

UL, ULC Listed;
CSFM, FM and
MEA (NYC) Approved*

Fire Alarm Controls
4020 Series, Enhanced Capacity
Addressable/Hard-Wired

STANDARD FEATURES

- **UL listed to Standard 864 for Fire and Standard 1076 for Security**
- **Power limited operation per NEC 760**
- **Standard with 127 addressable points:**
 - Supports MAPNET II® addressable and TrueAlarm® analog sensing devices**
 - Two wire operation, Class B or Class A (Style 4 or Style 6)
 - Expandable up to 508 points
- **80 character liquid crystal display (LCD):**
 - Super-twist design for wide viewing angle
 - Back-lit alphanumeric characters
- **Four input/output (I/O) circuits, field selectable as initiating device circuit (IDC), notification appliance circuit (NAC), or relay**
- **Eight amp (8 A) power supply/charger**
- **Front panel ground fault isolation control**
- **Compatible with Simplex:**
 - 4003 Voice Control Panel
 - 4009 NAC Power Extenders
 - Remote LCD and LED annunciators, 24 Point I/O module, and 64/64 LED/Switch controller

OPTIONAL FEATURES

- **Addressable expansion to 508 points**
- **Hard-wired expansion to 20 circuits**
- **4120 Network interface**
- **Internal DACT**
- **RS-232 Interface for printer or CRT/keyboard**
- **FM approved releasing service**
- **Dial-In service modem interface**
- **Decoder module for coded circuit interface**
- **Simplex 2120 interface**

* This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7165-0026:178 for allowable values and/or conditions concerning material presented in this document. It is subject to re-examination, revision, and possible cancellation. Accepted for use – City of New York Department of Buildings – MEA35-93E. Applicable MF approval information is available on request. Additional listings may be applicable, contact Simplex for the latest status.



4020 Fire Alarm Control Panel Mounted in 2-Unit Cabinet

SOFTWARE FEATURES

- **Easily customized on-site**
- **WALKTEST™ system test****
- **Four operator access levels**
- **600 event historical log**
- **Zone or point selectable alarm verification**

INTRODUCTION

Simplex 4020 Series Fire Alarm Control Panels provide both addressable and hard-wired monitor and control in a compact, feature optimized package. They can be on-site programmed to provide custom labels, supply mapping logic for inputs and outputs, and they support an extensive list of additional features to satisfy a wide variety of applications and local code requirements. These powerful and flexible site-specific software features can be quickly and securely generated, modified, and archived by trained service personnel using menu-driven computer based programming tools.

Model 4020 panels are available in three cabinet sizes and can be expanded up to 508 MAPNET II addressable points and/or TrueAlarm analog detection points, and up to 20 hard-wired I/O circuits. Hard-wired circuits use a field selectable I/O module to determine operation as either monitor or control, and to select for Class B or Class A operation (Style B/D or Style Y/Z).

** MAPNET II addressable communications is protected under U.S. Patent # 4,796,025. TrueAlarm analog detection is protected under U.S. Patent # 5,155,468 and 5,173,683. WALKTEST is protected under US Patent # 4,725,818.

OPERATOR INTERACTION

Primary Operator Functions. The 4020 operator panel maximizes the performance of primary fire alarm functions by displaying only the indications and interaction switches required for responding to emergency situations (see Figure 1).

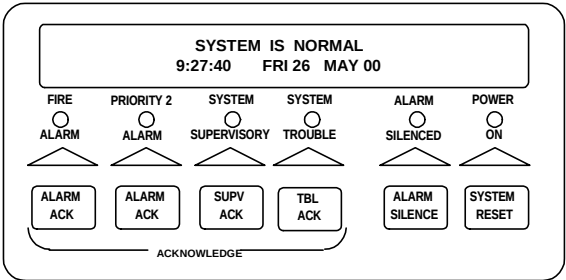


Figure 1. Primary Operator Functions

Indications. Alarm, supervisory, and trouble conditions are indicated at the operator's panel by dedicated LEDs and a local tone-alert. An 80 character (2 lines x 40 characters) alphanumeric super-twist liquid crystal display provides information concerning point status (alarm, trouble, supervisory, etc.), type of alarm (smoke detector, manual station, waterflow supervisory, etc.), number of alarms in the system, and a custom location label.

