FuelTech

OWNER'S MANUAL

FT450

SPORTSMAN HARNESS

1. Index

2. Presentation

The FuelTech FT450 / FT550 Sportsman Data Logging A Harness is a plug and play solution to easily incorporate data logging into any setup equipped with an FT450 or FT550 ECU.

It comes pre-terminated to plug directly into essential data logging input channels (see features below) and has an extra input connector to add up to two more configurable inputs for sensors or buttons. It is also equipped with two extra connectors that allow the use of 10 outputs to control EFI fuel Injectors, ignition control through a CDI box with points input or smart coils (8 coils on wasted spark is not recommended for carbureted V8 applications). The outputs can also be used to control accessories such as transbrake, shifter, nitrous, throttle stop, fans, pumps, etc. The harness is set up for either VR or Hall effect cam and crank sensors and includes 2 relays with built in fuses for main electronics, injectors and coils. Each connector has its own label and harness insulation is heat, moisture and oil resistant.

Designed around a Big Block Chevy, yet the harness has extra long leads that allow it to be used in numerous other applications.

Features:

- FT450 Connector (FT550 A connector)
- CPC Firewall Connector
- Pre-terminated connections:
- Wide Band 02 Sensor x2
- Oil Pressure
- Fuel Pressure
- Engine Temperature
- Transmission Temperature
- Drive shaft sensor / 2-step connector

Extra Inputs connector:

- 2 configurable inputs for sensors or buttons

Extra Outputs connector:

- For DIY expansion to control EFI fuel injectors or relay activation for accessory control (transbrake, shifter, nitrous, throttle stop, fans, pumps, etc)

Ignition Expansion Connector:

- For DIY expansion to control Ignition or relay activation for accessory control (transbrake, shifter, nitrous, throttle stop, fans, pumps, etc).

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3. Warnings and Warranty Terms

The use of this equipment implies in total accordance with the terms described in this manual and exempts the manufacturer from any responsibility regarding product misuse.

Read all the information in this manual before starting the product installation.

This product must be installed and tuned by specialized auto shops and/or personnel with experience in engine tuning.

Before starting any electrical installation, disconnect the battery.

The inobservance of any of the warnings or precautions described in this manual may lead to engine damage and could cause the products warranty to be voided.

This product does not have a certification for the use on aircrafts or any flying vehicles, as it was not designed for such use or purpose.

In some countries where an annual inspection of vehicles is enforced, no modification to the OEM ECU is permitted. Be informed about local laws and regulations prior to the product installation.

Limited Warranty

All products manufactured by FUELTECH are warranted to be free from defects in material and workmanship for three months the date of original purchase. Warranty claim must be made by original owner with proof of purchase from an authorized reseller. This warranty does not include sensors or other products that FUELTECH carries but did not manufacture.

If a product is found defective, such products will, at FUELTECH's option, be replaced or repaired at no cost. All products alleged by Purchaser to be defective must be returned to FUELTECH, postage prepaid, within the one year warranty period. Purchaser must obtain an RMA number from FUELTECH and complete an RMA form to be included in the return shipment prior to sending back the product.

This limited warranty does not cover labor or other costs or expenses incidental to the repair and/or replacement of products or parts. This limited warranty does not apply to any product which has been subject to misuse, mishandling,

misapplication, neglect (including but not limited to improper maintenance), accident, improper installation, tampered seal, modification (including but not limited to use of unauthorized parts or attachments), or adjustment or repair performed by anyone other than FUELTECH.

The parties hereto expressly agree that the purchaser's sole and exclusive remedy against FUELTECH shall be for the repair or replacement of the defective product as provided in this limited warranty. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as FUELTECH is willing and able to repair or replace defective goods.

FUELTECH reserves the right to request additional information such as, but not limited to, tune up and log files in order to evaluate a claim.

