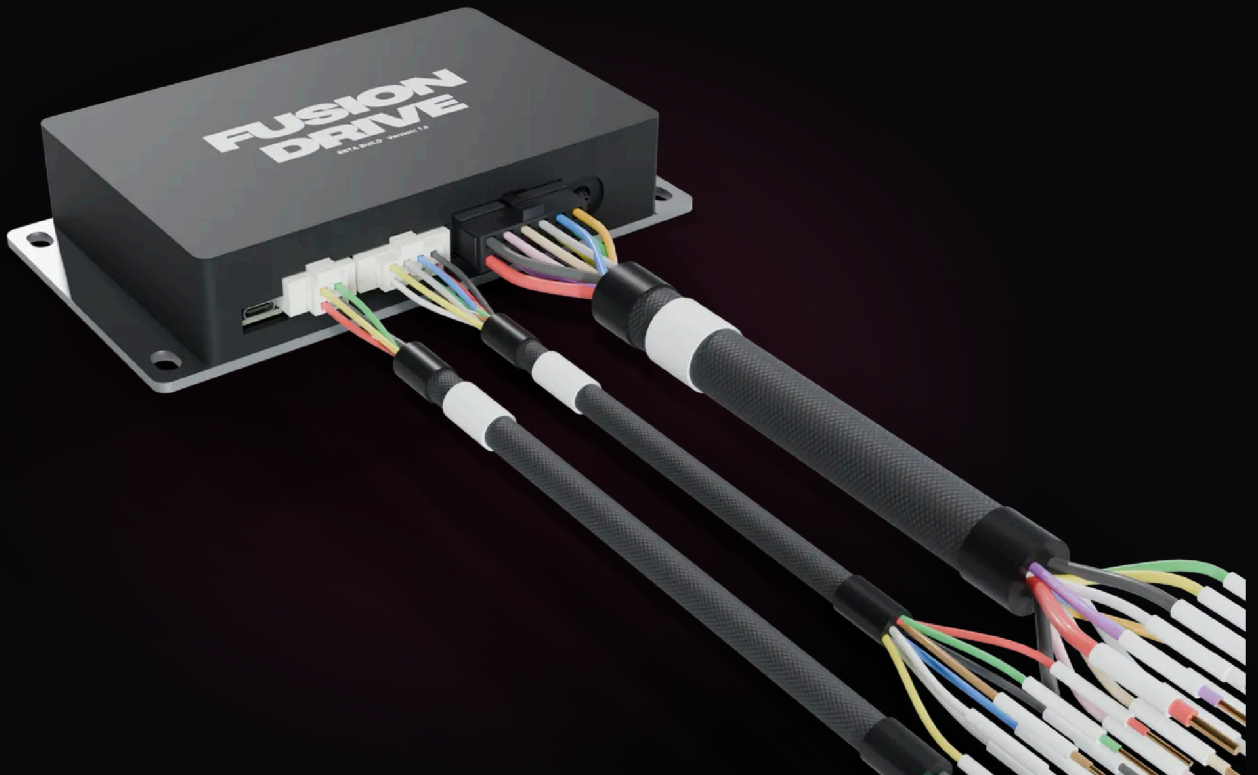




— EXACT-MODEL INSTALLATION GUIDE

AEM 30-0300

Bring your measurements into FusionDrive. Retain your instruments, migrate a display or connect a compatible sensor.



Contents

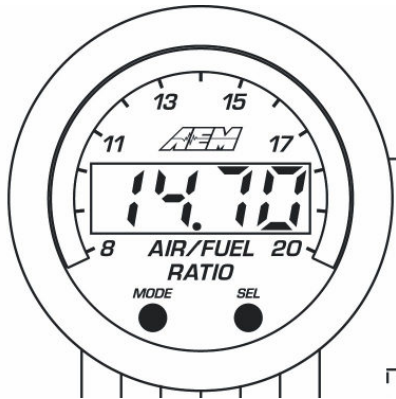
1	Identify your exact unit	2
	Choose the result you want	
2	Wiring diagrams	3
	W1 · Retain the wideband gauge - dedicated analog logging path · W2 · AEMnet to FD CAN2 - H/L pair and end termination	
3	Route A - keep the existing system	7
	Prepare the connection	
4	Configure the measurement in the FD app	8
	Calibration check points	
5	Optional CAN2 measurement route	10
6	Route B - replace the display or migrate the sensor	11
	Keep these functions · Audit what disappears	
7	Automations and useful tuner logs	12
	One controlled example · Session setup	
8	Commission and release the installation	13
9	Sources and image attribution	14

1

— AEM 30-0300

Identify your exact unit

This guide covers the Bosch LSU4.9 version documented in AEM manual 10-0300 dated 12 July 2017. AEM currently publishes separate Bosch and FAE instructions for this product number. Read the sensor and harness identity as well as the gauge face; this recipe does not qualify the FAE revision.



