



USER MANUAL

Digifiz Replica GEN1 & Digifiz Next User Manual

Product Line Volkswagen Golf® II/III, Vento, Jetta I, II

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PHOL-LABS Kft

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1 Precautions

This chapter consolidates the mandatory safety rules that accompany every Digifiz Replica GEN1 and Digifiz Replica Next (or Digifiz Next) instrument cluster. Ignoring any of these items is the fastest way to damage the electronics or obtain unreliable readings.

- () Disconnect the vehicle battery before starting the installation. Working on a powered harness feels faster, but several dashboards have already been destroyed by short circuits caused by a live loom.
- () Never feed the sensor inputs with an external voltage source. The coolant temperature, oil temperature, outside temperature, and fuel level channels are designed for passive sensors only. Even a “harmless” test through a resistor burns the measurement circuitry.
- () Remember that Generation 1 and 1.5 panels have no internal fuse. The first protective element is the 15 A fuse in the Volkswagen fuse box. It reacts far too late to save the cluster from wiring mistakes.
- () Shield the unit from direct sunlight. Prolonged exposure washes out the LCD segments and permanently reduces contrast.
- () Do not attempt to overdrive the LED backlight. Generations 1, 1.5, and 2 use fixed-current lighting. If the daytime image is dim, add shading around the binnacle rather than increasing the drive current.
- () Beware of resonances in cable-driven speedometers. Mechanical drives often oscillate at 40–60 km/h. Fit the supplied electronic sensor—it ships with all current Gen 1.5 and Gen 2 kits—whenever possible.
- () Plan external MFA controls for Generation 2 dashboards. The VW badge touch sensor was removed, so MFA mode switching must come from the steering-column stalk or another external switch.
- () Account for the standby current. A Generation 2 cluster draws roughly 11–13 mA from the vehicle battery even when the ignition is off. This quiescent consumption cannot be reduced.
- () Instantaneous fuel consumption is not factory fitted. The feature can be retrofitted to Gen 1 and Gen 1.5 units following the instructions below, but it has not been validated for Gen 2 hardware.

<https://www.youtube.com/watch?v=qWqvYc9388U>



(a) Label emphasising battery disconnection during installation.



(b) Warning supplied with the sensor harness against external voltage.

Figure 1.1: Safety placards shipped with the wiring kit.

2 Introduction

This operating manual covers the Digifiz Replica GEN1 and Digifiz Replica Next (or Digifiz Next) digital instrument clusters for Volkswagen Golf II/III, Jetta II, Vento, and Scirocco II vehicles. It summarises the hardware variants, describes their functions, and explains how to install, configure, operate, store, and maintain the dashboards. The guidance is intended for vehicle owners, automotive electricians, and service centres that retrofit the product. The expanded edition adds the Golf Mk3 and Volkswagen Vento dashboard configurations that share wiring and calibration procedures with the earlier platforms.

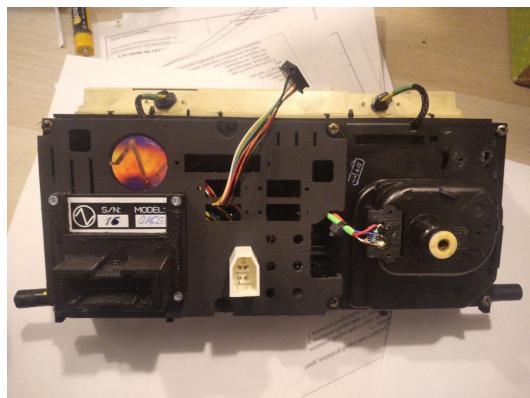
The following chapters provide the product identification scheme, connector pin-outs, operating conditions, and detailed installation and configuration procedures. Maintenance and troubleshooting references for both Replica generations are also included so the instrument panel can be serviced without the factory documentation.



(a) Delivery set for the GART 8-MGF configuration.



(b) Typical contents of a GART package.



(c) Rear view of the single-connector GACS assembly.



(d) Rear view of the dual-connector GACT assembly.

Figure 2.1: Representative Digifiz Replica GEN1 and Digifiz Replica Next (or Digifiz Next) instrument panels supplied with this manual.

Each variant ships with the components required for the intended drivetrain, measurement units, and wiring harness style. Later chapters decode the variant markings and provide connector tables so the cluster can be integrated safely.

3 Description and operation of the product

3.1 Purpose

The Digifiz Replica GEN1 and Digifiz Replica Next (or Digifiz Next) dashboards replace the original Volkswagen instrument clusters while extending their functionality. They provide digital indications for speed, engine speed, coolant temperature, fuel level, and auxiliary MFA calculations, and they support both cable and electronic speed sensors. Replica GEN1 units integrate a Bluetooth controller, while Digifiz Next adds Wi-Fi-based configuration modules and optional expansion units.

3.2 Model identification

Every dashboard is marked with a four-letter code that describes the drivetrain, assembly type, speed sensor interface, and wiring generation. Optional digits indicate the supported tachometer scale, and an additional three-letter suffix reports export measurement units.

Four-letter designation

Position 1 G for petrol engines or D for diesel engines.

Position 2 A for factory-assembled units or M for self-assembly kits.

Position 3 C for a mechanical cable speed sensor or R for an electronic speed sensor.

Position 4 T for the pre-facelift (CE 1) harness or S for the facelift (CE 2) harness.

A trailing digit denotes the maximum displayed engine speed in thousands of RPM (for example, “8” on a GACT8 cluster equals an 8000 RPM scale).

Measurement suffix

Export variants may add a three-letter suffix formed from the set MGFK:

M miles per hour,

G gallons,

F Fahrenheit,

K Kelvin.

For example, a GART8-MGF dashboard is a petrol, factory-assembled, electronic-sensor, CE 2 unit with an 8000 RPM tachometer and imperial measurement units.

3.3 Model range

| Model | Description |
|-----------|--|
| GACT | Petrol, fully assembled, cable speed sensor, two connectors, 7000 RPM scale. |
| GART | Petrol, fully assembled, remote electronic speed sensor, two connectors, 7000 RPM scale. |
| GAC | Petrol, fully assembled, cable speed sensor, single connector, 7000 RPM scale. |
| GARS | Petrol, fully assembled, remote electronic speed sensor, single connector, 7000 RPM scale. |
| GACT8 | Petrol, fully assembled, cable speed sensor, two connectors, 8000 RPM scale. |
| GART8 | Petrol, fully assembled, remote electronic speed sensor, two connectors, 8000 RPM scale. |
| GACS8 | Petrol, fully assembled, cable speed sensor, single connector, 8000 RPM scale. |
| GARS8 | Petrol, fully assembled, remote electronic speed sensor, single connector, 8000 RPM scale. |
| DACT | Diesel, fully assembled, cable speed sensor, two connectors, 6000 RPM scale. |
| DART | Diesel, fully assembled, remote electronic speed sensor, two connectors, 6000 RPM scale. |
| DACS | Diesel, fully assembled, cable speed sensor, single connector, 6000 RPM scale. |
| DARS | Diesel, fully assembled, remote electronic speed sensor, single connector, 6000 RPM scale. |
| MT | Self-assembly kit with two connectors. |
| M.S. | Self-assembly kit with a single connector. |
| NEXT-GART | Digifiz Replica Next (or Digifiz Next), 8000 RPM scale, two connectors, electronic speed sensor. |
| NEXT-GARS | Digifiz Replica Next (or Digifiz Next), 8000 RPM scale, single connector, electronic speed sensor. |
| NEXT-MT | Digifiz Replica Next (or Digifiz Next) self-assembly kit with two connectors. |
| NEXT-MS | Digifiz Replica Next (or Digifiz Next) self-assembly kit with a single connector. |

3.4 Connector pin-outs

Clusters with two connectors

White connector

| Pin | Assignment |
|-----|--|
| 1 | Blinker output, tied to ground for the indicator lamp. |
| 2 | Frei — not connected. |
| 3 | Terminal 58, positive supply for the panel backlight. |
| 4 | Resistive coolant temperature sensor input. |
| 5 | Resistive fuel level sensor input. |
| 6 | Ground return. |
| 7 | Additional ground return. |
| 8 | Terminal 1 engine-speed signal (coil, distributor, or other waveform up to 12 V with possible 300 V spikes). |
| 9 | MFA mode line used to change MFA functions. |
| 10 | UNR permanent positive supply (unused on Replica GEN1, main supply on Digifiz Next). |
| 11 | MFA temperature “+” lead for the ambient sensor (Digifiz Next). |
| 12 | MFA oil temperature sensor lead (Digifiz Next only). |
| 13 | KL 56a high-beam indicator input (+12 V active). |

Black connector



Figure 3.1: Connector layout for dual-connector Digifiz Replica GEN1 dashboards.

| Pin | Assignment |
|-----|--|
| 1 | Terminal 15 switched +12 V from the ignition switch. |
| 2–4 | Not connected. |
| 5 | Handbrake indicator input (active low). |
| 6 | KL 61 generator warning lamp drive with 120 Ω excitation resistor. |
| 7 | Oil pressure switch, 0.3 bar. |
| 8 | Oil pressure switch, 1.8 bar. |
| 9 | Not used. |
| 10 | Glow-plug indicator input (+12 V active, diesel only). |
| 11 | Hall sensor input for optional speed sensors. |
| 12 | MFA block selection line. |
| 13 | MFA reset line. |

Clusters with a single connector

Single-connector dashboards use the mapping shown in [Figure 3.2](#). The harness replicates the same signals found on the dual-connector variants but consolidates them into a single plug.