Seal violation voids warranty and renders loss of access to software updates.
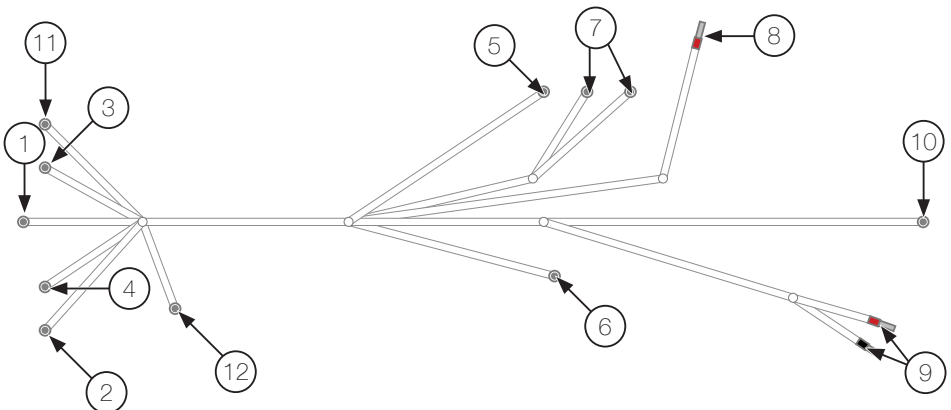
Version manual 1.0 - July/2021

4. Overview

The Fueltech FT450 SPORTSMAN universal harness is a plug and play wiring solution to be used with a FuelTech FT450 ECU. It comes pre-terminated to plug directly into essential data logging input channels, and has an extra input connector to add up to two more configurable inputs for sensors or buttons.

4.1 FT450 Universal Harness

This harness was designed for FuelTech Wideband NANO O2 systems with Bosch LSU 4.2 sensor, ready to execute the reading of the engine temperature and pressure sensors. There are 2 separate relays to supply the entire system. There is also a head grounding wire, which must be connected to the engine head. The motor MUST have its own ground wire (not included).
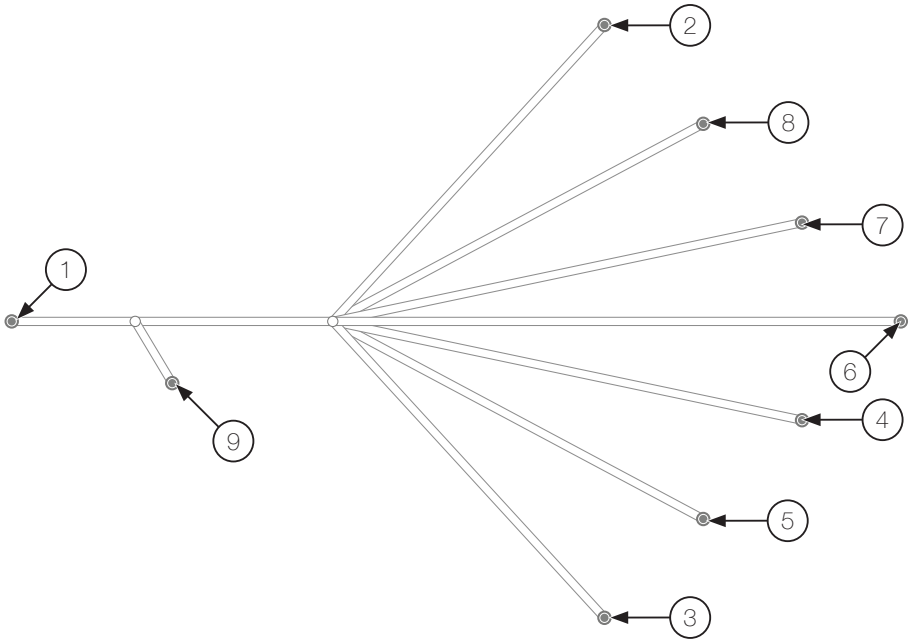
Inner

1 - FT450 Connector
2 - WB-O2 NANO Right Connector
3 - WB-O2 NANO Left Connector
4 - DriveShaft Sensor Connector
5 - Extra Outputs A Connector (blue outputs)

6 - Ignition Expansion Connector
7 - Relays and fuse
8 - 12V Switched
9 - +BATT (Red) and -BATT (Black)
10 - CPC Connector
11 - Extra Inputs Connector
12 - Powered CAN