AEM 30-0300 X-Series - Bosch LSU4.9 - Bosch LSU4.9 / manual 10-0300, 12 July 2017, original OEM identification illustration/photo.

This is an independent FD Design LS installation design for local review. It includes researched connector functions and setup procedures; it does not certify that this physical combination has passed bench or vehicle tests. Match the named manual revision before terminating a wire. Product names and the attributed identification image describe the equipment, not a manufacturer endorsement.

1.1 Choose the result you want

Route	What FD adds	Hardware ownership
Keep the existing setup	One named measurement in FD, logs overlaid with OBD/controllers, supported local rules	Existing sensor/controller keeps its original job
Replace the visible instrument	FD becomes the viewport and logger; required warnings are deliberately recreated	The wideband or sender electronics still need a qualified owner

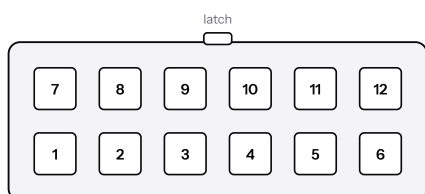
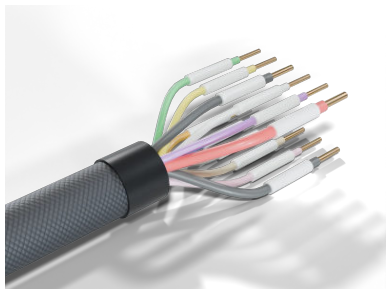
2

— AEM 30-0300

Wiring diagrams

Start here for the actual wire connections. First locate the FD leads, then choose the drawing for the route you are installing.

Harness B • J6 • 12-way

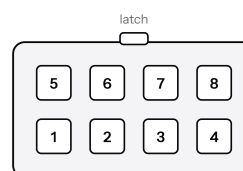
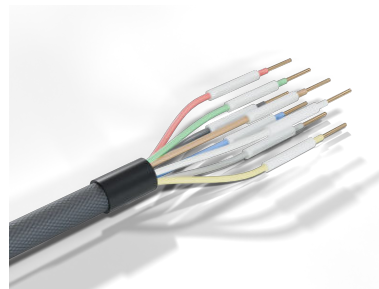


Bottom row, left to right: 1 BATT+ · 2 AUX1 · 3 IGN · 4 GND · 5 CAN2 H · 6 CAN2 L
Top row, left to right: 7 GND · 8 AUX2 · 9 OUT4 · 10 OUT3 · 11 OUT2 · 12 OUT1

Looking into the plug's mating face with the latch at the top

Original FusionDrive harness reference. Look into the plug mating face with the latch at the top. Wire drawings show logical terminal positions.

Harness C • J8 • 8-way



Bottom row, left to right: 1 IN1 · 2 IN2 · 3 IN3 · 4 +5V OUT
Top row, left to right: 5 IN4 · 6 IN5 · 7 IN6 · 8 GND

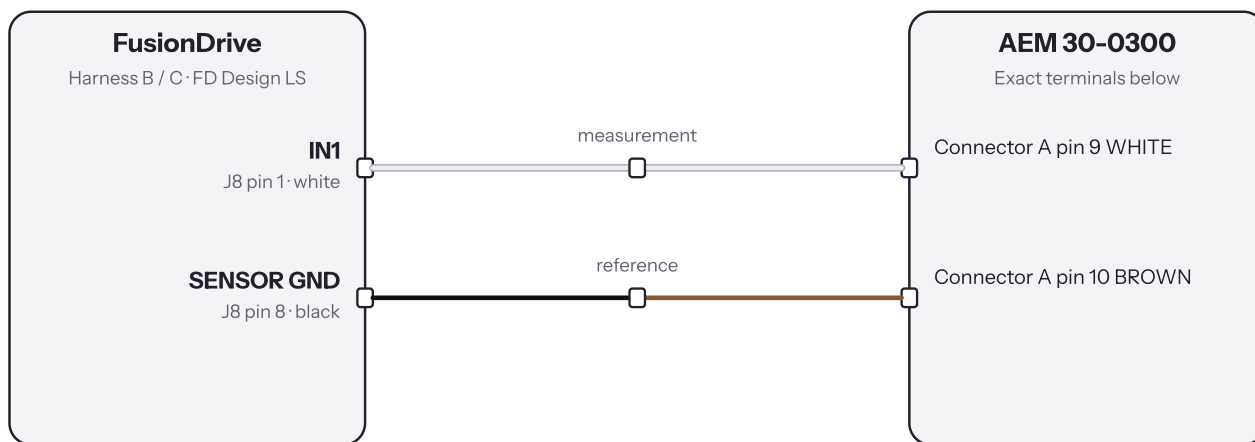
Looking into the plug's mating face with the latch at the top

