

7.3 QUADLOG Critical Discrete Module (CDM)

The Critical Discrete Module (CDM) interfaces discrete DC sensors and actuators with a control module's IOBUS. It provides 32 channels. Each channel can be configured as any of the five discrete channel types: an input, an output, an event recording input, an event recording output, or a pulse output.

The CDM's inputs are current sinking (i.e. the input device is wired between the power supply positive and the I/O terminal). Outputs are current sourced (i.e. the output device is wired between the output terminal and power supply common). In addition, a soft-fuse circuit protects each output channel from a short-circuit in the field wiring and prevents a short from affecting other CDM channels. Note that a soft-fuse can be reset locally or remotely.

All channel types, except pulse output, can be configured to run pulse test diagnostics to ensure the channel is in working order. The diagnostics require inputs to have an external device called a Safety-Related Switch Adapter (SRSA). The diagnostics detect shorts in the field, channel-to-channel shorts, and channel-to-power shorts.

Caution

To avoid signal interference, do not externally wire an output channel to other QUADLOG or APACS input channels if it is configured to use pulse test diagnostics. The short pulses emitted by the diagnostics are not intended to be connected directly to these input types.

Starting with version 3.1 of the CDM software (firmware), each output channel can be configured so the diagnostics can also detect an open load condition (i.e. when there is no load attached to that channel's I/O termination). When an open load condition is detected, the module reports a module error (SSC 07, EC 37). The following table lists the criteria necessary to determine if the load connected to an output channel is compatible with the open load diagnostics. It applies to both redundant and non-redundant CDM configurations.

The table below lists the limits for open load diagnostics

CDM MODEL	OPEN LOAD DETECTION THRESHOLD	CONNECTED LOAD DETECTION THRESHOLD
QLCDM024DCxAN (24 V)	A load resistance greater than 4,050 ohms is considered open.	A load resistance less than 496 ohms is considered connected.
QLCDM048DCxAN (48 V)	A load resistance greater than 4,271 ohms is considered open.	A load resistance less than 1,030 ohms is considered connected.

Notes

1. A load resistance value in the range between the open and connected thresholds can be detected as either open or connected.
2. If an output channel is connected to a load, but the module still reports an error (SSC 07, EC37) , you can disable the open load diagnostics by setting the channel's PulseDiagTest softlist value to disable. **However, this parameter must be enabled for a safety critical output channel.** Starting with firmware 3.02, the OpenCircuitTest softlist parameter disables open load diagnostics.

A discrete pulse output channel type is configurable so it is on for a time duration that you define (within a range of 25 to 2000 ms and a resolution of 25 ms).

Every input and output circuit is electrically isolated from the CDM's CPU, IOBUS, and ground. In addition, a soft-fuse circuit protects each output channel from a short circuit in the field wiring and prevents a short from affecting other CDM channels. Note that a soft-fuse can be reset locally or remotely.

ScanRate (hidden in HW Config): This is a read-only parameter that displays the current scan rate of the module. Generally, the scan rate will be the same as the scan rate of the control module, but can be a multiple of the control module's scan rate.

QUADLOG CDM Channel Types

The following channel types are supported for the CDM. In a DP/IO Bus Link environment, configuration information in this document supersedes information in the section titled "Configuring I/O Channels" in the document [Using the ProcessSuite 4-mation Configuration Software Version 4.30 or Higher](#) (CG39-20).

- Discrete Input (ADIC)
- CDM Discrete Output (CDOC)
- Discrete Pulse Output (DPOC)

7.3.1 QUADLOG Discrete Input (ADIC)

The Discrete Input channel type returns a BOOL variable. The table below lists the softlist parameters for this channel type.

PARAMETER	SELECTION	DEFAULT
InputFaultState	TRUE, FALSE (hidden in HW Config)	FALSE
Shutdown_Channel	TRUE, FALSE	FALSE
PulseDiagTest	Enabled, Disabled	Enabled

InputFaultState (hidden from HW Config, cannot be changed in HW Config): For QUADLOG input channels, Siemens strongly recommends that customers configure and use the channel driver's substitute value to ensure that the input value is safe under fault conditions. Doing so may allow out-of-range values to