FT450/FT550 Sportsman Data logging A Harness

Engine

1 - CPC Connector
2 - O2 Sensor R
3 - O2 Sensor L
4 - Unterminated wires CAM and Crank

5 - Oil Pressure Connector
6 - Fuel Pressure Connector
7 - Engine Temperature Connector
8 - Transmission Temperature Connector
9 - Powered CAN

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5. Diagrams

5.1 FT450/FT550 A Connector

FT450	Color	Pin	Connector	Function	CPC Pin
#1	Blue #1	A			
#2	Blue #2	B			
#3	Blue #3	C	Extra Output A	Spare output connector	-
#4	Blue #4	D			
#5	Blue #5	E			
#6	Blue #6	F			
#7	Black/White	-	(-) BATT ground	Chassis ground	-
#8	Gray #1	A			
		F			
#9	Gray #2	H			
		E	Ignition Expansion	Smart Coil Harness Connector	-
#10	Gray #3	D			
		G			
#11	Gray #4	B			
		C			
#12	Black	-	(-) BATT signal	Ground	#6
#13	Red	-	87 main relay	12V input from relay	#7
#14	Green/Red	A	DriveShaft		
		F	Extra Input	5V output sensors	#3
		B	Oil Pressure		
		B	Fuel Pressure		
#15	Blue/Yellow	#3	Powered CAN (inner)		
		#12	WB-O2 NANO R	CAN A (LOW)	#4
		#12	WB-O2 NANO L		
		#4	Powered CAN (engine)		
#16	White/Red	#4	Powered CAN (inner)		
		#6	WB-O2 NANO R	CAN A (HIGH)	#8
		#6	WB-O2 NANO L		
		#8	Powered CAN (engine)		
#17	White	-	Cam Hall / Cam VR	Cam Sync signal input	#9
#18	White	-	CRANK VR	RPM reference input	#10
#19	Red	-	CRANK VR / Hall	RPM signal input	#11

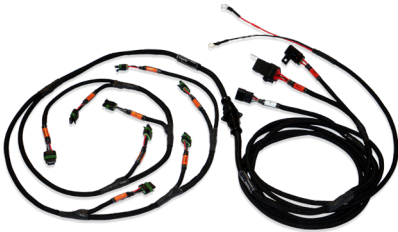| FT450	Color	Pin	Connector	Function	CPC Pin
#20	White #1	A	Transmission temperature	Transmission temp. Signal	-
#21	White #2	B	DRIVESHAFT RPM	DRIVESHAFT RPM	-
#22	White #3	A	Extra Inputs	Spare Inputs connector	-
#23	White #4	D			
#24	White #5	-	CPC Connector	Coolant temperature	#1
#25	White #6	-		Fuel Pressure	#2
#26	White #7	-		Oil pressure	#5

5.2 Harness Components

- **FuelTech FT450 connector:** Direct connection to FT450 or FT550 A Connector.

- **FuelTech Wideband NANO O2:** This connector goes to a FuelTech Wideband NANO O2 module, it's capable of reading the BOSCH LSU 4.2 O2 sensor and send the information to log in the ECU.

- **2x 40A Relay:** The system has 2 relays to power everything. The Main Relay powers the ECU, Wideband NANO O2, Peak and Hold drivers, sensors and extra connector.

- **+12V Switched wire:** This wire goes to the ignition key and is responsible for powering the relays.

- **Battery ground and battery positive:** It is the system power supply and must be connected exactly as the following: Battery (+) goes directly to the battery's positive or kill switch. Battery (-) MUST GO ONLY on the battery's negative terminal

- **Powered CAN:** There are two Powered CAN connectors available, "INNER", and "ENGINE". CAN A can operate FTCAN 1.0, FTCAN 2.0 or CAN OEM. Both protocols work with any FuelTech module that communicates over CAN bus and are able to broadcast data for external data loggers or dash.

- **Extra Outputs A Connector:** The outputs connector has six blue outputs and one power ground.