Original FusionDrive harness reference. Look into the plug mating face with the latch at the top. Wire drawings show logical terminal positions.

Wire colours match the FD flying leads; the accessory segment uses its documented colour where known. A small sleeve marks an insulated splice. Match the lead label and cavity number. Harness B AUX1/AUX2 are low-side ground sinks. OUT1-4 supply positive voltage from the dedicated feed. Harness C inputs accept conditioned 0-5 V signals. Never join competing supplies or output drivers.

1. **W1 • Retain the wideband gauge - dedicated analog logging path**
2. **W2 • AEMnet to FD CAN2 - H/L pair and end termination**

2.1

W1 • Retain the wideband gauge - dedicated analog logging path

Wire colours: FD loom at left; documented accessory wire at right. Small sleeve = insulated splice.

Connector positions here are logical; use the mating-face drawings to locate FD cavities.

Retain the wideband gauge - dedicated analog logging path

Terminal-to-terminal wiring schedule

From	To	Signal / electrical condition
Connector A pin 9 WHITE	FD J8 pin 1 IN1	measurement 0-5 V bounded by model calibration
Connector A pin 10 BROWN	FD J8 pin 8 GND	reference signal ground

OFF / released: Accessory off/fault: data unavailable or explicitly excluded after qualification.

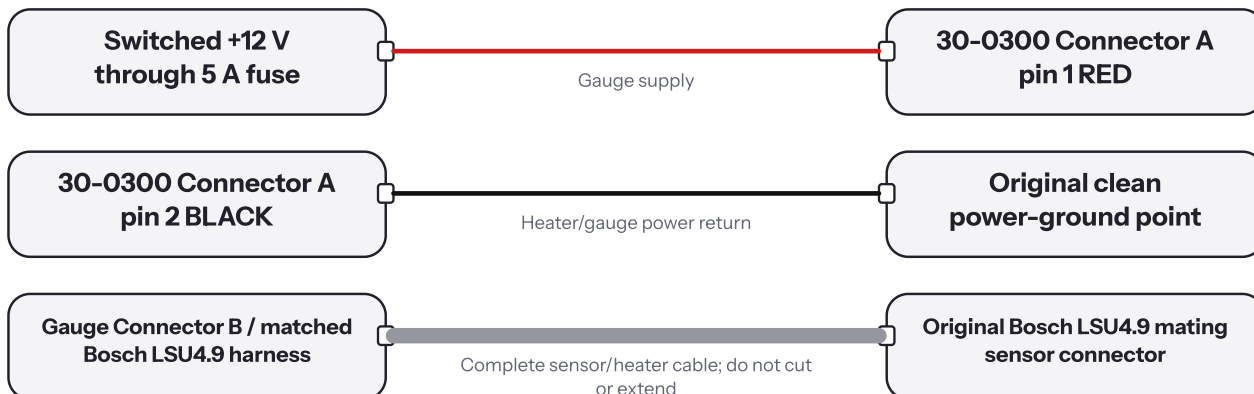
ON / active: Accessory healthy: FD reads the dedicated logging output; original receiver still works.

Qualification: No raw oxygen-sensor wires or competing active outputs may join J8.

