

## Features

- Multiple zone models - field expandable.
- Panels custom designed to specifications.
- Full extinguishing systems control.
- Monitors up to 2,500 feet of Protectowire Linear Heat Detector per zone.
- Zones can be tested, silenced and reset independently.
- Digital Protectowire Meter option for reading distance to overheat condition.
- Zone scanning option for Digital Protectowire Meter.
- Intrinsically safe detection circuits available.
- Accommodates up to 25 smoke detectors per zone.
- Industrial NEMA-12 or NEMA-4 enclosures.

## ACR-1600HD Heavy Duty Industrial Fire Control Panel

### Description

The ACR-1600HD is modular in design and features individual circuit control modules designed to meet specialized system requirements for most special hazard and industrial fire detection systems.

The standard Class B (NFPA Style B) or optional Class A (NFPA Style D) detection circuits can accommodate up to 2,500 feet (758m) of Protectowire Linear Heat Detector, 25 PRO-series smoke detectors, and any number of shorting type contact devices, such as thermal detectors, manual stations or water flow pressure switches.

The basic ACR-1600HD Control Panel includes the following standard features: industrial type NEMA-12 enclosure; Class B (NFPA Style B) detection circuit(s); battery charger and monitor; (1) Class B (NFPA Styles W&Y) audible signal circuit; common trouble audible; detection circuit alarm and trouble lamps; audible alarm circuit trouble lamp; AC power on lamp; back-up power on lamp; battery out (disconnect) lamp; zone alarm and trouble contacts; one DPDT common alarm relay; and one DPDT common trouble relay.

System capabilities may be expanded by adding additional modules and functions to the basic system. The ACR-1600HD will accept a combination of the following options:

- Protectowire PWM-D Alarm Point Location Meter/Scanner.
- Extinguishing system release and supervision.
- Water flow detection zones.
- Fire and non-fire supervisory monitoring.
- Intrinsically safe detection zones.

A complete list of available options is included in the "How to order" section of this catalog sheet.



## Introduction

The ACR-1600HD Series is specifically designed for industrial special hazard applications, which demand high reliability and customized system operation. Unlike competitive systems which are often limited in scope, the ACR-1600HD Series is custom designed to each customer's specific requirements. Special requirements, such as custom system operating logic, outdoor and hazardous installation environments or special operating input voltages can be provided to meet any fire defense need.

## System Features

All system alarm, trouble, and supervisory indications are provided by reliable LED indicators mounted on the front of the enclosure behind a sealed window, which has been specially designed to maintain the integrity of the enclosure's NEMA rating. In addition, most individual control or detection modules have on board LED indicators which duplicate the external visual indicators to assist in identifying various alarm, trouble or off normal conditions once the control panel door has been opened.

Five system status indicators are mounted on the main control board. A yellow power supply trouble/backup on LED, a yellow detection circuit trouble LED, a yellow alarm (audible) circuit trouble LED, a yellow charger out LED, and a red alarm test LED.

System detection and supervisory modules provide individual switches for alarm reset, alarm silence/zone bypass, and zone alarm test.



PWM-D  
Protectowire Alarm  
Point Location Meter  
with 16 zone scanner  
(Options F & Y).

## PWM-D Protectowire Alarm Point Location Meter (Option F)

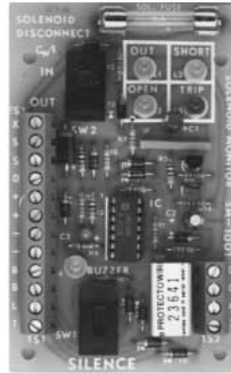
Protectowire introduces "smart" detector technology to Linear Heat Detectors. The PWM-D Meter (Option F) may be built into the ACR-1600HD Control Panel to locate a heat actuated point on the Protectowire Linear Heat Detector. The Meter will display the distance in feet or meters from the start of the detector portion of the zone to the overheated or shorted point on the Protectowire Linear Heat Detector.