- **Ignition Expansion:** The Ignition Outputs connector has four gray outputs.

- **Extra Inputs:** two spare inputs available for custom use.

- **Fuel pressure sensor:** This input can be used to read fuel pressure using a FuelTech PS sensor or SSI P51 Packard sensor.

- **Oil pressure sensor:** This input can be used to read oil pressure using a FuelTech PS sensor or SSI P51 Packard sensor.

- **Crank trigger sensor (Hall effect or variable reluctance):** Wires are unterminated and ready to receive a VR or Hall effect sensor

- **Cam sync sensor (Hall effect or variable reluctance):** Wires are unterminated and ready to receive a VR or Hall effect sensor

- **Coolant temperature sensor:** Ready for GM style CLT sensor.

- **Bosch wideband O2 sensors:** Designed for Bosch LSU 4.2 O2 sensor.

- **Aux Power:** power and ground for general purpose.

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5.3 Smart Coil harness components (Sold Separately)

This extension allows the use of 8 individual Smart COP coils(w/ integrated igniter) on the ignition system, it has 8 metri-pack 150.2 connectors, 2 relays and 2 fuses.

-   **Main Inner 16-way circular:** The Main connector is a 16-way Tyco CPC connector which contains the outputs to the 8 individual coils.
-   **8x Smart coil connectors:** 8 Smart COP coil outputs (metri-pack 150.2 connectors) which allows wasted spark ignition.

-   **2x 30A Relay:** These Relays will power the coils.
-   **Gray Outputs connector:** This connector must be plugged to the "IGNITION EXPANSION" connector at the Sportsman A Harness.
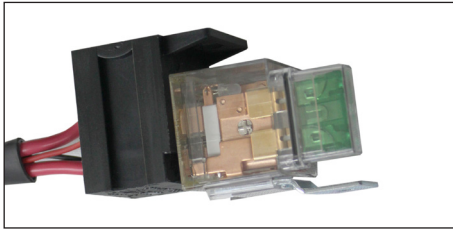
6. Harness Connectors

6.1 Relay and Fuses

Both relays in this harness are automotive type with a 40A capacity, integrated 40A fuse and an ON status LED.

There is a main relay for the FuelTech ECU, O2 conditioner and sensors. There is also a Outputs Relay, that supplies power to the "Outputs A" and the "Aux Power" connectors.

6.2 POWERED CAN A

Auxiliary connectors in the Inner and Engine side of the harness that plug directly to the FuelTech Switch Panel or that can be used or something else. It has Switched 12V, sensor ground and CAN A communication.

- Pin 1: Switched +12V
- Pin 2: Sensor ground
- Pin 3: CAN A LO (-)
- Pin 4: CAN A HI (+)

6.3 Extra Connections

Extra Inputs: The Extra Inputs connector has two white inputs that can be used to read any 0 to 5V analog sensor. The connector also has a +5V output for sensors (green with red stripe) and a +12V output from the main relay.

Pin	Color	Function
A	White #3	Extra Input
B	Black	Signal Ground
C	Black	Signal Ground
D	White #4	Extra Input
E	Red	12V for sensor
F	Green/Red	5V for sensor

Extra Outputs A: The Extra Outputs A connector has six blue outputs that can be used for almost any kind of purpose, activating solenoids (some need relays), injectors, loads and general output. The connector also has a power Ground.

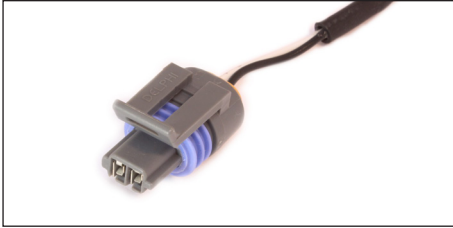| Pin	Color	Function
A	Blue #1	Free
B	Blue #2	Free
C	Blue #3	Free
D	Blue #4	Free
E	Blue #5	Free
F	Blue #6	Free
L	Black	Power Ground

FT450 - Gray - IGNITION EXPANSION Connector: Connector designed to be used with the SmartCoil Harness. Please read sections 5.3 and 6.7 of this manual for more info.

