

FuelTech



OWNER'S MANUAL

WIRING HARNESS
4 CYLINDER

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2. Presentation

The Fueltech FT450/FT550 4 Cylinder universal harness was developed to be installed on 4 cylinder engines.

This harness has all the components needed to make a plug and play installation on an engine with a standard setup.

The insulation and connectors are moisture, heat and oil resistant.

Specifications

- 4 injectors outputs (FT450) / 8 injectors outputs (FT550)
- FuelTech Peak and Hold external drivers ready
- FuelTech WB-Nano O2 ready
- GM Style intake air temperature sensor ready
- GM Style engine temperature sensor ready
- 2 pressure sensor ready for fuel, oil / another 0-5V sensor
- Extra output connector for generic use
- Crank and Cam connectors (hall and VR options included)
- Relay to injectors and coils driven by negative through blue #6 - **It's mandatory to configure blue #6 as a fuel pump or RPM activated output.**

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 to 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 might cause engine damage and lead to the invalidation of this products warranty. The improper adjustment of the product might cause engine damage.

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 in 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 one year following 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.

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 update releases.

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4. Overview

The FuelTech FT450/FT550 4 Cylinder universal harness is a plug and play wiring solution to be used with a FuelTech FT450/FT550 ECU. It has all the connectors, relays and fuses directly built-in and can be used with nearly any application with 4 injectors and 4 coils.

4.1 FT450/FT550 - 4 Cylinder Universal A Harness

This harness was designed for systems with 4 injectors, 4 smart coils and a FuelTech Wideband Nano O2 with Bosch LSU 4.2 sensor, setup to run semi-sequential or multipoint injection and wasted spark. Full sequential is only possible using FT550 ECU and 4 Cyl Expansion harness, please see section 4.2 for this setup.

The harness is ready for low impedance injectors setup, wired for FuelTech Peak and Hold driver.

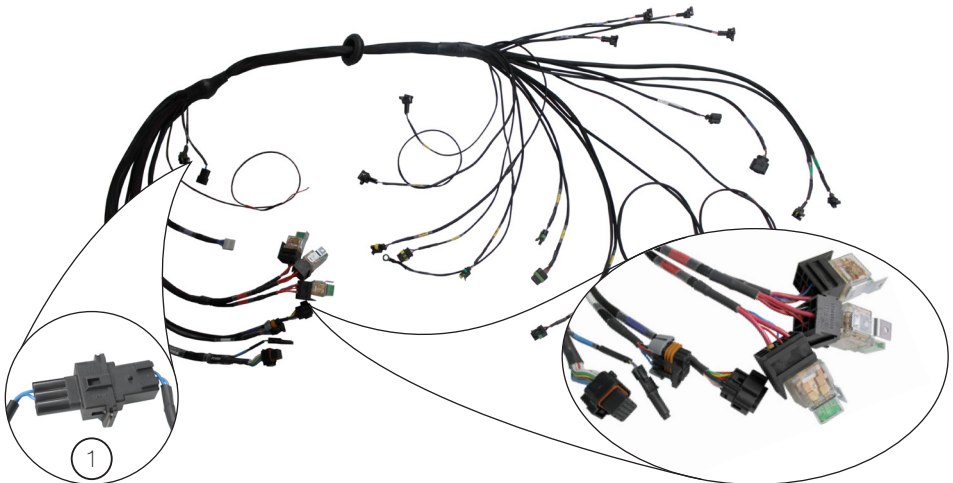
When using high impedance injectors, a Peak and Hold driver is not needed and in this case, only a bypass connector is required (jumper included).

There are 3 separate relays to power the whole system, separating the injectors and coils from the electronics.



NOTE

For the correct operation of the harness, "fuel/ignition mode" and "wasted spark" connectors must be connected to each other. If using the FT550 expansion harness, plug the male connector from the main harness to the female connector on the expansion harness. In this case the female connector of this main harness remains disconnected.



4 Cylinder Wiring Harness

4.2 FT550 Expansion Harness

The FT550 Expansion B Harness makes a FT550 ECU installation faster and easier. This harness must be used along with the FT450/ FT550 4 Cylinder Universal A Harness.

The Expansion B Harness (only available for FT550 ECU) adds 4 secondary injectors connectors (EV-1) sequentially wired, Extra Inputs and Extra Outputs connectors, CAN B port and FuelTech Shift Knob with Strain Gauge connector. Also, by connecting the A Harness to the B Expansion Harness, using the "FUEL/IGNITION MODE" connector, the primary injectors turn to sequential, as well as the ignition.

The Expansion Harness is wired for 4 secondary injectors, the harness has a FuelTech Peak and Hold connector, allowing the use of low impedance secondary injectors (jumper connector included for high impedance application).

