



ELITE 950
GM Gen III LS1 V8
Terminated Engine Harness
(Suits EV1 Injector Connectors)
HT - 140721

QUICK START GUIDE



Haltech Off-Road Usage Policy

It is unlawful to tamper with your vehicle's emissions equipment.

Haltech products are designed and sold for sanctioned off-road/competition non-emissions controlled vehicles only. Using Haltech products for street/road use on public roads is prohibited by law. It is the responsibility of the installer and/or user of this product to ensure compliance with all applicable local and federal laws and regulations. Please check with your local vehicle authority before using any Haltech product

Installation of Haltech Products

No responsibility whatsoever is accepted by Haltech for the fitment of Haltech Products. The onus is clearly on the installer to ensure that both their knowledge and the parts selected are correct for that particular application. Any damage to parts or consequential damage or costs resulting from the incorrect installation of Haltech products are totally the responsibility of the installer.

Always disconnect the battery when doing electrical work on your vehicle. Avoid sparks, open flames or use of electrical devices near flammable substances. Do not run the engine with a battery charger connected as this could damage the ECU and other electrical equipment. Do not overcharge the battery or reverse the polarity of the battery or any charging unit. Disconnect the Haltech ECU from the electrical system whenever doing any welding on the vehicle by unplugging the wiring harness connector from the ECU. After completing the ECU installation, make sure there is no wiring left un-insulated. Uninsulated wiring can cause sparks, short circuits and in some cases fire. Before attempting to run the engine ensure there are no leaks in the fuel system. All fuel system components and wiring should be mounted away from heat sources, shielded if necessary and well ventilated. Always ensure that you follow workshop safety procedures. If you're working underneath a jacked-up car, always use safety stands!

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Unless specified otherwise, Haltech warrants its products to be free from defects in material or workmanship for a period of 12 months from the date of purchase, valid in the original country of purchase only. Proof of purchase, in the form of a bill of sale or receipted invoice, which indicates that the product is within the warranty period, must be presented to obtain warranty service. Haltech suggests that the purchaser retain the dealer's dated bill of sale/receipt as evidence of the date of retail purchase. If the Haltech product is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of purchase. This shall constitute the sole liability of Haltech. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations, either expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Haltech, be liable for special or consequential damages.

Product Returns

Please include a copy of the original purchase invoice along with the unused, undamaged product and its original packaging. Any product returned with missing accessory items or packaging will incur extra charges to return the item to a re-saleable condition. All product returns must be sent via a freight method with adequate tracking, insurance and proof of delivery services. Haltech will not be held responsible for product returns lost during transit. The sale of any sensor or accessory that is supplied in sealed packaging is strictly non-refundable if the sealed packaging has been opened or tampered with. This will be clearly noted on the product packaging. If you do not accept these terms please return the sensor in its original unopened packaging within 30 days for a full refund.

Returning a sensor or accessory product within 30 days of purchase: Product may be returned for credit or full refund. (Any sealed packaging must not have been opened or tampered with)

Returning a sensor or accessory product after 30 days of purchase: Product may be returned for credit only (no refunds given) and is subject to a 10% Restocking fee. (Any sealed packaging must not have been opened or tampered with)

Elite 950 GM Gen III LS1 V8

Terminated Engine Harness

Quick Start Guide

Congratulations on purchasing a Haltech Engine Management terminated engine harness. This *Plug and Play* product allows you to be up and running in a few hours.

This Harness when installed in conjunction with a Haltech Elite 950 ECU opens the door to virtually limitless performance modification and tuning of your vehicle. Programmable systems allow you to extract all the performance from your engine by delivering precisely the required amount of fuel and ignition timing that your engine requires for maximum output under all operating conditions.

