

Diagnostics Overview for M580 Safety I/O Modules

Introduction

Each M580 safety I/O module presents the following diagnostic features:

- Self-test at module start-up
- Continuous built-in runtime self-test
- Module and channel diagnostic LEDs

In addition, the digital safety I/O modules also perform wiring diagnostics.

Power On Self Test

At power up, the I/O modules perform an extended series of power on self-tests. If the result of these tests are:

- Successful: The modules are considered to be healthy and are operational.
- Unsuccessful: The modules are not considered to be healthy and are not operational. In this case, the inputs are set to 0, and the outputs are de-energized.

NOTE: If the 24 Vdc external power supply is not connected to a digital input or digital output module, the power on self-tests are not performed and the module does not start.

Continuous Built-In Tests

During runtime, the I/O modules continuously perform self-tests. The input modules verify that they are able to read data from the sensors over the complete range. The output modules verify that the actual state of the output is the same as the commanded state.

LEDs

Each safety I/O module provides module and channel LED diagnostics on the front face of the module:

- The top four LEDs (**Run**, **Err**, **I/O**, and **Lck**) together describe the state of the module.
- The bottom two or four (depending on the module) rows of LEDs combine with the top four LEDs to describe the state and health of each input or output channel.

Refer to the LED diagnostics topic for the following safety I/O modules for more information on the how to read the LEDs for that module:

- BMXSAI0410 safety analog input module (*see page 210*)
- BMXSDI1602 safety digital input module (*see page 216*)
- BMXSDO0802 safety digital output module (*see page 222*)
- BMXSRA0405 safety digital relay output module (*see page 227*)

Wiring Diagnostics for Digital Modules

Both the safety digital input module and the safety digital output module can detect the following channel wiring diagnostic conditions:

- Open (or cut) wire.
- Short circuit to the 0 V ground.
- Short circuit to the 24 Vdc.
- Crossed circuits between two channels.

NOTE: The availability of these diagnostic functions depends on the specific wiring design of the module to its field devices. Refer to the application wiring examples for the following safety digital I/O modules for more information:

- BMXSDI1602 safety digital input module (*see page 69*)
- BMXSDO0802 safety digital output module (*see page 98*)