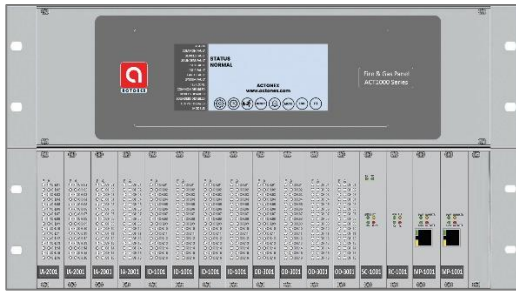


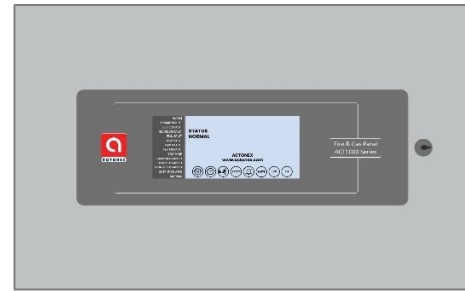


F&G CONTROL PANEL DATASHEET

• F&G CONTROL PANEL SYSTEM – ACTONEX



ACT1000-Type A



ACT1000-Type C

ACTONEX is the designer and manufacturer of automated safety solutions. Everything we do, think, and create is designed to help you achieve safety. The result of this philosophy: solutions that provide maximum safety and uninterrupted plant operations. ACTONEX solutions increase your efficiency through:

ACTONEX solutions increase your efficiency through

- Optimal system sizing, preventing over dimensioning
- Maximized plant uptime
- Lower investment and lifecycle costs
- High flexibility across the system's lifetime
- Exceptional ease of use

Full integration with DCS & ESD operating and monitoring functions

The advantages of a ACTONEX solution, can be combined with all leading distributed control systems (DCS) & emergency shutdown (ESD) via industrial protocol.

Major solutions

High-availability solutions with ACTONEX guarantee safe and uninterrupted operation for every safety-critical process in your facility such as Fire & Gas systems.

Self- diagnostic

ACT-1000 system incorporates comprehensive self-diagnostics such that all permanent and transient faults are identified, alarmed, and reported. Also has Watchdog functionality to monitor the healthiness of system hardware and software.

All I/O's test at a regular interval every 1 second for fault monitoring .

Fault information is available and displayed for the maintenance staff in a manner that enables fault diagnosis to the module level.

Proof test

According to IEC 61508 , every safety system must be subjected to a proof test at regular intervals. A proof test is designed to reveal any faults, so the system can be restored and fulfil its intended function. The proof test interval for ACTONEX system is 1 year.

ACTONEX controller can be subjected to a proof test by testing the entire safety circuit. In practice, a shorter testing interval (6-12 months) is required for the field unit's inputs and outputs than for the ACTONEX controller.

Transparent, fast diagnosis

Detailed information via LEDs tests its own functionality regularly, using self-diagnosis. This diagnostic information can be observed on the modules themselves via colored LEDs that show the full range of operating statuses. You can see at a glance whether redundant parts are available, whether the system bus is working properly, whether an internal fault has been recognized in the system and whether a fault exists in the field. Because more than 90 % of all faults originate on the field side, it is important to detect faults such as short circuits and wiring breakages quickly. ACTONEX indicates the faulty channel, saving you the time it would take to find the fault. Internal diagnostic, the fully integrated engineering tool, can be used to obtain more detailed information via its online diagnostic features, which display operating statuses over time. You can connect a computer running software at any point in the network, further speeding up the search for faults.

The system components

Faster, more powerful, more efficient

ACTONEX defines a completely new performance category. Its power is based on high-performance system components and intelligent system architectures, including:

- High-performance RISK processors for fast calculations
- Processing of all field signals in the I/O modules, which means that analog values are processed at the same time as digital values.
- Implementation of a system bus with upto 100 MBit/s transmission speed.
- All this produces impressive performance specifications:
- Up to 1248 I/Os per cabinet
- For example, the cycle time for 896 I/Os (half analog, half digital I/Os) is just 800 ms.

