

LVPS | DC DC Multi-Outputs

Military-Grade Low Voltage Power Supply

MODEL: LVPS | CATEGORY: DC-DC | INPUT: 16-36 VDC | FORM: VEHICLE INTEGRATION

PRODUCT OVERVIEW



Key Product Features

- Wide 16-36 VDC input range with transient ride-through down to 10-12 V
- 17 regulated output rails for digital, analog, high-voltage, and external loads
- Fast startup, with full operation in 50 ms or less
- High efficiency of 86% or greater at nominal input and full load
- Supports 3.3 V, 5 V digital, +/-15 V analog, +/-70 V, +/-140 V, and external service outputs
- Separate analog and digital return domains with optional single-point tie
- Designed for harsh vehicle power conditions, shock, vibration, temperature, and EMI environments
- Predicted MTBF of at least 100,000 hours

PRODUCT DESCRIPTION

The Military-Grade LVPS is a rugged low-voltage power supply designed for demanding military vehicle and tactical-system environments. It accepts a nominal 28 VDC input from vehicle power systems

and converts it into multiple regulated output rails required by sensitive mission electronics, including digital processors, analog sensor circuits, high-voltage subsystems, and external auxiliary loads.

The unit is suited for combat platforms where power reliability is directly tied to mission continuity. It supports systems that must remain accurate and operational during vehicle motion, shock, vibration, recoil, extreme temperature, and high-EMI environments. With 17 regulated outputs, fast startup, fault monitoring, and built-in protection features, the LVPS provides a compact power foundation for integrated military electronics.



Rugged GPS-INS System for Land



Rugged GPS-INS Systems for Marine

INS / GPS

North finding

Fire control

Radar

Autonomous

17 Outputs

regulated outputs

<= 50 ms / >= 86%

turn-on time and full-load efficiency

100,000 h

predicted MTBF minimum

SAFETY CERTIFICATES

- Military vehicle power: MIL-STD-1275
- - Aircraft power reference: MIL-STD-704
- - Environmental durability: MIL-STD-810
- - EMI/EMC performance: MIL-STD-461
- - ESD immunity reference: IEC 61000-4-2
- - Reliability prediction: MIL-HDBK-217F
- - Aerospace quality system references: AS9100 / ISO

APPLICATIONS

- Military vehicle power systems
- INS/GPS navigation systems
- North finding and azimuth alignment systems
- Fire control and targeting electronics
- Radar and surveillance platforms
- Artillery and missile launcher systems
- Armored vehicles, tanks, APCs, and autonomous platforms

PLATFORM ROLES ENABLED BY THE LVPS

Role	Description
Navigation systems	Powers INS/GPS sensors, accelerometers, gyros, processors, and interface electronics deployed in armored vehicles, tanks, artillery, missile launchers, radar systems, and autonomous platforms.
North finding and azimuth transfer	Supplies precision rails for rapid deployment systems enabling heading acquisition, alignment, and serial / Ethernet control.
Fire control and launch systems	Maintains power integrity during recoil, shock, and transient vehicle-bus events on artillery, missile launchers, and air-defense platforms.
External subsystem support	Provides regulated and unregulated external outputs for tightly coupled subsystems, diagnostics, and auxiliary loads.