When using FT550 Expansion Harness, follow this procedure:

- 1- Using the FTManager software, go to Engine Settings, then Advanced map options and select Manual mode for "Fuel Injection pins assignment mode"
- 2- At Engine Settings menu, then Fuel injection and select:
 - Set Fuel Primary mode as Sequential, using 4 outputs
 - Enable and set Fuel Secondary mode as Sequential, using 4 outputs.

3- Also at Engine Settings menu, go to Ignition and select "Sequential - individual coils / COP" at ignition mode.

4- Now go to Sensors and Calibration menu, then Outputs. Configure Fuel and Ignition outputs as following:

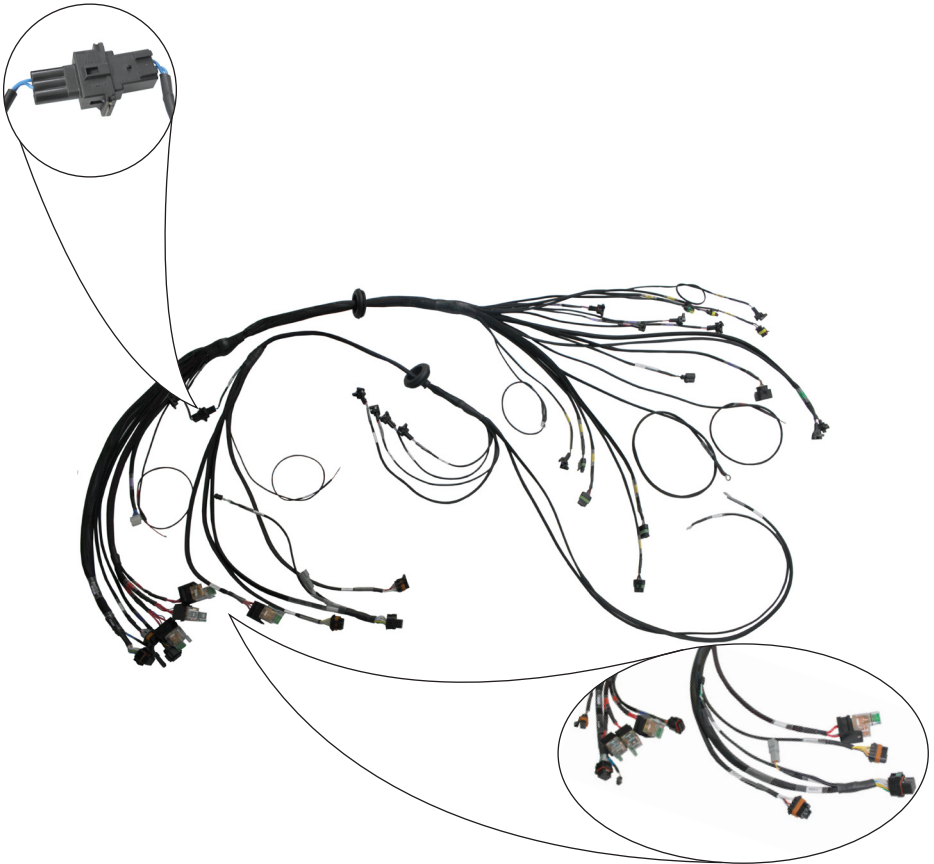
- Blue #1: Fuel Injector cyl.#01 - Primary
- Blue #2: Fuel Injector cyl.#02 - Primary
- Blue #6: Fuel Pump or RPM activated output
- Blue #7: Fuel Injector cyl.#03 - Primary
- Blue #8: Fuel Injector cyl.#04 - Primary
- Blue #9: Fuel Injector cyl.#01 - Secondary
- Blue #10: Fuel Injector cyl.#02 - secondary
- Blue #11: Fuel Injector cyl.#03 - Secondary
- Blue #12: Fuel Injector cyl.#04 - Secondary
- Gray #1: Cylinder #01 ignition
- Gray #2: Cylinder #02 ignition
- Gray #5: Cylinder #03 ignition
- Gray #6: Cylinder #04 ignition



NOTE

In order to change injectors outputs settings, is required to have Fuel Injection Pins Assignment mode as Manual. To set it this way, go to Engine Setting menu, then Advanced map options.