Nonstop safety for the process industry

ACTONEX solutions are used in the most various applications. For instance:

- | | |
|---|---------------------------------|
| - Petrochemical Plants | - Tank Farms and Gas Containers |
| - Oil and Gas projects | - Loading Stations |
| - Fertilizer plants | - Refineries |
| - Onshore/offshore facilities, platforms and FPSO | - Combustion and Power Plants |
| - Pipelines | - Turbines and Compressors |
| - Others | |

Parts of ACT-1000 System

The following tables provide an overview of the modules currently available. They should offer you a comparative guideline for the first planning steps.

Central module	Part No.	Description	Redundancy
Processor Module	MP-1001	Central Unit	Yes
Rack Control Module	RC-1001	Intelligent Rack Communication Controller	No

I/O module	Part No.	Description	Redundancy
Digital input module	ID-1001	Line monitoring 16 channel 24Vdc	Yes
Analog input module	IA-2001	16 channels, 4...20 mA	Yes
Digital output card	OD-3001	16 channels, 24 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off	Yes
Digital output card	OD-3002	4 channels, 24 VDC, 2.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off	Yes
Digital output card	OD-3005	32 channels, 24 VDC, 0.25 A, open collector	No
Addressable Loop Card	LP-4001	Addressable Loop Card With Apollo Protocol	No
Addressable Loop Card	LP-4002	Addressable Loop Card With ESP (Hochiki) Protocol	No

Communication module	Part No.	Description	Redundancy
RS 485 module	SC-1001	Modbus RS485 RTU	No

- Module dimension: 3U
- Rack dimension: 3U / 19"

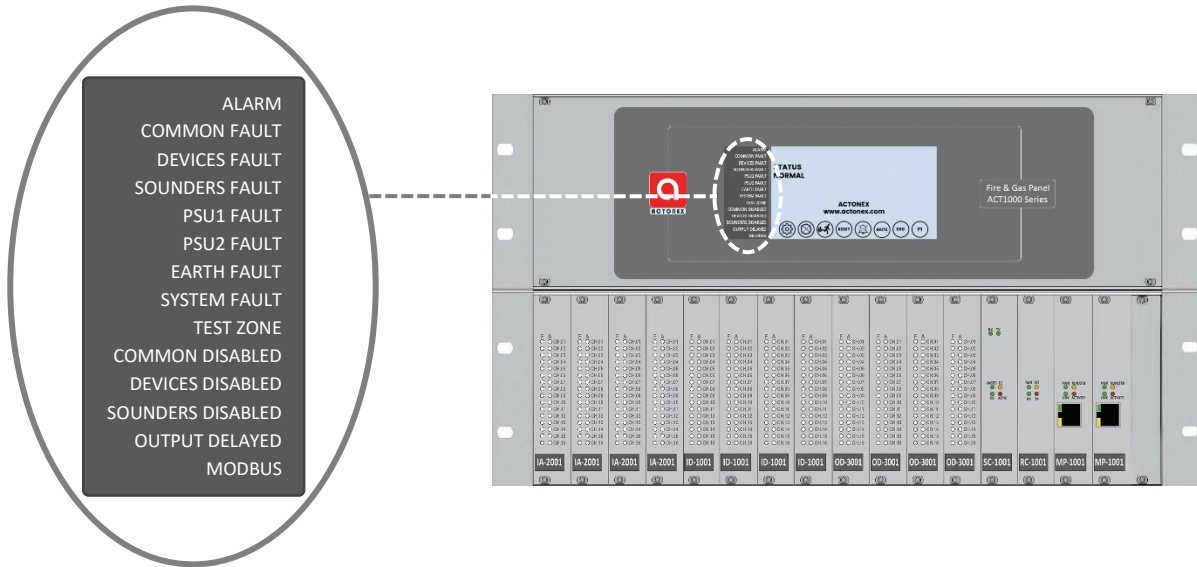
The system bus module organizes the communication of all modules. The ring communication structure has the advantage that the individual modules cannot interact. The system bus module can be installed individually or redundantly. The "UP" and "DOWN" Ethernet ports are used for networking/Configuration.