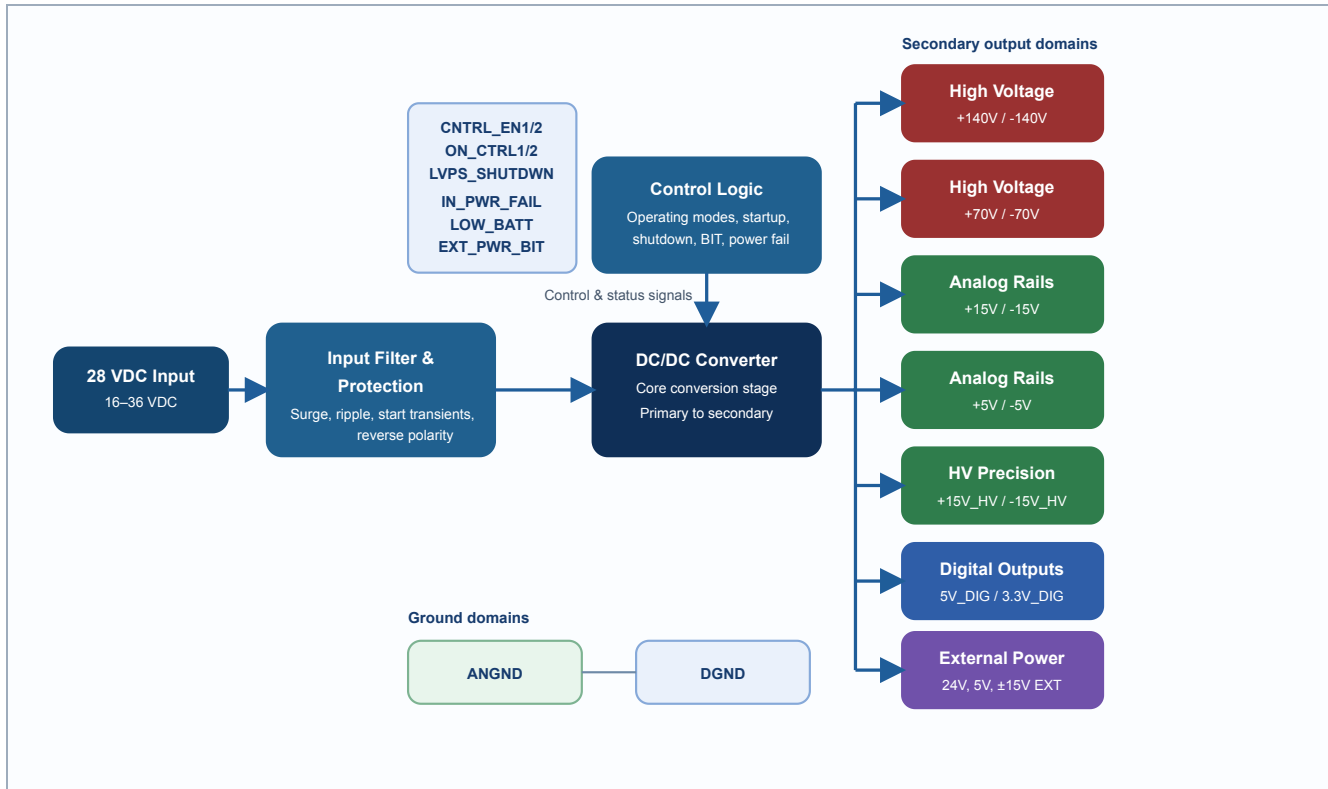
Indicative Operational Profile

System family	Typical Power (System-Level)	Typical use	LVPS contribution
RLG + Accelerometer-Based INS	~30–60 W	Hybrid land navigation systems (INS/GPS) for armored vehicles, tanks, self-propelled howitzers, towed artillery, and mobile radar platforms	Provides stable multi-rail power for inertial sensors, processing units, and digital interfaces under dynamic vehicle conditions
Fiber Optic Gyro (FOG) Systems	~20–30 W	Compact navigation systems for vehicles, APCs, tanks, and autonomous platforms	Enables compact, efficient power conditioning with ride-through capability during motion and vehicle transients
Ring Laser Gyro (RLG) North Finding Systems	~25–40 W	High-precision north finding and azimuth transfer systems for artillery, radar, and missile platforms	Supplies low-noise, high-stability rails supporting accurate heading determination, fast alignment, and communication interface integrity

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

FUNCTIONAL ARCHITECTURE

The power architecture is centered on input filtering and protection, supervisory control, and a DC/DC conversion stage that generates dedicated output families. Separate analog and digital returns are provided, with an optional internal tie point.



● High voltage

● Analog / low voltage

● Digital outputs

● External service rails

● Input / logic

Architecture notes

- The input filter and protection stage is designed to withstand and suppress input disturbances including surge, ripple, starting transients, polarity reversal, and abnormal vehicle bus conditions, without degradation or damage to the LVPS.
- The control logic subsystem manages operating modes, startup sequencing, controlled shutdown, input power failure detection, and external power status monitoring (EXT_PWR_BIT).
- In the event of a fault condition on the 3.3 V or 5V_DIG rails, all other internal output channels shall be disabled, except for designated external rails, to ensure controlled shutdown and fault containment.
- Output return paths are partitioned into analog ground (ANGND) and digital ground (DGND) domains. An internal jumper provision allows a single-point connection between ANGND and DGND when required by system integration.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

