1999-2004 Ford Modular Main Harness and Harness Kits
PN 558-108, 558-505, & 558-506

This wiring harness interfaces a Holley EFI ECU to a 2V or 4V Ford Modular engine. It is meant to be used in conjunction with an injector harness, a coil harness, and ignition modules. Most stock sensors are used with this harness. There are two optional connectors for interfacing with CAN based Holley modules. There are some loose leads for grounds and power connections.

INSTALLATION:

1. The main harness was designed to have a main junction point behind the engine where the sub-harnesses plug in and the harness branches to reach the engine sensors.

2. There is a single black wire with a ring terminal that comes from the main junction point. This must be grounded to one of the heads. There are drilled and tapped holes on the back of the heads. Make sure the ring terminal on the black wire is grounded at one of these places.

3. The crank sensor splits off and can be routed along the right bank of the engine down to the sensor just to the right of the crank damper. Often this is behind an AC compressor. Take care to secure the harness to avoid interference with the belt.

4. On the left side of the engine, there is a branch that connects to the oil pressure, cam, and fuel pressure sensors. The oil and fuel pressure sensor connectors are selected to mate to Holley stainless steel 100psig sensors (554-102). If the fuel or oil pressure measurement is not used, tie the leads such that it will not be damaged, since there will be 5V going to that connector whether or not you use the sensor.

5. The coolant temp sensor location varies depending on the application. Most 2V applications are in the crossover at the front of the engine on the right side, whereas many 4V applications are on the left side. Because of this, the wires for the coolant temp sensor branch off at the back and can be routed to either side.

6. Likewise, because of the variety of throttle body locations, the TPS and IAC wiring was specified to be able to cover most of these and might have some slack that would need to be restrained. Unfortunately, there is not enough length to reach the forward mounted throttle bodies in the "Terminator" applications.

7. There is also a connector for a knock harness that is at the main junction at the rear of the engine. This connector was not on any 99-04 applications, but actually mates to the knock sub-harness used on the later "Coyote" engines, since they are commonly available. This was done so the main harness could be removed without having to get under the intake where the knock sensors would usually be. Using the knock sensors is optional, of course. Many applications had bosses, but did not have sensors installed from the factory.

8. The MAP sensor is key to load sensing with the Holley ECU. Even though the original applications did not have MAP sensors, the installation is quite easy. A firewall sensor mounting with a down-facing port is recommended. This simply connects to the plenum via a hose after the throttle body or blower. The MAP sensor should sense the pressure the intake ports "see."

9. The air temperature sensing in the stock applications was primarily done in conjunction with the MAF sensor, but there are accommodations to run a dedicated air temperature sensor. The connector will mate with commonly available Ford air temp sensors. A Motorcraft DY735 (F57F12A697AA, SMP AX31, Wells 5S1039) is an exposed tip, push-in style sensor. There are also some screw-in versions that will mate to the same connector like a Motorcraft DY1159 or SMP AX232, for instance.

10. There are two 10 pin connectors to connect to the injector and coil harnesses. Although they look similar, they are keyed differently so they will not plug into the wrong connector. The injector connector is grey while the connector for the coils is black. There are multiple types of coil harnesses available depending on engine configuration and multiple injector harnesses depending on injector type. They should be plug-and-play.

11. The oxygen sensor uses a shielded jacketed cable that emerges a little further down on the harness. This will correspond to the "AFR Left" reading in the software, so it would make sense to connect this to the left oxygen sensor. If you are running a Dominator and want to run two oxygen sensors, then you need to get the 558-401 J2A adapter harness.

12. There are two more connectors a little further down that are optional and should be capped when not in use.

    The "Power Tap" connector is a convenient place to connect to power and grounds when adding additional sensors or actuators.
    - Power Tap Pin A – Chassis ground
    - Power Tap Pin B – Sensor ground
    - Power Tap Pin C – Sensor 5V
    - Power Tap Pin D – Output from fuel pump relay (battery voltage when engine is running)

    The "Inputs/Outputs" connector is used to access the first four inputs and the first four outputs.
    - Inputs/Outputs Pin A – Input 1 (ECU pin J1A12) F 5 2 T H G
    - Inputs/Outputs Pin B – Input 2 (ECU pin J1A03) F 5 2 T H G
    - Inputs/Outputs Pin C – Input 3 (ECU pin J1A13) F 5 G
    - Inputs/Outputs Pin D – Input 4 (ECU pin J1A04) F 5 G
    - Inputs/Outputs Pin E – Output 1 (ECU pin J1B12) H P+ (shared with IAC)
    - Inputs/Outputs Pin F – Output 2 (ECU pin J1B11) H P+
    - Inputs/Outputs Pin G – Output 3 (ECU pin J1B10) G P-
    - Inputs/Outputs Pin H – Output 4 (ECU pin J1B03) G P-

    The harness is prewired so the IAC is connected to Output 1. If you do not use the 2-wire IAC connector you may use Output 1 for another purpose.