A Zone Alarm Scanner Option for the PWM-D Meter is available which allows for automatic display of the zone number in alarm, while still monitoring the remaining zones for an overheat condition. The Scanner, which must be ordered with the PWM-D Meter option, is available in the following configurations: 8 zones (Option X) and 16 zones (Option Y), 32 zones (Option Y2) and 48 zones (Option Y3).

## Intrinsically Safe Detection Circuits (Option W)

The ACR-1600HD control equipment can be provided with FM approved intrinsically safe detection circuits (Option W) for those areas that are classified as hazardous (National Electrical Code Class I, II, and III, Division 1, Groups A, B, C, D, E, F and G). The voltage and current in the detection circuits will be limited to values which are incapable of causing an explosion in a Division 1 area. Protectowire Linear Heat Detector and/or other non-energy storing initiating devices may be used in these areas.

This option permits the use of the Protectowire Alarm Point Location Meter (Option F), but is not compatible with the system ground fault detection circuit (Option R).



Solenoid Monitor and  
Release Module  
(Option N).

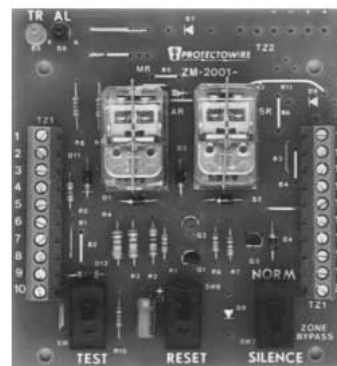
## Solenoid Monitor and Release Circuit (Option N)

The SM-1001 Series Solenoid Monitor and Release Module (Option N) is designed to operate and supervise solenoid valves used for actuation of extinguishing systems.

Release logic and activation of the module is governed by a designated detection zone or group of zones in the ACR-1600HD Control Panel.

The release circuit is supervised for open and shorted conditions. In the event of an open or short, the system trouble buzzer will sound, and the appropriate yellow indicating lamp(s) will illuminate. The SM-1001 provides a solenoid disconnect switch to deactivate the module during servicing. Also provided are on board yellow diagnostic LED's for open circuit, short circuit, solenoid out (disconnect) and trouble buzzer switch to be silenced. A red solenoid trip LED is also provided to confirm module activation as well as a set of Form C dry trouble contacts for auxiliary field use.

The SM-1001 (Option N) has been Factory Mutual approved for the following solenoids: Skinner Model LV2LBX25; ASCO Models T8210A107; R8210A107; 8210A107; and the Star Model D deluge valve which requires a special power supply and is provided on special order.



Class B switch  
supervisory circuit  
(Option P).

## Class B Supervisory Circuits (Option P)

The ZM Series Supervisory Module (Option P) is designed to provide one Class B circuit used to monitor any device(s) which contains normally open contacts, such as temperature monitors, tamper switches, air pressure switches or fire pumps.

The module is designed so that a short on the input circuit lights a yellow supervisory lamp on the control panel door. An open in the input circuit lights a yellow trouble lamp. Both supervisory off normal and circuit trouble conditions cause a panel common trouble.

The use of Option P Supervisory Circuits is not recommended for water flow detection, since this is considered an alarm condition and Option P is not wired into the alarm circuit structure of the panel. Water flow detection is accomplished by utilizing additional detection zones in the basic ACR-1600HD Control Panel.

### Audible Alarm Circuits

The ACR-1600HD Control Panel provides one standard Class B (NFPA Styles W & Y) general alarm circuit which is contained on the main control board and rated for a total circuit load of 3.0 amps. A Class A (NFPA Styles X & Z) configuration is available when Option Z is ordered.

Additional Audible Alarm Circuits may be added to the system by utilizing the AM-1600 Alarm Expander Module(s) Option S. The AM-1600 Module may be actuated from the main system control board or by an individual zone or group of zones, and is ideal for separate annunciation of water flow alarm.

The AM-1600 Module is rated for a total circuit load of 3.0 amps max. When the Module is used in conjunction with the main panel general alarm circuit or when multiple AM-1600's are used, total available system power must be considered when determining the number of alarm devices which may be utilized on each circuit.