This quick start guide will walk you through the installation of the Haltech 950 terminated engine harness into a vehicle. This guide is accompanied by the comprehensive help menu located within the ESP software that you or your tuner will need to refer to before completing your installation and configuration. The ESP software is located on the Haltech Resource Centre CD/USB provided with the ECU. The latest version of the software can also be downloaded from the Haltech website www.haltech.com

Supported Engine

The Haltech GM Gen III LS1 V8 Terminated Engine Harness supports the following engine configurations:

- General Motors - Generation III (24X) LS1 V8 Engines w/o Drive-By-Wire throttle control

Supported ECU

- Haltech Elite 950

Included in this package

- Haltech GM Gen III LS1 V8 Terminated Engine Harness
- Connector pack

Optional Accessories (Sold Separately)

- Dual Channel Wideband Controller Kit (HT-059986)
- Single Channel Wideband Controller Kit (HT-059976) *For single turbo applications.
- DTM4 CAN Cable 600mm (HT-130006) *other lengths available
- Boost Control Solenoid (HT-020400)
- High Output Inductive Coils (HT-020114 Qty8)

Harness Overview

The Haltech GM Gen III LS1 V8 Terminated Engine Harness is a plug and play solution for wiring the General Motors LS1 V8 engine without Drive-By-Wire throttle control.

Installation is simple and easy as the harness is designed for the engine and all wires are clearly labelled.

Notes on installation:

- Make sure your engine is grounded to the battery. A ground wire / earthing strap should be used to ground your engine to the battery of the vehicle. The Haltech terminated engine harness **does not** ground your engine.

WARNING!

Damage can occur to your harness and / or ECU if you do not ground your engine properly. Please ensure heavy gauge cable is used.

Other Notes:

- The Elite 950 does not support Drive-By-Wire throttle body.
- The Elite 950 does not support 4-wire stepper idle control motors.
- Keep all wires away from the exhaust manifolds and other extreme sources of heat
- The harness is designed to plug directly into the OEM ignition looms and therefore no ignition looms are supplied.
- Base maps are provided with ESP software installation.

Main Power Connections

Main Power

The main power connections supply power through the harness. The wires are bundled and labelled as **"BATTERY"**. Please ensure these connections are connected only after all other connections have been completed and all unused in-cabin wiring has been insulated.

The ECU main power consist of the following connections:

Fuel Pump Battery + (R)

The Fuel Pump Battery + (Red) connection will supply the 12V DC to the fuel pump relay within the harness. Please connect this wire directly to the battery (+) terminal.

Main Battery + (R/G)

The Battery + (Red/Green) connection will supply the 12V DC to the ECU/Injector and Ignition relays within the harness. Please connect this wire directly to the battery (+) terminal.

Battery Ground (B)

The Battery Ground (Black) connection supplies battery ground for the harness. The battery ground consists of one wire flying lead. Please connect this cable directly to the Battery (-) Supply terminal.

WARNING!

Please make sure your engine block is grounded to the battery of the vehicle by a correctly sized grounding strap. This harness will not ground your engine. Damage can occur to this harness and / or your ECU if your engine is not properly grounded.

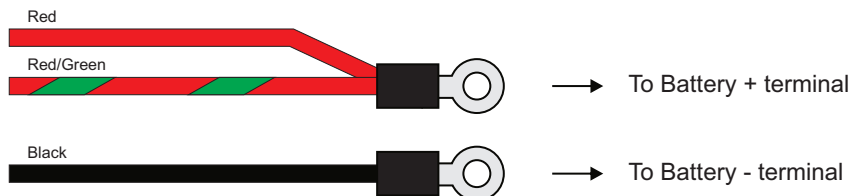


Figure 1 - Main Power Connections

Engine Bay Connections

Injection Outputs 1 - 8 (INJ1, INJ2, INJ3, INJ4, INJ5, INJ6, INJ7, INJ8)

The injector outputs are terminated with Bosch EV1 injector connectors.

Please ensure the correct injector output is connected to the corresponding injector on the engine. Refer to the label on the harness for correct injector allocation.

Ignition Outputs 1 - 4 (IGN1, IGN2, IGN3, IGN4)

The ignition outputs connect directly to the OEM ignition harnesses. Ensure the correct ignition output connector is connected to the corresponding coil bank on each bank. Each connector will be labeled with the appropriate bank.

NOTE: If the OEM ignition sub-harnesses are not present on your engine then you may purchase Qty 1 HT-045657. This part number contains two ignition sub-harnesses (L&R) to suit standard LS1 ignition coils.

Camshaft Position Sensor (CAM)

The camshaft position sensor is used in conjunction with the crank angle sensor to determine crankshaft position and stroke of the engine. This allows full sequential fueling operation. The camshaft position sensor is located on the rear of the engine on the timing cover.