13. Further down the harness, there are four connectors for two ignition modules (554-112). Each ignition module has four drivers. COP applications will need two modules. One module controls the coils on the Cyl 1-4 bank, and the other module controls the Cyl 5-8 bank. The modules are interchangeable, but you need to make sure the connectors marked "1234" go to the same module and the connectors marked "5678" go to the same module.

14. There are two CAN connectors which are only used if you have a CAN based accessory.

15. There are four loose leads that emerge close to the fuse and relay.

    - Red/White wire – Low current signal to turn on the ECU. Must be energized in start and run position.
    - Red wire – Provides power for relay. Must be energized in start and run position. OK to be powered continuously.
    - Green wire – Relay output for fuel pump (also powers ignition and injectors)
    - Blue/White wire – Tachometer output (12V square wave 4 pulses/rev)

16. There is approximately 20" from the ECU connectors to the next set of connectors to facilitate mounting the ECU in the passenger compartment, if so desired.

NOTE: The coil and injector harnesses are fairly self-explanatory; however the coil harnesses have connectors that might seem unnecessary. There are two single-pass rectangular connectors that are made to plug into the factory ignition capacitors. The capacitors serve to make the ignition system function well while reducing the amount of RF that is generated by the ignition system. Most stock or take out engines should have the capacitors already installed on the engine. If they are missing or the engine you purchased did not include the capacitors, they can be purchased at any Ford dealer or from various on-line suppliers. The capacitors are Ford part # YL1Z-18801-AA. They bolt to the heads (2V COP applications are at the front, 4V COP are at the rear) to complete the circuit through the mounting tab. The engine will probably run OK without them, however they are recommended as a part of a robust installation.

SOFTWARE SETUP:

To setup the ECU, you need to select the proper ignition type so the ECU properly interprets the crank and cam signals and fires the coils with the right dwell. You can find this in the system ICF under Ignition Parameters. The Ignition type has two Ford Modular specific options at the time of this writing:
- *Ford Modular 2V/4V, 4.6 and 5.4, Waste-Spark Coils*
- *Ford Modular 2V/4V, 4.6 and 5.4, COP*

The early applications used waste-spark coils, which are easily identifiable by the spark plug wires that cross over the engine. The main point of difference is the firing pattern and programmed dwell time. Both ignition types use a 36-1 crank type and a single pulse per cycle cam type setup for factory 2-wire inductive pickups.

There are calibrations built into the Holley software for many of the common factory sensors, but they need to be selected as well. These built in calibrations cover most of the Ford Modular applications and can be selected in the Sensors ICF:
- Coolant Temperature Sensor- Ford Modular CTS
- Air Temperature Sensor- Ford Modular MAT

There are many other sensors that use the same connectors and have the same calibration as the previously referenced part numbers.

NOTE: It is highly recommended to use ECUs that have a hardware revision level of L2 or higher with Ford modular applications. All new ECUs purchased from Holley in Ford kits are revision L2 or later and incorporate the latest design updates.

The Rev L2 and newer ECUs have updates to the thermistor inputs (coolant and air temperature sensors) for increased accuracy at low temperatures when using Ford sensors. Earlier ECUs have less than ideal temperature sensor accuracy under cold ambient conditions (less than about 50° F) when using Ford sensors.

Rev J and higher ECUs have improvements to the crank and cam input circuitry that are very important for the Ford applications and are considered to be the earliest rev level that you can use with a stock modular cam sensor if you can live with reduced accuracy at cold temperatures.
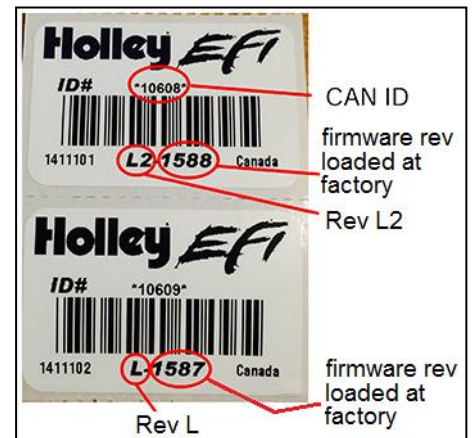
The ECU rev level is denoted under the barcode on the back of the ECU. If there is no alphanumeric designation under the barcode, it is a version earlier than a revision level J unit. It is usually followed by the firmware loaded at the time of ECU manufacture. For instance "L2-1588" would mean that the ECU hardware is Rev L2 and it had firmware 1588 loaded in it at the factory. "L-1587" would mean the ECU hardware is Rev L and it had firmware 1587 loaded at the factory. The firmware can be upgraded but the hardware revision cannot. As always we recommend keeping firmware up to date whatever your ECU rev level.