Scirocco/Passat prospective harness

The prospective Scirocco/Passat harness uses two plugs. Their functions are summarised below.

5-pin plug



| | |
|--|--|
| 1 - aussentemperaturgeber MFA | 15 - modeschalter MFA |
| 2 [жел/сер] датчик уровня ОЖ | 16 [сиг] индикатор разряда аккумулятора |
| 3 [корич] масса (KL31) | 17 -geber öfentemperatur MFA |
| 4 - reset MFA | 18 - frei |
| 5 - motormasse zylinderkopf | 19 - aussentemperaturgeber MFA |
| 6 - memory zylinderkopf | 20 [сиг/зеп] доп.индикатор накала свечей, дизель |
| 7 [бел/жел] датчик холла | 21 [блон/чер] датчик уровня топлива |
| 8 [жел] датчик давления масла 2Bar | 22 - frei |
| 9 [сиг/чер] датчик давления масла 0,8Bar | 23 [жел/сер] датчик температуры ОЖ |
| 10 [хр/сер] сигнал катушки зажигания (KL1) | 24 [сиг/сер] индикатор указателя поворотов |
| 11 [красн] питание часов (KL30) | 25 [бел/син] индикатор дальнего света |
| 12 [сер/сиг] подсветка панели приборов | 26 - frei |
| 13 [черн] +12V зажигания (KL15) | 27 - frei |
| 14 - frei | 28 - frei |

Figure 3.2: Single-connector layout used on compact Replica dashboards.

| Pin | Assignment |
|------------|---|
| 1 (D3) | Automatic-transmission “D” range indicator contact. Grounds the drive lamp when the selector is in position D. |
| 2 (D2) | Automatic-transmission second-range indicator contact. Grounds the “2” lamp when the selector is in position 2. |
| 3 (D1) | Automatic-transmission low-range indicator contact. Grounds the “1” lamp when the selector is in position 1. |
| 4 (SA) | Common feed for the automatic selector display (Schaltanzeige); provides the +12 V supply for the range lamps. |
| 5 (SPERRE) | Starter interlock contact from the selector. Closed in park or neutral to permit engine cranking. |

14-pin plug

| Pin | Assignment |
|-------------------|--|
| 1 (KL 58) | Illumination supply for the panel backlight. |
| 2 (MASS) | Chassis ground return. |
| 3 (TANK) | Fuel-level sender input. |
| 4 (TEMP) | Coolant temperature sender input. |
| 5 (KL 1) | Engine-speed signal (terminal 1). |
| 6 (UHR) | Permanent +12 V feed for the clock and memory backup. |
| 7 (FERNL) | High-beam indicator input. |
| 8 (reserved) | Not connected. |
| 9 (OEL 1.8) | High-pressure oil switch, 1.8 bar. |
| 10 (CAT VORGL(-)) | Catalytic-preheat / diesel pre-glow warning lamp input (active low). |
| 11 (OEL 0.3) | Low-pressure oil switch, 0.3 bar. |
| 12 (KL 61) | Alternator warning lamp and excitation feed. |
| 13 (KL 49a) | Combined turn-signal indicator feed. |
| 14 (KL 15) | Ignition-switched +12 V supply. |

Mk1 connector mapping

Volkswagen Mk1 vehicles use the following assignments:

- () Illumination and low-beam supply.
- () MASSE 31 ground reference.
- () TANK fuel-level sender.
- () TEMP coolant temperature sender.
- () KL 1 tachometer signal.
- () UHR permanent +12 V.
- () KL 56 high-beam signal.
- () OIL (HIGH) 1.8 bar pressure switch.
- () OIL (LOW) 0.3 bar pressure switch.
- () Diesel glow indicator.
- () CHOKE input (unused).
- () KL 61 generator lamp.
- () Blinker input (combined left/right).
- () KL 15 ignition supply.

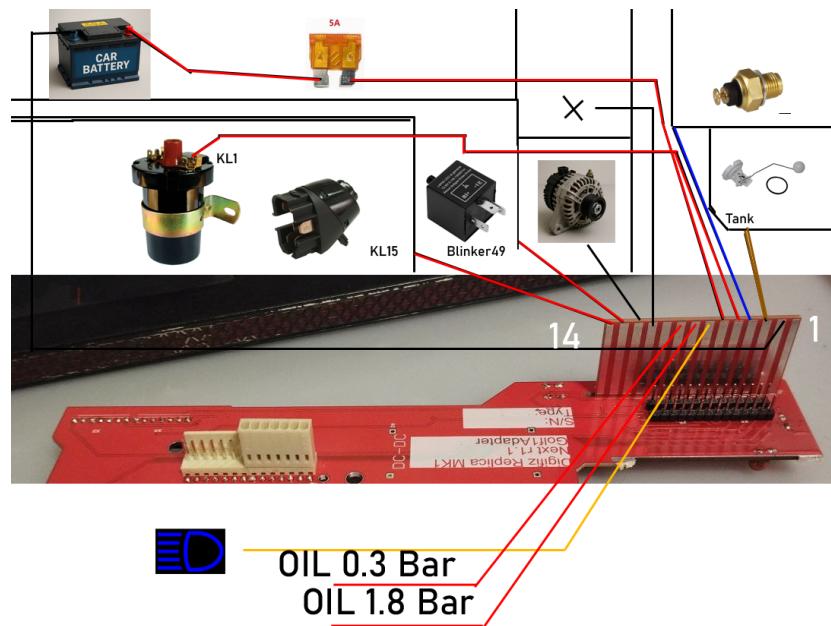


Figure 3.3: Harness connection diagram for Mk1 installations.

Mk3 Digifiz Next pinout

The dedicated Mk3 harness supplied with Digifiz Next dashboards terminates in a single 28-pin connector. The assignments follow the Volkswagen Digifiz Mk3

layout shown in [Table 3.4](#), allowing the harness to plug directly into the factory fuse panel or adapter blocks.

| Pin | Assignment |
|-----|--|
| 1 | Outside air temperature sensor -G17- ground (GND) [†] . |
| 2 | Engine Coolant Level (ECL) sensor -G32-. |
| 3 | Terminal 31 chassis ground. |
| 4 | Multi-function indicator memory switch -E109- reset lead [†] . |
| 5 | Terminal 31 chassis ground. |
| 6 | Multi-function indicator memory switch -E109- memory lead [†] . |
| 7 | Vehicle speed sensor (VSS) output. |
| 8 | Oil-pressure switch -F1-, 1.8 bar. |
| 9 | Oil-pressure switch -F22-, 0.3 bar. |
| 10 | Terminal 1 / terminal W tachometer input. |
| 11 | Terminal 30 battery supply (B+). |
| 12 | Terminal 58b illumination feed. |
| 13 | Terminal 15 ignition-switched B+. |
| 14 | Not connected. |
| 15 | Multi-function indicator mode-select switch -E86-. |
| 16 | Generator warning lamp -K2-, terminal 61. |
| 17 | Engine-oil temperature sensor -G8- [†] . |
| 18 | Brake / parking-brake warning lamp -K7-. |
| 19 | Outside air temperature sensor -G17- signal [†] . |
| 20 | Malfunction indicator lamp -K83- or diesel glow-plug lamp -K29-. |
| 21 | Fuel gauge -G1-. |
| 22 | Left turn-signal indicator lamp -K65-. |
| 23 | Engine coolant temperature gauge -G3-. |
| 24 | Right turn-signal indicator lamp -K94-. |
| 25 | High-beam indicator lamp -K1-. |
| 26 | Fuel-consumption input signal [†] . |
| 27 | Vehicle speed signal from the speedometer VSS -G22-. |
| 28 | Transmission-range (AG4) selector display. |

Table 3.4: Pin assignments for the Mk3 Digifiz Next harness.

Pins marked with [†] leave the 28-pin shell through the auxiliary JST breakouts bundled with the Mk3 kit. They provide twisted pairs for the ambient and oil thermistors plus direct access to the MFA buttons and fuel consumption signal.

Printed-circuit-board service connector

The third connector on the circuit board mirrors the dashboard connectors, with pins numbered right-to-left on Replica GEN1 and Digifiz Next units. It provides a service interface with the assignments listed in [Table 3.5](#).

| Position | Assignment |
|----------|---|
| 1 | Indicator output. |
| 2 | Speed sensor input (SPM_M). |
| 3 | Vehicle ground. |
| 4 | Indicator output. |
| 5 | Left blinker optocoupler input. |
| 6 | Right blinker optocoupler input. |
| 7 | Ignition +12 V. |
| 8 | Diesel-specific input. |
| 9 | Indicator input (positive). |
| 10 | Alternative RPM input (unused, Digifiz Next only). |
| 11 | Replica GEN1: indicator output (normally disconnected); Digifiz Next: brake input (active low). |
| 12 | Reserved. |
| 13 | Check-engine input. |
| 14 | No contact. |

Table 3.5: Service connector pin assignments.

Auxiliary expansion connectors

Three supplementary four-pin headers are fitted to the main board to simplify harness upgrades and service work:

- Expansion analog signals: provides a dedicated breakout for additional analog inputs when integrating custom sensors.
- MFA mirror: duplicates the standard MFA connector to support parallel tapping of the trip computer signals.
- Analog duplicates: repeats the oil temperature, ambient temperature, and brake indicator inputs so these circuits can be routed to external logging or monitoring modules.

All three use the KF2510-4p mating connector, which is not supplied with the dashboard kit and must be sourced separately if needed.

