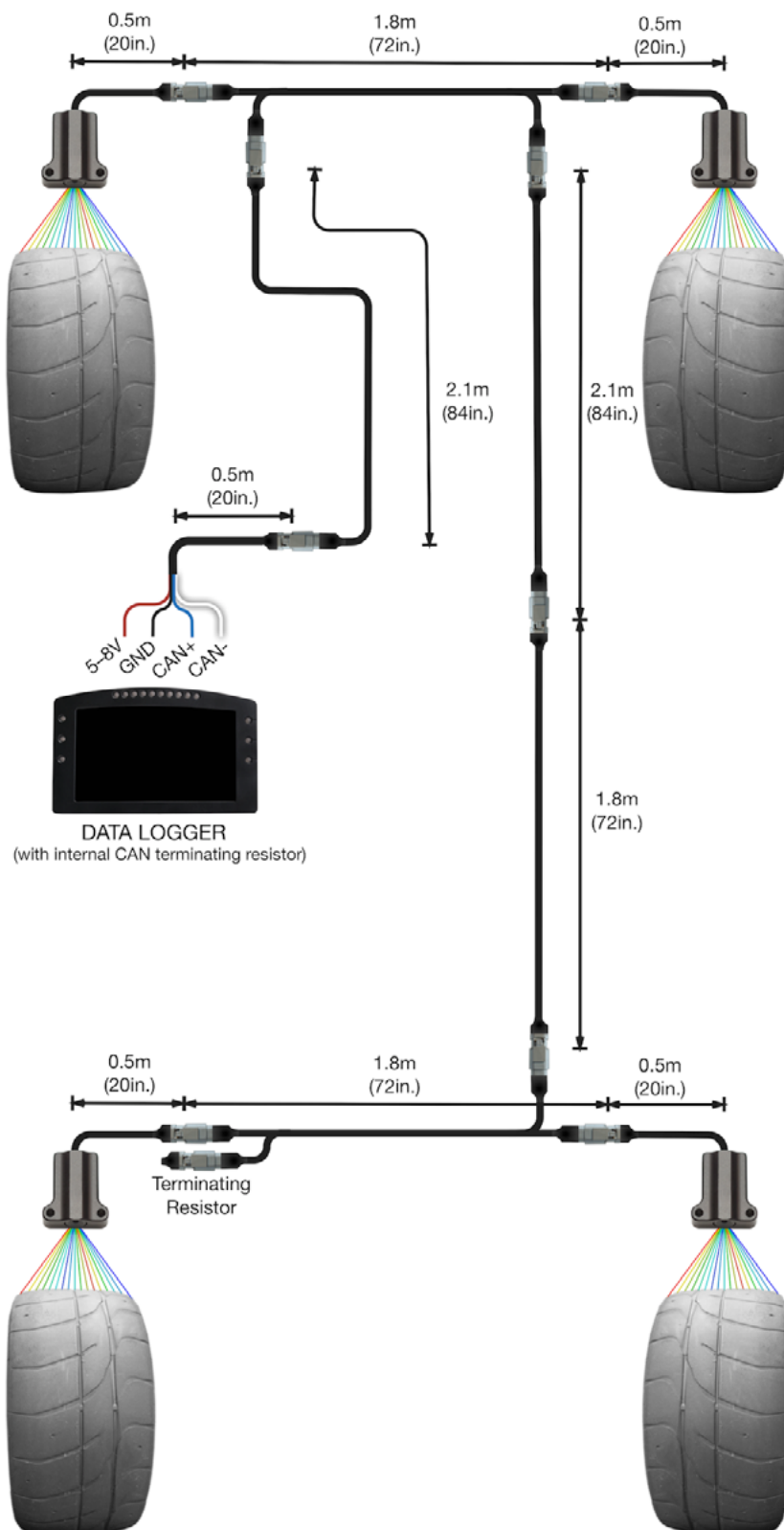
(Data logger without internal CAN terminating resistor)



INFRARED TIRE TEMPERATURE SENSOR KIT
IRTS-UK-V2

ALTERNATIVE WIRING HARNESS LAYOUT:

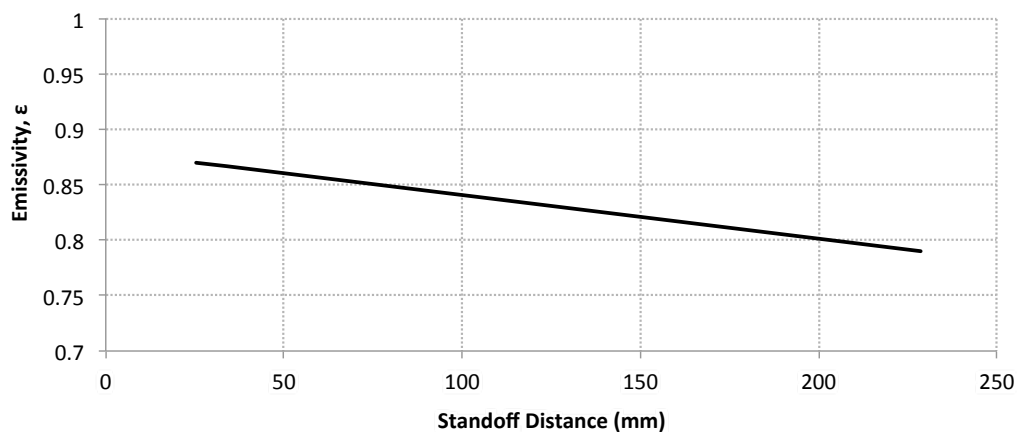
(Data Logger with internal CAN terminating resistor)



INFRARED TIRE TEMPERATURE SENSOR KIT IRTS-UK-V2

ADDITIONAL INFORMATION:

- Stated accuracy is under isothermal package conditions; for utmost accuracy, avoid abrupt temperature transients and gradients across the sensor's package.
- Point the sensor in the downstream direction (facing front of tire) to avoid contamination, pitting, and/or destruction of the sensor's lens from debris. Protective windows are available upon request.
- The *effective* emissivity of most tires ranges from approximately 0.75 to 0.90 in the 8 to 14 μm spectrum.
 - Generally, the emissivity should be lowered as the standoff distance (distance from tire to sensor) increases; this is particularly important with the 60° FOV sensor due to the larger standoff distances required. The suggested emissivity vs. standoff distance is shown in the graph below:



- Lowering the emissivity increases the measured object temperature and vice versa
- Noise Equivalent Temperature Difference (NETD) increases with increasing sampling frequency:
 - Provided that tire surface temperature is highly transient, it is usually advantageous to use a higher sampling frequency at the cost of increased noise. A sampling frequency of 16 or 32 Hz is recommended for most applications.