Crankshaft Position Sensor (CRANK)

The crankshaft position sensor is used to accurately measure crankshaft angle and engine speed. The crankshaft sensor is located in the right rear of the engine block behind the starter motor.

Manifold Absolute Pressure Sensor (MAP)

The Manifold Absolute Pressure sensor measures changes in the intake manifold pressure which result from changes in engine load and converts these into a voltage output for the ECU to use. The MAP sensor is located on the intake manifold.

Air Temperature Sensor (ATS)

The Air Temperature Sensor connector connects to a temperature sensor located in the air intake stream. The connection is terminated with a connector to suit a GM style sensor such as the Haltech HT-010206 Air Temp Sensor - 1/8 NPT thread.

Coolant Temperature Sensor (CTS)

The Coolant Temperature Sensor connector connects directly to the OEM coolant temperature sensor located towards the front of the head on the left bank.

Throttle Position Sensor (TPS)

The Throttle Position Sensor connector connects directly to the OEM throttle position sensor located on the throttle body.

Alternator Connection

The alternator connection is compromised of two wires that must be inserted into the supplied connector by the installer based upon the model of alternator being used. Typical known alternator pinouts are listed below with their corresponding vehicle model.

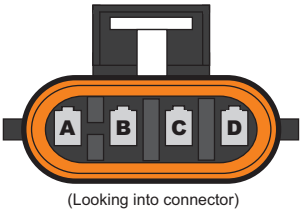


Figure 2 - Standard Alternator Connector

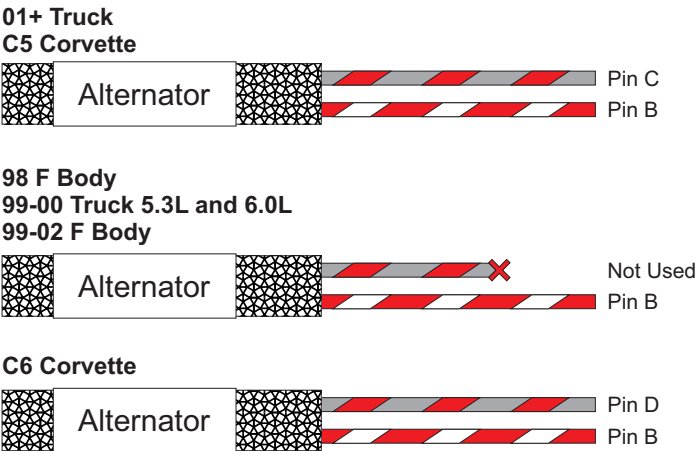


Figure 3 - Alternator Connections

NOTE:
If you do not see your alternator listed or if you experience charging issues you may have a non-standard alternator and will need to reference OEM wiring documentation for the correct pinout.

In rare cases your alternator may use a different connector entirely from the standard connector. There are two additional options for possible alternator connectors and adapters to suit each are available. Reference the images below to identify which adapter you might need.

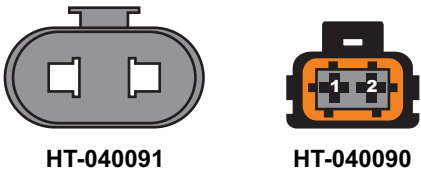
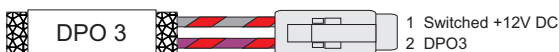


Figure 4 - Alternative Alternator Connectors

Spare Digital Pulsed Outputs (DPO3, DPO4)

There are two spare Digital Pulsed Output (DPO) connectors located on the Haltech LS Terminated engine harness. (DPO3 and DPO4). These connections consist of:

- +12V DC Sensor Supply
- Digital Pulsed Output



When the output is activated by the ECU, the output will switch to ground. Devices such as solenoid valves, shift lights can be run directly from the output provided that they do not exceed the maximum current draw of 1A, however high current devices such as thermofans and additional fuel pumps must be activated through a relay. A relay can be wired between the DPO and the supplied +12V DC on this connector. This way the output is only switching the relay on and off.

**The Digital Pulsed Outputs are limited to 1A Max current draw.
A relay is required for devices that might pull more than 1A.**

These outputs can be programmed within the ESP Software to control auxiliaries such as:

- A/C Output
- Aux Fuel Pump
- Boost Control
- Intercooler Spray
- Thermofans

For a full list of output options and explanations please go to the help section within the ESP Software.

