Koyo F4-04AD

Engineering Installation, Diagnostic and Acceptance Guide

Four-channel DL405 analog input module with selectable voltage/current ranges, data formats and PLC input allocation.

01 Work package

Complete model	F4-04AD
Product type	DL405 four-channel analog input module
Manufacturer	Koyo
Technical source	AutomationDirect DL405 Analog I/O Modules User Manual, F4-04AD chapter

Field decisions

1 Establish identity

Capture the full marking, installed companion components and baseline before disconnection.

2 Inspect interfaces

Verify mounting, cable, connector, armor, approval and environmental boundaries.

3 Fit the exact chain

Preserve the documented probe-cable-Proximitor or sensor-monitor relationship.

4 Prove response

Use the approved stopped-machine and operating acceptance procedure.

5 Record as left

Save markings, configuration, test values and operating observations.

Pre-work evidence

Installed drawing	Record the approved cabinet, rail, slot, terminal, cable and system references that govern F4-04AD.
Complete marking	Capture the complete order identity and every revision or approval marking on the delivered item.
Mechanical reference	Record mounting position, fasteners, connector orientation, access clearance and support points.
Electrical interfaces	Confirm supply, signal, bus, terminal and protective-conductor assignments against the installed drawing.
Configuration state	Record jumpers, switches, addresses, firmware or project settings that apply to this hardware.

Selected order-code snapshot

Signal coverage	Four voltage or current inputs with single-ended or differential wiring.
Conversion	12-bit unipolar or 13-bit bipolar representation with less than 6 ms conversion per selected channel.
PLC interface	Jumper-selectable 16- or 32-input allocation in a DL405 base or remote system.

Evidence boundary

The values are taken from the exact F4-04AD chapter. They do not apply to the isolated F4-04ADS model.

Initial quality controls

Traceability	Each value is tied to F4-04AD, the asset location, test state, instrument and date.
Repeatability	The same approved method and comparable operating state are used for before-and-after readings.
Resolution	Recorded precision does not exceed the capability of the instrument or source document.
Reference state	Stopped, energized, loaded and process-running observations are clearly distinguished.

02 Interface and configuration map

Analog channels	4
Input topology	Single-ended or differential
Voltage ranges	0-5 V, 1-5 V, 0-10 V, +/-5 V, +/-10 V DC
Current ranges	0-20 mA and 4-20 mA
Unipolar resolution	12 bit, 0 to 4095
Bipolar resolution	13 bit, -4095 to +4095
Voltage input impedance	20 Mohm minimum
Current input resistance	250 ohm, 1/2 W, +/-0.1%
Conversion time	Less than 6 ms per selected channel
PLC update rate	Up to 4 channels per scan
PLC input allocation	16 or 32 X input points
Base power	85 mA
Field supply	24 V DC +/-10%, 100 mA, Class 2
Operating temperature	0 to 60 deg C
Isolation resistance	10 Mohm at 500 V DC

Application checks

Process-current inputs

Acquire up to four 0-20 mA or 4-20 mA transmitter signals with the documented 250 ohm input path.

Voltage measurement

Select the shared voltage range and wire each channel as single-ended or differential.

DL405 retrofit

Replace D4-04AD only after applying the documented jumper and program cross-reference.

Remote I/O analog

Install in a supported DL405 remote base while checking power budget and X-input allocation.

Interpretation boundaries

Product boundary	Apply the listed facts to F4-04AD and the documented DirectLOGIC DL405 PLC analog I/O context only.
Interface boundary	Connector, terminal, bus, cable and companion-device assignments must match the installed drawing.
Electrical boundary	Use exact-model values only; system-level ratings remain conditional on the complete installed configuration.
Configuration boundary	Switches, jumpers, addresses, firmware and project settings must be reconciled before energization.
Diagnostic boundary	Interpret indicators and fault states together with measured inputs, outputs and host-system status.
Acceptance rule	Use the approved system baseline and maintenance procedure for the final as-left decision.

System verification controls

Traceability	Each value is tied to F4-04AD, the asset location, test state, instrument and date.
Repeatability	The same approved method and comparable operating state are used for before-and-after readings.
Resolution	Recorded precision does not exceed the capability of the instrument or source document.
Reference state	Stopped, energized, loaded and process-running observations are clearly distinguished.

Technical notes

Shared selection	Input range and units jumper selections apply to all enabled channels.
Scan behavior	One channel is supplied per CPU scan; disabling unused channels shortens the complete update cycle.
Diagnostic focus	Check RUN, TB, 24V, NEG and channel indicators together with injected signal values.

03 Installation workflow

Set jumpers before power

Select 16/32 input mode, range, units and active channels with the module de-energized.

Provide Class 2 power

Use 24 V DC +/-10% with 100 mA available for each module.

Ground one shield end

Ground the analog cable shield at the transmitter source, not at both ends.

Short unused inputs

Apply the manual's unused-channel wiring to reduce noise.

Keep signals separated

Route analog wiring away from motors, high-current switches and transformers.

Verify raw data

Compare injected low, mid and high points with the PLC counts and selected data format.

Controlled sequence

01 Isolate	Place the monitored machine and channel in the approved maintenance state; prove the required isolation.
02 Photograph	Capture F4-04AD, the installed datum, connector, route and companion-component markings.
03 Measure	Record mechanical position and the applicable stopped-machine electrical reading before removal.
04 Compare	Check delivered identity, interfaces and evidence against the approved drawing and spare-parts record.
05 Install	Fit without twisting the lead; preserve thread engagement, target clearance, bend radius and strain relief.
06 Set point	Establish the operating gap or datum only with the approved stopped-machine procedure.
07 Prove	Compare local reading, monitor indication and controlled operating response with the accepted baseline.
08 Handover	Record as-left values, photographs, deviations, responsible technician and release approval.