Specification, Dimension & Weight

Supply voltage	24Vdc (18~30Vdc)
Input current	Up to 20A for full rack
Housing Material	Aluminum
Operation temperature	0 °C to +60 °C
Storage temperature	from -5 °C to +50 °C
Humidity	Max. 95% relative humidity, non-condensing

• Main Rack – MR10

There are 2 display versions for system which one version is including LCD, Keyboard, Function Keys and Status LEDs and the other one is including just HMI touch Monitor. All control panel status is shown in this rack as power and alarm and also input/output faults. This rack is the interface between the panel and the operator. It is composed of a color LCD, LED back-lit, graphic type, with many lines, keys, and a buzzer. All status are shown as picture:



Status Items



Status Symbols

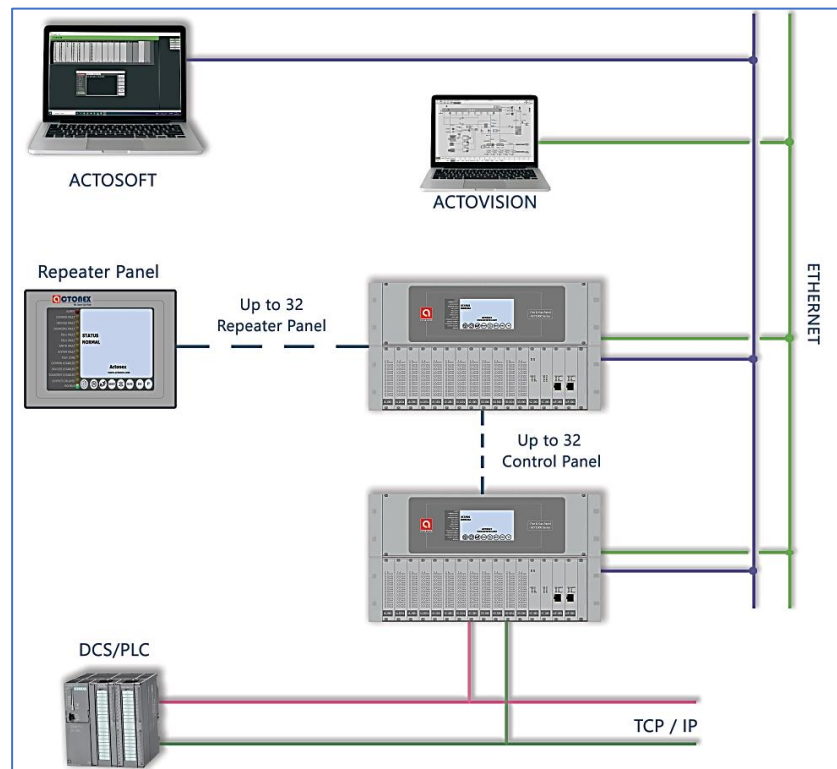
Keys Functions

Icon	Meaning	Icon	Meaning
	Mute		Delay Over Ride
	Sounder Alarm Silencing		Menu
	Panel Reset		Directions within menus
	Evacuation command		Scroll

Communication

ACT-1000 System supports the following communication features:

- Master/slave Modbus RTU protocol to communicate with the upper-level panel (DCS).
- Ethernet 10/100 BaseT with RJ-45 connector to communicate with configuration tool.
- The fully integrated configuration tool provides detailed information through online diagnostics, displaying network operations in real time and helping to speed up fault detection.
- Users can manage and define monitoring software using Modbus TCP/IP communication based on their needs.



- **CPU Card - MP-1001**

The CPU card is the system's central unit and contains the controller, flash memory, a buffered static RAM, a watchdog circuit and an Ethernet controller with an RJ 45 Ethernet output connector. The CPU card can be used in either single or redundant configuration with two CPU's operating in parallel. Both CPU's process information, but only one is the primary. Once the primary CPU stops operating, the other immediately takes over without disrupting ongoing operations or losing captured events.