Switch Operation. Alarm, supervisory, and trouble conditions have dedicated acknowledge push-button switches. Operation of the appropriate acknowledge switch silences the tone-alert with the LED remaining illuminated until all conditions in that category are restored to normal.

The 4020 can be programmed to perform a "global acknowledge" where a single push of the appropriate acknowledge switch will silence the tone-alert for all points in that condition. It can also be programmed for individual acknowledgment of each point in an abnormal condition, as well as their restoration. Both operations are in accordance with the requirements of NFPA 72, the *National Fire Alarm Code*.

Notification appliances can be silenced by pressing the ALARM SILENCE switch. Pressing the SYSTEM RESET switch restores the system to the normal operation mode. The system tone-alert can be programmed to resound at user specified time intervals to serve as an "active status reminder" when a trouble condition remains in the system and the audible trouble signal has been silenced.

Additional Operator Function Keys. For increased functionality, additional operator keys are available by opening the access door (see Figure 2). The FUNCTION KEYS, DISPLAY/ACTION keypad, and the ENTRY keypad are the operator interface sections that are not essential in a fire emergency situation. These functions are presented in a self-directing manner and include: circuit/device ENABLE or DISABLE, control point turn ON or OFF, DISPLAY HISTORICAL LOGS, etc.

The operator's access is determined by four passcode protected security levels. Level 1 allows routine actions while level 4 is reserved for more sensitive operations requiring higher level operator knowledge. Levels 2, 3, and 4 are passcode protected to ensure proper authorization for that level's control access. Passcode log-ins are stored in the history log for access review.

Display Action and Entry Keypads. The Display/Action and Entry keypads allow operators (with proper access levels) to perform controlling functions to system zones, notification appliance circuits (NACs), and auxiliary control relays, or to gain access for system information. DISABLE allows a specific circuit or a specific addressable device to be disconnected from the system to isolate a problem. A trouble condition will occur as a reminder of the action taken. ENABLE followed by ENTER restores the circuit or device to active status in approximately 60 seconds. The display will count down the remaining time and will warn the operator if the circuit to be enabled will cause an alarm.

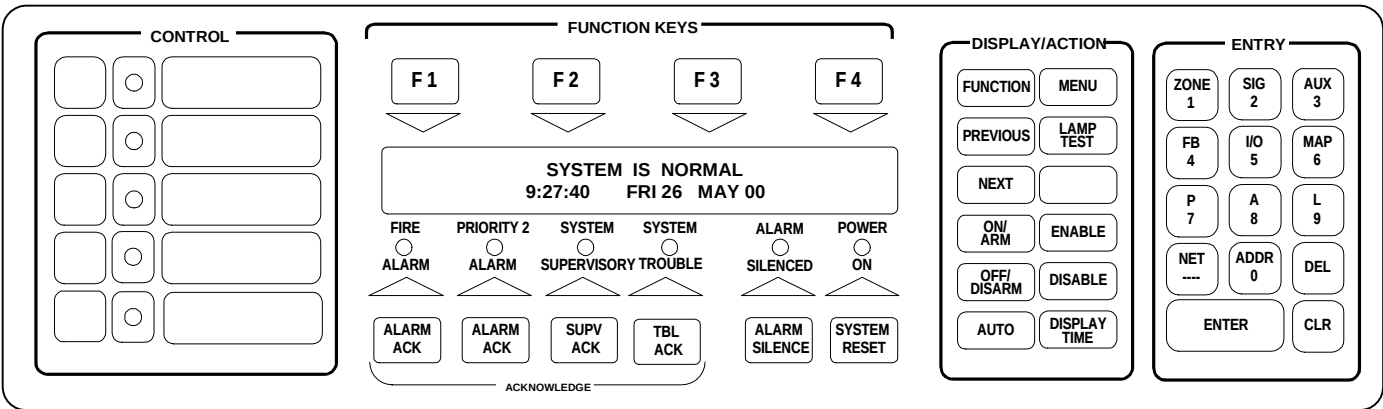


Figure 2. Additional Operator Keys

OPERATOR INTERACTION (Continued)