Doing this procedure, the harness and the ECU will be ready to run full sequential, using jumpers and high impedance injectors or Peak and Hold and low impedance injectors (check out the right P&H for your low impedance injector)



4 Cylinder Wiring Harness

5. Diagrams

5.1 FT450/FT550 4 Cylinder - A Connector

FT450	Color	Pin	Connector	Function
#1	Blue #1	#4	Peak and Hold A	Injector output #1 - Fuel Primary
		#1	Wasted Spark	Injector output #4 - Fuel Primary
#2	Blue #2	#2	Peak and Hold A	Injector output #2 - Fuel Primary
		#2	Wasted Spark	Injector output #3 - Fuel Primary
#3	Blue #3	C	Extra	Auxiliary Output - (Fan)
#4	Blue #4	D	Extra	Auxiliary Output - (Boost +)
#5	Blue #5	E	Extra	Auxiliary Output - (Boost -)
#6	Blue #6	F	Extra	Auxiliary Output - Fuel Pump and relays
#7	Black/White	-	(-) BAT ground	Chassis ground
#8	Gray #1	A / 4	Coil 1 / Wasted Spark	Ignition output #1
#9	Gray #2	A / 3	Coil 2 / Wasted Spark	Ignition output #2
#10	Gray #3	A	Extra	Auxiliary Output
#11	Gray #4	B	Extra	Auxiliary Output
#12	Black	-	(-) BAT signal	Ground
#13	Red	-	87 main relay	12V input from relay
#14	Green/Red		TPS / Oil pressure / Extra / Fuel pressure	5V output sensors
#15	Blue/Yellow	#3	CAN Female	CAN A (LOW)
		#12	WB-O2 NANO	
#16	White/Red	#4	CAN Female	CAN A (HIGH)
		#6	WB-O2 NANO	
#17	White	-	Cam Hall / Cam VR	Cam Sync signal input
#18	White	-	CRANK VR	RPM reference input
#19	Red	-	CRANK VR / Hall	RPM signal input
#20	White #1	K	Extra	White input #1 (wastegate pressure)
#21	White #2	-	2-STEP	White input #2 (2-Step)
#22	White #3	#3	TPS	White input #3 (TPS)
#23	White #4	#2	Oil pressure	White input #4 (Oil pressure)
#24	White #5	#1	H ₂ O temperature	White input #5 (H ₂ O temperature)
#25	White #6	#2	Fuel pressure	White input #6 (Fuel pressure)
#26	White #7	#1	Air temperature	White input #7 (Air temperature)

5.2 FT550 4 Cylinder - B Connector

FT550	Wire color	Pin	Connector	Function
#1	Black/White	-	(-) BAT ground	Chassis ground
#2	Black/White	-	(-) BAT ground	Chassis ground
#3	Blue/Yellow	#1	CAN Female	CAN_B (LOW)
#4	White/Red	#2	CAN Female	CAN_B (HIGH)
#5	White #8	#1	Extra	Auxiliary Input #8
#6	White #9	#2	Extra	Auxiliary Input #9
#7	White #10	#3	Extra	Auxiliary Input #10
#8	Blue #7	#2	Sequential	Injector output #3 - Fuel Primary
#9	Blue #8	#1	Sequential	Injector output #4 - Fuel Primary
#10	Gray #5	E	Sequential	Ignition output #3
#11	Gray #6	F	Sequential	Ignition output #4
#12	White #11	D	Extra	Auxiliary Input #11
#13	White #12	E	Extra	Auxiliary Input #12
#14	Blue #9	#3	1B	Injector output #1 - Fuel Secondary
#15	Blue #10	#2	2B	Injector output #2 - Fuel Secondary
#16	Gray #7	G	Extra	Gray Output #7
#17	Gray #8	H	Extra	Gray Output #8
#18	White #13	#2	GEAR	Auxiliary Input #13
#19	White #14	#3	GEAR	Auxiliary Input #14
#20	Blue #11	#2	3B	Injector output #3 - Fuel Secondary
#21	Blue #12	#2	4B	Injector output #4 - Fuel Secondary
#22	Yellow #1	A	Extra	Yellow Output #1
#23	Yellow #2	B	Extra	Yellow Output #2
#24	Yellow #3	C	Extra	Yellow Output #3
#25	Yellow #4	D	Extra	Yellow Output #4
#26	Green/Black	#1	GEAR	Sensors Ground
		#4	GEAR	

