Smart 4-Port RS-485 DIN-Rail Isolated Hub

Model: FCC-1210-D1D4

1-channel uplink · 4 independent isolated branches
3 kV isolation per port · 6 kV protection against lightning and switch operation surges for serial port/power supply.
DC 9–70 V · automatically isolated faulty branch



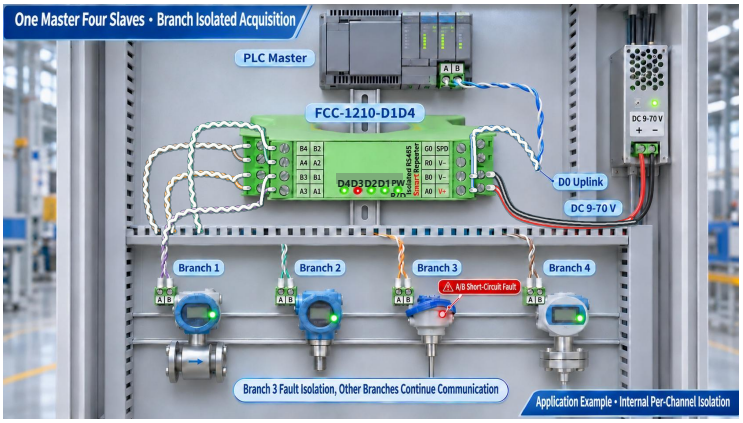
Product Overview

- Expands one PLC/controller RS-485 bus into four independent branches for instruments, sensors and other field devices.
- All five internal serial grounds have mutual 3 kV isolation and are isolated from power ground, reducing ground-potential interference and fault propagation. Each branch exposes A/B only.
- Common-mode chokes and FPGA digital filtering suppress common-mode noise and glitches. Short SPD to V− to enable strong filtering in noisy environments.

Key Features

- **Branches** 1-channel uplink with 4 additional independent RS-485 branches.
- **Two-stage filter** Common-mode inductor + FPGA digital filtering, suppressing interference and glitches.
- **Strong Filter** SPD and V− short-circuit; maximum 38.4 kbps.
- **Fault Isolation** Isolate abnormal branch, keep other branches communicating.
- **Isolation** The grounds of the five serial ports and the power ground are isolated, with 3 kV between each port.
- **Surge Protection** All five serial ports and power supply have 6 kV surge protection.
- **Mounting** 23 mm thick guide rail housing, no fan.

Typical application: PLC branch isolation and acquisition.

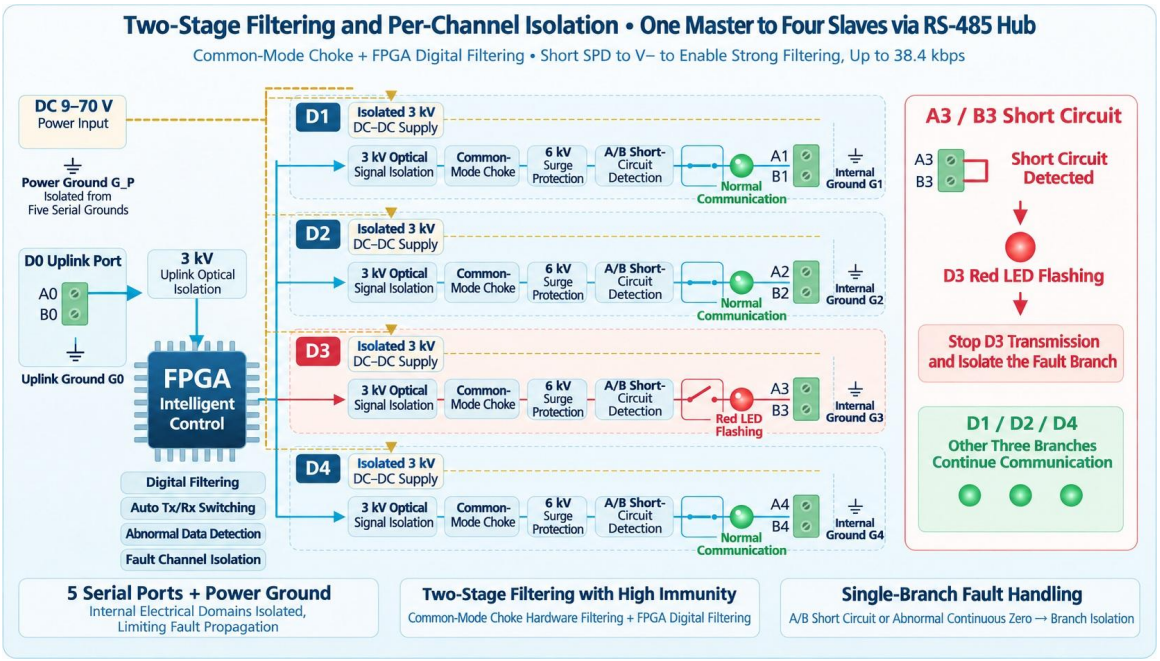


Application diagram. D0 is the uplink PLC; D1–D4 each connect to a bundle of RS-485 twisted pair cables. Taking branch 3 as an example, the isolated fault branch is disabled, and the remaining three branches continue communication.