Control Keypad. CONTROL identifies five programmable switches with associated LEDs. Possible applications are: city disconnect, door holder bypass, manual evacuation, elevator capture bypass, etc. Control switches can be individually passcode protected such that only certain access level operators can perform that function (see Figure 3).

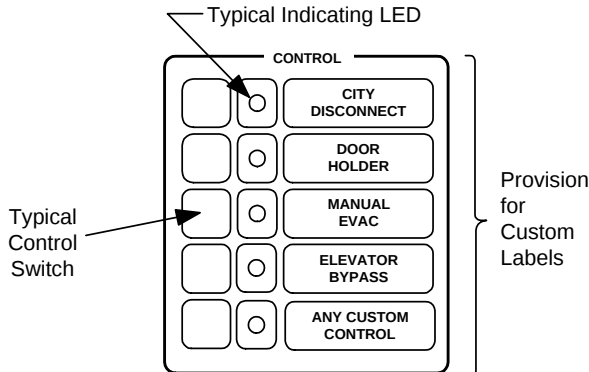


Figure 3. Control Key Detail

Function Keys. FUNCTION KEYS identifies the "soft" keys F1 through F4 whose functions vary within each Main Menu Option. Each key's function is described on the top line of the display. For example, when setting time and date, F1 and F2 control the placement of the cursor and F3 and F4 either increase or decrease the indication above the cursor (see Figure 4).

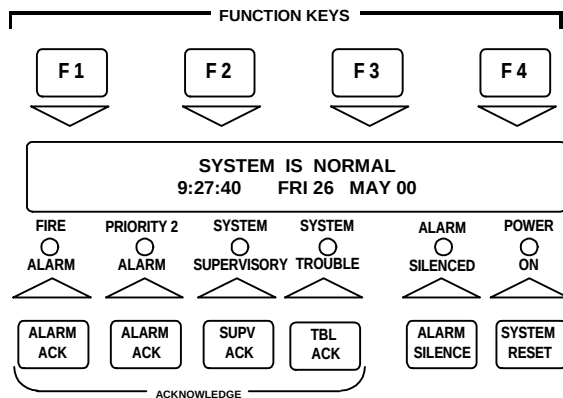


Figure 4. Function Key Detail

Ground Fault Isolation. A disconnect feature for zone circuit wiring is available from the front panel. When operated, it isolates ground fault conditions to assist service personnel in locating and repairing grounded wiring problems.

STANDARD MODULE DESCRIPTIONS

The 4020 **Master Controller Board** supports the Operator's Panel, provides local and remote module communications and supervision, controls system memory and custom programming interface, and provides the city and trouble circuitry. Feature highlights are:

- **Remote Serial Annunciator Control.** Control for up to 31 remote Simplex Annunciator products including SCU, RCU, Graphic SCU/RCU, 64/64 LED/Switch Controller, 24 Point I/O, and LCD Annunciators. (Refer to page 6 for more information.)
- **Trouble Relay.** One SPDT Auxiliary Trouble Relay Contact Rated at 2 A @ 24 VDC, resistive.
- **City Connection.** City Circuit operation for 24 VDC Remote Station (reverse polarity), local energy, shunt master box, or a Form "C" contact output.
- **Access Port.** RS-232 port for connecting the computer programming tools to the Flash EPROM memory for custom programming and service diagnostics.

Power Supply Interface Board:

- Provides DC power conversion, and supervision and control of the switching power supply module.
- Contains the power supply output terminals and generates digital data that can display actual system voltage and current readings on the panel LCD.