Release review

Shared selection	Input range and units jumper selections apply to all enabled channels.
Scan behavior	One channel is supplied per CPU scan; disabling unused channels shortens the complete update cycle.
Diagnostic focus	Check RUN, TB, 24V, NEG and channel indicators together with injected signal values.

Installation evidence package

Nameplate evidence	Overall and close photographs showing F4-04AD, revision, approval and serial details where present.
Installation evidence	Views of the rack position, mechanical datum, terminal assignment, cable route and strain relief.
Configuration evidence	Export or screenshots identifying the approved hardware assignment and parameters without exposing credentials.
Baseline evidence	As-found readings with units, test conditions, machine state and the instrument used.
Inspection evidence	Connector, contact, insulation, fastener, contamination and heat-condition observations.
Functional evidence	As-left readings and the controlled input, output or channel response used for acceptance.
Change evidence	Any wiring, setting, firmware or mechanical change linked to its approved work reference.
Release evidence	Technician, reviewer, date, asset reference and the maintenance-record location for traceability.

04 Diagnostic decision table

Which signal ranges can F4-04AD accept?	It supports 0-5 V, 1-5 V, 0-10 V, +/-5 V, +/-10 V, 0-20 mA and 4-20 mA selections.
How many analog channels does F4-04AD provide?	The module provides four analog input channels that can be wired single-ended or differential.
What do the 16-input and 32-input modes change on F4-04AD?	They change the PLC X-input allocation and available data formats and diagnostics; choose the mode that matches the ladder program.
What is the factory jumper configuration of F4-04AD?	All jumpers installed selects four active channels, 32-input mode, 4-20 mA and 12-bit 0-4095 BCD data.
What field supply is required for F4-04AD?	Provide 24 V DC +/-10%, 100 mA, Class 2 power to the isolated field side.
How quickly does F4-04AD convert an enabled channel?	The documented conversion time is less than 6 ms per selected channel, while CPU updates also follow the scan sequence.
How should shields and unused inputs be handled on F4-04AD?	Ground each shield at the signal source and use the documented shorting arrangement for unused inputs.
How should F4-04AD be commissioned?	Verify jumpers and LEDs, then inject low, mid and high values into every enabled channel and compare the PLC counts with the selected format.

Escalation triggers

Identity conflict	Stop if the complete marking, suffix, revision or approval identity differs from the approved record.
Host mismatch	Escalate if the rack, carrier, backplane, terminal unit or controller assignment is not documented for F4-04AD.
Interface damage	Do not energize with bent contacts, damaged insulation, loose retainers, contamination or heat discoloration.
Environmental breach	Review any exposure beyond the documented temperature, vibration, humidity, contamination or enclosure boundary.
Unapproved substitution	Do not transfer ratings or compatibility from an adjacent order code without manufacturer evidence.
Configuration conflict	Stop if hardware settings, firmware, channel assignment or project configuration disagree with the installed record.
Unstable measurement	Investigate noise, drift, intermittent status or inconsistent readings before replacing another component.
Failed functional proof	Keep the asset in the approved maintenance state until the complete acceptance sequence is passed and recorded.

Evidence quality controls

Traceability	Each value is tied to F4-04AD, the asset location, test state, instrument and date.
Repeatability	The same approved method and comparable operating state are used for before-and-after readings.
Resolution	Recorded precision does not exceed the capability of the instrument or source document.
Reference state	Stopped, energized, loaded and process-running observations are clearly distinguished.
Change control	Every changed setting, connection or mechanical datum has an approved reason and reviewer.
Retention	Evidence remains accessible with the maintenance record for future troubleshooting and replacement review.

05 Acceptance, handover and support

Release the channel only after the exact marking, installed-chain identities, mechanical datum, electrical baseline and controlled operating proof have all been recorded.

As-left verification worksheet

Exact delivered marking	F4-04AD; photograph and record any additional label detail.
Installed asset reference	Machine, bearing, train, channel and drawing identifiers.
Mechanical as found	Reach, lock position, gap reference, cable route and connector support.
Static reading as found	Gap, bias, continuity or channel value appropriate to the installed system.
Companion identities	Extension cable, Proximitor or conditioner and monitor channel markings.
Mechanical as left	Final reach, lock position, target clearance and route protection.
Static reading as left	Final gap, bias, continuity or channel value with test conditions.
Operating proof	Monitor response and machine observation accepted by the responsible authority.
Deviation record	Any difference from drawing or baseline, disposition and approval reference.
Release signatures	Technician, reviewer, operations owner and date.

Lifecycle status

Catalog status	F4-04AD remains listed in the DirectLOGIC DL405 analog I/O catalog.
Retrofit relationship	It is documented as a configurable replacement for D4-04AD.
Replacement boundary	Jumper mode, shared range, data format, X allocation and ladder interpretation must be reconciled.

Available unit details

Offered hardware	One F4-04AD four-channel analog input module with removable terminal block.
Field interface	Four configurable voltage/current channels and a 24 V DC field-supply input.
Separate scope	DL405 base, CPU, transmitter power, field wiring and programming software are separate unless itemized.

Verified related product references

Related product	Yokogawa AAI841-H00
Related product	ABB CI858K01 3BSE018135R1
Related product	Allen-Bradley 1756-IF6I
Related product	Siemens 6ES7331-1KF02-0AB0

Engineering contact

Discuss the exact marking and installed application with Apter Power.
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