4 Cylinder Wiring Harness

5.3 Harness Components

- **FuelTech FT450/FT550 A connector:** Direct connection to FT450 or FT550.
- **FuelTech Peak and Hold:** This is the driver needed to fire low impedance injectors. When the system uses high impedance injectors, jumper wires are required. If a Peak and Hold or the jumper wires are not being used, the injectors will not fire. PN - jumper - 2001000071
- **FuelTech Wideband Nano O2:** This connector goes to a FuelTech Wideband Nano O2 module, it's capable of reading the Bosch O2 sensor and send the information to log in the ECU.
- **3x 40A Relay:** The system has 3 relays to power everything. The Main Relay powers the ECU, Wideband Nano O2, Peak and Hold drivers, sensors and extra connector. The Injector Relay powers only the primary injectors. Coils Relay powers coils only.
- **+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
- **CAN A Connector:** 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.
- **CAN B Connector:** Deutsch connector to use a second CAN port. Allows to use a second CAN protocol.
- **Extra Connector:** The extra connector has 4 blue outputs, 2 gray outputs, 5V for sensors 1 white input, 12v and ground.
- **Throttle position sensor:** The TPS measures the throttle position. The harness has a 3-way Weather Pack connector and almost any 0-5V TPS can be used.
- **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
- **Engine temperature sensor:** Ready for GM style CLT sensor.
- **Intake air temperature sensor:** Ready for GM style IAT sensor.
- **Bosch wideband O2 sensors:** Designed for Bosch LSU 4.2 O2 sensor.
- **4x (FT450) / 8x (FT550) fuel Injector outputs:** Four EV1 connector for primary injectors and 4 EV1 connector for secondary injectors using Expansion B Harness.
- **2-step wire:** White input number 2, can be used on a 2-step button or something similar.
- **GEARSHIFT Connector:** Dedicated connector to use FuelTech Shift Knob or FuelTech Shifter Handle
- **Expansion connectors:** Use this connectors to switch from wasted spark and semi-sequential/multipoint injection to full-sequential when using FT550 combined with "B Expansion Harness".

6. Harness Connectors

FT450/FT550 - 4 Cylinder - EXTRA connector

Pin	Color	Function
A	Gray #3	Gray output #3 - Free
B	Gray #4	Gray output #4 - Free
C	Blue #3	Blue output #3 - Free
D	Blue #4	Blue output #4 - Free
E	Blue #5	Blue output #5 - Free
F	Blue #6	Fuel pump / relays
G	Red	12V
H	Black	Ground
J	Green/Red	5V output sensors
K	White #1	Wastegate pressure

FT550 - 4 Cylinder - EXTRA INPUTS Connector

Pin	Color	Function
A	White #8	White input #8 - Free
B	White #9	White input #9 - Free
C	White #10	White input #10 - Free
D	White #11	White input #11 - Free
E	White #12	White input #12 - Free
F	-	-
G	Red	12V
H	Black	Ground

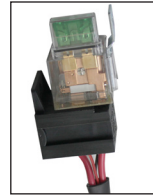
FT550 - 4 Cylinder - EXTRA OUTPUT Connector

Pin	Color	Function
A	Yellow #1	Yellow output #1 - Free
B	Yellow #2	Yellow output #2 - Free
C	Yellow #3	Yellow output #3 - Free
D	Yellow #4	Yellow output #4 - Free
G	Gray #7	Gray output #7 - Free
H	Gray #8	Gray output #8 - Free

6.1 Relay and Fuses

All relays available in the Harness are automotive type with a 40A capacity, integrated 40A fuse and an ON status LED.

There is a main relay for the FuelTech units such as ECU, O2 conditioner and sensors, 1 relay is for the fuel injectors and other relay is for the coils.



6.2 CAN Bus Connector

The harness has a CAN bus connection. CAN B Connector: Deutsch connector to use a second CAN port. Allows to use a second CAN protocol.



6.3 Extra Connections

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

Outputs: The gray, blue and yellow outputs can be used for almost any kind of purpose, activating solenoids (some need relays), loads and general output.



4 Cylinder Wiring Harness

6.4 TPS

TPS is a potentiometer that informs the throttle position. The ECU can read almost any 0-5V TPS. The harness uses a 3-way male Weather Pack connector.

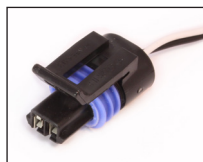
- Pin A: signal ground
- Pin B: signal output
- Pin C: 5V supply



6.5 H2O and Air Temperature

The Harness has 2 temperature inputs. One input is for the engine temperature (H2O) and the other is for the intake air temperature (AIR). Both sensors are GM style and uses Metri-Pack 150.2 connectors.

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



6.6 Oil, Fuel and Wastegate Pressure

The oil, fuel and wastegate 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. It has a 5V ground and signal.

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



6.7 Injectors

There are 4 injector outputs available. All injector connectors are Bosch EV1 style.



6.8 WB-O2 Nano Connector

The WB-O2 NANO has a 12 ways 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.



6.9 Coil Connector

This harness is finished to 4 FuelTech Smart Coil plug.



6.10 GEARSHIFT Sensor

For manual transmission cars with dog engagement is possible to connect a FuelTech Shift Knob or a FuelTech Shifter Handle to use the Power Shift (gear change ignition cut) feature. When using this shifter White inputs #13 and #14 must be configured as Strain Gauge P and Strain Gauge N.