Spare Digital Pulsed Input - DPI1

The connector labeled “DPI1” can be used to connect inputs that may use a digital pulsed signal to communicate information to the ECU. A mating connector for this connection is provided in the connector kit.

The connection consists of:

- +12V DC Sensor Supply
- Signal Ground
- Digital Pulsed Input



This input can be programmed within the ESP Software to read inputs such as:

- Vehicle Speed Sensor
- Flex Fuel Composition Sensor
- Fuel Flow Sensor
- Clutch Switch

For a full list of input options and explanations please go to the help guide located within the ESP Software.

Auxiliary Connections

The in-cabin harness wiring is made up of multiple inputs and outputs. Correct connection of these wires is essential for proper operation of the harness. **Any unused connections should be insulated.** All available in cabin connections are outlined below:

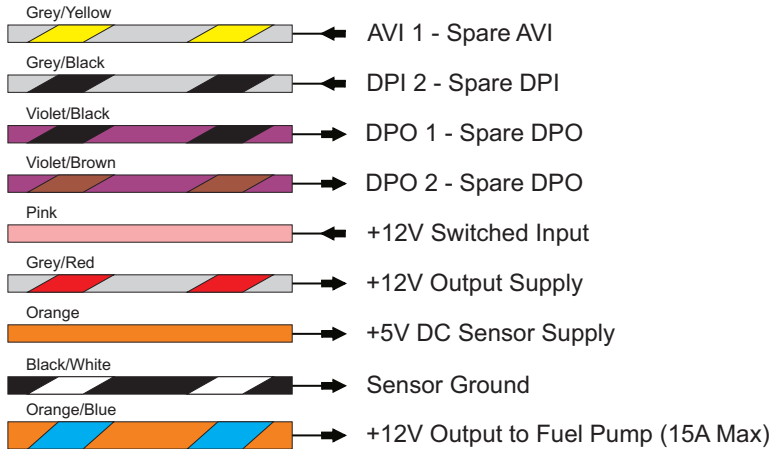


Figure 5 - In Cabin Harness Wiring

Fuel Pump Output (Fuel Pump +12V DC)

The fuel pump output supplies a continuous +12V DC supply to the fuel pump when the engine is running.

This output wire is rated for a max continuous current draw of 15A (through relay located inside the fuse box).

The fuel pump output wire can be connected directly to the positive side of the fuel pump, providing the pump in use will draw less than 15A of current under full load. If your pump will draw more than 15A or if dual pumps are to be used, it is recommended that you use this wire to control a relay to turn on the fuel pumps.

+12VDC Switched Input (Pink)

This input must be connected to a +12VDC switched ignition source. This is required to turn on the relays contained within the fusebox.

+12VDC Output Supply (Grey/Red)

This output can be used to power devices such as solenoids, relays, lights, etc.