3.5 Embedded software and completeness

The dashboard firmware is published at the following address:

<https://github.com/Sgw32/DigifizReplica>

Two delivery sets are available:

- Digifiz Replica GEN1: dashboard assembly, ambient and oil temperature harness, USBasp programmer, and (for remote sensors) a speed sensor harness.
- Digifiz Replica Next (or Digifiz Next): dashboard assembly and an electronic speed sensor harness.

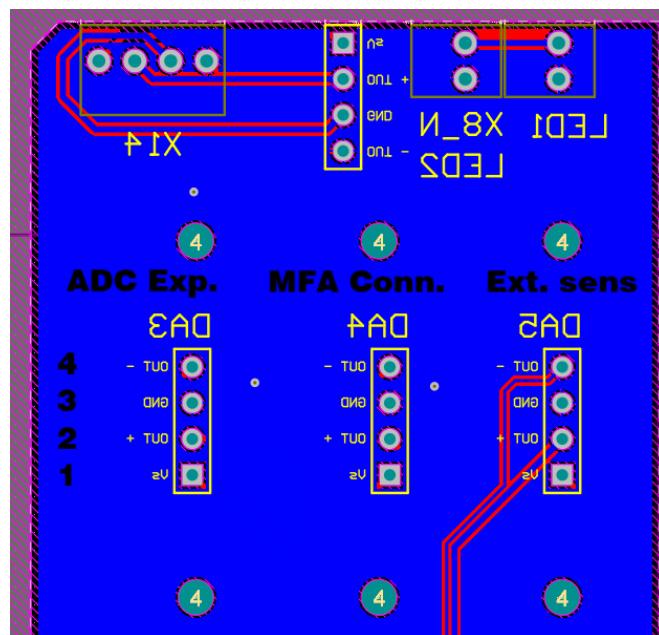


Figure 3.6: Auxiliary connector layout on the main board.

| Connector | Pin | Assignment |
|---------------|-----|-----------------------------------|
| Connector I | 4 | Aux analog input 1 |
| Connector I | 3 | Ground (GND) |
| Connector I | 2 | Aux analog input 2 |
| Connector I | 1 | VCC (3V3, unfused!!!) |
| Connector II | 4 | MFA reset |
| Connector II | 3 | Ground (GND) |
| Connector II | 2 | MFA memory block |
| Connector II | 1 | MFA mode |
| Connector III | 4 | Oil temperature sensor output |
| Connector III | 3 | Ground (GND) |
| Connector III | 2 | Outdoor temperature sensor output |
| Connector III | 1 | Brake indicator |

Table 3.7: Pin assignments for the auxiliary expansion connectors.

Operating Principle

Digifiz Replica GEN1 dashboards reuse the original Volkswagen enclosure, the factory CE 1 or CE 2 connectors, and either the mechanical speedometer cable or an electronic speed sensor. Replica GEN1 main boards are based on a fiberglass PCB populated with discrete components controlled by an ATmega 2560 microcontroller and MAX 7219 indicator drivers.

Digifiz Replica Next (or Digifiz Next) builds on an ESP32-S3 system-on-chip and introduces a newly manufactured SLA-printed enclosure, a redesigned front panel and cover, and a connector adapter board. The Digifiz Next display is illuminated by WS2812 addressable LEDs mounted behind the front frame, and the accompanying harness includes the electronic speed sensor by default.

Both generations share the same display layout and MFA pages, ensuring that installation procedures and day-to-day operation remain familiar between hardware revisions.

5 Technical specifications

The Digifiz Replica GEN1 dashboard consumes no standby current when powered down. Digifiz Next draws approximately 13 mA from the +12 V supply while the ignition is off, which should be considered when the vehicle is stored for extended periods. Both generations operate reliably from the vehicle electrical system between 9 V and 16 V DC.

5.1 Measurement capabilities

- Vehicle speed: measured through the factory cable or electronic speed sensor. The systematic error is 10 km/h, the relative error is 3 km/h, and the indication saturates at 999 km/h (or mph for imperial units).
- Engine speed: derived from the ignition signal via an optocoupler stage with a 430 nF/1.2 k Ω RC network and a diode limiter. The absolute and relative errors are within 200 rpm.
- Fuel level: read from the resistive tank sender with an uncertainty of approximately 10 litres.
- Coolant temperature: indicated qualitatively using the standard thermistor connected through the vehicle harness; quantitative values are not displayed.
- Timekeeping: maintained to within one minute.
- Indicator lamps: direction indicators, high beam, oil pressure warnings, generator status, handbrake, rear window heating or diesel glow-plug, and front and rear fog lights.

6 Operating conditions and safety precautions

6.1 Environmental limits

- The instrument panel operates between -40°C and $+70^{\circ}\text{C}$ at relative humidity up to 95 %.
- The dashboard may remain installed inside the vehicle throughout the year, including when the car is parked for extended periods.

6.2 Safety precautions

- () The Digifiz dashboard is a do-it-yourself device assembled and integrated by enthusiasts. Observe general electrical safety practices while working with it.
- () The product is intended for the personal projects of vehicle owners.
- () The readings are not certified or metrologically verified, although they correspond to the declared specifications at the time of release.
- () Use the dashboard only when you accept responsibility for the installation and for road safety.
- () If the displayed data cannot be trusted, verify it with the vehicle's standard gauges or external measuring instruments.
- () Do not use the instrument panel outputs for automatic vehicle control systems.
- () The authors accept no liability for consequences arising from the installation or use of the dashboard, including traffic fines or accidents. Malfunctions reported within the warranty period (one year for installations performed jointly with the authors and two weeks for independent installations) will be repaired.
- () The functional capabilities listed in Chapter 5^{→ p.17} are guaranteed for one year during supervised installation and for two weeks after independent installation.

7 Preparation for work and work order

7.1 Preparing the vehicle

Follow the sequence below when replacing the factory cluster with a Digifiz dashboard:

- () Remove the plastic trim covering the pedals and the lower dashboard to expose the original instrument panel.
- () Disconnect the vehicle battery.
- () Unplug the wiring harness from the factory instrument panel.
- () Detach the mechanical speedometer cable, if present.
- () Unscrew the panel from its brackets and carefully remove it from the vehicle.
- () Route the supplied temperature and speed sensor harnesses as required.
- () Install the Digifiz dashboard into the bracket grooves and secure it with screws.
- () For Digifiz Replica Next (or Digifiz Next), install the Volkswagen MFA sensors (or equivalents) and route their leads to the CE 1/CE 2 connectors.
- () On GACS/GARS/DARS/DACS models, connect the labelled MFA_MODE, MFA_RESET, MFA_BLOCK, and handbrake wires manually if the vehicle harness lacks these contacts. The second-generation Digifiz Next connects these signals internally by default.
- () Plug the harnesses into the dashboard.
- () Fit the electronic speed sensor or reconnect the mechanical cable.
- () Reinstall the dashboard trim and pedal cover in the reverse order.

7.2 Operating the dashboard

- The dashboard powers up automatically with the ignition. The sidelights switch controls the backlight.
- At start-up the entire speed scale illuminates while internal diagnostics stabilise the RPM model; the display then settles on the current idle speed.
- Once the vehicle begins to move, the system reports the parameters listed in Chapter 5 → p.¹⁷.

MFA functions

Six MFA pages are available:

- () Daily operating time.
 - () Trip distance.
 - () Fuel consumption (not implemented on the first Replica revision).
 - () Average speed (displayed as the value multiplied by ten).
 - () Engine oil temperature (external harness required).
 - () Ambient temperature (external harness required).

On Replica GEN1 dashboards a capacitive touch point behind the VW badge cycles the pages; Digifiz Next uses an external steering-column switch. Touch durations behave as follows:

- Short press (< 1 s): cycle to the next MFA function.
 - Medium press (1–3 s when no steering-column switch is fitted): switch between MFA memory blocks; the change is indicated on screen.
 - Long press (3–7 s): reset the active MFA function (affecting consumption, trip distance, elapsed time, and average speed).

Backlight and indicator layout

The Replica GEN1 dashboard offers a manual brightness trim above the parking-light switch; Digifiz Next relies on automatic brightness driven by a photodiode. Manual overrides can be configured through the maintenance interfaces described in Chapters 8 and 10 → p.??.

The layout of the horizontal indicator block and the on-screen legend are shown in Figure 7.1.

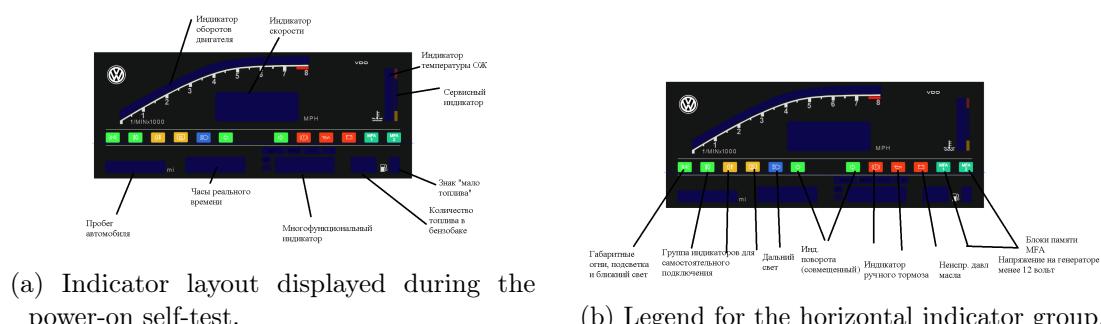


Figure 7.1: Instrument panel indication scheme.