6.11 Crank Hall/Crank VR

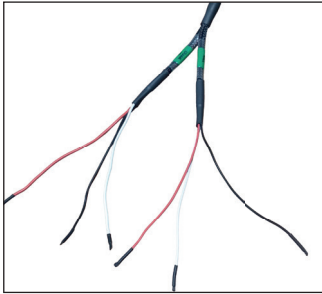
Wires are unterminated pinout:

Crank Hall:

- **Black:** Ground
- **Red:** 12V
- **White:** RPM signal

Crank VR:

- **Black:** Shield (Grounded)
- **Red:** RPM signal
- **White:** VR Reference



6.12 Cam Hall/Cam VR

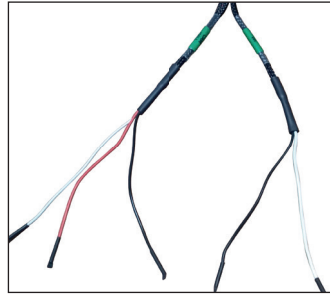
Wires are unterminated pinout:

Cam Hall:

- **Black:** Ground
- **Red:** 12V
- **White:** Signal

Cam VR:

- **Black:** Ground
- **White:** Signal



IMPORTANT

Wires not used must be isolated. Shield when not used must be isolated (do not ground it).

6.13 Expansion connectors:

The "Fuel/Ignition Mode" connector must be plugged to "Wasted Spark" connector if using FT450 and "A Universal Harness", otherwise, when using FT550 and both "A" and "B Expansion Harness" it must be plugged to the "Sequential" connector, at the expansion harness. Early harness version may show "expansion F" and "expansion M" at the harness labels.

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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 Intake Air Temperature

With this sensor, the ECU can monitor the intake air temperature and perform real time compensations.

Part numbers: FuelTech 5005100015.



7.3 Engine 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 water temperature. On air cooled engines, install this sensor reading the engine oil temperature. Part numbers: FuelTech 5005100016.



8. Peak and Hold - External Injector Driver

Peak and Hold drivers are designed to control the current on low impedance injectors. The FuelTech Peak and Hold has 4 outputs and in the Harness will run one injector per channel. There are 3 different versions of Peak and Hold available to fire different injectors, according to the resistance of the injector. The only differences between the versions are the peak current and the hold current.

Considering one injector per channel application:

- 2A/0.5A – Bosch 1600cc, Ford Racing 1600cc
- 4A/1A – Siemens Dekka 225lb/hr, Precision 225lb/hr
- 8A/2A – FT Injector / Precision 550lb/hr, Billet Atomizer, Moran

Some earlier Billet Atomizer and Moran injectors require a 4A/1A driver. Contact FuelTech tech support to confirm correct Peak and Hold drivers before purchasing.

When using high impedance injectors without Peak and Hold drivers, jumpers wires must be connected to the Peak and Hold plugs in the harness. If the jumper wires are not being used then the injectors won't fire since there will be no continuity between the FT450/FT550 and injectors.



9. Meters and Adapter Wires

9.1 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.



9.2 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.



10. Generating a FuelTech base map

That's the first step to have the engine running, follow the instructions according to the harness installation.

1. Open the software FTManager and connect the ECU using the USB cable.
2. Click on "File/New".
3. Under "Map Options" select ECU model that you have.
4. Select the features you want to enable.

The screenshot shows the 'Map options' dialog box in the FuelTech software. The dialog is titled 'Map options' and has a subtitle 'Set enabled functions to the default map'. It contains several sections with checkboxes for enabling various features:

- ECU model:** FT450, FT500 (selected), FT550, FT600.
- Fuel Tables:** O2 closed loop, Gear based compensation, Gear change compensation.
- Ignition Tables:** Gear based compensation, Gear change compensation.
- Engine Settings:** Ignition (checked).
- Drag Race features:** Burnout mode, 3-Step / boost spool / roll start, 2-Step rev limiter (checked), Brake line lock control, Gear shift output, Pro-Nitrous, Time based output, Staging Control / Transbrake, Mechanical Fuel Injection Controller (MFI), Launch delay controls (delay box).
- Other Functions:** Internal datalogger (checked), Deceleration cutoff (checked), Rev limiter (checked), Shift light (checked), Thematic fan #1 (checked), Thematic fan #2, Air conditioning, Fuel pump (checked), Cold start auxiliary, Variable camshaft (VTEC), Progressive nitrous control #1, Progressive nitrous control #2, Generic duty cycle control, Boost activated output #1, Boost activated output #2, Wastegate Boost Control, Power shift (gear change ignition cut), Start button, RPM activated output, Map selection by button, Pit limit, Active traction control, Flex Fuel, Variable camshaft (VVT), Slip / Heel and toe, Automatic Transmission Control, Lockup control.
- Sensors and Calibration:** Gear change detection, Flywheel RPM (clutch basket).
- Interface:** RPM LED Shift Light (checked).