Accessory-side connections - 1

AEM 30-0300 · accessory-side connections

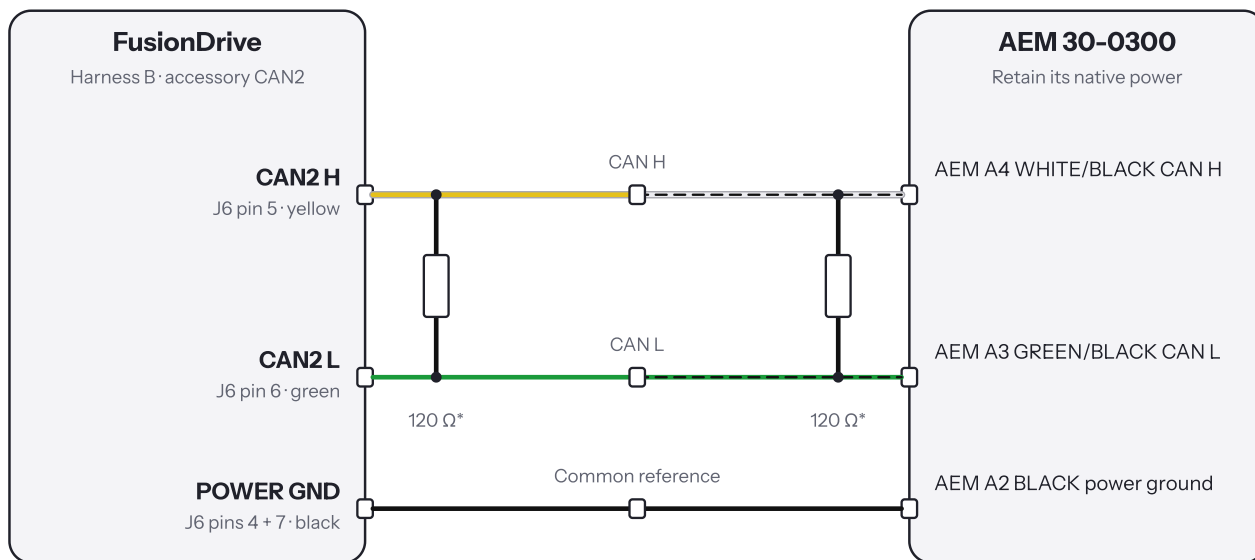
Accessory connections for the selected route. Grey bands are complete looms; blue dashes are pressure hoses.



Match the exact harness/revision in the source manual. Unspecified wire colours are drawn black.

Complete the accessory-side circuit for the selected route. Retain or transfer connections as specified in the installation steps; do not join competing supplies or output drivers.

2.2 W2 • AEMnet to FD CAN2 - H/L pair and end termination



*Exactly two end terminations in the complete bus. Use existing resistors; add only missing ones.

Keep H/L twisted. The reference conductor is separate from the CAN pair. Match bitrate and frame format.

AEMnet to FD CAN2 - H/L pair and end termination

Terminal-to-terminal wiring schedule

From	To	Signal / electrical condition
AEM A4 WHITE/BLACK CAN H	FD J6 pin 5 CAN2 H	CAN H differential
AEM A3 GREEN/BLACK CAN L	FD J6 pin 6 CAN2 L	CAN L differential
AEM A2 BLACK power ground	FD J6 pin 4 GND	reference common grounding point; retain both original power-ground paths

OFF / released: Missing AEM frames: freshness and fault conditions must remove permission.

ON / active: 500 kbit/s extended frames; no invented control requests.

Qualification: Two end terminators only. FD listen-only does not acknowledge a two-node bus.

3

— AEM 30-0300

Route A - keep the existing system

Leave the AEM power circuit, sensor harness, heater control and original display connected. The FD analog recipe represents gasoline-equivalent AFR; it does not change the fuel calibration in the car or the gauge display mode. If using CAN, record the gauge's configured CAN ID before adding its definition to FD.

The white/brown pair is a logging output and return. It is different from the wideband sensor harness. Do not attach a raw LSU cell/heater wire to J8. AEM CAN is a second useful route, but it measures the same sensor: analog and CAN traces are not independent redundancy.