Configuration interfaces

- Classic Digifiz Replica GEN1 units include a Bluetooth 2.0 (or BLE-compatible) module. Install the Serial Bluetooth Terminal application from Google Play, pair with the dashboard, and issue commands directly from the terminal view. Apple iOS devices cannot connect to this module.
- Digifiz Next exposes an embedded Wi-Fi access point and configuration portal described in [Chapter 8 → p.22](#). Disable mobile data while connecting to ensure the captive portal loads correctly.

Both generations can also be powered and configured on the bench using the USBasp programming interface.

Setting up and maintaining Digifiz Replica Next (or Digifiz Next)

This section applies to the Digifiz Replica Next (or Digifiz Next) dashboard shown in [Figure 8.1](#).



Figure 8.1: Digifiz Replica Next (or Digifiz Next) dashboard assembly.

8.1 Panel handling

- The UV-printed polycarbonate faceplate must be protected from scratches and foreign objects. Significant damage requires replacement parts from PHOL-LABS Kft and is not treated as a warranty case.
- The real-time clock is configured via the Wi-Fi control panel. It resets whenever the permanent supply is disconnected.

8.2 Wi-Fi control portal

Configuration, data collection, and firmware management are performed through the embedded web application.

- Connect to the dashboard's Wi-Fi access point. Disable mobile data and join `Digifiz_AP` (password 87654321); some revisions advertise `PHOL-LABS2` with the same password.
- The default IP address is 192.168.4.1. If the dashboard is configured to join another network, scan the subnet for an address ending in .32 using an IP tools application.
- The portal contains five tabs: WiFi, Control, Settings, Colors, and About ([Figure 8.2](#)). The WiFi tab configures network settings and handles firmware

uploads; the Control tab adjusts dashboard parameters; the Settings tab provides a structured editor for all firmware parameters; the Colors tab manages multi-segment colour schemes; the About tab lists author information.

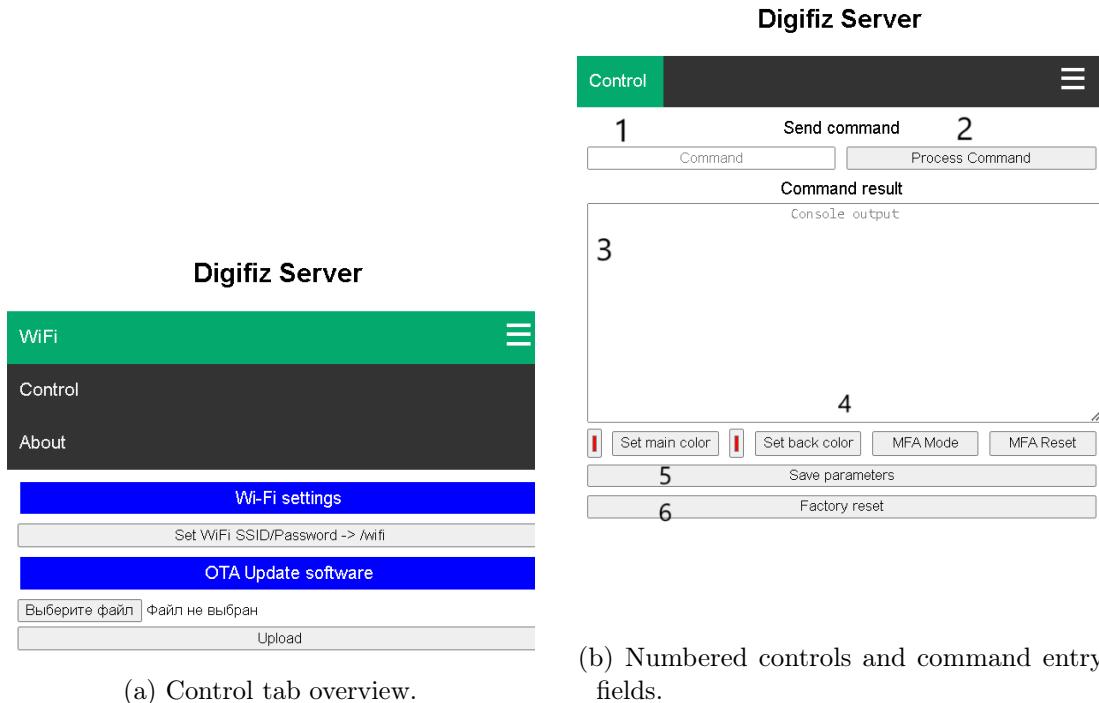


Figure 8.2: Digifiz Next Wi-Fi control interface.

8.3 Command entry

The Control tab provides a command input line (1), a Process button (2), a result window (3), quick controls (4), a Save button (5), and a Reset button (6). Enter commands as space-separated pairs <number> <value> using integers only; punctuation and quotation marks are not required. [Figure 8.3](#) illustrates the interface while toggling automatic brightness.

8.4 Command reference

8.5 Default values

8.6 Reading parameters and examples

To read a parameter, add 128 to the command number (for example, 129 0 reports the speed coefficient). Typical commands include disabling automatic brightness (13 0), enabling it again (13 1), adjusting the speed coefficient (1 110 increases the displayed speed by 10%), and setting the odometer (11 123456). Clock values

| Command | Name | Description |
|-----------|-------------------------------------|--|
| 22 (or 0) | PARAMETER_RPMCOEFFICIENT | Engine RPM calibration factor (100–10000). |
| 1 | PARAMETER_SPEEDCOEFFICIENT | Speed calibration factor (10–255). |
| 2 | PARAMETER_COOLANTTHERMISTORB | Coolant thermistor beta coefficient (2000–5000). |
| 3 | PARAMETER_OILTHERMISTORB | Oil thermistor beta coefficient (2000–5000). |
| 4 | PARAMETER_AIRTHERMISTORB | Ambient thermistor beta coefficient (2000–5000). |
| 5 | PARAMETER_TANKMINRESISTANCE | Minimum fuel sender resistance (0–1000 Ω). |
| 6 | PARAMETER_TANKMAXRESISTANCE | Maximum fuel sender resistance (100–1000 Ω). |
| 7 | PARAMETER_TAU_COOLANT | Coolant temperature filter constant (1–50, higher is more responsive). |
| 8 | PARAMETER_TAU_OIL | Oil temperature filter constant (1–50). |
| 9 | PARAMETER_TAU_AIR | Ambient temperature filter constant (1–50). |
| 10 | PARAMETER_TAU_TANK | Fuel level filter constant (1–50). |
| 11 | PARAMETER_MILEAGE | Total odometer value (0–999999). |
| 12 | PARAMETER_DAILY_MILEAGE | Trip odometer (0–9999). |
| 13 | PARAMETER_AUTO_BRIGHTNESS | Automatic brightness enable (1=on, 0=off). |
| 14 | PARAMETER_BRIGHTNESS_LEVEL | Manual brightness level (0–60%; values above 60 reduce LED life). |
| 15 | PARAMETER_TANK_CAPACITY | Fuel tank capacity in litres (0–99; 55 L typical for Golf II/III and Vento). |
| 16 | PARAMETER_MFA_STATE | Active MFA mode (normally controlled via hardware input). |
| 17 | PARAMETER_BUZZER_OFF | Disable buzzer (1 disables, 0 enables; Digifiz Next lacks a buzzer). |
| 18 | PARAMETER_MAX_RPM | Tachometer scaling (typical 8000, range 4000–16000). |
| 19 | PARAMETER_NORMAL_RESISTANCE_COOLANT | Coolant sensor resistance at 25 °C (1000–10000 Ω). |
| 20 | PARAMETER_NORMAL_RESISTANCE_OIL | Oil sensor resistance at 25 °C (1000–10000 Ω). |
| 21 | PARAMETER_NORMAL_RESISTANCE_AMB | Ambient sensor resistance at 25 °C (1000–10000 Ω). |
| 23 | PARAMETER_DOT_OFF | Clock colon behaviour (0=blink, 1=solid). |
| 24 | PARAMETER_BACKLIGHT_ON | Enable backlight on low beam (not used on Digifiz Next). |
| 25 | PARAMETER_M_D_FILTER | Median filter constant (legacy, normally unused). |
| 26 | PARAMETER_COOLANT_MAX_R | Coolant sensor threshold for full-scale indication (100 °C–150 °C). |
| 27 | PARAMETER_COOLANT_MIN_R | Coolant sensor threshold for “1 bar” indication (0 °C–80 °C). |
| 31 | PARAMETER_MAINCOLOR_R | Red component of the UI colour (0–255). |
| 32 | PARAMETER_MAINCOLOR_G | Green component of the UI colour (0–255). |
| 33 | PARAMETER_MAINCOLOR_B | Blue component of the UI colour (0–255). |
| 37 | PARAMETER_RPM_FILTER | RPM filter aggressiveness (10–200, higher reacts faster). |
| 128 | PARAMETER_READ_ADDITION | Add 128 to read the current value of any command. |
| 255 | PARAMETER_SET_HOUR | Set clock hours (24-hour format). |
| 254 | PARAMETER_SET_MINUTE | Set clock minutes. |
| 253 | PARAMETER_RESET_DAILY_MILEAGE | Reset the trip odometer. |
| 252 | PARAMETER_RESET_DIGITAL | Factory reset of stored parameters. |

Table 8.4: Primary Digifiz Next configuration commands.