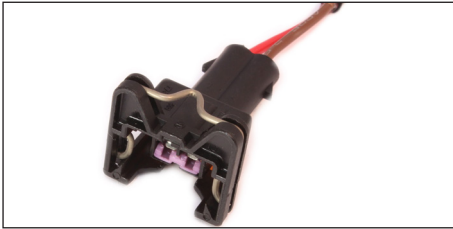## 6.4 Coolant and Transmission Temperature

The Harness has 2 temperature inputs. One input is for the engine coolant temperature and the other is for transmission temperature. The engine Coolant Temperature connector is a GM style and uses Metri-Pack 150.2 connectors. Compatible with FT 5005100016 water temperature sensor.

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- Pin A: signal output
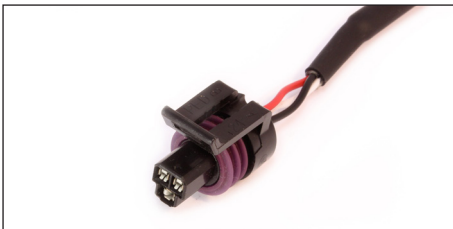- Pin B: battery's negative

Transmission Temperature: Compatible with FT Temperature Sensor (5005100225), EV-1 connector

6.5 Oil and Fuel Pressure

The oil and fuel pressure sensor connectors are designed for the PS-150, PS-300, PS-500 and PS-1500 sensors; ranging from 150 to 1500 psi, with a Packard style 3-way connector.

- Pin A: battery's negative (black)
- Pin B: 5V supply (green/red)
- Pin C: signal output (white)

6.6 WB-O2 NANO Connector

The WB-O2 NANO has a 12 way connector with 3 wire groups. One has the connector for the O2 sensor (Part number 3022000965), the second is for CAN communication and the third is responsible for the power and analog output.

NANO Pin	CPC Pin	O2 sensor Pin	Color
Left #3	12	Left #1	brown
Left #7	13	Left #2	orange
Left #8	14	Left #3	green
Left #9	15	Left #4	blue
Left #2	16	Left #5	yellow
Left #1	17	Left #6	red
Right #3	18	Right #1	brown
Right #7	19	Right #2	orange
Right #8	20	Right #3	green
Right #9	21	Right #4	blue
Right #2	22	Right #5	yellow
Right #1	23	Right #6	red

6.7 Ignition Expansion

When using this harness combined with FuelTech Smart Coil Harness (sold separately - 2002100108), there will be 8 Smart Coil (5001100012) plugs.

The Smart Coil Harness' Relay is powered by a external switch that must be supplied trough the "J" pin at the IGNITION EXPANSION connector.

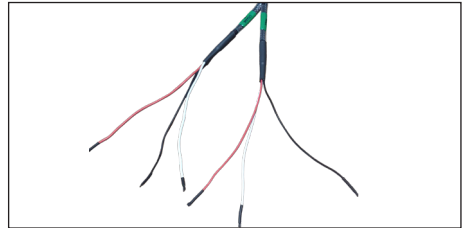| Pin	Color	Function
A	Gray #1	
B	Gray #4	
C	Gray #4	
D	Gray #3	Ignition Expansion FT Smart Coil Harness Ready
E	Gray #2	
F	Gray #1	
G	Gray #3	
H	Gray #2	
K	- BAT	Ground

6.8 Firewall CPC Connector

The CPC connector is both safe and user friendly and offers the perfect connection solution for the harness through the firewall, by having keys that won't allow connection in the wrong position.