### System Enclosures

The ACR-1600HD Series is provided in NEMA-12 rated enclosures which are custom sized to accommodate the exact configuration of the system ordered. NEMA-4 rated enclosures are also available (Option K) for those systems which require protection from wind-blown dust and rain, and hose-directed water.

Each enclosure is provided with a gasketed window which permits viewing of all appropriate visual indicators while still maintaining the enclosure's NEMA rating and FM Approval.

### Field Expansion

The zone capacity of the basic ACR-1600HD system can be expanded after installation by utilizing a zone control extender panel. These panels contain additional zone control modules, alarm and trouble indicating lamps, and are provided in a standard NEMA-12 enclosure.

NEMA-4 rated enclosures are also available. Power for these extenders is derived from the main ACR-1600HD Control Panel power supply.

### Custom Options

Because the ACR-1600HD is custom designed and assembled, a wide range of unique features are available on special order from the factory. A partial list of special order features includes:

- Cross-linked flame retardant panel wiring.
  - Built-in alarm indicating audible.
  - Panel wire markers.
  - Multi-pole heavy duty relays.
  - 125VDC or 250VDC primary and/or back-up power input.
- Contact the factory for availability of additional custom options not listed above.

### ACR-1600HD Specifications and Environmental Ratings

#### AC supply

120VAC + 10% - 15% 50-60Hz,  
100VA

#### Battery supply

3-50 ampere hour  
Nickel cadmium  
Gel cell

#### DC Regulated Supply

Output voltage:  
28V at 0.8 amp - Single zone  
28V at 2.0 amp - Multiple zone  
Line regulation:  $\pm 0.1\%$   
Load regulation:  $\pm 0.1\%$   
Ripple:  $\pm 0.5\%$  typically  
2 to 6 M.V.P-P  
Short circuit protection:  
Fold back overload protection,  
factory set at 110 to 150%  
of nominal output current  
Output voltage adjustment:  $\pm 10\%$

#### DC Unregulated Supply (unfiltered)

Nominally 24V fullwave  
rectified at 4 amp

#### Environmental Operation Conditions

Ambient temperature:  
0-49°C (32°F-120°F)  
Humidity: Max. 95% RH  
non-condensing

#### Alarm Contact Rating (Main Panel)

Maximum 3 amp 28VDC or  
115VAC resistive load

#### Approvals

Factory Mutual Approved  
UL Listed (limited options)  
City of New York Board of  
Standards and Appeals  
California State Fire Marshal

## ACR-1600HD fire control panels...custom designed to meet any fire defense need.



1.



2.



3.

1. 2 zone control panel intrinsically safe circuits in NEMA-9. Detroit Edison Co.
2. 18 zone control panel, NEMA-12. Arizona Nuclear Power Project.
3. 11 zone control panel with sequential wetting system for cooling tower, NEMA-4. Pacific Gas & Electric Co.

## How to Order

Step 1. Determine the number of detection zones (including water flow) required and select the appropriate system control unit from the table below.

Basic System Control Units	
Model #	Description
ACR-1601 HD	(1) Zone Control Panel
ACR-1602 HD	(2) Zone Control Panel
ACR-1603 HD	(3) Zone Control Panel
ACR-1604 HD	(4) Zone Control Panel
ACR-1605 HD	(5) Zone Control Panel
ACR-1606 HD	(6) Zone Control Panel
ACR-1607 HD	(7) Zone Control Panel
ACR-1608 HD	(8) Zone Control Panel
ACR-1609 HD	(9) Zone Control Panel
ACR-1610 HD	(10) Zone Control Panel

Additional zones up to a maximum of 50, may be configured by using the format shown above, for the basic system model number.

Step 2. Select option code letter(s) and show quantity when necessary.

Step 3. Finalize complete system model number as shown in the system model number ordering guide at right.