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Connect each wire pair to A/B of its corresponding channel. Connect the uplink to A0/B0 and power to V+/V−. The unit's long axis is perpendicular to the 35 mm DIN rail. Wiring inside cable ducts is omitted.

Principle of Internal Isolation and Short Circuit Detection



Schematic of functional principle. G1–G4 are internal electrical domains, with only A/B as external branches; the switches in the diagram indicate fault channel forwarding control.

Isolation, surge protection, and surge protection.

Item	Metrics and conditions	Protection Notes
Five RS-485 channels	6 kV, three-level surge protection	Protection against lightning-induced surges and switch operations per port.
Power Interface	6 kV	Reduce the risk of transient overvoltage from power supply lines.
Signal/Power Isolation	3 kV	Signals are isolated by high-speed optocoupler, and each channel is powered by 3 kV DC-DC isolation.
Internal ground isolation	3 kV between all ports and the power ground.	The internal grounds of five RS-485 ports are independent of each other and isolated from the power ground; only A/B lines are exposed for the four branch circuits.
AC Misconnection Protection	AC 220 V / AC 380 V	When a single RS-485 line is incorrectly connected to the above AC voltage, electrical isolation protection isolates other serial port devices on the isolated side; this is not the normal input voltage for the communication port.
RS-485 surge protection and lightning impulse test criteria: GB/T 17626.5 (IEC 61000-4-5); open-circuit voltage waveform at 10/700 μs; open-circuit peak voltage of 6 kV; test source impedance of 40 Ω.		

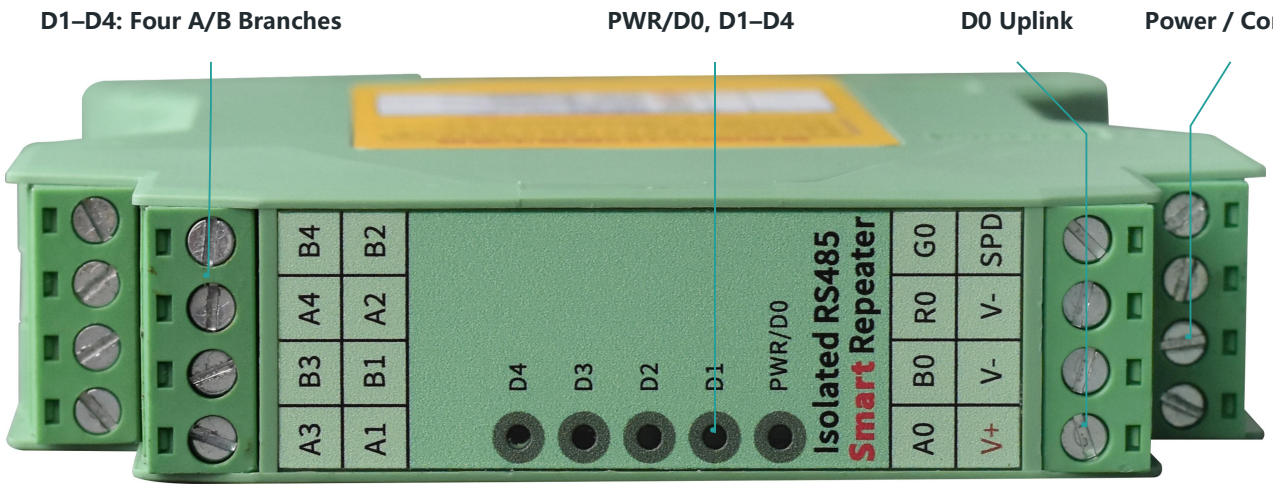
Status indication and fault handling

Status	PWR/D0	D1–D4
Green on	Power supply energized.	—
Green flashing light	Uplink D0 has data reception.	Data reception in the corresponding branch.
Red flash	Short circuit in A/B of uplink D0.	Short circuit of A/B branch of the circuit.
Red on	D0: abnormal continuous-zero data.	Abnormal continuous-zero data on this branch.
Off	No power supply.	No data reception in the corresponding branch.

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Abnormal-data detection checks whether a continuous low level at the receiver lasts longer than the maximum continuous-zero duration in 300 bps data. The abnormal channel is then isolated and identified by its LED.

Interfaces and Installation



Front Terminals and Status LEDs

Interface	Physical Labeling	Connection instructions
D0 uplink	A0 / B0 / G0	A0 is positive, B0 is negative, connected to PLC or upstream RS-485 bus; G0 is the uplink port ground.
D1 branch	A1 / B1	Branch 1, two-wire RS-485.
D2 branch	A2 / B2	Branch 2, two-wire RS-485.
D3 branch	A3 / B3	Branch 3, two-wire RS-485.
D4 branch	A4 / B4	Branch 4, two-wire RS-485.
Power supply	V+ / V−	DC 9–70 V; Positive terminal connected to V+, negative terminal to V−; Uses 5.08 mm pitch terminals with 4 pins.
Terminal/Filtering	R0 / SPD	Built-in 120 Ω terminal resistor; R0 is the terminal related to the uplink termination. When the SPD is open, maximum speed is 256 kbps; when the SPD is shorted to V−, the FPGA strong digital filtering is enabled, with a maximum speed of 38.4 kbps.