In addition to the micro-controller, the card has a flash memory, a buffered RAM, a watchdog circuit and an Ethernet controller with an RJ 45 Ethernet output connector.



Main Features

- Redundancy Ability
- Hot-Swap Ability
- Applicable for fault-tolerant
- After activating second CPU , automatically will be set.
- Ethernet 10/100 link via RJ 45
- Watchdog external to CPU, for software functional cycle monitoring
- Fault self-check on the hardware
- Built-in clock with lithium battery
- Operating system residing in internal flash memory
- On-line transfer of configuration program
- Front plug-in, with locking screws

- **Rack Controller Card - RC-1001**

Rack Controller is the intelligent communication hub of each I/O rack. It manages data exchange between the CPU and all installed I/O Cards, continuously monitors rack status, and provides reliable, deterministic communication for high-availability industrial fire & gas systems.



Main Features

- Deterministic Data Exchange with CPU
- Dedicated UART Communication for Each I/O Card
- High-Speed Backplane Communication
- Continuous Rack & Module Health Monitoring
- Automatic I/O Card Detection
- Hot Swap Card Functionality
- Fault-Tolerant Communication
- Industrial Grade Design
- EMC/EMI Hardened Hardware
- Designed for Continuous 24/7 Operation Supports up to 13 I/O Cards per Rack
- Dedicated UART Interface for Each I/O Card
- High-Speed CPU Communication Interface
- Automatic Card Identification
- Built-in Diagnostics
- LED Status Indication

- **Modbus Protocol Serial Communications Card (Communication Modbus RTU) – SC1001**

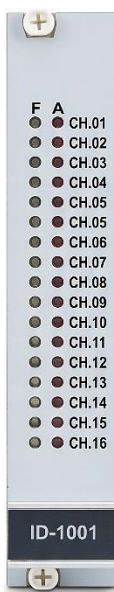
Communication Modbus RTU Card with Master/slave Modbus protocol. It manages the following Modbus variables: 512 Input variables, 512 Output variables, 1024 16-bit analogue variables. The values on to 4-20mA analogue cards can be transmitted to the DCS system. Its Output supplies two independent connections, a RS485 Half Duplex and a RS232. The analogue variables boast the engineered values relative to 4-20mA analogue cards.

**Main Features**

- Supply voltage: 18-30 Vdc
- Normal Current: 50mA
- Redundancy: No
- Operating modes: Master/Slave
- Ports: RS232 + RS485
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Monitoring Digital Input Card - ID1001**

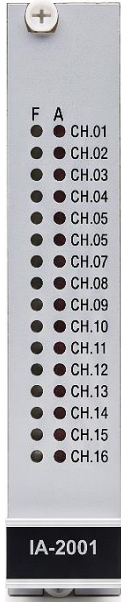
16 Inputs for conventional sensors for safety related functions. This card compatible to almost all conventional detectors on the market. This card is suitable to manage detection systems with conventional devices; it is suitable for use in systems with already existing detection lines, to command automatic extinguishing systems with double consent logics or intrinsic safety systems. Additionally, it is used to control all typical devices of extinguishing systems (pressure gauges, discharge keys, etc).

**Main Features**

- Supply voltage: 18-30Vdc
- Normal Current: 80mA
- Double programmable alarm threshold for each line
- Adaptable to various types and brands of detectors
- Can monitor and control 16 monitored lines individually
- Programmable safety or security operating mode
- Automatic testing of each line every thirty seconds
- Internal logic management by micro-controller
- Redundancy: Yes
- Operating modes: configurable through software.
- Short circuit status on the line: with current >23.5mA
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Monitoring Analogue Input Card - IA2001**

A Safety related 4-20mA analog input with 16 inputs, each having two threshold settings. The following transducer types can be connected: Explosive Sensors, Toxicity Sensors, Oxygen Sensors, Temperature Sensors, General 4-20mA sensors. The channel is tested during operation every 30 seconds. The card is equipped with a 4-20mA Output that supplies the current value measured at the Input. The analog value can be transferred to a DCS using a RTU Modbus module.