3.1 Prepare the connection

- 1 Photograph the module label, sensor identity and both connector faces. Record the exact firmware/manual revision, calibration and every existing receiver on the signal.
- 2 Isolate actuator outputs and switch off power before changing wiring. Identify the FD LS connector by cavity markings, not by visual left-to-right order in a photograph.
- 3 Reserve IN1 for this worked example. If occupied, choose another IN and translate its physical pin: IN2/J8-2, IN3/J8-3, IN4/J8-5, IN5/J8-6, IN6/J8-7. Do not silently reuse an occupied source.
- 4 Connect **Connector A pin 9 WHITE to FD IN1 / J8 pin 1** and **Connector A pin 10 BROWN to FD J8 pin 8**. Leave FD J8 pin 4 unconnected for this logging-output route.
- 5 Preserve the existing controller's power-ground path. A signal reference is not a high-current return for pumps, heaters or solenoids. Document the joining point and test ground offset with accessories switching on dummy loads.
- 6 Provide strain relief, proper terminals and protection from heat/moisture. Label both ends with the product and signal name. Do not unplug a required ECU or gauge circuit merely to make the FD connection convenient.

The drawing names electrical terminals. It is not a universal mating-face view. The installer must check the actual harness orientation and the original manufacturer connector illustration before assembly.

4

— AEM 30-0300

Configure the measurement in the FD app

Current app workflow: Configure this installation from its function in Settings. Controls provides live actions and the Dashboard provides glance controls; use a card's edit menu to return to setup. A configured output remains visible even when disabled. Enabled rules operate their assigned enabled outputs automatically; there is no extra output mode to select. Live Off, On or duty takes over a generic output until you choose Resume automation. Setup keeps the electrical limits, calibration and response settings. Assigned boost, WMI and nitrous outputs use their controller-specific actions, preserving sensor protections and any paired fuel/stage logic. Nitrous Arm allows its configured activation conditions to operate; it is not an unconditional spray command.

Setup and vehicle data: Starting presets remain editable; Add Sensor includes calibration and fine tuning before Create. Use dedicated IGN, fresh running-engine OBD evidence, or both for vehicle activity; a dedicated IGN wire is optional when valid OBD evidence is available. If the pressure hose is unused, explicitly select OBD pressure in setup. A valid atmospheric sensor reading cannot identify a disconnected hose. These app choices do not change the product-specific electrical compatibility or limitations described below.

Use real device mode. The following configuration belongs to the ESP, with the phone and portal acting as editors and views. Save/read-back is part of the procedure.

- 1 Open Sensors and tap the empty IN1 card. Confirm the slot header says IN1 / J8 pin 1. Choose Sensor type **0-5 V Generic**, Type **Analog**, temporary Unit **V**, enter **AEM Bosch AFR**, and tap **Create**. The plus button uses the first free input automatically; it does not offer a separate pin picker.
- 2 Open the card's Edit action. Set Unit **AFR**, Additional voltage scale **1**. The FD input divider is already compensated; do not multiply this reading again.
- 3 Under Calibration, enter Voltage Range Min V **0.5**, Max V **4.5**; Value Range Min **8.5**, Max **18**. These values apply to the exact documented/default output described here.
- 4 Set a useful Display Range and Show on Dashboard if wanted. Display limits do not define electrical validity. For programmable outputs, change this calibration if the saved controller curve differs.
- 5 Save, wait for the device acknowledgement, refresh and reopen Edit. Verify the actual stored endpoints and unit; a screen containing an unsaved draft is not acceptance.
- 6 Compare Connector voltage with a meter referenced to J8 sensor ground. Then compare Current Value with the original instrument or a traceable pressure/mixture reference at several stable points.
- 7 Record Acquisition age. Test missing power and signal. A connected wire with an in-range voltage is not proof of a healthy source.
- 8 Reboot FD with loads isolated, reconnect and check the saved configuration. Disconnect the phone and verify any intended local rule remains configured. The ESP retains the configuration; it cannot create phone log samples while no phone is receiving them.

4.1 Calibration check points

Voltage at the FD connector	Expected mapped value
0.5 V	8.5 AFR
2.5 V	13.25 AFR
4.5 V	18 AFR

These are arithmetic checkpoints, not measured bench results. Include intermediate operating points, not only endpoints. Record tolerances and supply/ground conditions. AFR and lambda are different representations. Do not rename an AFR number lambda; select and calibrate the intended quantity explicitly.

5

— AEM 30-0300

Optional CAN2 measurement route

Use wiring diagram W2 in the Wiring diagrams chapter for the exact connections. Return here for the installation and app setup steps.

Use CAN2, the accessory bus, on J6. Keep the vehicle OBD/CAN1 pair separate. The gauge has no built-in termination; assess the actual network before adding any. Two correct end resistors normally measure about 60 ohms across H/L with power removed. Start with outputs isolated.

