LIFE SAFETY ENGINEERING

562 Weddell Drive, Suite 6
Sunnyvale, CA 94089-2108
Tel (408) 747-0457
Fax (408) 747-0612
CA Lic. # 406738

CO_2 FIRE SUPPRESSION SYSTEM FOR PSN CABINETS – NLCTA MODULATOR, BLDG. 062 AT STANFORD LINEAR ACCELERATOR CENTER 2575 SAND HILL ROAD, MENLO PARK, CA

Table of Contents

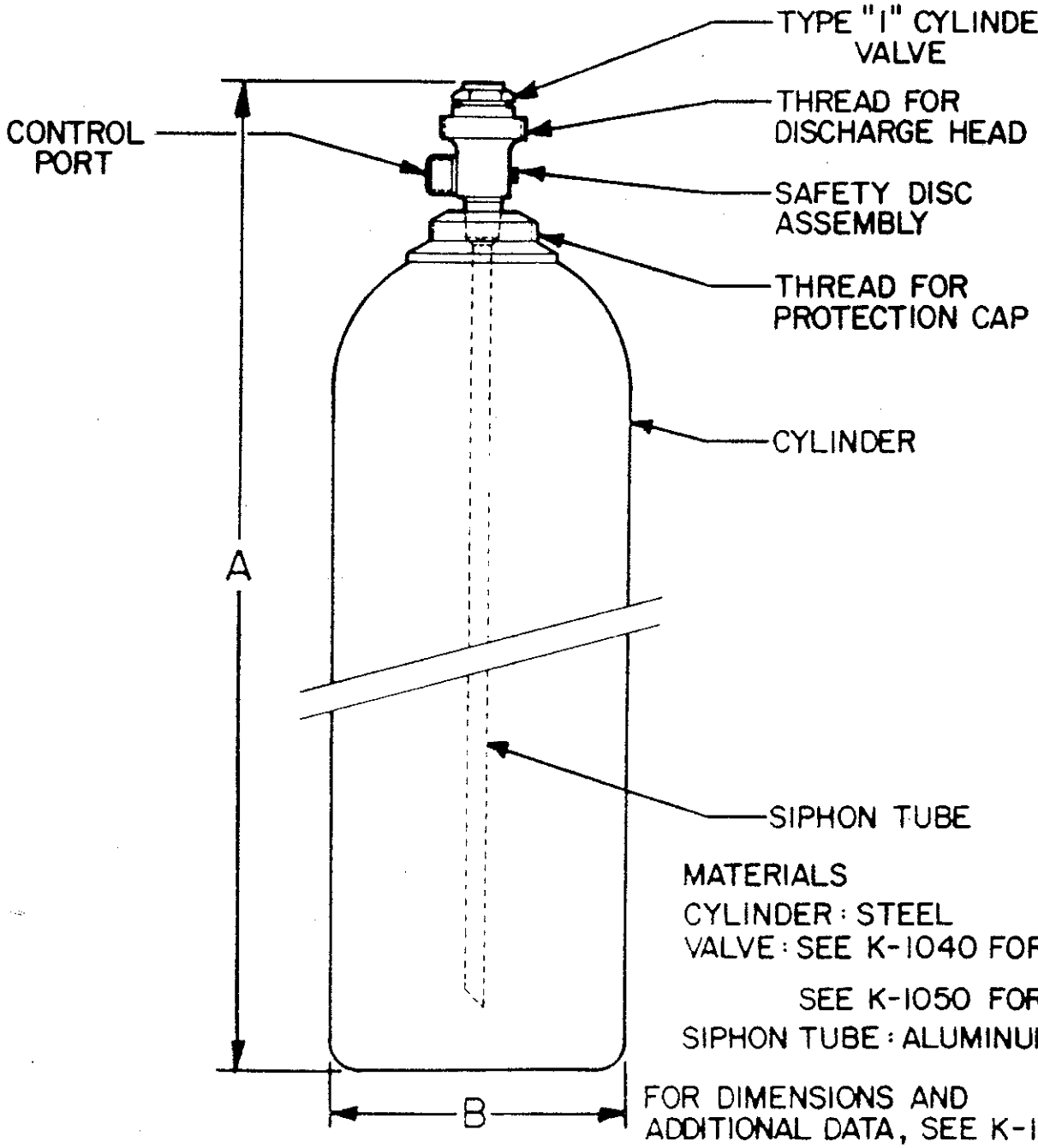
PREPARED BY

Life Safety Engineering
562 Weddell Dr. Suite 6
Sunnyvale, CA 94089
(408) 747-0457

CA License No. 406738 C-16, C-10, B, C-7

KIDDE
Fire Systems
400 Main Street
Ashland, MA 01721-2150
Tel. (508) 881-2000
Fax (508) 881-8920

50 LB., 75 LB., 100 LB. CARBON DIOXIDE CYLINDERS



MATERIALS
CYLINDER : STEEL
VALVE : SEE K-1040 FOR $\frac{1}{2}$"
SEE K-1050 FOR $\frac{5}{8}$"
SIPHON TUBE : ALUMINUM

FOR DIMENSIONS AND ADDITIONAL DATA, SEE K-1030

PART NUMBER	CYLINDER	VALVE TYPE
982528	50 LB	1/2"
870287	75 LB	5/8"
870269	100 LB	5/8"