**Main Features**

- Supply voltage: 18-30Vdc
- Normal Current: 80mA
- Measuring Range 0-24mA
- Alarm thresholds: 2 that can be programmed
- Test of channels: performed every 30 seconds
- Redundancy: Yes
- Operating modes: configurable through software.
- Short circuit status on the line: with current >23.5mA
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Monitoring Digital Output Card - OD3001**

Card with 16 controlled Output channels of 500mA for the command of solenoids with safety related functions. It performs testing every 2 seconds on the channels cyclically, in case of discrepancy between the set signal and the read signal, the unit promptly warns about the failure condition. The Output is tested for the following: line opening, short circuit towards positive pole, short circuit towards negative pole, failure of piloting DMOS device, over-temperature of piloting DMOS device, power voltage outside the limits allowed. To increase output current, channels can be connected in parallel.

**Main Features**

- Supply voltage: 18-30Vdc
- Normal Current: 95mA
- Automatic protection of Outputs: YES
- Maximum current of Outputs: 500mA
- Controlled Output channels: 16 ch
- Redundancy: Yes
- Test of channels: performed every 2 seconds
- Operating modes: configurable through software.
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Monitoring Digital Output Card - OD3002**

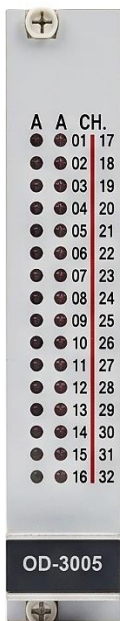
Card with 4 controlled Output channels of 2 A for the command of solenoids with safety related functions.. The Output is tested for the following: line opening, short circuit towards positive pole, short circuit towards negative pole, failure of piloting DMOS device, over-temperature of piloting DMOS device, power voltage outside the limits allowed. To increase output current, channels can be connected in parallel.

**Main Features**

- Supply voltage: 22-29Vdc
- Normal Current: 60mA
- Automatic protection of Outputs: YES
- Maximum current of Outputs: 2.5A
- Controlled Output channels: 4 ch
- Redundancy: Yes
- Test of channels: Performed every 2 seconds
- Operating modes: configurable through software.
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Output Card Open Collector - OD3005**

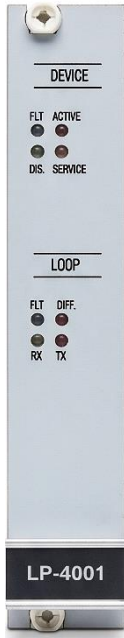
Card with 32 open collector, non-controlled Output channels of 250mA. This card effects status and functionality checks, but does not monitor the control channels.

**Main Features**

- Supply voltage: 18-30Vdc
- Normal Current: 35mA
- Automatic protection of Outputs: YES
- Maximum current of Outputs: 250mA
- Controlled Output channels: 32 ch
- Redundancy: No
- Test of channels: Performed every 2 seconds
- Operating modes: configurable through software.
- Operating Temperature: -5 to +60 °C
- Maximum humidity: 95% W/C

- **Addressable Loop Card (Apollo Protocol) – LP4001**

Addressable Loop Card for devices addressed with Apollo protocol. It manages up to 127 devices of max. Two points each.



Main Features

- Redundancy: NO
- Operating modes: configurable through software.
- No. of devices for each loop 127
- Maximum loop's current 250mA
- Supply voltage: 22-29Vdc
- Absorption in idle status: 65mA
- Operating temperature: -5 / +50 °C
- Storage temperature: -30 / +80 °C
- Maximum humidity: 95% without condensate

- **Addressable Loop Card (Hochiki Protocol) – LP4002**

Addressable Loop Card for devices addressed with ESP protocol. It manages up to 254 devices of max. Two points each.



Main Features

- Redundancy: NO
- Operating modes: configurable through software.
- No. of devices for each loop 254
- Maximum loop's current 250mA
- Supply voltage: 22-29Vdc
- Absorption in idle status: 65mA
- Operating temperature: -5 / +50 °C
- Storage temperature: -30 / +80 °C
- Maximum humidity: 95% without condensate