At the bottom of the dialog are buttons for 'Cancel', '< Previous', and 'Next >'.

- Next step is to configure engine settings (engine type, main fuel table, max RPM, etc).

Generate FuelTech base map - Engine setup

Engine setup
Select options according to engine characteristics. This information is very important to generate a good base map.

Engine type
Piston

TPS idle fuel injection table
Disabled

Number of cylinders
4

Main fuel table by
MAP

Acceleration fuel enrichment by
TPS

Maximum boost
29.01 psi

Maximum engine speed
8000 RPM

Firing order
☒ Predefined
1-3-4-2 (VW AP, VW Golf, Chevrolet, Ford, Fiat, Honda, etc)
1-2-3-4 (FT200, FT250, FT300, FT350 and FT400 standard)
1-3-2-4 (Subaru)
1-4-3-2 (Aircooled VW)
1-2-4-3 (Most motorcycle)

☐ Custom

1	2	3	4
1	3	4	2

Cancel < Previous Next >

- Next step will be the setup of the RPM signal and cam sync pattern.

RPM Signal: FuelTech universal harness is ready for VR and Hall effect sensor, just choose the one you wired.

Cam sync: FuelTech universal harness is ready for VR and Hall effect sensor, just choose the one you wired.

Generate FuelTech base map - RPM signal

RPM signal
Select options regarding RPM signal reading of the engine.

RPM sensor
RPM sensor type
☐ Hall/VR with pull-up
☐ VR internal reference
☒ VR differential
RPM sensor edge
Falling

Cam sync sensor
Sensor type
☒ Not used
☐ Hall / VR with pull-up
☐ VR (Variable Reluctance)
☐ VR differential
☐ Random Hall - Diagnostic
☐ Random VR - Diagnostic
Cam sync edge
Falling

Crank trigger pattern
Crank trigger wheel
60-2 or 58X (at crank)
Crank index position
93.0 16 teeth +3.0°
Crank trigger type
With missing tooth
Crank trigger teeth number
60
Missing teeth
2
Additional tooth angle
0.0
Gap duration time
1.75

Cancel < Previous Next >

4 Cylinder Wiring Harness

7. Ignition: select ignition settings.

FuelTech FT450 pre-made harness is wired as wasted spark using only 2 ignition outputs, so the right option is Wasted spark – individual coils / COP.

FuelTech FT550 pre-made expansion harness is wired as sequential and must be configured as Sequential – Individual coils / COP. In case you don't have a cam sync sensor, select Wasted spark - individual coils / COP.

Generate FuelTech base map - Ignition

Ignition

Select the engine ignition system characteristics.

Ignition mode

☐ Sequential - individual coils / COP

☒ Wasted spark - individual coils / COP

☐ Wasted spark - double coil

☐ Distributor - single coil

FTSPARK

☐ Enabled

Outputs

☒ Multiple wires

☐ Serial bus (1 wire)

In this mode FTSPARK is connected to the ECU through multiple ignition outputs (gray wires). On ignition output settings, the 'Falling edge' and fixed 3ms dwell are automatically selected.

Ignition output

☒ Falling edge (SparkPRO)

☐ Rising edge (MSD - duty 50%)

☐ Rising edge (Honda distributor)

Cancel

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8. Fuel Injection settings:

FuelTech FT450 pre-made harness is wired as semi sequential using only 2 injection outputs, so the right option is Semi sequential – 2 outputs.

FuelTech FT550 pre-made harness is wired as sequential and must be configured as Sequential – 4 outputs. When using the secondary injectors configure it as Sequential – 4 outputs.



NOTE

Using FT550 harness with cam sync not enabled, the software won't let sequential option available, so in those cases Multipoint or semi sequential can be selected, always using 4 outputs.

Generate FuelTech base map - Fuel injection

Fuel injection

Select the engine fuel injection system characteristics.

Primary injectors

☒ Enable primary injectors

Primary mode

☐ Multipoint

☒ Semi-sequential

☐ Sequential

Primary outputs

2

4

Primary bank total flow

0

lb/h

Total flow is a sum of injectors flow at the bank.
Example: 4 injectors with 80 lb/h has a 320 lb/h total flow.

Primary injectors deadtime

1.00

ms

Secondary injectors

☐ Enable secondary injectors

Secondary mode

☐ Multipoint

☒ Semi-sequential

☐ Sequential

Secondary outputs

4

Secondary bank total flow

0

lb/h

Total flow is a sum of injectors flow at the bank.
Example: 4 injectors with 80 lb/h has a 320 lb/h total flow.