P/N-SEE TABLE

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CARBON DIOXIDE CYLINDER DATA

PART NUMBER	CYLINDER CO_2 CAPACITY		VALVE SIZE	SAFETY DISC	SIPHON TUBE	DIM. "A" (HEIGHT)	
	LBS.	KG				IN.	MM.
870269	100	45.3	5/8"	RED	STRAIGHT	62	1570
870287	75	34.0	5/8"	RED	STRAIGHT	60	1520
982528	50	22.6	1/2"	WHITE	STRAIGHT	55	1390
870296	75	34.0	5/8"	RED	BENT	60	1520
982548	50	22.6	1/2"	WHITE	BENT	55	1390
982547	35	15.8	1/2"	WHITE	BENT	40	1010
870486	25	11.3	1/2"	WHITE	BENT	30	760
870485	20	9.0	1/2"	WHITE	BENT	31	780
870484	15	6.8	1/2"	WHITE	BENT	28	710
870483	10	4.5	1/2"	WHITE	BENT	24	600

PART NUMBER	DIM. "B" (DIAMETER)		CYLINDER VOLUME		NOMINAL CHGD. WEIGHT		DOT* CYLINDER SPECIFICATION
	IN.	MM.	IN.3	M.3	LBS.	KG.	
870269	10.50	266	4070	.0667	288	130.6	3AA-2300
870287	9.25	234	3055	.0501	205	92.9	3AA-2300
982528	8.50	215	2300	.0377	155	70.3	3A-2015
870296	9.25	234	3055	.0501	205	92.9	3AA-2300
982548	8.50	215	2300	.0377	155	70.3	3A-2015
982547	8.50	215	1510	.0247	114	51.7	3A-2015
870486	8.50	215	1040	.0170	84	38.1	3A-2015
870485	7.25	184	855	.0140	67	30.3	3AA-2015
870484	6.75	171	640	.0105	41.5	18.8	3AA-1800
870483	6.75	171	505	.0083	33	14.9	3AA-1800

ALL CYLINDER VALVES ARE TYPE "I"

Kidde®

*U.S. Department of Transportation

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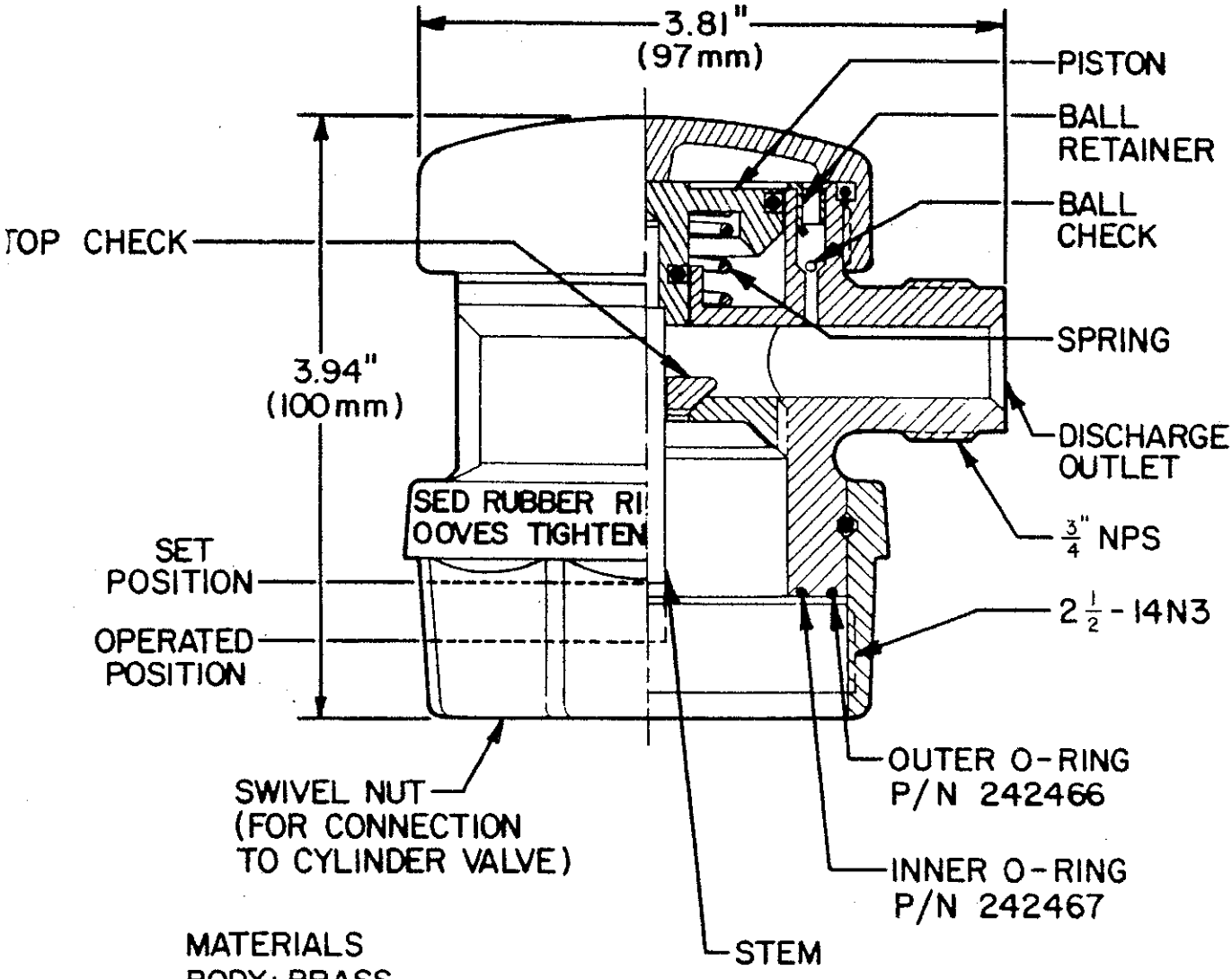
PLAIN NUT DISCHARGE HEAD



