HIMA HIMatrix F1 DI 1601 SILworX

01 Scope and system boundary

Installed function

HIMA HIMatrix F1 DI 1601 SILworX is a safety remote I/O device with sixteen digital inputs and four pulsed outputs for monitored input circuits. The unit participates in a safety system through its remote input role. Certification capability does not by itself establish the integrity level of an installed function: field devices, wiring, diagnostics, host logic and response time all remain part of the validated design.

Functional sequence

01	Field contacts or signal sources establish sixteen digital input states.
02	Configured test outputs inject line-monitoring pulses where required.
03	Input diagnostics classify faults and provide status to the safety application.
04	safeethernet transfers the I/O information to the connected safety controller.

Before work starts

Check	Technical purpose
Establish the safety boundary	Identify the host controller, remote I/O assignment and the input signals used by the safety function. Keep actuator outputs outside the scope of this remote input unit.
Verify the device variant	Use the SILworX hardware configuration associated with F1 DI 16 01. Do not load the ELOP II Factory device variant or assume extended-temperature options apply to this unit.

Isolation and handling

The 250 µs input switching time is not the complete safety-function response time. Include remote I/O processing, safeethernet communication and controller execution in the validated response-time calculation.

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02 Connections and readiness

Interface preparation

Interface	Function	Check
DI channels	Safety-related digital input acquisition	Evaluate value and channel diagnostics together.
LS+ input supplies	Short-circuit-proof contact supply groups	Keep loads inside the group rating.
TO channels	Pulsed line-control sources	Not safety actuator outputs.
RJ45 ports	Switched Ethernet connection	Preserve the safeethernet system design.
24 V input	Device operating power	Use a safely isolated source and external protection.

Engineering considerations

The input switching specification describes the electrical input circuitry. The device response begins at a longer timescale and the complete safety response also includes communication and controller processing. Assess these stages separately to avoid using the 250 µs figure as the complete shutdown time.

Relevant setup data

Item	Value or condition
Minimum device response time	At least 20 ms
Supply ripple	wss ≤15%
Pulsed-output voltage	At least L+ minus 4 V
Pulsed-output minimum load	None

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03 Installation and replacement

Execution details

Stage	Action and reason
Establish the safety boundary	Identify the host controller, remote I/O assignment and the input signals used by the safety function. Keep actuator outputs outside the scope of this remote input unit.
Verify the device variant	Use the SILworX hardware configuration associated with F1 DI 16 01. Do not load the ELOP II Factory device variant or assume extended-temperature options apply to this unit.
Prepare the supply	Provide a safely isolated nominal 24 V DC source within −15%/+20%. Coordinate the external 10 A slow-blow fuse and the circuit wiring with the installation design.
Connect the input groups	Connect potential-free contacts to the intended supply group and input channel. For externally driven signals, establish the required L− reference and prevent unintended cross-connections.
Configure line control	Assign the pulsed-output source to each monitored input in SILworX. Preserve the relationship between physical wiring and the Pulse Channel value.
Establish communication	Connect the two-port Ethernet interface to the intended safeethernet arrangement. Verify the project’s device identity and network settings before commissioning.
Test faults safely	With the process secured, exercise the intended input states and the required wiring-fault cases. Observe both input values and diagnostic codes; a low value alone is not proof of fault detection.
Validate and release	Confirm the host safety logic handles low inputs, fault indications and communication loss as designed. Record the tested response time and remove temporary test conditions before return to service.

Before energization

Verify the SILworX device variant before assigning the hardware configuration. Isolate the supply and field circuits before changing the input wiring. Use a safely isolated DC supply within the permitted voltage tolerance. Keep the four pulsed outputs assigned to line control, not safety actuators.

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04 Commissioning and fault isolation

Functional acceptance

Test	Action	Expected result
Normal signal states	Operate each connected field signal	Correct values reach the intended host variables.
Line-control fault	Introduce an approved test fault in a safe state	The expected diagnostic and safe response occur.
Communication loss	Perform the approved network-failure test	The host executes the designed fault reaction.

Interpret the symptom

Observation	Investigation	Decision boundary
Input low without fault	Check field state and whether line monitoring is configured	An open wire may resemble a normal low state.
Code 0x10	Inspect the affected channel for a short circuit	Correct the field wiring before resetting the test.
Code 0x80	Inspect the pulse return path, switch state and L+ supply	Resolve interruption causes before accepting the channel.

Acceptance limits

Parameter	Required condition
Digital inputs	16, non-isolated
Pulsed outputs	4, non-isolated
Ethernet interfaces	2 × RJ45, 10/100Base-T, integrated switch
Supply voltage	24 V DC, −15%/+20%

Controlled return to service

Retain the SILworX hardware assignment, pulse-channel mapping, field-circuit diagram and completed fault-test results. Release requires the approved safety application and a validated complete response time.

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05 Technical checks and handover

Questions that affect the work

May the four pulsed outputs on HIMatrix F1 DI 1601 SILworX drive safety actuators?
No. These outputs are intended for input line-control functions and must not be used as safety-related outputs.

What happens to an affected input value when HIMatrix F1 DI 1601 SILworX detects an input fault?
The affected input is processed as low, and diagnostic information identifies the error. The safety application must use the relevant error codes when evaluating that input.

Final checks

Check	Requirement
1	Match each monitored input to its configured pulse-source channel.
2	Use channel error information together with the input value in the safety logic.
3	Validate open-circuit and cross-circuit responses with the plant in a safe state.
4	Confirm communication, diagnostics and the complete safety response before release.

Related catalogue pages

HIMA HIMatrix F3 DIO 16/8 01

HIMA F3DIO8/801

HIMA F7553

Technical basis

HI 800 153 E Rev. 1.01, F1 DI 16 01 manual; HIMA HIMatrix technical overview.