| Parameter | Default | Notes |
|-------------------------------------|------------------|---|
| PARAMETER_RPMCOEFFICIENT | 3000 | Typical for Audi tachometer inputs. |
| PARAMETER_SPEEDCOEFFICIENT | 100 | Calibrated for 100 km/h. |
| PARAMETER_COOLANTTHERMISTORB | 4000 | |
| PARAMETER_OILTHERMISTORB | 4000 | |
| PARAMETER_AIRTHERMISTORB | 3812 | 3600 for Generation 2 panels. |
| PARAMETER_TANKMINRESISTANCE | 35 | Ω . |
| PARAMETER_TANKMAXRESISTANCE | 265 | Ω . |
| PARAMETER_TAU_COOLANT | 2 | Filter constant. |
| PARAMETER_TAU_OIL | 2 | Filter constant. |
| PARAMETER_TAU_AIR | 2 | Filter constant. |
| PARAMETER_TAU_TANK | 2 | Filter constant. |
| PARAMETER_MILEAGE | Vehicle-specific | Retains stored odometer. |
| PARAMETER_DAILY_MILEAGE | 0 | |
| PARAMETER_AUTO_BRIGHTNESS | 1 | Enabled. |
| PARAMETER_BRIGHTNESS_LEVEL | 25 | Generation 2 default; Generation 1/1.5 use 7 or 13. |
| PARAMETER_TANK_CAPACITY | 63 | Litres. |
| PARAMETER_MFA_STATE | 0 | Default MFA page. |
| PARAMETER_BUZZER_OFF | 1 | Buzzer disabled. |
| PARAMETER_MAX_RPM | 8000 | Tachometer scale. |
| PARAMETER_NORMAL_RESISTANCE_COOLANT | 1000 | Ω at 25 °C. |
| PARAMETER_NORMAL_RESISTANCE_OIL | 1000 | Ω at 25 °C. |
| PARAMETER_NORMAL_RESISTANCE_AMB | 2991 | 500 Ω for Generation 2 sensors. |
| PARAMETER_DOT_OFF | 0 | Blinking clock colon. |
| PARAMETER_BACKLIGHT_ON | 1 | Backlight enabled with low beam. |
| PARAMETER_M_D_FILTER | 65535 | Legacy median filter constant. |
| PARAMETER_COOLANT_MAX_R | 120 | °C. |
| PARAMETER_COOLANT_MIN_R | 60 | °C. |
| PARAMETER_MAINCOLOR_R | 180 | Yellow-green default. |
| PARAMETER_MAINCOLOR_G | 240 | Yellow-green default. |
| PARAMETER_MAINCOLOR_B | 6 | Yellow-green default. |
| PARAMETER_RPM_FILTER | 70 | Filter response. |
| PARAMETER_UPTIME | 0 | Runtime counter. |

Table 8.5: Digifiz Next default settings.

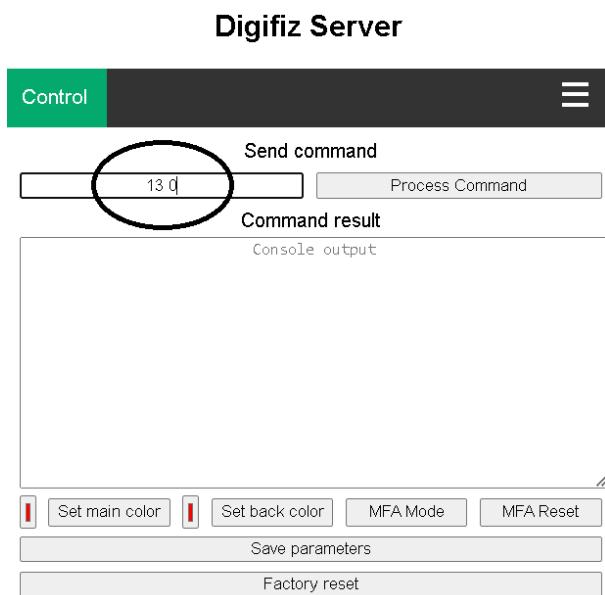


Figure 8.3: Example command sequence disabling automatic brightness.

are set with 255 <hours> followed by 254 <minutes>. Commands 31–33 set the RGB components of the user interface colour.

8.7 Service commands

Recent firmware revisions accept human-readable parameter names, for example PARAMETER_RPMCOEFFICIENT 3000. The diagnostic command adc 0 prints raw ADC readings for sensor troubleshooting. Firmware updates add visual colour controls, so update regularly through the WiFi tab to access the latest features.

8.8 Settings tab parameter editor

The Settings tab mirrors the parameter list in [Table 8.4](#) and [Table 8.5](#) while adding metadata about ranges, descriptions, and data types. [Table B.1](#) summarises every firmware parameter. Use the Settings tab whenever you prefer a graphical workflow instead of typing command numbers; it exposes the same catalogue, including range validation, so you can adjust values quickly without memorising numeric IDs.

- () Press Load Parameters to fetch the live values from the dashboard. The browser displays each item with its name, current value, tooltip, and type.
- () For numeric entries, type the desired value inside the New Value column. The interface enforces the permissible range shown in the Min and Max columns.

Boolean parameters appear as checkboxes.

- () Click Set to submit the change instantly. The table refreshes to confirm the updated value.
- () Repeat the process for every parameter you want to adjust. When finished, return to the Control tab and press Save parameters to write the configuration to non-volatile memory.

The colour workflow requires that you enable the firmware flag responsible for custom palettes before moving to the Colors tab. Locate the boolean entry labelled “Custom colour scheme” in the web dashboard’s Settings tab, tick the checkbox, and press Set. The dashboard will reject bespoke segment edits until this flag is turned on.

8.9 Custom colour schemes

The Colors tab introduces a segment-based editor for the WS2812 LED backlight. Each row describes a range end point, the functional area it corresponds to, and the colour or base colour inheritance.

- () Press Load Scheme to read the active mapping. Use Add Segment, or the inline “+↑” and “+↓” controls, to insert new ranges. The drop-down menus select the instrument function, and the base-colour selector lets you reuse the main or back colours instead of specifying a fixed RGB value.
- () Click the colour picker to fine-tune the RGB tone for segments that are set to “Custom”. The editor reports component values in real time.
- () Use the reorder arrows to match the physical LED sequence (segments must remain in ascending order). Delete redundant rows with the “×” button.
- () When the table reflects the desired layout, press Set Scheme. The browser iterates through the rows and pushes each segment to the dashboard.
- () Immediately switch to the Control tab and press Save parameters. This step is mandatory—the firmware caches the uploaded segments in RAM and discards them after a reboot if they are not saved.
- () Optionally export the JSON representation via Export to File for backups, or import a previously saved file with Import from File. The Reset Scheme button restores the factory layout after confirmation.

If you later disable the custom colour scheme flag in the Settings tab, the dashboard falls back to the classic single-colour mode driven by PARAMETER_MAINCOLOR_R/G/B|

9 Typical situations for setting up the Digifiz Next

Hotspot not visible Move closer to the vehicle and ensure it is parked in an open area. Disable mobile data, forget stale Wi-Fi profiles, and reconnect to Digifiz_AP (or PHOL-LABS2).

404 at 192.168.4.1 Turn off mobile data on the phone or laptop and reload the page. Captive portal detection on Android/iOS often interferes until the cellular modem is disabled.

Firmware updates Open the WiFi tab and select the supplied Digifiz.bin file. The latest releases are published at the link below.

<https://github.com/Sgw32/DigifizReplica/releases>

Click Upload. The first attempt can fail; repeat the upload if necessary. Successful flashes redirect to a confirmation page. Record the odometer before updating and restore it afterwards with 11 <mileage>.

Commands ignored Refresh the browser, return to the Control tab, and resend the command. Ensure the Process button is pressed after entering the value.

Speed reading incorrect Connect via Wi-Fi, drive at an indicated 100 km/h, note the GPS speed, then issue 1 <gps_value> (for example, 1 85) to set PARAMETER_SPEEDCOEFFICIENT to the verified value.

RPM reading incorrect Adjust PARAMETER_RPMCOEFFICIENT. Older firmware uses 0 <value>; current versions use 22 <value>. Example: 22 1500 halves the reading relative to 22 3000.

Display too dim Disable automatic brightness with 13 0, then raise the manual level (for example, 14 50). Experiment with values between 45 and 55; avoid levels above 60 to preserve LED life.

Setting the clock Use the web terminal (or Serial Bluetooth Terminal on legacy builds) to send 255 <hours> followed by 254 <minutes>. Example: 255 23 and 254 55 sets 23:55.

Fuel readings stuck Disconnect the battery and measure the resistance between the fuel sender pin and vehicle ground. Valid readings are typically 30–300 Ω. Repair shorts below 5 Ω or open circuits before reconnecting. If the readings vary correctly but the gauge does not, record adc 0 results at several fuel levels and share them with PHOL-LABS Kft.

Fuel flow readings inaccurate The optional flow sensor produces emulated data and is unreliable without an intake manifold pressure sensor. Treat the readings

as experimental.

Coolant temperature out of range Tune PARAMETER_COOLANT_MIN_R and PARAMETER_COOLANT_MAX_R. Example: 27 30 lowers the “1 bar” threshold to 30 °C.

Oil or ambient temperature missing With the battery disconnected and the engine cold, measure the sensor resistance. Oil sensors should read about $2\text{ k}\Omega \pm 0.3\text{ k}\Omega$, ambient sensors about $10\text{ k}\Omega \pm 2\text{ k}\Omega$. Adjust PARAMETER_NORMAL_RESISTANCE_OIL (command 20) or PARAMETER_NORMAL_RESISTANCE_AMB (command 21); lower values decrease the indicated temperature, higher values increase it. Persistent issues should be diagnosed by collecting adc 0 output and contacting PHOL-LABS Kft.

Changing interface colour Use commands 31–33 to set the RGB values. New firmware revisions include visual colour controls in the web interface, so update regularly.