MATERIALS
BODY: BRASS
O-RINGS: RUBBER
SPRING: STAINLESS STEEL
BALL CHECK: MONEL
STOP CHECK: BRASS

P N 872450

Kidde®

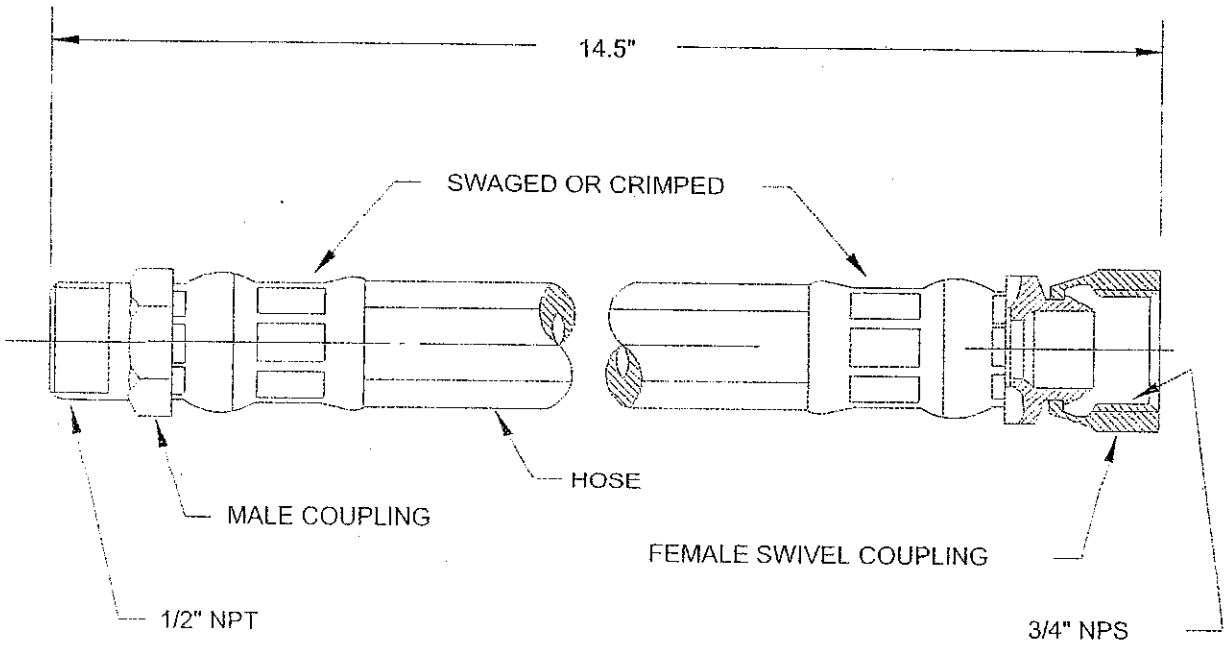
K-1060

CO_2 Component Description

Effective: April 1999

K-81-1080

Flex Hose - 1/2"



MINIMUM BURST PRESSURE: 6000 PSI (414 BAR)
HYDRO TEST PRESSURE: 1500 PSI (103 BAR)

TEMPERATURE RATING: -40F TO +250F (-40C TO 121C)

P/N: 252184

KIDDE® Fire Systems

K-81-1080 4/99 ©1999 Kidde-Fenwal, Inc. Printed in U.S.A.