- 1 In More > OBD Settings > Accessories · CAN2, enable CAN 2 - Accessories at 500 kbit/s. Save and reload.
- 2 Start observation with Allow transmitting off. A two-node transmitter/silent-listener network needs an ACK-capable node; if normal mode is needed for ACK, leave custom transmit/poll rules absent.
- 3 Open Accessory signals & decoders. Locate the gauge's actual extended frame; its documented default is 0x180. Do not confuse standard 0x180 with extended 0x180.
- 4 Add a signal named AEM Bosch lambda. For its whole-byte value, Packed bit layout off, Byte offset 0, Byte length 2, Motorola/big endian on, Signed off, multiplier 0.0001, offset 0, Unit lambda.
- 5 Add the validity bit separately: byte 6 bit 7. Set Packed bit layout on, Motorola/big endian off, Signed off, start 55, length 1, multiplier 1, offset 0. Add sensor-fault byte 7 bit 6 with start 62 and the same one-bit settings. These two one-bit recipes use Intel bit numbering, unlike the big-endian lambda value.
- 6 Save each definition to FD and read it back. Raw value 0x2710 maps to lambda 1.0000 in this arithmetic example; it does not establish a healthy sensor.
- 7 Compare the live gauge state and fault indicators. A generic CAN value decoder does not automatically combine them with lambda. In any proposed permission rule choose ALL conditions (AND): validity equals 1, sensor fault equals 0, and the required lambda comparison. Verify stale or missing required signals remove permission. Prove this complete logic before actuator use.

The manufacturer's 100 Hz broadcast rate is a source property, not a promise that 100 distinct samples per second will reach the phone log. Log actual source age, gaps and repeated values. Analog AEM AFR and CAN AEM lambda are separate quantities from the same sensing element; never label them independent redundant sensors.

6

— AEM 30-0300

Route B - replace the display or migrate the sensor

FD can take over the visible AFR display, overlay logging and supported rules. The AEM gauge also contains the LSU controller. Removing its power removes the measurement. To remove the visible gauge, either retain the powered unit in a suitable accessible location or install a separately qualified wideband controller and its matched sensor/harness. FD cannot replace the LSU control electronics.

6.1 Keep these functions

- Powered AEM gauge/controller
- Original Bosch LSU4.9 sensor and matched harness
- Original calibration and diagnostic indications
- Existing ECU feedback connection, if fitted

6.2 Audit what disappears

- Always-visible numeric display when the phone is absent
 - Direct access to MODE/SEL and the original status indication if the gauge is hidden
 - Original physical mounting/visibility unless replaced with a suitable arrangement
- 1 Save the working Route A log and configuration first. It provides a reference before anything is removed.
 - 2 Write an ownership list for sensor excitation, heater/conditioning, calibration, alarm, display, ECU feedback and logging. Give each required function one owner.
 - 3 Disconnect only the component being replaced. Never connect two active sensor supplies or two output drivers together. A removed display is not evidence that the underlying controller can be removed too.
 - 4 Install the qualified retained/replacement hardware and repeat the FD calibration and failure checks. Keep service access to calibration/status controls.
 - 5 Recreate any required no-phone warning using an independently verified physical indication. A phone notification is unavailable if the phone is absent.
 - 6 Mark every original function retained, replaced, deliberately omitted or still unresolved. Stop the conversion if a function required by the tune is unresolved.



— AEM 30-0300

Automations and useful tuner logs

The documented analog ready/error boundaries are 0.5 V and 4.5 V. FD permits a margin around a calibrated input range and clamps values: approximately 0.45 V can still appear as 8.5 AFR. An Input Valid indication alone therefore cannot certify sensor readiness. A control permission must also use qualified raw-voltage bounds and the applicable readiness/fault evidence.

7.1

One controlled example

With real loads disconnected, create a disabled rule in Automations named **AEM Bosch AFR - review trigger**. Choose **ALL conditions (AND)**. Select the configured measurement, compare it in **AFR** against a tuner-chosen test threshold, and require the source's **Valid** field to equal **ON**. Use its **Connector voltage** and **Acquisition age** fields for qualified electrical limits and a tested age limit in milliseconds; include accessory-ready/fault gates where available. These appear under the configured sensor's name, backed by Input 1 Valid / Voltage / Age for this IN1 example. Stay within the device-reported condition limit; never omit a required gate to make a rule fit. A threshold example is not a tune recommendation.