Secondary injectors deadtime

1.00

ms

Cancel

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4 Cylinder Wiring Harness

9. Pedal/Throttle/Accelerator option will pre-set an input to match the harness that has a TPS connector and no idle speed control valve, so the basic setup is the following option:

X

Generate FuelTech base map - Pedal / Throttle / Actuator



Pedal / Throttle / Actuator

Select throttle / pedal and idle actuator of the motor.

Pedal / Throttle

☐ None
☒ TPS
☐ 1 ETC
☐ 2 ETCs

Electronic throttle code

Idle actuator

☒ No actuator
☐ Electronic throttle
☐ Step motor
☐ PWM valve

Electronic throttle

Brand

Model

Description

Step motor type

☒ Custom
☐ GM (210 steps)
☐ VW (260 steps)

Number of steps

PWM valve frequency

Hz

Cancel
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10. Last option is related to the engine characteristics as compression ratio, fuel and camshaft profile. When everything is according to the engine just click Generate.

Generate FuelTech base map

Generate FuelTech base map

FT

Generate FuelTech base map

Select other engine characteristics, needed to generate the FuelTech base map.

Compression ratio

☐ Low compression
☐ Medium compression
☒ High compression

Fuel type

Alcohol

Initial boost secondary injectors

0.0 $\frac{1}{2}$ psi

Camshaft profile

☒ Low profile
☐ High profile

Cancel

< Previous

Generate

10.1 Outputs configuration:

To match the harness and the software configuration, some outputs must be allocated not as the FuelTech Default options.

FuelTech FT450 harness doesn't require any change. Outputs will be like following:

Quick access panel		Outputs			
Diagnostic Panel Fuel Tables Ignition Tables Other Functions Drag Race Features Engine Settings Sensors and Calibration Inputs MAP Throttle type Front wheel speed Rear wheel speed Drive shaft RPM Input shaft RPM Turbo speed RPM Fuel flow sensor Paddle shift Brake CAN communication Outputs Interface Settings Alert Settings	Blue output #1 Fuel injection cyl.#01 - Primary	Blue output #9 None	Gray output #1 Cylinder #01 ignition	Yellow output #1 None	
	Blue output #2 Fuel injection cyl.#02 - Primary	Blue output #10 None	Gray output #2 Cylinder #02 ignition	Yellow output #2 None	
	Blue output #3 None	Blue output #11 None	Gray output #3 None	Yellow output #3 None	
	Blue output #4 None	Blue output #12 None	Gray output #4 None	Yellow output #4 None	
	Blue output #5 None	Blue output #13 None	Gray output #5 None	Yellow output #5 None	
	Blue output #6 Fuel pump	Blue output #14 None	Gray output #6 None	Yellow output #6 None	
	Blue output #7 None	Blue output #15 None	Gray output #7 None	Yellow output #7 None	
	Blue output #8 None	Blue output #16 None	Gray output #8 None	Yellow output #8 None	

FuelTech FT550 harness require the following modifications:

- Go to Engine settings / Advanced map options. Select the drop-down bar of Fuel injection pins assignment mode box and mark as Manual. The Ignition pins assignment options must also be changed to Manual.

Quick access panel		Advanced adjust options			
Diagnostic Panel Fuel Tables Ignition Tables Other Functions Drag Race Features Engine Settings Engine setup RPM signal Cam sync signal Ignition Fuel injection Pedal/Throttle Idle actuator Ignition coil dwell Wiring harness diagram Map options Advanced map options Sensors and Calibration Interface Settings Alert Settings	Fuel maps Line Line: 2D injection map with up to 32 MAP or TPS cells Table: 3D injection table with 32x32 cells of MAPxRPM or TPSxRPM	Fuel injection pins assignment mode Manual Automatic: Fuel injector's pins are automatically assigned by the ECU. Manual: Fuel injector's pins are manually assigned by the user through "Sensors and calibration - Outputs" menu.	Fuel injection angles assignment mode Default Default: The injection angles are assigned by default in the ECU. Custom: The injection angles are assigned manually via the "Settings / Injection / Injection Angle Table" menu. (Not recommended)	O2 closed loop mode Default Custom: Enable options to change the PID values for the O2 closed loop. (Not recommended)	
	Ignition maps Line Line: 2D injection map with up to 32 MAP or TPS cells Table: 3D injection table with 32x32 cells of MAPxRPM or TPSxRPM	Ignition pins assignment mode Manual Automatic: Ignition pins are automatically assigned by the ECU. Manual: Ignition pins are manually assigned by the user through "Sensors and calibration / Outputs" menu.	Ignition angles assignment mode Default Default: The injection angles are assigned by default in the ECU. Custom: The injection angles are assigned manually via the "Settings / Injection / Injection Angle Table" menu. (Not recommended)	RPM settings Default Default: Pre-defined voltage detection levels for VR crank and cam sensors. Custom: The adjustment of voltage levels for detection of VR sensors in advanced mode allows the conditioning of non standard crank/cam signals, especially when they're spliced with the stock ECU. (Not recommended)	
	Advanced map options Default: fixed sampling rates. Custom: Configurable sampling rates per channel.	Idle speed control Default: Predefined options for the idle speed control. Custom: Enable options to change the PID values for the idle speed control. (Not recommended)	Active traction control Default: Predefined options for the active traction control. Custom: Enable options to change the PID for the active traction control. (Not recommended)	Wastegate boost pressure control Default: Predefined options for the wastegate boost pressure control. Custom: Enable options to change the PID for the wastegate boost pressure control. (Not recommended)	