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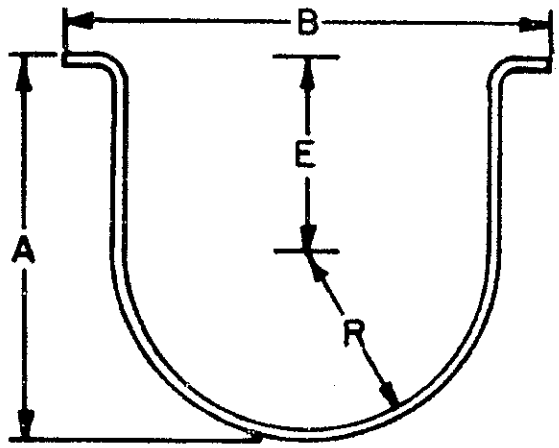
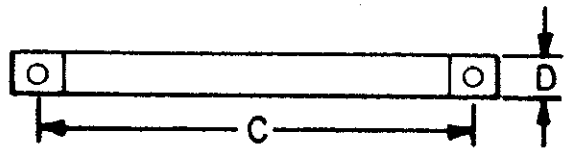
CARBON DIOXIDE SINGLE CYLINDER STRAPS





PART NUMBER	CYLINDER SIZE	A		B		C		D		E		R	
		IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
270012	10	6.22	158	9.81	249	8.75	222	1.00	25.4	2.62	66.5	3.41	86.6
270013	15 & 20	6.44	164	10.8	274	9.63	245	1.00	25.4	2.38	60.4	3.88	98.6
~~270014~~	25, 35, & 50	7.94	202	11.5	292	10.4	264	1.00	25.4	3.50	88.9	4.25	108
62669	75	5.63	143	12.3	312	11.1	282	1.25	31.8	3.75	95.2	4.63	118
~~270157~~	100	10.0	254	14.0	356	12.4	315	1.75	44.4	4.50	114	5.31	135

MATERIAL : STEEL

62669

P/N-SEE TABLE

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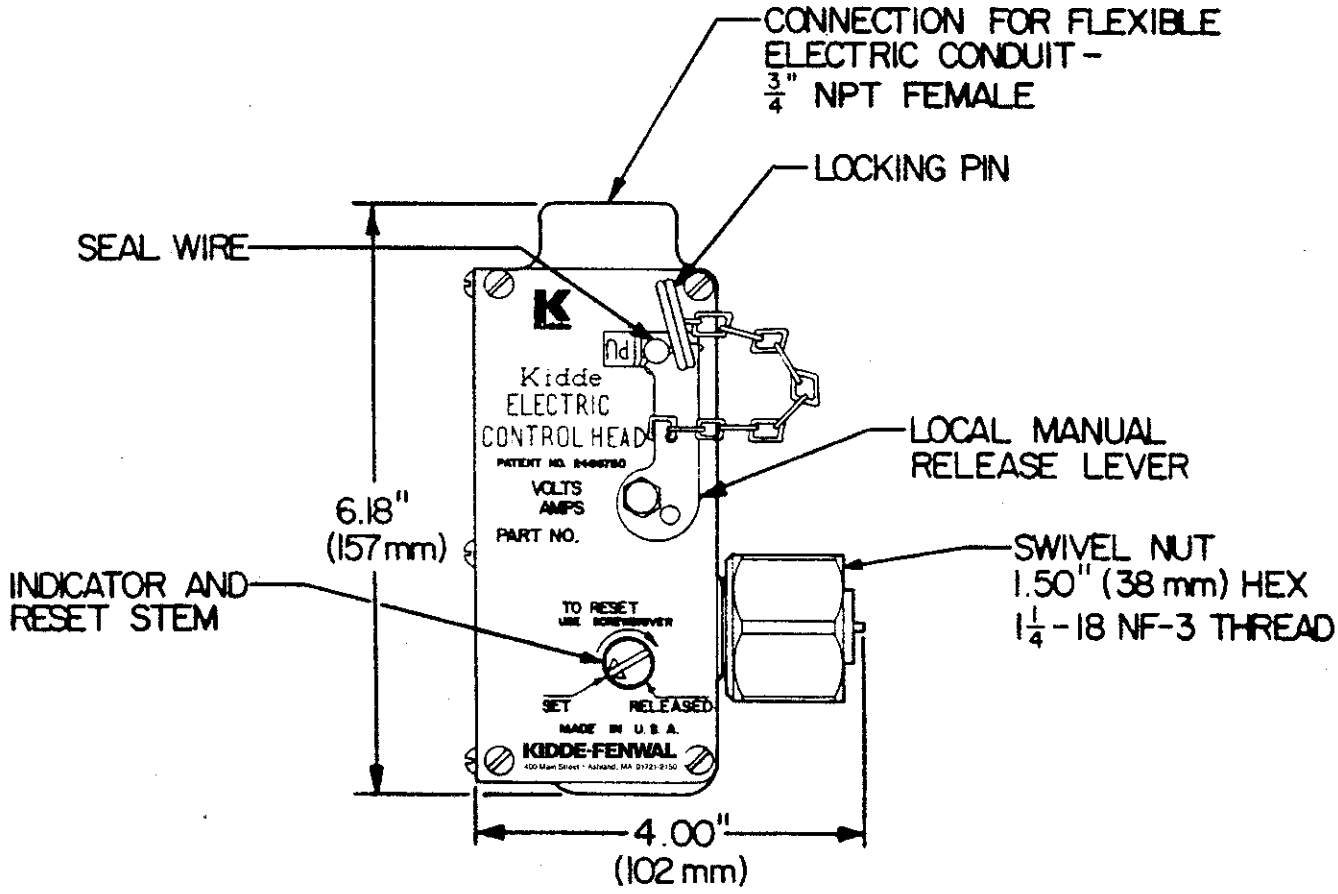
ELECTRIC CONTROL HEAD