10

Setup and maintenance of the Digifiz Replica GEN1

This chapter applies to the classic Digifiz Replica GEN1 instrument panel shown in [Figure 10.1](#). If your dashboard matches the Digifiz Replica Next (or Digifiz Next) layout, refer to the previous chapter.



(a) Classic Digifiz Replica GEN1 with square bezel.



(b) Round-edge fascia used on later kits.

Figure 10.1: Appearance of the Digifiz Replica GEN1 dashboard.

10.1 Handling and screen care

- The plexiglass front with UV printing is easily marred. Avoid contact with sharp or abrasive objects.
- Surface damage is cosmetic and not covered by warranty. Request replacement parts from PHOL-LABS Kft if the screen pattern is deformed.

10.2 Real-time clock battery

The dashboard contains a DS3231 real-time clock with a CR2032 cell. The battery typically lasts about four years. When it is depleted the clock resets at every power-up. Remove the front and/or rear cover, keep the wiring harnesses connected, and replace the coin cell. Dispose of the spent battery according to local regulations.

10.3 Firmware maintenance with USBasp

Each kit ships with a USBasp programmer lead already connected inside the housing ([Figure 10.2](#)). Install a suitable USBasp driver before flashing. For example, download it from the following address:

<https://myrobot.ru/downloads/driver-usbasp-v-2.0-usb-ispl-windows-7-8-10-xp.php>

The programmer powers the dashboard when it is connected to a computer, allowing bench checks.



Figure 10.2: USBasp harness orientation inside the Digifiz Replica GEN1.

Flash firmware with avrdude using the command below (replace the firmware filename if required):

```
avrdude -c usbasp -p m2560 -e \
-U lfuse:w:0xff:m -U hfuse:w:0x99:m -U efuse:w:0xff:m \
-U flash:w:Digifiz.ino.mega.hex
```

After a successful upload press the front touch button four to five times to initialise the memory blocks. If the blocks remain empty, repeat the flashing procedure or issue the Bluetooth command 252 0 to trigger a factory reset. Ready-to-use firmware images are published at:

<https://github.com/Sgw32/DigifizReplica>

10.4 Bluetooth configuration

Most parameters are adjusted over Bluetooth using an Android phone and the Serial Bluetooth Terminal application. Download it from the following link before pairing with the dashboard:

https://play.google.com/store/apps/details?id=de.kai_morich.serial_bluetooth_terminal&hl=en&gl=US

iOS devices cannot connect to the classic Bluetooth 2.0 module.

- Ensure you pair with the dashboard's Bluetooth Classic interface rather than BLE-only devices.
- In Serial Bluetooth Terminal set the end-of-line character to LF. Disable CR+LF before sending commands.

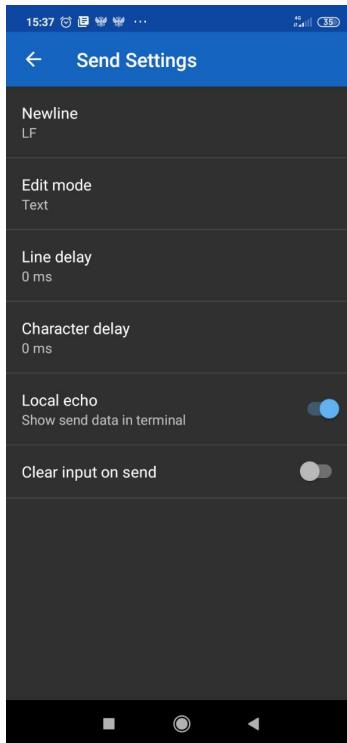


Figure 10.3: Recommended Serial Bluetooth Terminal configuration.

Enter commands as space-separated pairs <number> <value>. For example, to store an odometer value of 123 456 km send 11 123456. Add 128 to a command number to read its current value (129 0 reports the speed coefficient). The diagnostic command adc 0 prints raw sensor readings that help the developers analyse faults.

10.5 Configuration parameters

The primary Bluetooth commands are listed in [Table 10.4](#). Default settings for Generation 1/1.5 and Generation 2 dashboards are summarised in [Table A.2](#). Use commands 31–33 only on Digifiz Next units; they have no effect on the classic Replica GEN1.

Table 10.4: Classic Digifiz Replica GEN1 configuration commands.

| ID | Name | Description |
|-----------|--------------------------|--------------------------------|
| 22 (or 0) | PARAMETER_RPMCOEFFICIENT | Engine RPM calibration factor. |

Continued on next page

Table 10.4: Classic Digifiz Replica GEN1 configuration commands. (Continued)

| | | |
|-------|-------------------------------------|--|
| 1 | PARAMETER_SPEEDCOEFFICIENT | Speed calibration factor. |
| 2 | PARAMETER_COOLANTTHERMISTORB | Coolant thermistor beta coefficient. |
| 3 | PARAMETER_OILTHERMISTORB | Oil thermistor beta coefficient. |
| 4 | PARAMETER_AIRTHERMISTORB | Ambient thermistor beta coefficient. |
| 5 | PARAMETER_TANKMINRESISTANCE | Minimum fuel sender resistance (Ω). |
| 6 | PARAMETER_TANKMAXRESISTANCE | Maximum fuel sender resistance (Ω). |
| 7 | PARAMETER_TAU_COOLANT | Coolant temperature filter constant. |
| 8 | PARAMETER_TAU_OIL | Oil temperature filter constant. |
| 9 | PARAMETER_TAU_AIR | Ambient temperature filter constant. |
| 10 | PARAMETER_TAU_TANK | Fuel level filter constant. |
| 11 | PARAMETER_MILEAGE | Total odometer value. |
| 12 | PARAMETER_DAILY_MILEAGE | Trip odometer. |
| 13 | PARAMETER_AUTO_BRIGHTNESS | Enable automatic brightness adjustment. |
| 14 | PARAMETER_BRIGHTNESS_LEVEL | Manual brightness level (0–15). |
| 15 | PARAMETER_TANK_CAPACITY | Fuel tank capacity (litres). |
| 16 | PARAMETER_MFA_STATE | Active MFA page. |
| 17 | PARAMETER_BUZZER_OFF | Disable the buzzer (1 disables, 0 enables). |
| 18 | PARAMETER_MAX_RPM | Tachometer scale (default 8000). |
| 19 | PARAMETER_NORMAL_RESISTANCE_COOLANT | Coolant sensor resistance at 25 °C. |
| 20 | PARAMETER_NORMAL_RESISTANCE_OIL | Oil sensor resistance at 25 °C. |
| 21 | PARAMETER_NORMAL_RESISTANCE_AMB | Ambient sensor resistance at 25 °C. |
| 23 | PARAMETER_DOT_OFF | Clock colon behaviour (0 blink, 1 solid). |
| 24 | PARAMETER_BACKLIGHT_ON | Switch on backlight with low beam. |
| 25 | PARAMETER_M_D_FILTER | Median filter constant (legacy). |
| 26 | PARAMETER_COOLANT_MAX_R | Coolant “full-scale” temperature threshold. |
| 27 | PARAMETER_COOLANT_MIN_R | Coolant “1 bar” temperature threshold. |
| 31–33 | PARAMETER_MAINCOLOR_[RGB] | Interface colour components (Digifiz Next only). |
| 37 | PARAMETER_RPM_FILTER | RPM filtering aggressiveness. |
| 128 | PARAMETER_READ_ADDITION | Add to read any parameter. |
| 255 | PARAMETER_SET_HOUR | Set clock hours (24-hour). |
| 254 | PARAMETER_SET_MINUTE | Set clock minutes. |
| 253 | PARAMETER_RESET_DAILY_MILEAGE | Reset the trip odometer. |
| 252 | PARAMETER_RESET_DIGITAL | Factory reset and memory initialisation. |

The Serial Bluetooth Terminal quick buttons are convenient for routine actions such as toggling automatic brightness (13 0 and 13 1) or writing colour values. Keep values above 60 % brightness only for short tests to preserve LED life.

11 Typical situations for setting up the Digifiz Replica GEN1

Before troubleshooting, confirm that the dashboard is the classic Digifiz Replica GEN1 ([chapter 10](#)). Digifiz Replica Next (or Digifiz Next) panels use a Wi-Fi portal and are covered in [chapter 9](#).

Bluetooth module not detected Pair with the dashboard's Bluetooth Classic interface (it normally advertises as Digifiz). Serial Bluetooth Terminal for Android remains the recommended tool: configure the end-of-line character as LF and avoid BLE-only scanners, which cannot discover the module.

iPhone or iPad cannot connect Replica GEN1 dashboards use Bluetooth 2.0 and are incompatible with iOS devices. Use an Android phone or a computer running a Bluetooth serial utility.

Commands ignored on 2024+ firmware Unlock the command parser by sending 234 123, then repeat the desired sequence. Store quick-access buttons in Serial Bluetooth Terminal for the values you adjust frequently.

Speed reading too high or low Connect through Serial Bluetooth Terminal, drive at an indicated 100 km/h, and note the GPS speed. Send 1 <gps_value> (for example, 1 85) so PARAMETER_SPEEDCOEFFICIENT matches the verified GPS speed.

RPM reading incorrect Firmware prior to 2024 expects 0 <value> while current releases use 22 <value>. Audi engines typically need 22 3000; halve or double the value (for example, 22 1500 or 22 6000) until the display matches the tachometer.

Increase brightness Disable automatic control with 13 0 and raise the manual level with 14 <value>. Values between 45 and 55 brighten the display substantially; avoid levels above 60 to preserve LED life. Re-enable the photodiode later with 13 1.