Typical Trans-Brake/Auxiliary Rev Limiter Installation

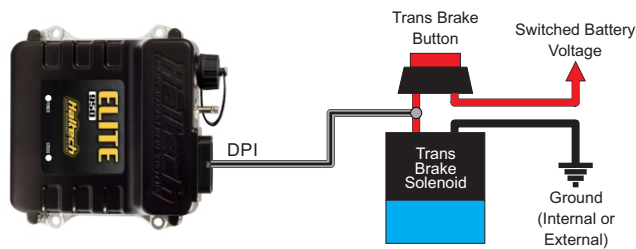


Figure 6 - Auxiliary Rev Limiter Connection

Typical Single Stage Nitrous Solenoid Installation

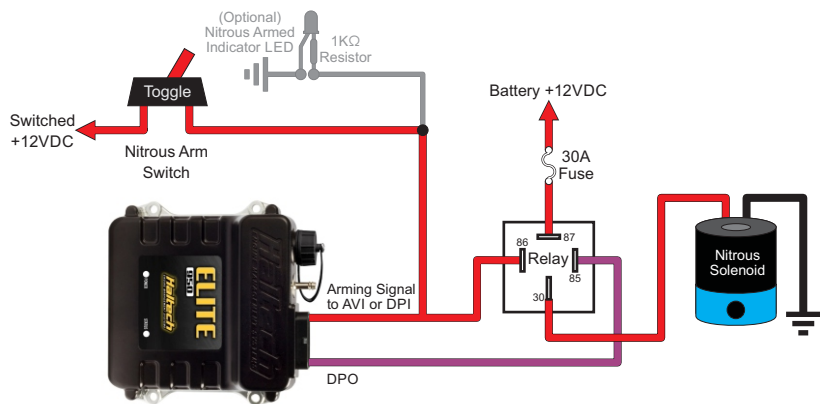


Figure 7 - Nitrous Control Connection

Typical Boost Control Installation

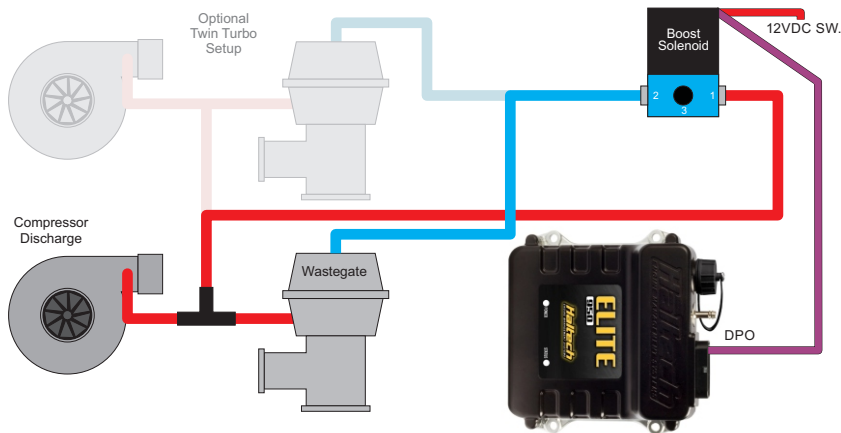


Figure 8 - Boost Control Connection

Initial Setup

When Installation is complete it is now time to upload the base map to your ECU. Connect to the ECU using the Haltech Elite Software Programmer (ESP). When connected navigate through the software menu to File > Upload Map.

In the window that opens navigate to Documents > Haltech > ECU Maps and locate the base map that corresponds with the ECU and harness part number installed. Once the correct base map is selected confirm the upload.

Once the upload is complete it is now time to check and setup any non-OEM performance parts and modifications that your individual engine may have installed. (i.e. large injector size, boost control, etc.)

At this time it is also important to calibrate your throttle position sensor. To do this please navigate to the Throttle Position Sensor function page and select the “calibration” tab. Follow the prompts to calibrate the throttle. Once complete you are now able to start your engine and check the timing and tune.

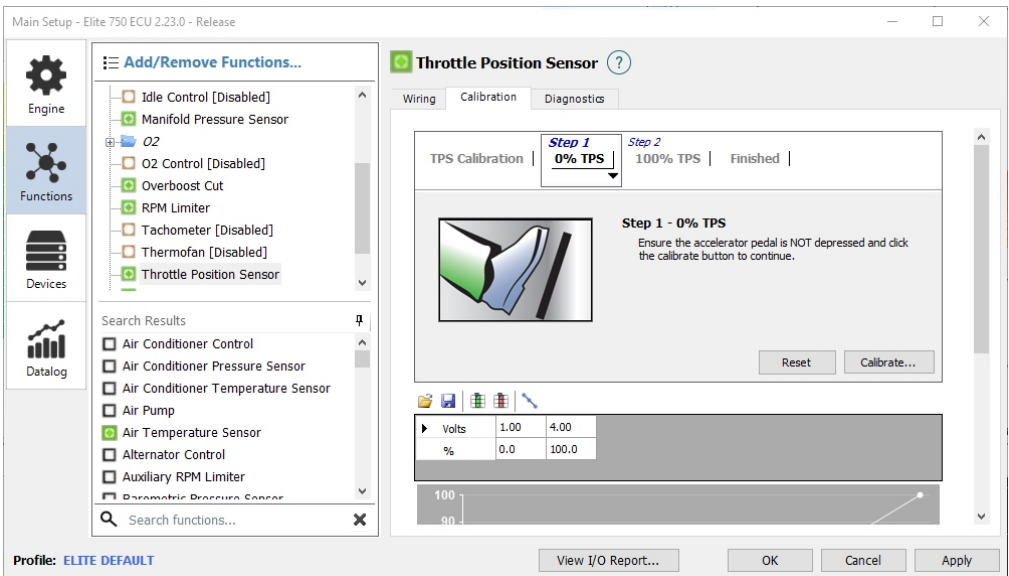


Figure 9 - Throttle Position Sensor Calibration

Please refer to the help file located within the ESP software for more information on setup and tuning.