ELECTRICAL SPECIFICATIONS

Input characteristics

Parameter	Specification
Nominal input class	28 VDC military vehicle power (MIL-STD-1275 / MIL-STD-704 compliant)
Steady-state operating range	16 to 36 VDC
Turn-off threshold	Unit shall remain OFF at ≤ 15 VDC steady-state input
Ripple tolerance	± 2 V relative to steady-state input, over 50 Hz to 200 kHz
Spike tolerance	Withstand input voltage spikes up to +100 V for 0 to 1.0 ms without damage
Reverse polarity	No damage shall occur under reverse polarity conditions
Inrush current	Limited to $\leq 2.5\times$ input current at maximum output power (28 VDC), for ≤ 10 ms
Turn-on time	≤ 50 ms to full operation; 3.3 V and 5V_DIG outputs shall be present 5–10 ms prior to all other outputs
Hold-up behavior	Upon input power loss, all outputs shall turn OFF except 3.3 V and 5V_DIG, which shall remain active for ≥ 10 ms
Operational voltage dip profile	Unit shall maintain specified performance during transient input dips, including profiles down to 12 V and short-duration dips to 10 V

Control and discrete signals

Signal	Type	Function
CNTRL_EN1 / CNTRL_EN2	Input	Enable mode selection. Jumper present: LVPS activated only by ON controls after power is in range. Jumper absent: unit activates automatically on system power.
ON_CTRL1 / ON_CTRL2	Input	Momentary or continuous contact closure is used to activate LVPS in manual enable mode.
LVPS_SHUTDWN	Input	Logic-low input shuts down the LVPS; referenced to digital ground.
IN_PWR_FAIL	Output	LVTTL discrete driven low on input power failure; high during normal condition.
LOW_BATT	Output	LVTTL low when input power remains below 18 ± 0.5 V beyond specified time.
EXT_PWR_BIT	Output	Fault indication for external output group; logic "1" when external rails are OK.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

ELECTRICAL SPECIFICATIONS

DC output families

Family	Outputs
High Voltage	+140V, -140V, +70V, -70V
HV Precision	+15V_HV, -15V_HV
Analog	+15V, -15V, +5V, -5V
Digital	5V_DIG, 3.3V_DIG
External service	+24V EXT Regulated, +24V EXT Unregulated, +5V EXT, +15V EXT, -15V EXT

Primary DC output rails

No.	Nominal Output	Power	Regulation	Ripple
1	+15_HV	4.5 W	±2.5%	100 mVp-p
2	-15_HV	4.5 W	±2.5%	100 mVp-p
3	+70 V	2W	±5%	150 mVp-p
4	-70 V	2W	±5%	150 mVp-p
5	+15 V	3.75 W	±2.5%	50 mVp-p
6	-15 V	3.75 W	±2.5%	50 mVp-p
7	+5 V	1.5 W	±2%	50 mVp-p
8	-5 V	1.5 W	±2%	50 mVp-p
9	5.15 V_DIG	10 W	±1%	50 mVp-p
10	3.3 V_DIG	11 W	±3%	50 mVp-p
11	+24 V EXT Reg	7W	±2.5%	100 mVp-p
12	+24 V EXT	32 W	---	---
13	+5 V EXT	3.5 W	±2%	50 mVp-p
14	+15 V EXT	5.5 W	±4%	100 mVp-p
15	-15 V EXT	5.5 W	±4%	100 mVp-p
16	+140 V	2W	±5%	150 mVp-p
17	-140 V	2W	±5%	150 mVp-p

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

ELECTRICAL SPECIFICATIONS

Protection and performance characteristics

Characteristic	Specified behavior
Dynamic response	50% to 80% load step at any output causes less than $\pm 10\%$ deviation with over/undershoot duration not exceeding 10ms.

Characteristic	Specified behavior
Cross stabilization	Rapid change at one output causes max $\pm 5\%$ change in other outputs with recovery within 5ms.
Efficiency	No less than 86% at nominal input voltage and 100% load.
No-load behavior	No damage under no-load; channels shall not exceed the no-load voltage / power limits defined in the source table.
Short-circuit protection	No damage for any combination of overloads or output shorts for any duration; normal operation resumes within 100ms after fault removal.
Input leakage when OFF	Less than 50 mA under all conditions.
Voltage isolation	10 M-Ohm minimum between input and output pins, and between I/O and chassis, at 100 VDC.