Standard I/O Module Features:

- **MAPNET II/TrueAlarm Addressable Output** provides communications for up to 127 remote addressable devices, including TrueAlarm analog sensors (see descriptions on page 5).
- **Four I/O Circuits**, field selected in any combination, to be either:
 - Class B or Class A (Style B/D) **Initiating Device Circuits (IDCs)**
 - Class B or Class A (Style Y/Z) **Notification Appliance Circuits (NACs)** (rated 2 A @ 24 VDC)
 - **Auxiliary Control Circuits**, SPDT contacts rated 2 A resistive @ 24 VDC, and 1/2 A inductive @ 120 VAC
- **I/O Circuit function** is determined by panel programming and by the insertion of a feature selection plug installed by service personnel after the system application and wiring is inspected.
- **I/O Circuit Features:**
 - NACs may be individually programmed for coded outputs as temporal, or march time codes.
 - The first I/O Circuit accepts a coded input.
 - Local trouble LED is provided to assist with system diagnostics.

STANDARD MODULE DESCRIPTIONS (Continued)

Power Supply/Battery Charger Design

Switching power supply design provides high efficiency, small size, and precise monitoring and control of output power.

- **Battery Charging.** Charger capacity is rated for sealed lead-acid batteries up to 50 Ah. (Internally mounted batteries are limited to 33 Ah, 50 Ah batteries require external mounting.) During alarm conditions, battery charging is terminated and full power supply capacity is assigned to alarm control. During normal conditions, full power supply capacity is available for battery charging.
- **Dual Outputs.** Two isolated outputs of 4 A each at 28.5 VDC under AC powered conditions (24 VDC during battery operation).
 - **Tap “B”** provides 4 A for general purpose NAC and control power.
 - **Tap “A”** provides 2 A (typical) for NACs controlling “clean” loads (notification appliances with controlled inrush current and proper transient suppression). Actual available power depends on total system power requirements.

OPTIONAL MODULES

Eight Circuit I/O Module (4020-0305):

- Eight I/O circuits, field selectable in any combination to be either Class B or A (Style B/D) IDCs, or Class B or A (Style Y/Z) NACs (rated 2 A @ 24 VDC, resistive), or SPDT Auxiliary Control Circuits (rated 2 A resistive @ 24 VDC, and 1/2 A inductive @ 120 VAC). Circuit operation is identical to that of the standard four circuit I/O module.
- Up to two optional modules may be added. When combined with the four standard circuits, the maximum hard-wired I/O capacity is 20 circuits.

MAPNET II Module (4020-0110):

- Each module supports an additional 127 addressable MAPNET II/TrueAlarm devices.
- Up to three modules may be added. When combined with the standard 127 addressable points, the maximum addressable point capacity can be expanded up to 508.

Internal Dual Line DACT Modules:

- Each module provides multiple programmable features such as automatic 24 hour test and programmable power fail report delay.
- **4020-0155 Serial DACT** provides communication of serial, point-specific information, up to two are allowed (refer to data sheet S2080-0009 for more information).
- **4020-0153 Contact Closure DACT** provides general point status information.

RS-232/2120 Interface Module (4020-0113):

- Two isolated RS-232 ports. Operation can be programmed as either a CRT/Keyboard (terminal) or printer, or one port can be dedicated to communicate with a 2120 Multiplex System.
- CRT/keyboard operation connects to Simplex model 4190-9006, providing both full screen annunciation and keyboard control. (Reference data sheet S4190-0006.)
- Printer operation can be field programmed to print activity displayed on the local LCD or to be selective by event types (alarms, supervision, or troubles).
- The 4020 keyboard or a CRT/Keyboard can be used to request a printed report from the historical log including alarms, supervision, troubles, and TrueAlarm status and service reports.
- Applicable printers are model 4190-9007, for 120 VAC operation, or model 2190-9039, for 24 VDC operation. (Reference data sheets S4190-0008 and S2190-0014.)