Use an isolated dummy output for the first action test. For a qualified binary AUX permission, start the output at 0, choose **AUX1·Duty** (or that output's configured name · Duty) at 100% while the rule is true and **Restore Previous Value When False**. Its captured prior value must be 0; no other rule/manual control may compete for it. Keep release delay at 0 for a safety-related permission. Missing required source data must remove the permission; verify this independently of a normal threshold crossing. Do not confuse a generic AUX command with measured fluid delivery or current.

Bind this measurement in a controller section only when its source selector accepts the quantity and the units match. Fuel pressure, boost pressure, bottle pressure, AFR, lambda and measured flow are not interchangeable merely because each is a number. Never use an invalid or absent reading to satisfy a healthy-source condition.

7.2

Session setup

In Data Log settings include the named measurement, raw input voltage and acquisition age where exposed; add the relevant vehicle RPM/TPS/MAP, boost target/requested duty, WMI or nitrous state and automation transitions available on this build. Label command/request channels separately from actual pressure, current or flow. Choose active/idle rates and confirm achieved timestamps after leaving the live screen. Source sample rate, BLE delivery and phone backgrounding can all limit useful samples.

Record the exact controller/sensor part, calibration, pressure point or AFR convention, and any hardware changes in the session notes. Overlay the modification trace with the ECU data to investigate what happened and when. Cloud backup/Intelligence can aid review; it does not turn a requested command into proof of delivered output or a prediction into certainty.



— AEM 30-0300

Commission and release the installation

Test to perform	Required observation	Evidence to record
Existing setup before FD	Original gauge/ECU behaviour documented	Baseline log and photos
Low/middle/high stimulus	Mapped value matches the documented transfer within the agreed tolerance	Meter/reference readings
Accessory power absent	Missing/unqualified data does not grant permission	State and release time
Open signal/reference	Defined safe behaviour or an explicitly unresolved hold point	Measured voltage and rule state
Fault/warm-up	Native error is not accepted as healthy measurement	Original status and FD traces
FD restart / phone removed	Saved configuration restored; local behaviour verified	Reconnection/read-back record
Simultaneous dummy loads	No false measurement from ground noise	Voltage trace and timestamped log

Do the first checks with non-operating loads and an independent instrument. A function in the app, a saved acknowledgement and a passing arithmetic example are different evidence from an installed electrical test. For a controlled vehicle run, record the mechanical installation, permitted operating envelope and tuner/installer acceptance.

Installation record	Fill in before release
Vehicle / FD serial / LS board revision	_____
FD firmware / iOS build	_____
AEM 30-0300 X-Series - Bosch LSU4.9 identity and manual revision	_____
Used IN / optional CAN signals / unit / calibration	_____
Fault and latency test file	_____
Required functions retained or lost	_____
Installer / tuner / date	_____



— AEM 30-0300

Sources and image attribution

[OEM] Bosch LSU4.9 / manual 10-0300, 12 July 2017, pages 3, 10-11.

https://documents.aemelectronics.com/techlibrary_30-0300.pdf

Identification image: original manufacturer illustration/photo extracted from the matching manual, page 2.

Gauge front detail cropped from the OEM wiring illustration. Shown to identify the product; terminal orientation must be checked against the actual connector and wiring schedule.

FD implementation evidence: HardwareMap.swift; SensorsView.swift; SensorManager.swift; CANBusConfigurationView.swift; CANDecodeEditorView.swift; AutomationEditorView.swift; DataLog/LogSettingsView.swift; docs/V1_LS_HARDWARE_LIMITATIONS.md. The library records design review; it contains no assertion of completed physical compatibility testing.



Questions?

Documentation · fusiondrive.io/docs

Support · in the app: [More](#) → [Settings](#) → [Device & firmware](#) → [Report an Issue](#)

Review library · [Local FD V3](#) / [accessory-integration](#) / [model-guides](#)

FusionDrive switches real current to real loads and can control boost, water/methanol injection and nitrous. Fuse every feed and every load, respect the ratings in the specifications, and set failsafes before you drive. Configure and tune with the vehicle stationary. The installer is responsible for compliance with local vehicle regulations. Independent local review draft. Exact-model electrical compatibility and the commissioning tests in this guide have not received physical sign-off. Product photographs and manufacturer names identify equipment only; no manufacturer endorsement is implied. Follow the matching original manual and the qualification requirements for each proposed interface. No universal replacement or load-rating approval is given.