Setting the clock Use Serial Bluetooth Terminal to send 255 <hours> followed by 254 <minutes>. Examples: 255 23, 254 55 sets 23:55; 255 14, 254 30 sets 14:30; 255 2, 254 28 sets 02:28.

Fuel gauge issues Disconnect the vehicle battery before probing.

- If the display drifts from 60 to 0, measure the sender resistance between the harness pin and ground; valid readings are typically 30–300 Ω. Clean the connector and confirm the signal reaches the main board.
- If the gauge is pegged full, look for a short to ground below 5 Ω on the sender line and repair it.

- If the reading never changes, compare the sender resistance with full and empty tanks. Replace the sensor if it stays constant.

Fuel flow values seem wrong The flow channel is emulated unless an intake-manifold pressure sensor is fitted. Treat the reading as indicative rather than absolute.

Coolant gauge inaccurate Adjust PARAMETER_COOLANT_MIN_R and PARAMETER_COOLANT_MAX_R. Example: 27 30 shortens the scale so that the “1 bar” mark aligns with roughly 30 °C.

Oil or ambient temperature readings missing A reading of -999 or a stuck value indicates a sensor issue. With the battery disconnected and the engine cold, measure the sensor resistance between the harness pin and ground. Oil sensors should read about $2\text{ k}\Omega \pm 0.3\text{ k}\Omega$; ambient sensors about $10\text{ k}\Omega \pm 2\text{ k}\Omega$. Adjust PARAMETER_NORMAL_RESISTANCE_OIL (command 20) or PARAMETER_NORMAL_RESISTANCE_AMB (command 21) if the display needs fine-tuning. Persistent faults should be documented with adc 0 logs and escalated to PHOL-LABS Kft support.

Collect raw sensor data with adc 0 if the problem persists and share the results with the dashboard developers for analysis.

12

Marking and sealing

- Each dashboard may be marked with the model number corresponding to its instrument-cluster variant.
- Export batches can include additional markings applied by the importing organisation.
- The Digifiz Replica GEN1 is not sealed; no tamper seals are fitted at the factory.

Package 13

- () For transport, wrap the instrument panel set in bubble wrap and place it in a rigid cardboard box.
- () Alternative packaging is acceptable provided it protects the dashboard during transport and storage.

14 Storage and transportation rules

- Transportation conditions must comply with the general freight rules applicable to each transport mode (GOST 23216-78).
- Packaged dashboards may be shipped by road, rail, river, or air transport.
- Store the instrument panel inside the vehicle cabin or in a heated room between 15 °C and 40 °C. Protect the unit from direct sunlight, although storage behind vehicle glass is permissible.

A Reference Tables

A.1 Classic Digifiz Replica GEN1 Command Reference

The classic Replica firmware shares most commands with Digifiz Next. Commands 31–33 (colour control) are only active on Digifiz Next units; other commands apply equally to both generations.

A.2 Classic Replica GEN1 Default Values

| Command | Name | Description |
|---------|-------------------------------|---|
| 22(or0) | PARAMETER_RPMCOEFFICIENT | Engine RPM calibration factor. |
| 1 | PARAMETER_SPEEDCOEFFICIENT | Speed calibration factor. |
| 2 | PARAMETER_COOLANTTHERMISTORB | Coolant thermistor beta coefficient. |
| 3 | PARAMETER_OILTHERMISTORB | Oil thermistor beta coefficient. |
| 4 | PARAMETER_AIRTHERMISTORB | Ambient thermistor beta coefficient. |
| 5 | PARAMETER_TANKMINRESISTANCE | Minimum fuel sender resistance. |
| 6 | PARAMETER_TANKMAXRESISTANCE | Maximum fuel sender resistance. |
| 7–10 | PARAMETER_TAU_X | Filtering constants for coolant, oil, air, and fuel level. |
| 11 | PARAMETER_MILEAGE | Total odometer value. |
| 12 | PARAMETER_DAILY_MILEAGE | Trip odometer. |
| 13 | PARAMETER_AUTO_BRIGHTNESS | Automatic brightness enable. |
| 14 | PARAMETER_BRIGHTNESS_LEVEL | Manual brightness level. |
| 15 | PARAMETER_TANK_CAPACITY | Fuel tank capacity. |
| 16 | PARAMETER_MFA_STATE | Active MFA mode. |
| 17 | PARAMETER_BUZZER_OFF | Disable buzzer (Replica only). |
| 18 | PARAMETER_MAX_RPM | Tachometer scaling (7000 default). |
| 19–21 | PARAMETER_NORMAL_RESISTANCE_X | Sensor resistances at 25 °C for coolant, oil, and ambient inputs. |
| 23 | PARAMETER_DOT_OFF | Clock colon behaviour. |
| 24 | PARAMETER_BACKLIGHT_ON | Enable backlight when low beam is active. |
| 25 | PARAMETER_M_D_FILTER | Median filter constant. |
| 26 | PARAMETER_COOLANT_MAX_R | Coolant sensor threshold for full-scale indication. |
| 27 | PARAMETER_COOLANT_MIN_R | Coolant sensor threshold for “1 bar” indication. |
| 31–33 | PARAMETER_MAINCOLOR_[RGB] | UI colour components (Digifiz Next only). |
| 37 | PARAMETER_RPM_FILTER | RPM filtering aggressiveness. |
| 128 | PARAMETER_READ_ADDITION | Add 128 to read the current value of a command. |
| 255 | PARAMETER_SET_HOUR | Set clock hours. |
| 254 | PARAMETER_SET_MINUTE | Set clock minutes. |
| 253 | PARAMETER_RESET_DAILY_MILEAGE | Reset trip odometer. |
| 252 | PARAMETER_RESET_DIGITAL | Factory reset of stored parameters. |

Table A.1: Primary configuration commands for classic Digifiz Replica GEN1 dashboards.

| Parameter | Default | Notes |
|--------------------------------------|------------------|--|
| PARAMETER_RPMC_OEFFICIENT | 3000 | |
| PARAMETER_SPEE_DCOEFFICIENT | 100 | |
| PARAMETER_COOL_ANTTHERMISTORB | 4000 | |
| PARAMETER_OILTH_ERMISTORB | 4000 | |
| PARAMETER_AIRT_HERMISTORB | 3812 | 3600 on Gen 2. |
| PARAMETER_TANK_MINRESISTANCE | 35 | Ohms. |
| PARAMETER_TANK_MAXRESISTANCE | 265 | Ohms. |
| PARAMETER_TAU_COOLANT | 2 | |
| PARAMETER_TAU_OIL | 2 | |
| PARAMETER_TAU_AIR | 2 | |
| PARAMETER_TAU_TANK | 2 | |
| PARAMETER_MILEAGE | Vehicle-specific | Preserve existing odometer. |
| PARAMETER_DAILY_MILEAGE | 0 | |
| PARAMETER_AUTO_BRIGHTNESS | 1 | Enabled. |
| PARAMETER_BRIGHTNESS_LEVEL | 7 or 13 | Typical values for Gen 1/1.5. |
| PARAMETER_TANK_CAPACITY | 63 | Litres. |
| PARAMETER_MFA_STATE | 0 | |
| PARAMETER_BUZZER_OFF | 1 | Buzzer disabled. |
| PARAMETER_MAX_RPM | 8000 | 7000 on earlier clusters. |
| PARAMETER_NORM_AL_RESISTANCE_COOLANT | 1000 | Ω at 25 °C. |
| PARAMETER_NORM_AL_RESISTANCE_OIL | 1000 | Ω at 25 °C. |
| PARAMETER_NORM_AL_RESISTANCE_AMB | 2991 | Ω at 25 °C. |
| PARAMETER_DOT_OFF | 0 | Blinking colon. |
| PARAMETER_BACK_LIGHT_ON | 1 | Enabled. |
| PARAMETER_M_D_FILTER | 65535 | |
| PARAMETER_COOL_ANT_MAX_R | 120 | °C. |
| PARAMETER_COOL_ANT_MIN_R | 60 | °C. |
| PARAMETER_MAIN_COLOR_[RGB] | - | Colour commands not active on classic Replica. |
| PARAMETER_RPM_FILTER | 70 | Draft - January 25, 2026 |
| PARAMETER_UPTIME | 0 | |

Digifiz Next Parameter Catalogue

Table B.1: Digifiz Next firmware parameters available through the Settings tab.

| UI label | Description | Type | Default | Range / notes |
|---|---|------|---------|--|
| Regional options and diagnostic toggles | | | | |
| MFA Option Enable | Enable MFA steering column switch integration. | U8 | 1 | Boolean toggle (0–1). |
| Miles option | Display mileage in miles instead of kilometres. | U8 | 0 | Boolean toggle (0–1). |
| Gallons option | Show fuel consumption in gallons. | U8 | 0 | Boolean toggle (0–1). |
| Fahrenheit option | Display temperatures in degrees Fahrenheit. | U8 | 0 | Boolean toggle (0–1). |
| Kelvin option | Display temperatures in degrees Kelvin. | U8 | 0 | Boolean toggle (0–1). |
| Reserved option | Reserved flag for future units. | U8 | 0 | Boolean toggle (0–1); no user-facing function. |
| Linear fuel calculation | Calculate fuel level with a linear curve instead of table lookup. | U8 | 0 | Boolean toggle (0–1). |
| Test mode | Enable firmware test mode. | U8 | 0 | Boolean toggle (0–1). |
| Tachometer and drivetrain | | | | |
| Redline segments | Number of red warning segments on the tachometer scale. | U8 | 8 | 0–31 segments. |
| Diesel option | Use diesel-specific tachometer scaling. | U8 | 0 | Boolean toggle (0–1). |
| 7k option | Switch to a 7000 rpm tachometer scale. | U8 | 0 | Boolean toggle (0–1). |
| RPM Coefficient | Tachometer calibration coefficient. | U16 | 3000 | Typical range 1000–6000. |
| Maximum RPM | Maximum displayed RPM. | U16 | 8000 | Selectable 6000, 7000, or 8000. |