Step 4. The ACR-1600HD is custom assembled and tested at the factory as a complete system. In order to assure exact conformance with the customer's operational requirements, each order should be accompanied by a brief description of the panel's operating logic and zone function.

### Examples:

1. Zone #1 operates solenoid release #1 (Option N).
2. Zone #2 water flow operates audible circuit #1 (Option S).
3. Supervisory circuit #1 (Option P) - Low air circuit.
4. Supervisory circuit #2 (Option P) - Tamper switch circuit.

Step 5. Based upon required battery standby hours, size system batteries using Protectowire Data Sheet 8937.

Step 6. Order appropriate battery cabinet as follows:  
 Model G-.5 (Fits Protectowire 7AH & 10AH gel cell sets)  
 Model E-.5 (Fits Protectowire 17AH-40AH gel cell sets)  
 Option D - Battery charging meters (mounted on battery cabinet door). Consult factory for NICAD batteries & associated cabinets.

## System Model Number Ordering Guide

Model number of basic system control unit selected in Step 1.

AC operational voltage 120 or 220-240VAC - 50/60Hz.

Battery charger adjustment GC - Gel Cell (Std.)  
NC - Nickel Cadmium

**Options/Quantity**

- A - Municipal tie unit (shunt type)
- B - Municipal tie unit (series type)
- C - Remote station (rev. current type)
- E - 2nd circuit, used when battery back-up not required (120VAC or 240VAC)
- E2 - 125VDC or 250VDC system power input/backup
- F - Digital Protectowire meter
- G - Class A - detection circuits
- H - Class B - detection circuits
- J - Firesense analog detection circuit (1/module) (Refer to Form 9120 for additional information)
- JJ - Firesense two stage analog detection circuit (1/module) (Refer to Form 9120 for additional information)
- K - NEMA-4 enclosure
- L - Zoned alarm relay (DPDT) - 10 amp 120VAC or 28VDC
- LL - Zoned alarm relay (3PDT) - 10 amp 120VAC or 28VDC
- M - Zone trouble or auxiliary relay (DPDT) - 10 amp 120VAC or 28VDC
- MM - Zone trouble or auxiliary relay (3PDT) - 10 amp 120VAC or 28VDC
- N - Solenoid monitor and trip circuit 24VDC
- P - Supervisory circuit: i.e., air pressure, temperature, etc.
- Q - Guarded push button or switch/external door mounted
- R - Ground fault detector (GFD-1603), not compatible with Option W
- S - Additional supervised Class B audible circuit (AM-1600)
- T - Flasher module
- W - Intrinsic safety barriers - Class B detection circuits
- X - 8 zone alarm scanner - must choose Option F
- Y - 16 zone alarm scanner - must choose Option F
- Y2 - 32 zone alarm scanner - must choose Option F
- Y3 - 48 zone alarm scanner - must choose Option F
- Z - Class A audible general alarm circuit
- AA - Lamp test
- BB - Time delay relay - solid state, 0-60 seconds
- DD - Solenoid monitor and trip circuit 120VAC\*
- EE - 220-240VAC -50Hz power input
- GG - Heavy duty 4 pole relay ratings to 600VAC & 240VDC
- HH - Heavy duty 6 pole relay ratings to 600VAC & 240VDC

\*Not FM approved

ACR-16   HD -   -   -

Example:

ACR-16 04 HD - 120 - GC - FHNP3RAA

**Basic four zone Class B panel. 120VAC or 50-60Hz input power, for use with gel cell batteries. Digital Protectowire meter, (1) solenoid monitor and release circuit, (3) Class B supervisory circuits, ground fault detector, and lamp test all in a NEMA-12 enclosure.**

## Zone Extender Panels Model Configuration Guide

Product line designation.

The number of detection zone modules.

Specific options, if required (See ordering guide).

ACR-1600HD   -

Example:

ACR-1600HD 03

Zone control extender panel with (3) Class B detection zones in a NEMA-12 enclosure.

ACR-1600HD 06 K

Zone control extender panel with (6) Class B detection zones in a NEMA-4 enclosure.

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Special hazard fire detection systems