PART NUMBER	CONTROL HEAD	
	VOLTAGE	AMPS
890181	24 VDC	2.0
890149	125 VDC	0.3
890165	115 VAC	1.0

P/N - SEE TABLE

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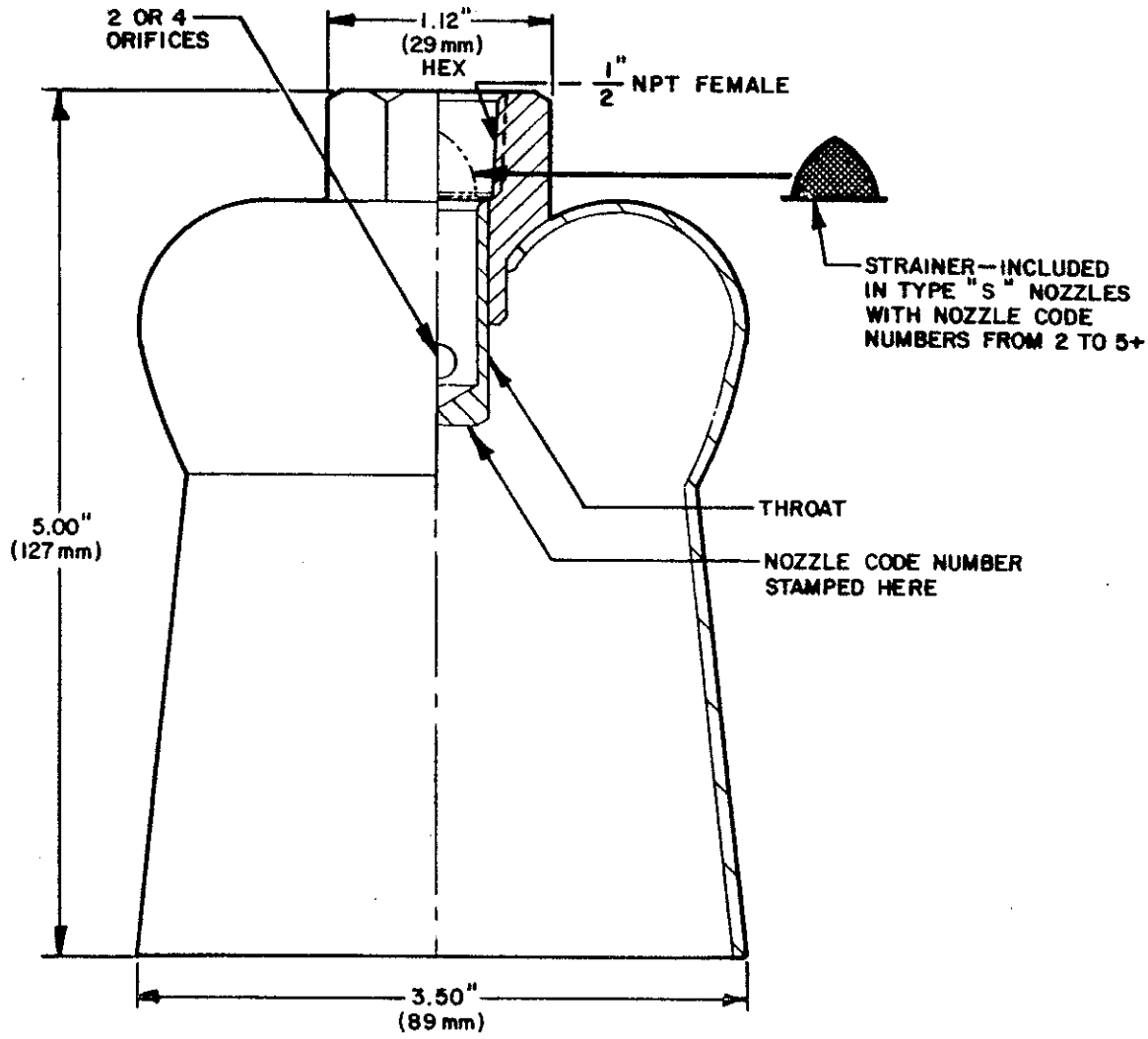
MULTIJET NOZZLE, TYPE "S"



MATERIALS
NOZZLE: COLD ROLLED STEEL
THROAT: BRASS
STRAINER: MONEL

AVAILABLE FINISHES (NOZZLE ONLY)
1. RED PAINT
2. CADMIUM PLATED

P/N- SEE K-1160

Kidde®

K-1120

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400 Main Street
Ashland, MA 01721-2150
Tel. (508) 881-2000
Fax (508) 881-8920