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Table B.1: Digifiz Next firmware parameters available through the Settings tab. (Continued)

| UI label | Description | Type | Default | Range / notes |
|-----------------------------|--|------|---------|--|
| RPM LPF coeff. | Low-pass filter coefficient applied while RPM increases. | U16 | 70 | Higher values respond faster. |
| RPM LPF coeff. fall | Low-pass filter coefficient applied while RPM decreases. | U16 | 200 | Higher values respond faster. |
| Stable RPM input | Optimise RPM input for modern ECUs. | U8 | 0 | Boolean toggle (0–1). |
| Gear change indicator | Blink the gear indicator on detected shifts. | U8 | 1 | Boolean toggle (0–1). |
| Rear gear coefficient | Ratio of vehicle speed to reverse gear input frequency. | U32 | 9999999 | Sentinel value indicates not configured. |
| 1-st gear coefficient | Ratio of vehicle speed to first gear input frequency. | U32 | 1000 | Increase to lower the detected gear. |
| 2-nd gear coefficient | Ratio of vehicle speed to second gear input frequency. | U32 | 2000 | Increase to lower the detected gear. |
| 3-rd gear coefficient | Ratio of vehicle speed to third gear input frequency. | U32 | 3000 | Increase to lower the detected gear. |
| 4-th gear coefficient | Ratio of vehicle speed to fourth gear input frequency. | U32 | 4000 | Increase to lower the detected gear. |
| 5-th gear coefficient | Ratio of vehicle speed to fifth gear input frequency. | U32 | 5000 | Increase to lower the detected gear. |
| 6-th gear coefficient | Ratio of vehicle speed to sixth gear input frequency. | U32 | 10000 | Default indicates “no gear”. |
| Temperature and fuel gauges | | | | |
| Red segments count | Number of red warning segments on the temperature gauge. | U8 | 0 | 0–3 segments. |
| Indicate temp. sensor | Indicate a connected temperature sensor using one segment. | U8 | 0 | Boolean toggle (0–1). |
| Lower atten. enable | Enable the lower attenuator for the oil channel. | U8 | 0 | Boolean toggle (0–1). |

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Table B.1: Digifiz Next firmware parameters available through the Settings tab. (Continued)

| UI label | Description | Type | Default | Range / notes |
|-----------------------------------|---|------|---------|-------------------------------|
| Temp. alarm function | Flash the temperature gauge when an alarm triggers. | U8 | 0 | Boolean toggle (0–1). |
| Min. coolant temp. | Minimum coolant temperature shown as a single segment. | U16 | 60 | Expressed in °C. |
| Max. coolant temp. | Coolant temperature mapped to a full-scale reading. | U16 | 120 | Expressed in °C. |
| Coolant LPF coeff. | Low-pass filter constant for coolant readings. | U16 | 2 | Higher values respond faster. |
| Oil LPF coeff. | Low-pass filter constant for oil readings. | U16 | 2 | Higher values respond faster. |
| Air LPF coeff. | Low-pass filter constant for ambient readings. | U16 | 2 | Higher values respond faster. |
| Tank LPF coeff. | Low-pass filter constant for fuel level readings. | U16 | 2 | Higher values respond faster. |
| Fuel tank min. resistance | Minimum resistance of the fuel level sender. | U16 | 35 | Expressed in Ω. |
| Fuel tank max. resistance | Maximum resistance of the fuel level sender. | U16 | 265 | Expressed in Ω. |
| Fuel tank capacity | Fuel tank capacity. | U8 | 63 | Expressed in litres. |
| Signal processing and measurement | | | | |
| Other blink | Use dedicated left/right indicator inputs instead of the common wire. | U8 | 0 | Boolean toggle (0–1). |
| Touch sensor option | Enable the wireless touch sensor input. | U8 | 0 | Boolean toggle (0–1). |
| Invert light signal input | Invert the headlight brightness trigger input. | U8 | 0 | Boolean toggle (0–1). |
| Consumption sensor option | Enable the external consumption MAF sensor. | U8 | 0 | Boolean toggle (0–1). |
| Indicator filter cycles | Cycles required to confirm indicator changes. | U16 | 0 | 0–65535 cycles. |

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Table B.1: Digifiz Next firmware parameters available through the Settings tab. (Continued)

| UI label | Description | Type | Default | Range / notes |
|---------------------------------------|--|------|---------|--|
| Turn signal filter cycles | Cycles required to confirm turn signal changes. | U16 | 0 | 0–65535 cycles. |
| Speedometer measurement period in ms | Pulse counter integration period. | U32 | 1000 | Adjustable 250–2000 ms. |
| Speedometer measurement window in ms | Averaging window for the speed pulse counter. | U32 | 1000 | Adjustable 250–2000 ms. |
| Stable Speed input | Optimise the speed input for electronic vehicle speed sensors. | U8 | 0 | Boolean toggle (0–1). |
| Filtered Speed input | Enable software filtering of the speed input. | U8 | 1 | Boolean toggle (0–1). |
| LPF coefficient for speed calculation | Low-pass filter constant for speed calculations. | U16 | – | Default depends on firmware build. |
| Median filter threshold | Legacy display filter threshold. | U16 | 65535 | Reserved for diagnostics. |
| Sensor calibration constants | | | | |
| Speed coefficient | Speedometer calibration factor. | U16 | 100 | Increase to raise the indicated speed. |
| Coolant thermistor beta | Beta coefficient for the coolant temperature sensor curve. | U16 | 4000 | Typical range 3000–4500. |
| Oil thermistor beta | Beta coefficient for the oil temperature sensor curve. | U16 | 4000 | Typical range 3000–4500. |
| Air thermistor beta | Beta coefficient for the ambient temperature sensor curve. | U16 | 3812 | Generation 2 panels use 3812. |
| Coolant default resistance | Coolant sensor resistance at 25 °C. | U16 | 1000 | Expressed in Ω. |
| Oil default resistance | Oil sensor resistance at 25 °C. | U16 | 1000 | Expressed in Ω. |
| Air default resistance | Ambient sensor resistance at 25 °C. | U16 | 2991 | Expressed in Ω. |

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Table B.1: Digifiz Next firmware parameters available through the Settings tab. (Continued)

| UI label | Description | Type | Default | Range / notes |
|--------------------------------|---|------|---------|---------------------------|
| Coolant pull-up | Pull-up resistor used for the coolant sensor. | U16 | 220 | Expressed in Ω . |
| Oil pull-up | Pull-up resistor used for the oil sensor. | U16 | 3300 | Expressed in Ω . |
| Amb. air pull-up | Pull-up resistor used for the ambient sensor. | U16 | 3300 | Expressed in Ω . |
| Display, brightness, and audio | | | | |
| Auto brightness | Enable automatic display brightness control. | U8 | 1 | Boolean toggle (0–1). |
| Brightness level | Manual brightness level. | U8 | 25 | Adjustable 0–70. |
| Light signal min | ADC reading that maps to minimum brightness. | U16 | 300 | Raw ADC units. |
| Light signal max | ADC reading that maps to maximum brightness. | U16 | 800 | Raw ADC units. |
| Brightness min | Minimum automatic brightness level. | U8 | 6 | Display intensity units. |
| Brightness max | Maximum automatic brightness level. | U8 | 25 | Display intensity units. |
| Brightness speed | Percentage applied per adjustment step. | U8 | 10 | Adjustable 0–100%. |
| Buzzer option | Enable or disable the integrated buzzer. | U8 | 1 | 1 disables, 0 enables. |
| Blinking dot | Control the colon animation on the clock. | U8 | – | 0 blinks, 1 holds steady. |
| Bkclt power | Enable the backlight power rail. | U8 | 1 | Boolean toggle (0–1). |
| Main R color | Red component of the main theme. | U8 | 180 | RGB value (0–255). |
| Main G color | Green component of the main theme. | U8 | 240 | RGB value (0–255). |
| Main B color | Blue component of the main theme. | U8 | 6 | RGB value (0–255). |
| Back R color | Red component of the backlight. | U8 | 180 | RGB value (0–255). |
| Back G color | Green component of the backlight. | U8 | 240 | RGB value (0–255). |

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Table B.1: Digifiz Next firmware parameters available through the Settings tab. (Continued)

| UI label | Description | Type | Default | Range / notes |
|--------------------|--|------|---------|-----------------------------|
| Back B color | Blue component of the backlight. | U8 | 6 | RGB value (0–255). |
| Custom scheme | Enable loading of a custom colour scheme. | U8 | 0 | Boolean toggle (0–1). |
| WiFi Auto Off | Automatically disable Wi-Fi after one minute of ignition on. | U8 | 0 | Boolean toggle (0–1). |
| Runtime values | | | | |
| MFA function state | Current MFA page index. | U8 | – | Runtime value (not stored). |
| MFA Block ind. | Selected MFA memory block. | U8 | – | Runtime value (not stored). |

Document Change Log

| Change | Affected sheets | Date |
|--------|----------------------------|-------------|
| 1 | 04.10.2022 | 04 Oct 2022 |
| 2 | 31.08.2023 | 31 Aug 2023 |
| 3 | 05.08.2024 | 05 Aug 2024 |
| 4 | LaTeX document introduced. | 22.09.2025 |

Table C.1: Document change registration sheet.