Decoder Module (4020-0136):

- Translates coded initiating circuit inputs into addressable points.
- An on-board LCD describes decoding status. (Reference data sheet S4100-0018.)

Dial-In Service Interface Modem Module (4020-0139):

- Remote access is available using a computer equipped with a modem and terminal emulation software.

4120 Network Interface, Multi-Media (Reference data sheet S4120-0003):

- Modular Interface Board (4020-6014), choose media combination of Wired Data (4020-0142), Fiber Optics (4020-0143), or Modem (4020-0144).
- Physical Bridge Module (4020-6023), provides expanded network connectivity (reference data sheet S4120-0005).

OPTIONAL FEATURES:

- External Battery Power (4020-1010). Required when batteries and charger are external.
- 240 VAC, 50/60 Hz power option (4020-6001).
- French Control Panel option (4020-6003).
- Suppression Release Panel operation (requires 4020-6007 Operation Instruction, 4020-0129, 25.5 VDC Limiter Module, and 2081-9032 Coil Supervision Module). FM approved for automatic extinguishing, deluge, and preaction sprinkler release control (reference data sheet S4100-0019).
- Cabinet selection of two, four, or six unit, beige or red cabinet with locking glass door.
- Semi-flush trim bands in beige or red.

MAPNET II/TrueAlarm ADDRESSABLE INTERFACE DESCRIPTION

GENERAL

Addressable device communications operate via Simplex MAPNET II communications. Using a two wire circuit, individual initiating devices such as automatic smoke detectors, manual fire alarm stations, TrueAlarm smoke sensors, and sprinkler waterflow switches can communicate their exact identity and status. This addressability allows the location and the condition of each device to be displayed on the 4020 panel LCD and on system annunciators. Additionally, NACs (horns, bells, strobes, etc.) as well as other control circuits (fans, dampers, etc.) may also be individually controlled.

Capacity. A combined total of 127 addressable monitor and control devices may be intermixed on the same common pair of wires. By using Zone Adaptor Modules (ZAMs), conventional initiating devices can be connected to the MAPNET II circuit. (Refer to data sheet S2190-0012 for addressable device information.)

MAPNET II ADDRESSABLE OPERATION

The MAPNET II controller continuously interrogates each addressable device on the communication channel for status condition such as: normal, off-normal, alarm, or trouble. Sophisticated poll and response communication techniques ensure supervision integrity and allow for "T-tapping" of the circuit.

Wiring. Up to 10,000 total feet of twisted, shielded 18 AWG wire may be connected to the MAPNET II channel. The maximum distance from the panel to the farthest device is limited to 2500 feet. Unshielded wire may be used in certain retrofit applications.

TrueAlarm SYSTEM OPERATION

MAPNET II can also communicate with TrueAlarm smoke density and temperature sensors. Every four seconds, smoke sensors transmit an output value based on their smoke chamber condition.

The 4020 CPU maintains a current value, peak value, and an average value of each sensor's output. Status is determined by comparing the current sensor value to its average value.

Tracking this average value as a continuously shifting reference point filters out environmental factors that cause shifts in sensitivity.

Programmable Sensitivity. The sensitivity of each sensor can be field programmed at the 4020 Control Panel for different levels of smoke obscuration (in percent). Sensor sensitivity can be individually varied automatically by time of day, typically more sensitive at night and less sensitive during daytime hours. In order to evaluate whether the sensitivity should be revised, the peak value that is stored in memory can be read and compared to the alarm threshold directly in percent.

Diagnostics and Dual Stage Operation. TrueAlarm operation gives the 4020 system the ability to automatically indicate when a sensor is dirty and excessively dirty. The NFPA 72 requirement for a test of the sensitivity range of the sensors is fulfilled by the TrueAlarm ability to maintain the sensitivity level of each sensor. Additionally, a "two-stage" alarm operation can be programmed in the 4020 panel. For example, a 1% smoke obscuration reading could cause a local indication allowing the building security staff to investigate, while a 3% obscuration report could immediately initiate a system alarm.