CARBON DIOXIDE NOZZLE DATA

SIZE	V	S	S-Cad.	S-Flanged	M	L
1+	930067	X	X	X	X	X
2	919309	803381	803897	802980	X	X
2+	803327	803365	803881	802974	X	X
3	929242	803366	803882	802975	X	X
3+	803328	803367	803883	802976	X	842334
4	915876	803368	803884	802977	842319	842335
4+	803329	803369	803885	802978	842320	842336
5	214721	803370	803886	802979	842321	842337
5+	214722	803371	803887	802980	842322	842338
6	214723	803372	803888	802981	842323	842339
6+	214724	803373	803889	802982	842324	842340
7	214725	803374	803890	802983	842325	842341
7+	214726	803375	803891	802984	X	842342
8	214727	803376	803892	802985	842326	842343
8+	214728	803377	803893	802986	X	842344
9	214729	803378	803894	802987	842327	842345
9+	X	803379	803895	802988	X	842346
10	X	803380	803896	802989	842328	842347
11	X	X	X	X	842329	X
12	X	X	X	X	842330	X
13	X	X	X	X	842331	X
14	X	X	X	X	842332	X
15	X	X	X	X	842333	X

V	: VENT NOZZLE TYPE "V"	K-1100
S	: MULTIJET NOZZLE TYPE "S"	K-1120
S-CAD	: MULTIJET NOZZLE TYPE "S" CADMIUM PLATED	K-1120
S-FLANGED	: MULTIJET NOZZLE TYPE "S" FLANGED	K-1130
M	: MULTIJET NOZZLE TYPE "M"	K-1140
L	: MULTIJET NOZZLE TYPE "L"	K-1150

Scorpio™ Fire/Suppression Control Panel

Effective: July 2000

84.02.2

GENERAL FEATURES

- **Microprocessor Based**
- ***Multiple Abort/Releasing Modes***
- ***14 Status Indicating LEDs***
- ***5 Diagnostic LEDs***
- ***Programmable Alarm Relay***
- ***Single or Dual Solenoid Release***
- ***Programmable Delays***
- ***Programmable Release Circuit Isolate***
- ***Programmable Cross Zone Operation***
- ***24 Hour Trouble Resound***
- ***Supervised Abort, Manual Release and Supervisory Circuits***
- ***Transient and Noise Protection***
- ***Listings: UL, FM, ULC, MEA, CSFM***

DESCRIPTION

The SCORPIO is a low cost control panel that supervises and controls one fire suppression hazard. Microprocessor technology enhances reliability and field programmable versatility. The control unit is compatible with KIDDE FM-200®, FE-13™, CO_2, Industrial Dry Chemical, and Restaurant Wet Chemical suppression systems. It meets requirements of NFPA 72 and - additional to extensive listings - is approved for use in suppression systems covered by NFPA codes: 12, 12A, 17, 17A and 2001.

The control panel provides 14 indicating status LEDs and 5 diagnostic LEDs:

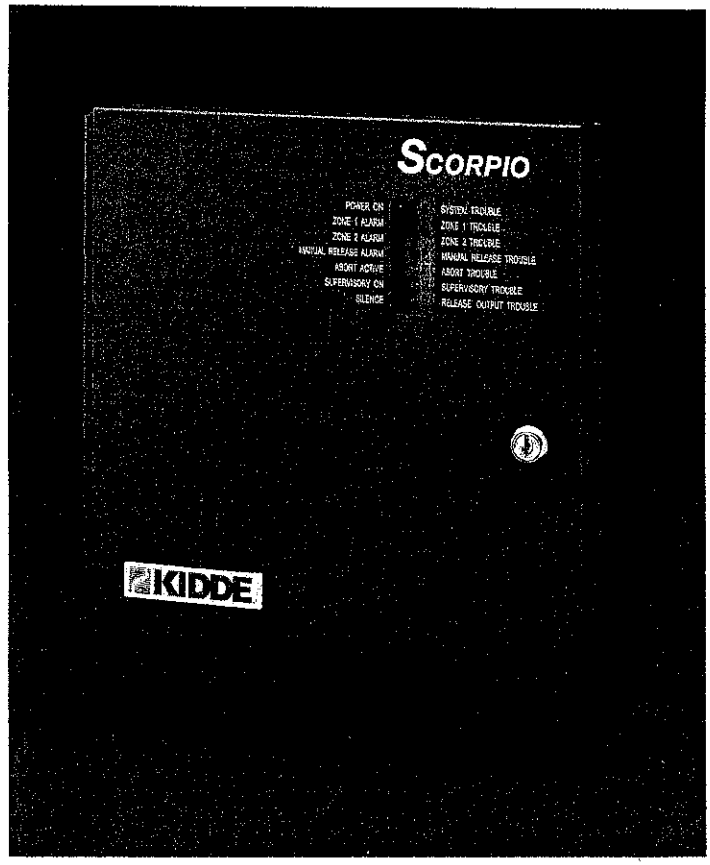
Indicating status LEDs are

- AC power
- Zone 1 Alarm and Trouble
- Zone 2 Alarm and Trouble
- Alarm Silence
- Supervisory ON
- Supervisory Trouble
- System Trouble
- Manual release Alarm and Trouble
- Release output Trouble
- Abort Active and Trouble

Diagnostic LED indications are:

- AC Fault
- Ground Fault
- Battery Fault
- Signal circuit Open
- Signal circuit Short

Field programmable options include: multiple time delays, 3 abort modes, single or cross zone operation, release circuit isolation, and a second alarm relay programmable to operate on actuation of 2nd cross zone or agent release.