DESCRIPTION	COLOR	WIRE GA	PIN#
COIL IN	YELLOW	PLUG	A1
FUEL PUMP RELAY OUT (10A MAX)	RED	20 GA	A2
INPUT #2 (F,5,2,T,H,G)	WHITE/RED	20 GA	A3
INPUT #4 (F,G,5)	WHITE/GREEN	20 GA	A4
TPS SIGNAL	GREEN	20 GA	A5
POINTS OUTPUT	WHITE	PLUG	A6
WB1_COMPR2	TAN	22 GA	A7
WB1 SHIELD	SHIELD	22 GA	A8
WB1 HTR-	YELLOW	18 GA	A9
SWITCHED +12V IN	RED/WHITE	18 GA	A10
MAT INPUT	BLUE	20 GA	A11
INPUT #1 (F,5,2,T,H,G)	WHITE/BLUE	20 GA	A12
INPUT #3 (F,G,5)	WHITE/BLACK	20 GA	A13
IPU GROUND	BLACK	20 GA	A14
DGI TX	WHITE/BLACK	PLUG	A15
WB1 COMPR1	BROWN	22 GA	A16
WB1 VS-/1P-	BLACK	22 GA	A17
SENSOR GROUND OUT	BLACK/WHITE	20 GA	A18
COOLANT TEMP IN	BROWN	20 GA	A19
OIL PRESSURE	GREY	20 GA	A20
KNOCK #2 IN	BEIGE/RED	20 GA	A21
CAM INPUT (DIG & IPU)	PURPLE	22 GA	A22
MAP SENSOR SIGNAL	RED/BLACK	20 GA	A23
CAN LO	ORANGE	20 GA	A24
WB1 VS+	RED	22 GA	A25
SENSOR +5V REF OUT	ORANGE	20 GA	A26
BYPASS OUT	BEIGE/BLACK	PLUG	A27
TACHOMETER	BLUE/WHITE	20 GA	A28
KNOCK #1 INPUT	BEIGE/BLUE	20 GA	A29
CRANK INPUT (DIG & IPU)	PURPLE	22 GA	A30
FUEL PRESSURE	PURPLE	20 GA	A31
CAN HI	ORANGE/BLACK	20 GA	A32
WB1 IP+	WHITE	22 GA	A33
WB1 HTR+	ORANGE	18 GA	A34

DESCRIPTION	COLOR	WIRE GA	PIN#
IAC A LO	PURPLE/BLUE	PLUG	B1
IAC A HI	PURPLE/YELLOW	PLUG	B2
PWM #4 OUT (HG)	GREY/GREEN	20 GA	B3
INJECTOR F	PURPLE	20 GA	B4
INJECTOR G	GREEN	20 GA	B5
INJECTOR H	ORANGE	20 GA	B6
INJECTOR E	GREY	20 GA	B7
IAC B LO	PURPLE/WHITE	PLUG	B8
IAC B HI	PURPLE/BLACK	PLUG	B9
PWM #3 OUT (HG)	GREY/BLACK	20 GA	B10
PWM #2 OUT (HG)	GREY/RED	20 GA	B11
PWM #1 OUT (HG)	GREY/YELLOW	20 GA	B12
INJECTOR D	BROWN	20 GA	B13
EST GROUND OUT	BLACK/YELLOW	20 GA	B14
EST B	GREEN/WHITE	20 GA	B15
EST D	ORANGE/WHITE	20 GA	B16
EST F	BLUE/WHITE	20 GA	B17
EST H	PINK/WHITE	20 GA	B18
INJECTOR A	BLACK	20 GA	B19
EST 12V OUT	RED	PLUG	B20
EST A	YELLOW/WHITE	20 GA	B21
EST C	GREY/WHITE	20 GA	B22
EST E	LT. BLUE/WHITE	20 GA	B23
EST G	LT. GREEN/WHITE	20 GA	B24
INJECTOR C	BLUE	20 GA	B25
INJECTOR B	YELLOW	20 GA	B26

1234 IGN MOD OUT			
COLOR	WIRE GA	DESC	PIN#
YELLOW/WHITE	18 GA	CYL 1	A
GREEN/WHITE		CYL 2	B
GREY/WHITE		CYL 3	C
ORANGE/WHITE		CYL 4	D
RED		PLUG	E
RED		PLUG	F
RED		PLUG	G
RED		PLUG	H

5678 IGN MOD OUT			
COLOR	WIRE GA	DESC	PIN#
LT. BLUE/WHITE	18 GA	CYL 5	A
BLUE/WHITE		CYL 6	B
LT. GREEN/WHITE		CYL 7	C
PINK/WHITE		CYL 8	D
RED		PLUG	E
RED		PLUG	F
RED		PLUG	G
RED		PLUG	H

12V SWITCHED
14 GA, RED — FUSE — 12V BATTERY
14 GA, GREEN — FUEL PUMP
18 GA
14 GA
20 GA
22 GA, WHITE
RELAY SIGNAL
LOOSE
POWER TAP
CHASSIS GROUND RING TERMINAL
CHASSIS GROUND
14 GA, BLACK
16 GA
16 GA BLACK
18 GA, RED
RED

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