Thermal Sensing. TrueAlarm heat sensors provide readings of local temperatures. For fire sensing, rate-of-rise sensing can be selected as either 15° F (8.3° C) or 20° F (11.1° C) per minute with an independent fixed limit of 135° F (57° C) or 155° F (68° C). For general temperature sensing, a set point can be selected from 32° to 158° F (0° to 70° C) and the local temperature readings can be used to warn of potential problems. The temperature readings can be programmed to be read in either Fahrenheit or Celsius.

Data Display. Sensor data can be displayed on the system LCD, on a remote CRT/keyboard, or printed on a remote printer. Figure 5 is a sample of a typical CRT/keyboard screen when selected for a TrueAlarm Status Report.

TIME:	2:42:03	custom title	USER:	1
DATE:	WED 03 MAY 00	Port 1 Card 5A	ACCESS:	1
REPORT 3: TRUEALARM STATUS REPORT				
Zone			Sensi-	Almost
Name	Custom Label		tivity	Dirty
M1-1	ANALOG PHOTO	- CLEAN ROOM	0.5	NORMAL
M1-2	ANALOG ION	- CLEAN ROOM	1.3	NORMAL
M1-3	ANALOG PHOTO	- MAIN LOBBY	2.5	NORMAL
M1-4	ANALOG PHOTO	- CONFERENCE ROOM 1	2.5	NORMAL
M1-10	HEAT DETECTOR	- GARAGE	135F	NORMAL
M1-11	ANALOG PHOTO	- KITCHEN	3.7	NORMAL
Press PF3 for next screen OR PF4 to return to menus				

Figure 5. Typical TrueAlarm CRT Status Report Information

With the proper operator access, a TrueAlarm Service Report can be generated to list the specific details of each TrueAlarm device. This report, as well as the Status Report shown in Figure 5 can either be displayed on the remote CRT or captured permanently by using a remote printer.

TIME: 2:42:03		custom title			USER: 1	
DATE: WED 03 MAY 00		Port 1 Card 5A			ACCESS: 1	
REPORT 4: TRUEALARM STATUS REPORT						
Dev		Alarm	Avg	Current/%	Peak/	State
Num	Custom Label	at:	val	alarm	% alarm	
1	ANALOG PHOTO - CLEAN ROOM	0.5/83	67	68/ 1%	72/ 10%	NOR
2	ANALOG ION - CLEAN ROOM	1.3/209	94	97/2%	101/ 1%	NOR
3	ANALOG PHOTO - MAIN LOBBY	2.5/185	117	117/ 0%	125/ 42%	NOR
4	ANALOG PHOTO - CONFERENCE ROOM 1	2.5/161	93	93/ 0%	93/ 0%	NOR
						NOR
10	HEAT DETECTOR - GARAGE	135F/253	-	63/ 67F	66/ 69F	NOR
11	ANALOG PHOTO - KITCHEN	3.7/216	116	116/ 1%	110/ 36%	NOR
Press PF3 for next screen OR PF4 to return to menus						

COMPATIBLE SIMPLEX REMOTE ANNUNCIATORS

4603-9101 LCD Annunciator features include remote annunciation and control similar to the primary operator functions of the 4020 Control Panel. Four programmable control switches and associated LEDs are available for custom system control functions. A panel mounted keyswitch controls access to the function keys. For additional security, the key is removable only in the disabled position. (Refer to data sheet S4603-0001 for additional information.)



- Controls up to 64 LEDs and 64 switches for graphic annunciation and control

- Provides 24 points, individually selectable as either an input or an output
- Output drivers are rated at 150 mA @ 24 VDC
- Switch inputs are selectable and can be supervised

4602 Series LED Annunciators

4602-9101 Status Command Units (SCU) provide 16 LEDs per unit for remote status indication. Custom zone information can be typed per application and inserted into each LED's label pocket.

