Allen-Bradley 1769-IQ16K

01 Product architecture

Product role

Allen-Bradley 1769-IQ16K is a conformally coated Compact I/O module with sixteen 24 V DC sinking/sourcing inputs arranged in two groups of eight.

Operating context

A discrete input module interprets field voltage; it does not provide the field sensor’s power source or replace a safety input device. The circuit designer must arrange the proper common and signal polarity for the selected sinking or sourcing connection.

Additional engineering data

Item	Value or condition
Compatible supply family	1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4
Replacement terminal block	1769-RTBN18
Solid copper conductor	22–14 AWG
Stranded copper conductor	22–16 AWG
Conductor temperature rating	90 °C minimum
Input category	IEC Type 1+
Isolation qualification	1200 V AC or 1697 V DC for 1 s

Key capabilities

Capability 1
Accepts both sinking and sourcing DC field circuits.

Capability 2
Uses an 8 ms maximum delay for both on and off transitions.

Capability 3
Draws 115 mA from the 5.1 V backplane supply.

Capability 4
Provides input-to-bus and group-to-group electrical isolation.

System integration

Sensor leakage and residual off-state voltage must remain below the input’s off-state limits. At elevated enclosure temperatures, the permitted input-voltage ceiling is reduced, so a nominal 24 V circuit must be checked at its actual operating conditions.

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02 Technical data and interfaces

Principal technical data

Parameter	Value
Input channels	16
Input grouping	2 groups of 8
Nominal input voltage	24 V DC
Operating input voltage	10–30 V DC at 30 °C; 10–26.4 V DC at 60 °C
On/off delay	8 ms maximum each
5.1 V bus current	115 mA
Maximum dissipation	3.55 W
Off-state voltage	5 V DC maximum
Off-state current	1.5 mA maximum
Minimum on-state voltage	10 V DC
Minimum on-state current	2 mA
Nominal input impedance	3 kΩ
Maximum inrush current	250 mA
Power-supply distance	8 modules
Terminal torque	0.68 N·m
Terminal retaining screw	0.46 N·m

How to apply these data

An 8 ms module transition delay is only one part of response time. A controller can observe a change later because of its I/O update and task execution. Test the shortest required field event with the final program and network configuration rather than treating a steady-state indicator check as a timing test.

Technical basis

1769-TD006H-EN-P, November 2023, page 12; 1769-IQ16K product specification.

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03 Integration and application

Interface map

Interface	Purpose	Engineering note
Inputs 0–7	First eight discrete channels	Use the associated common for the first group.
Inputs 8–15	Second eight discrete channels	Keep its common assignment distinct.
Removable terminal block	Field-wire connection	Retain wiring identity during replacement.
Compact I/O bus	Input data and module power	Seat the bus connectors before energization.

Application contexts

DC sensor acquisition
Collects discrete signals from compatible 24 V field circuits using the correct sinking or sourcing arrangement.

Grouped common wiring
Separates sixteen field inputs into two common groups for organized circuit distribution.

Machine state monitoring
Reports limit-switch and contact-state changes where the input delay meets the application timing.

Coated Compact I/O assemblies
Provides the K-version coating within a compatible 1769 I/O installation.

Integration constraint

Include the module’s input delay in the complete field-to-controller response calculation. Check off-state leakage and the high-temperature voltage ceiling before accepting the sensor circuit.

Commissioning record

Retain the channel-to-device map, common assignments, field-supply tolerance and timing-test result. Where a device was replaced, compare the new device’s leakage characteristics with the original circuit.

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04 Engineering decisions

Diagnostic decisions

Input remains active
Measure off-state voltage and current Investigate leakage or common wiring before replacing the module.

Entire group incorrect
Inspect that group’s common and supply polarity Treat a shared circuit issue before separate channel faults.

Short event missed
Review pulse duration against the complete response path Use a suitable faster input arrangement when required.

Product precautions

01
Isolate backplane and field power before removing the terminal block.

02
Identify both input commons and preserve their group assignments.

03
Check the maximum field voltage at the highest expected ambient temperature.

04
Keep sensor leakage within both off-state limits.

05
Use copper conductors of the permitted gauge and temperature rating.

06
Apply the separate terminal and retaining-screw torque values.

07
Keep the module within eight positions of its Compact I/O power supply.

08
Exercise all sixteen channels and confirm their controller indications.

Important notice

Keep each field common assigned to its intended group. Confirm that the controller input state follows every tested field transition before returning the circuit to service.

Related catalogue pages

Allen-Bradley 1769-L35E/A

Allen-Bradley 1769-ADN

Allen-Bradley 1769-L33ER

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05 Questions and functional acceptance

Product-specific engineering questions

What does the K version of 1769-IQ16K add to the input module?
The K version has conformal coating. Its sixteen-input electrical arrangement remains the Compact I/O sinking/sourcing configuration.

How are the field commons organized on 1769-IQ16K?
The sixteen inputs form two groups of eight. Each field circuit must be connected to the common belonging to its group.

Will a 30 V field signal remain within the 1769-IQ16K rating at 60 °C?
No. The permitted input range is 10–30 V DC at 30 °C but 10–26.4 V DC at 60 °C, so 30 V exceeds the upper-temperature limit.

Which sensor leakage limits prevent a false on-state at 1769-IQ16K?
The off-state input must remain at or below 5 V DC and 1.5 mA. Compare the sensor's leakage and the complete wiring circuit with both limits.

Can 1769-IQ16K capture a pulse shorter than its input delay?
Reliable capture of such a pulse must not be assumed. Both on and off delays can reach 8 ms, and the controller's update and scan timing add further response time.

How much 5.1 V bus capacity should be reserved for 1769-IQ16K?
Reserve 115 mA on the 5.1 V backplane rail for the module and include its 3.55 W maximum dissipation in the panel thermal calculation.

Which terminal-block torque values apply when servicing 1769-IQ16K?
Tighten the wiring terminals to 0.68 N·m and the terminal-block retaining screws to 0.46 N·m. These are separate fastening requirements.

Where is electrical isolation provided in 1769-IQ16K?
Isolation is provided from the input groups to the bus and between the two input groups. The working-voltage rating is 75 V DC with Class II reinforced insulation.

Functional acceptance

Test	Action	Expected result
Channel identity	Operate one field device at a time	Only its intended controller input changes.
Off-state immunity	Return the sensor to its inactive state	Residual voltage and current remain below the off limits.
Timing	Apply the shortest required event	The final controller logic detects it consistently.