4 Cylinder Wiring Harness

2. Go to the menu Sensors and Calibration / Outputs and configure the outputs as the following image, considering Primary and Secondary injectors bank:

Blue output #1	Blue output #8	Gray output #1	Yellow output #1
Fuel Injector cyl.#01 - Primary	Fuel Injector cyl.#01 - Secondary	Cylinder #01 ignition	None
Blue output #2	Blue output #10	Gray output #2	Yellow output #2
Fuel Injector cyl.#02 - Primary	Fuel Injector cyl.#02 - Secondary	Cylinder #02 ignition	None
Blue output #3	Blue output #11	Gray output #3	Yellow output #3
None	Fuel Injector cyl.#03 - Secondary	None	None
Blue output #4	Blue output #12	Gray output #4	Yellow output #4
None	Fuel Injector cyl.#04 - Secondary	None	None
Blue output #5	Blue output #13	Gray output #5	Yellow output #5
None	None	Cylinder #03 ignition	None
Blue output #6	Blue output #14	Gray output #6	Yellow output #6
Fuel pump	None	Cylinder #04 ignition	None
Blue output #7	Blue output #15	Gray output #7	Yellow output #7
Fuel Injector cyl.#03 - Primary	None	None	None
Blue output #8	Blue output #16	Gray output #8	Yellow output #8
Fuel Injector cyl.#04 - Primary	None	None	None

10.2 Inputs configuration:

FuelTech FT450 Harness:

Inputs (White wires)
#1: Extra Pin 1
#2: 2-step
#3: TPS
#4: Oil pressure
#5: Engine temp
#6: Fuel pressure
#7: Air temperature

☒ Input enabled

Channel name: Default name, Custom measure type #1, Custom name, Extra Pin 1

Unit: None

Offset type: Disabled

Offset value: 0

Digital filter: ☒ Digital filter enabled, Filter frequency: 50, Q factor: 0.60

Input sensor: ☒ Default, Sensor 0 to 5V, ☐ Custom

Signal type: Analog

Enable pullup: ☐

Average points: 7

Digital sensor setup: ☐ Digital options, Higher level

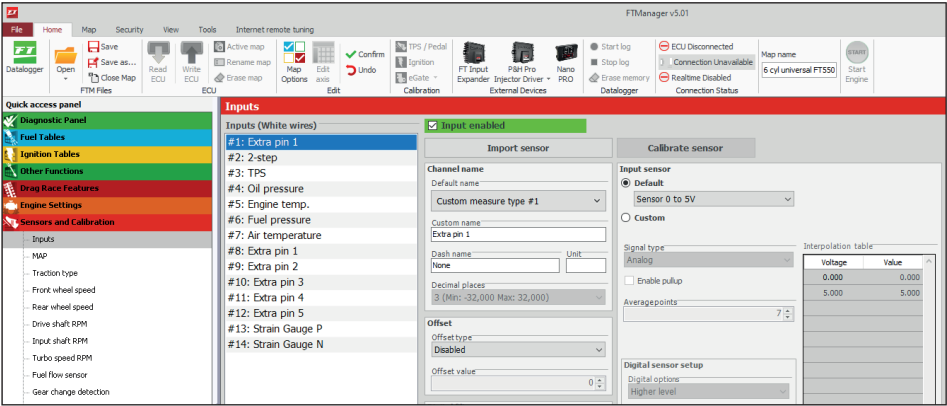
Hi level: 0.000 V, Lo level: 0.000 V

Invert output signal: ☐

Interpolation table: Voltage, Value, 0.000, 0.000, 5.000, 5.000

Fill values:

FuelTech FT550 Harness:



11. Troubleshooting

Issue	Solution
FT450/ FT550 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/FT550 doesn't read cranking	1. Check crank trigger and Cam sync connections
	2. Check sensor gap
	3. Check diagnostic panel for RPM signal
FT450/FT550 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

12. 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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