4602-9102 Remote Command Units (RCU) provide eight status indicating LEDs, an LED test switch, power and trouble LEDs, a local tone-alert, and a control access keyswitch. With the keyswitch turned on, push-button switches provide system control to perform Trouble Silence, Alarm Silence, System Reset, and Manual Evacuation. (Refer to data sheet S4602-0001 for additional information.)



4020 Product Selection Chart

Product	Description	Comments		
Control Panel Selection				
4020-8001	System Control Panel	Required		
4020-7003	Master Controller Assembly, 1 MAPNET II Channel (127 points), 4 I/O points, and power supply/charger			
Optional Modules				
4020-0110	MAPNET II Module, 127 points	Three maximum		
4020-0113	Dual Port RS-232 Module	One maximum		
4020-0305	8 Point I/O Module	Two maximum		
4020-0129	25.5 VDC Limiter Module, 4 A maximum, for use with 4020-6007	One each maximum		
4020-0139	Dial-In Service Modem (requires 4020-0113 or 4020-6014)			
4020-0136	Coded Input Decoder Module			
4020-0155*	Serial DACT for connecting to RJ31X Telco jacks, requires one DACT cable per line	Two maximum		
4020-0153*	Contact Closure DACT, connects to RJ31X Telco jacks, requires one cable per line	Select as required		
DACT Accessories				
2080-9046	DACT Cable with RJ45 plug, 7 ft long (2.1 m)	Select as required		
2080-9047	DACT Cable with RJ45 plug, 14 ft long (4.2 m)			
Operating Options				
4020-7553	Interface to 2120 system, requires 4020-0113	Select as required, one each maximum		
4020-6001	240 VAC, 50/60 Hz power input			
4020-6003	French control panel kit			
4020-6007	Automatic extinguishing, deluge, and preaction sprinkler release control, requires 4020-0129 (refer to Simplex data sheet S4100-0019 for details)			
4020-1010	External batteries and charger (batteries and charger ordered separately)			
Cabinet Size and Cabinet Options (shipped in mounting box)		Separate Mounting Box (select if required for pre-ship)		Select size as required for option choices
		Beige	Red	
4020-2001	Two unit	2975-9184	2975-9185	
4020-2002	Four unit	2975-9186	2975-9187	
4020-2003	Six unit	2975-9188	2975-9189	
4020-2201	Red finish for door, retainer, and cabinet			Select one if req'd.
4120 Network Interface Options (select as required)				
4020-7558	Interface to 4120 Network, requires 4020-6014			One maximum
4020-6014	4120 Network Interface Modular Card (requires 4020-7558 and two media cards)			Reference data sheet S4120-0003 for details
4020-0142	Wired Media Card			
4020-0143	Fiber Optic Media Card			
4020-0144	Modem Media Card			
4020-6023	Physical Bridge Module (requires 4020-7558 & -6014)			Ref. S4120-0005
Battery Selection and External Battery Cabinets (select one battery size per system requirements, quantities as indicated)				
2081-9272	6.2 Ah Battery, 12 VDC			2 required for 24 VDC system
2081-9274	10 Ah Battery, 12 VDC			
2081-9275	18 Ah Battery, 12 VDC			
2081-9271	33 Ah Battery, 12 VDC	NOTE: Use in cabinet will not allow bottom entry conduit		
2081-9211	50 Ah Battery, 12 VDC	NOTE: Requires external battery cabinet		
2081-9281	External battery cabinet, beige	Battery cabinet dimensions: 25 3/4" W x 20 3/4" H x 6 3/4" D (654 mm x 527 mm x 171 mm)		
2081-9282	External battery cabinet, red			

* The 4020-0155 and 4020-0153 DACTs are programmed using a terminal or a laptop computer in terminal emulation mode. Connection and programming details are provided with the installation instructions.