Programmable abort modes are:

- Mode 1 - Timer hold at 10 seconds, count down upon abort release
- Mode 2 - Timer reset to initial value, count down upon abort release
- Mode 3 - Timer hold at 10 seconds if actuated before 2nd alarm, count down upon abort release (IRI)

The SCORPIO has two independent style "B" initiating circuits that can be programmed for single or cross zone application. The circuits support 15 Fenwal 2-wire CPD/PSD type smoke detectors which can be intermixed with DETECT-A-FIRE® contact type, rate compensated thermal detectors. Also, style "B" abort, manual release and supervisory circuits are provided. All input circuits permit up to 50 ohms resistance thus allowing extended wiring runs.

One style "Y" signal circuit is rated 0.5 amps @ 24VDC.

The control unit will activate one or two 24VDC control heads (Kidde part number 48650001, 899175 or 890181) to be used with either pre-engineered or engineered suppression systems.

The control panel 24VDC power supply - provided for either 120 or 240VAC input - features electronic power limited overload protection and built-in battery charger. Optional panel mounted, 1.2 amp-hour batteries (Kidde part number 06-115915-020) provides 24 hours of standby followed by 5 minutes alarm operation.

See *ORDERING INFORMATION* for optional Canadian (ULC) version.

SPECIFICATIONS

Input power:	120 or 240VAC, 0.5 or 0.25 amp maximum
Power Requirements:	35mA - standby 200mA - alarm
Auxiliary power:	0.25 amps @ 24VDC in alarm only
Input circuits:	Two style "B", 50 ohms, 10K EOL resistor
Auxiliary input circuits:	One Supervisory, Manual Release and Abort, style "B", 10K EOL
Output circuit:	One style "Y", 0.5 amp @ 24VDC, 10K EOL
Relay outputs:	Two alarm, one trouble, form "C", rated 2 amp @ 24VDC. 2d alarm relay programmable
Release output:	Activate one or two p/n 48650001, 899175 or 890181
Isolation switch:	Disconnects Release Output, cut jumpers W1 and W2 and operate switch 2-4.
Time Delay to Discharge (detectors only):	Field selectable: 0, to 60 seconds in 10 second increments
Nominal dimensions:	13.25"H x 11.0"W x 2.3"D

ORDERING INFORMATION

DESCRIPTION	PART NO.
Scorpio Control Panel, UL, 120VAC	84-232000-102
Scorpio Control Panel, UL, 240VAC	84-232000-104
Scorpio Control Panel, ULC, 120VAC	84-232000-202
Scorpio Control Panel, ULC, 240VAC	84-232000-204
Battery, 12VDC, 1.2AH (2 required)	06-115915-020
Accessory kit: 50 - 10K EOL resistors	06-129520-001
Extra Operating Instruction Sheet	06-235795-001
Spare Scorpio Circuit board	06-129800-002
Extra Scorpio Key	06-118013-001

84.02.2 07/00 Kidde-Fenwal Inc. Printed in USA

KIDDE FireSystems
KIDDE-FENWAL INC.
400 MAIN STREET, ASHLAND, MA 01721, U.S.A
TEL: (508)881-2000 FAX: (508)881-8920
www.kiddefiresystems.com

LISTING SERVICE

STING No: 7165-1076:119

CATEGORY: Control Units (Non High-Rise)

LISTEE: Kidde-Fenwal, Inc., 400 Main Street, Ashland MA 01721-2150
Contact: Terrill Garland (508) 881-2000 * Fax (508) 881-1773

DESIGN: Models "2320" and "Scorpio" local fire alarm control units. Noncoded, automatic, manual, water flow, and sprinkler supervisory services. Refer to listee's data sheet for detailed product description and operational considerations.

Model	Part Number	Description
2320	30-232000-101	Control Unit w/120VAC Transformer
2320	30-232000-103	Control Unit w/240VAC Transformer
2320	30-232000-011	Upgrade/Retrofit Kit
Scorpio	84-232000-012	Upgrade/Retrofit Kit
Scorpio	84-232000-102	Control Unit w/120VAC Transformer
Scorpio	84-232000-104	Control Unit w/240VAC Transformer
	06-119520-020	12 VDC, 1.2 Ah Lead Acid Battery

'NSTALLATION: In accordance with listee's printed installation instructions, applicable codes and ordinances and in a manner acceptable to the authority having jurisdiction.

MARKING: Listee's name, model number, electrical rating and UL label.

APPROVAL: Listed as fire alarm control units for use with separately listed compatible initiating and indicating devices.