The internal grounds of each channel are isolated from each other; four branch lines are connected via A/B lines; each main line segment is connected according to the local terminals definition and on-site wiring conditions.

Two-stage filtering and on-site anti-interference.

Filtering hierarchy	Operating mode and on-site advantages.
Common-mode inductors with hardware filtering	Hardware-level filtering; suppresses common-mode interference from line coupling, providing a hardware anti-interference foundation for signal reception.
FPGA digital filtering	Digital filtering; digital processing of received signals to suppress interference and glitches; combined with automatic transmission and fault channel isolation to reduce the impact of abnormal data.
SPD Strong Filtering Mode	SPD and V− short-circuit enabled; maximum 38.4 kbps. Suitable for sites with many interferences such as frequency converters, motors, contactors, and relays, balancing anti-interference requirements and communication speed.

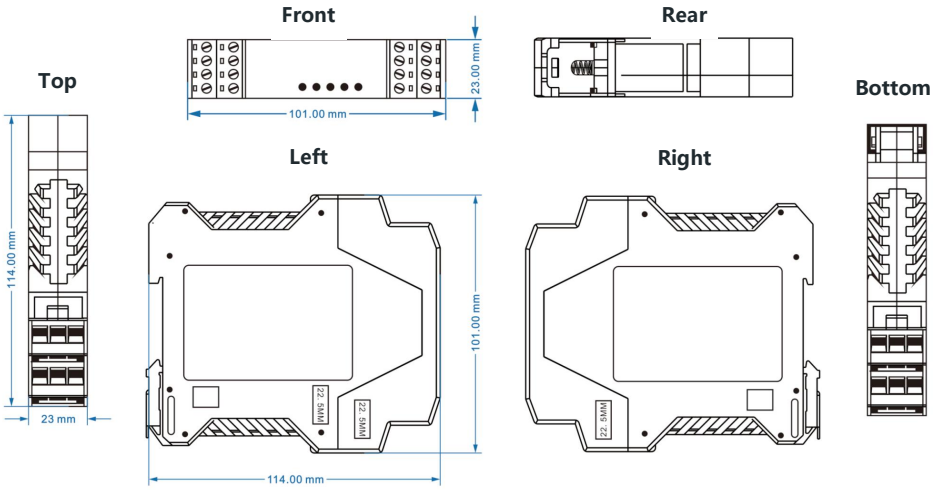
Communication, power supply, and environment

Item	Specifications and Instructions
Communication Interfaces	1-line uplink + 4 isolated branches; EIA/TIA-485, two-wire A (+), B (−), supports multi-machine communication.

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Item	Specifications and Instructions
Rate/Filter	Common-mode inductor with hardware filtering + FPGA digital filtering; two-stage suppression of common-mode interference and glitches, with automatic switching between transmission and reception. Normal mode: up to 256 kbps; SPD and V− connected in short circuit to enter strong filtering mode, up to 38.4 kbps.
Node/distance	Up to 128 enhanced nodes per port; up to 2200 m at 9600 bps, actual distance depends on cable, speed, and site environment.
Power Supply/Power Consumption	DC 9–70 V; Total power <1 W; Supports overload and reverse-polarity protection.
Installation / weight	Modular rail mounting; fanless high-efficiency cooling, easy to maintain; weight approx. 0.19 kg/unit.
Environment	Operating and storage temperatures: −40–+85 °C; operating humidity: 0%–95% RH, no condensation.
Reliability/Compatibility	MTBF >200,000 hours; 100% burn-in tested; meets Industrial Level 4 EMC requirements.

Dimensions and Mounting



Complete six-view drawings, unit: mm; dimensions 114 × 101 × 23 mm. Space is reserved for signal terminals, power supply, and rail clips during installation.

Ordering Information

Version: V1.5 EN | 2026-11-18

Model segmentation: FCC- | 1210- | D1 | D4

NO	Name	Definition
1	FCC-	Model prefix for this series of products
2	1210-	Code for modular rail-based product line.
3	D1	1-channel RS-485 uplink interface, corresponding to D0 (A0/B0).
4	D4	4-channel RS-485 independent isolation branch, corresponding to D1–D4.

Full Model Code	Configuration
FCC-1210-D1D4	1-channel RS-485 uplink + 4 isolated RS-485 branches, internal ground isolation for each branch, 3 kV optical isolation, 6 kV surge protection for serial port and power supply, DC 9–70 V power supply.

Specify the number of devices, power supply, installation accessories, cables, and other supporting requirements in the order request; accessories shall be as specified in the order list.

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