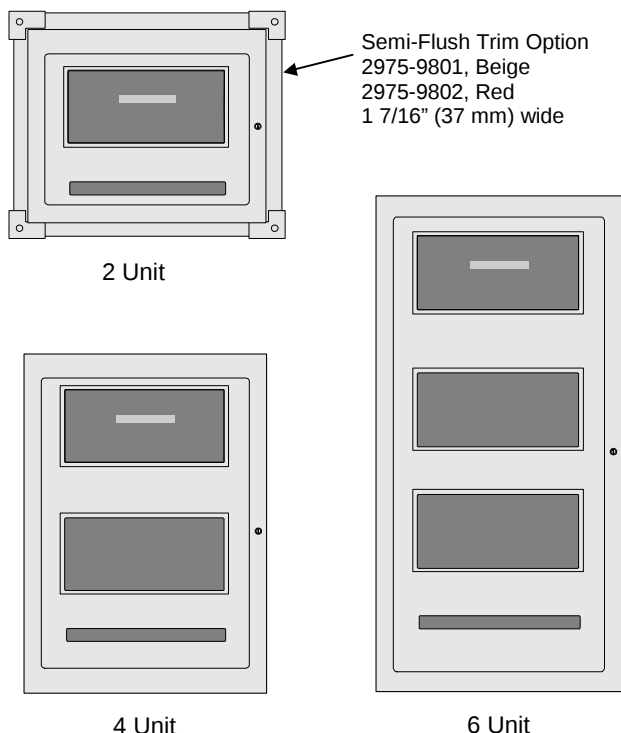
GENERAL SPECIFICATIONS

AC Input	
102 to 132 VAC, 60 Hz	6 A maximum
204 to 264 VAC, 50/60 Hz	3 A maximum
Environmental	
Operating Temperature Range	32° to 120° F (0° to 49° C)
Humidity	Up to 85 % RH, @ 86° F (30° C)

4020 CABINET DIMENSIONS

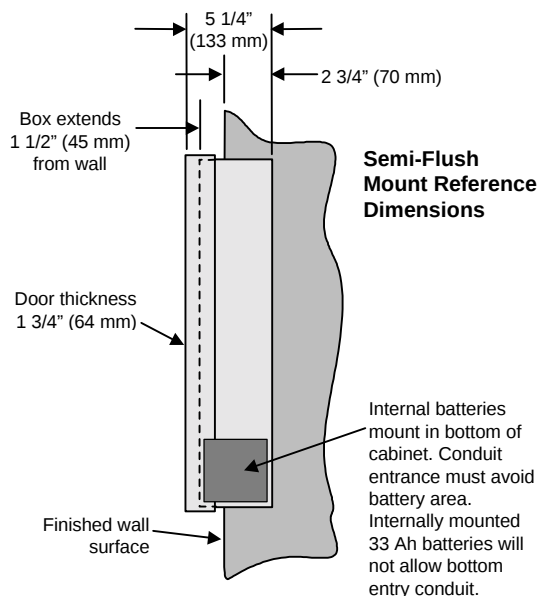
Size	Cabinet Height	Cabinet Width	Cabinet Depth	Door Width
2-unit	20 3/4" (527 mm)	25 3/4" (654 mm)	4 1/4" (108 mm)	26 3/8" (670 mm)
4-unit	36 1/4" (921 mm)			
6-unit	52 1/8" (1324 mm)			

MOUNTING INFORMATION



BATTERY REQUIREMENTS

Module	Standby Current	Alarm Current
4020-8001 with 4020-7003	500 mA	640 mA
4020-0305	100 mA each	340 mA each
4020-0110	300 mA each	320 mA each
4020-0136	85 mA	163 mA
4020-0113	132 mA	
4020-0139	50 mA	
4020-0153	35 mA, 50 mA when reporting	
4020-0155	35 mA, 40 mA when reporting	
4020-6014	35 mA	
4020-0142	40 mA each	
4020-0143	25 mA each	
4020-0144	50 mA each	
4020-6023	260 mA (includes its media cards)	



NOTE: A system ground must be provided for Earth Detection and transient protection devices. This connection shall be made to an approved, dedicated Earth connection per NFPA 70, Article 250, and NFPA 780.

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