Environmental, Reliability, and Compliance

Category	Requirement
Environmental envelope	-40°C to +85°C operating base plate / ambient range; -51°C to +71°C storage and transportation; altitude from -1,000 m to 10,000 m operating and to 21,336 m non-operating; humidity 1% to 95%; fungus resistance per MIL-STD-810 Method 508.3.
Mechanical survivability	Operating shock 50G for 11ms; non-operating shock 75G for 5ms; operational and endurance vibration per MIL-STD-810 profiles; ESS random vibration 6 Grms in three axes; gunfire shock profile up to 900 g at high frequency.
Reliability and maintainability	Predicted MTBF not less than 100,000 hours; operational life 15 years; storage life 15 years; depot-level MTTR not to exceed 3 hours; plug-in maintenance philosophy with no scheduled maintenance.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

ELECTRICAL SPECIFICATIONS

Applicable standards and compliance references

Standard / reference	Area addressed
MIL-STD-1275 A/B	28 VDC vehicle electric power, transients, and ride-through
MIL-STD-704D	Aircraft electric power characteristics referenced in source specification
MIL-STD-810 / 810F	Environmental tests, temperature, shock, vibration, altitude, fungus, bench handling
MIL-STD-461E	EMI/EMC emission and susceptibility requirements
MIL-HDBK-454 / 217F	General electronic equipment requirements and reliability prediction
IEC 61000-4-2	Electrostatic discharge immunity test reference
EIA RS-422 / RS-232	Balanced and serial digital interface references
AS9100 / ISO 9000 / ISO 10005 / ISO 10012	Quality management and measuring equipment requirements

Qualification and production assurance highlights

- Verification matrix in the source specification spans input power, outputs, protection, environmental conditions, EMC, documentation, and delivery preparation.
- 100% of units are screened and acceptance tested; first production units pass qualification.
- ESS includes vibration and temperature cycling; manufacturer traceability and source inspection are explicitly required.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

MILITARY USE IMPLEMENTATION

System	Fielded Platform Examples	Key Functional Highlights	LVPS Power Requirement
Navigation Systems	Tanks, self-propelled howitzers, and towed artillery, IFVs, mobile radar platforms	Powers INS/GPS sub-systems (RLG, FOG, accelerometers) Maintains stable operation during vehicle motion and engine cranking	Requires stable low-noise digital and analog rails, continuous operation during transients, and support for high-mobility and firing platforms
Fire Control & Launch Systems	Armored vehicles, APCs, main battle tanks, autonomous combat vehicles	Maintains power integrity during recoil and shock Supports targeting, stabilization, and fire-control electronics	Requires rugged, compact, and efficient power with high immunity to shock, vibration, and vehicle power disturbances
North Finding Systems	Artillery systems, ground radar units, missile launchers, target acquisition platforms	Provides precision voltage rails for heading and azimuth alignment Enables rapid system alignment (typically 3–5 minutes)	Requires high-precision, low-drift power rails, fast startup, and support for communication interfaces (serial/Ethernet) in deployable environments
Radar & Surveillance Systems	Ground-based radar systems, mobile surveillance units, air-defense sensors	Supplies clean, stable power to RF and signal processing electronics Maintains performance under high EMI/EMC conditions	Requires low-ripple, EMI-resistant power with strong isolation to ensure signal integrity and detection accuracy

Representative battlefield contributions enabled by the LVPS

- Maintains inertial sensor and processor supply integrity during engine crank, vehicle maneuver, and transient bus events.
- Supports rapid alignment and navigation on the move by keeping digital, analog, and interface domains within tolerance.
- Improves mission continuity through fault containment, BIT signaling, and fast recovery after overload or short-circuit removal.
- Provides environmental survivability margins needed for armored vehicles, artillery, launchers, and mobile radar systems.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.

INTEGRATION NOTES

Signal and interface summary

Category	Representative items	Integration implication
Power inputs	VIN1-HI, VIN-LO, chassis ground	Vehicle power input and return should preserve specified surge, ripple, and isolation behavior.
Control inputs	CNTRL_EN1/2, ON CTRL1/2, LVPS_SHUTDOWN	System controllers must implement the selected activation mode and the logic-low shutdown behavior.
Status outputs	IN_PWR_FAIL, LOW_BATT, EXT_PWR_BIT, PWR_ON_RST	Host system can monitor bus health, low-battery conditions, startup, and external rail state.
Output rails	Digital, analog, HV, external regulated / unregulated rails	Load planning must respect max power, ripple, and no-load / short-circuit requirements of each rail.

Design and implementation cautions

- The source specification references a 60-pin connector and detailed pinout; final system integration should trace each load to its exact output and return pins.
- The ON control line must not be externally connected to input DC return, and ON control voltage shall not exceed input power voltage.
- The LVPS chassis remains isolated from input and output power conductors; system grounding architecture should preserve this behavior.
- For tight EMC or sensor-noise budgets, keep digital return and analog return layout strategy consistent with the internal ANGND / DGND concept.

For quotes and customization requests, contact Digital Power sales at (877) 634-0982 or sales@digipwr.com.