Fuse Box

The Haltech fuse box is connected to the harness.

Contained within the Haltech fuse box is 3 fuses and 3 relays.

Each fuse protects the corresponding relay output (ie fuse #1 protects relay output #1, fuse #2 protects relay output #2 and so on).

The Haltech fuse box can handle a maximum continuous current draw of 75A, exceeding this value may cause damage to the fuse box, therefore please ensure all auxiliary devices, fans and fuel pumps connected **do not** exceed the supplied fuse box current limit.

The functions of each of the relays are outlined below:

Fuse #	Relay #	Function	Fuse Required
F1	R1	+12V Output to ECU/Injectors	15A
F2	R2	+12V Output to Ignition	15A
F3	R3	+12V Output to Fuel Pump	20A

Figure 10 - Haltech fuse box relay allocation table

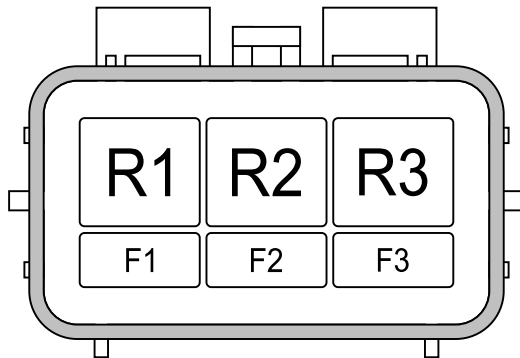
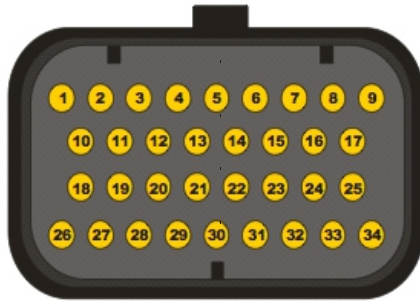


Figure 11 - Haltech fuse box layout

Harness Pinout



(34 Pin Connector)

Pin	Function	Description
A1	DPO 2	Digital Pulsed Output 2
A2	AVI 1	Analogue Voltage Input 1
A3	IGN 1	Ignition Coil #1
A4	IGN 2	Ignition Coil #2
A5	IGN 3	Ignition Coil #3
A6	IGN 4	Ignition Coil #4
A7	INJ 7	Injector #7
A8	INJ 8	Injector #8
A9	+5V	+5V DC Sensor Supply
A10	GND	Battery Negative
A11	SIG GND	Signal Ground
A12	DPI 1	Digital Pulsed Input 1
A13	DPI 2	Digital Pulsed Input 2
A14	TPS (AVI 2)	Throttle Position Sensor
A15	MAP (AVI 3)	Manifold Absolute Pressure Sensor
A16	CAN H	CAN High
A17	CAN L	CAN Low
A18	DPO 1	Digital Pulsed Output 1
A19	INJ 1	Injector #1
A20	INJ 2	Injector #2
A21	INJ 3	Injector #3
A22	INJ 4	Injector #4
A23	DPO 3	Digital Pulsed Output 3
A24	DPO 5	Fuel Pump (+) 15A Max
A25	DPO 4	Digital Pulsed Output 4
A26	+12V (INJ)	Main Power
A27	INJ 5	Injector #5
A28	INJ 6	Injector #6
A29	IAT (AVI 4)	Intake Air Temperature Sensor
A30	ECT (AVI 5)	Engine Coolant Temperature Sensor
A31	TRIGGER (+)	Crankshaft Position Sensor (+)
A32	HOME (+)	Camshaft Position Sensor (+)
A33	TRIGGER (-)	Crankshaft Position Sensor (-)
A34	HOME (-)	Camshaft Position Sensor (-)

NOTES_

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