6.9 Crank Hall/Crank VR
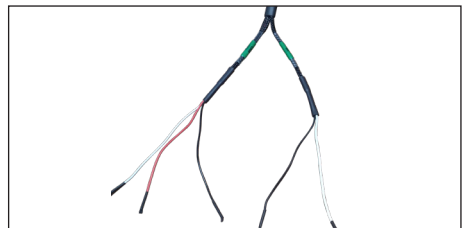
Unterminated (loose). Color code:

Crank Hall:	Crank VR:
Black: Ground	**Black:** Shield (Grounded)
Red: 12V	**Red:** RPM signal
White: RPM signal	**White:** VR Reference

6.10 Cam Hall/Cam VR

Unterminated (loose) Color code:

CAM Hall:	CAM VR:
Black: Ground	**Black:** Ground
Red: 12V	
White: Signal	**White:** Signal

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IMPORTANT

Unused wires and wire shield must never be grounded! Leave them insulated.

6.11 Aux. Power Connector

A - Positive battery
B - Negative battery

7. Standard Sensors

7.1 Fuel and Oil Pressure

FuelTech PS-150/300/500/1500 are high precision sensors responsible for general pressure readings (fuel, oil, boost, exhaust back pressure, etc.)

They can be purchased on-line at www.fueltech.net or from an authorized FuelTech dealer (check the website to locate the dealer nearest to you).
FuelTech PS-150/300/500/1500 sensor below:

- Connection: 1/8" - 27NPT
- Pressure Range: 0 to 150/300/1500psi
- Power Voltage: 5V
- Output Scale: 0.5-4.5V
- Electric Connector: 3-way Metri Pack 150
    - Pin 1: Battery's Negative
    - Pin 2: 5V supply
    - Pin 3: Output signal

FuelTech part numbers:

- 5005100020 - 0-150 psi sensor
- 5005100021 - 0-300 psi sensor
- 5005100217 - 0-500 psi sensor
- 5005100022 - 0-1500 psi sensor

7.2 Engine Coolant Temperature

This sensor is very important for a good running engine, as varying engine temperatures dramatically affect an engine's fuel and timing requirements.

On water cooled engines, place this sensor near the engine head, reading the coolant temperature. On air cooled engines, install this sensor reading the engine oil temperature. Part numbers: FuelTech 5005100016.

Transmission temperature sensor (0-300°F): part number FuelTech 5005100225

8. Meters and Adapter Wires

8.1 FuelTech WB-O2 NANO

The WB-O2 NANO has a 12-way connector with 3 wire groups. One of them has the connector for the O2 sensor, the second makes the CAN communication.

By default, the analog output is set to values of 8.7AFR to 16.2AFR Gas, but can be configured to 5.14AFR to 17.6AFR Gas or 9.55 to 19.11AFR or 9.55 to 58.80AFR, 9.55 to 146.9AFR (Gas) or yet in Lambda, if necessary. For further information, check the FuelTech WB-O2 NANO manual.

8.2 Bosch LSU 4.2 Wideband O2 Sensor

The BOSCH LSU 4.2 is a wideband O2 sensor that can be used with both the WB-O2 NANO and Alcohol O2. When using LSU 4.2 with our Alcohol O2 reader, an adapter harness is required, as well as free air calibration. Check the Alcohol O2 manual for further instructions.

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9. Troubleshooting

Issue	Solution
FT450 Unit doesn't turn on	1. Check battery voltage
	2. Check power and ground cables
	3. Check Switched 12V cable
	4. Check ECU harness cables
FT450 doesn't read cranking	1. Check crank trigger and Cam sync connections
	2. Check sensor gap
	3. Check diagnostic panel for RPM signal
FT450 reads RPM but engine doesn't start	1. Check if there is spark and injector pulse
	2. Check fuel pressure
	3. Check crank trigger alignment and TPS calibration
	4. Check if outputs are activated and properly configured
	5. Check the O2 sensor reading
Engine runs but doesn't idle	1. Check TPS calibration
	2. Check timing with a timing light
	3. Check TPS idle table and adjustment
	4. Check O2 sensor reading
Engine spits & sputters	1. Check O2 sensor reading
	2. Check ignition calibration and firing order
ECU won't communicate to PC	1. Ensure your software version is compatible with your FT450 firmware version
	2. Check if read and write buttons get colored when FT450 is connected

10. FuelTech Latest Manuals and Software

You can access all updated manuals and software at the FuelTech website:

www.fueltech.net/manuals
www.fueltech.net/software

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