This control unit does not generate a temporal pattern signal. If the distinctive three-pulse Temporal Pattern Fire Alarm Evacuation Signal (for total evacuation) in accordance with NFPA 72, 1999 Edition is required, the control unit must be used with appliances that can generate the temporal pattern signal. Refer to manufacturer's Installation Manual for details.

*Rev. 06-21-2003

Date Issued: **JUNE 21, 2003** *Listing Expires **June 30, 2004***

Authorized By: ***DIANE K. AREND**, Senior Deputy Program Manager*

KIDDE
FENWAL, INC.

400 Main Street, Ashland, MA 01721
Tele: (508) 881-2000 FAX: (508) 881-6729

Facsimile Cover Sheet

To: Shawn Sen
Company: Life Safety Engineering
Phone: (408) 747-0457
Fax: (408) 747-0612

From: David Kinell
Company: Kidde-Fenwal
Phone: (508) 881-2000
Fax: (508) 231-2096

Date: 3/11/03
Pages including this cover page: 1

Comments: Scorpio Battery Calculations

Shawn,
Please find the below battery calculation for the Scorpio Control Panel. As stated, the available backup battery current is fixed. The panel is ONLY capable of charging 2, 1.2ah, 12vdc batteries.

Standby Current = (Panel) .035 X 24 hours = .84ah
Alarm Current =
a) Panel = .20a
b) (Max) Audible Signals = .5a
c) (Max) Aux Power = .25a
Total Alarm Current = (a + b + c) X .16 hours
= (.20a + .5a + .25a) X .16 hours
= (.95) X (.16) = .152ah
Total AH = Standby Current + Total Alarm Current
= .84ah + .152ah = .992ah
Battery Required = Total AH + 10% of Total AH (10% De-rating)
= .992ah + .0992 = 1.0912

AH needed is 1.2AH so you need (2) 1.2AH, 12vdc batteries in series per 24vdc system.
NOTE : (.16 = 10 minutes)
Additional Note: System is designed to be used only with (2) 1.2AH batteries. Charging circuit will not work with other batteries. If you have any other questions, please contact me at the above numbers.

Sincerely,
Dave Kinell
Applications Specialist

Manual Stations Series B10 & B11

EFFECTIVE January 1997
84.05

FEATURES

- **Exclusive KIDDE® Design**
- **Unique Field Labeling for either Fire Alarm or Suppression Applications**
- **Dual Action Operation**
- **Single Pole or Double Pole**
- **Keylock for Reset and Test**
- **UL Listed and FM Approved**
- **cUL Listed for Canada**
- **ADA Compliant**
- **CSFM Listing (pending)**
- **MEA Approval (pending)**
- **Optional Weatherproof Box**

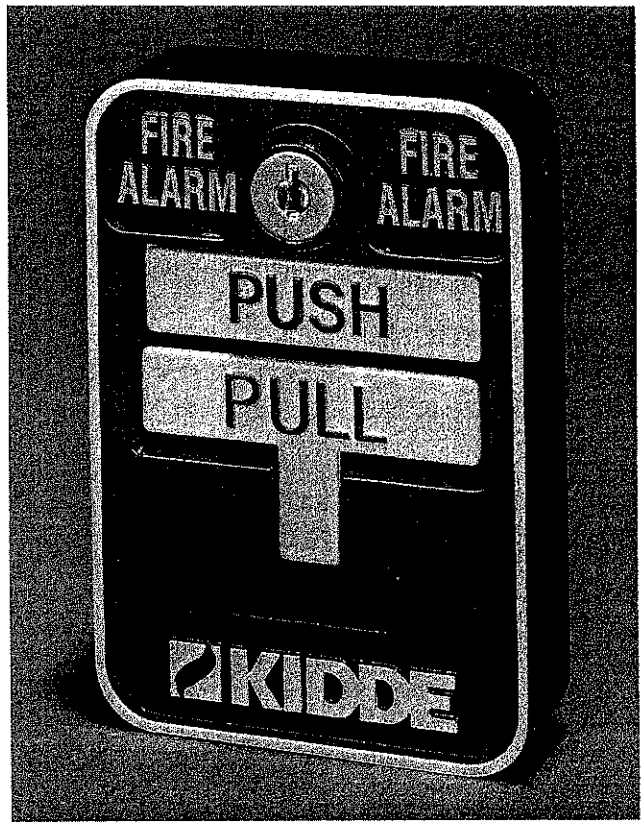
DESCRIPTION

The Kidde B10 and B11 Manual Pull Stations are high quality, reliable non-coded alarm initiating devices based upon a proven design. They are constructed of heavy die-cast aluminum for long life and reliability. These manual stations have the exclusive Kidde look, with gloss red paint with raised white lettering, and black sides with a white trim border.

The B10 station has a standard single pole single throw switch, while the B11 has a double pole single throw switch for local annunciation or remote signaling. Switches are gold plated for reliability when used in low current initiating circuits.

These manual stations are designed for quick, efficient response by personnel in an emergency, while the standard double action PUSH/PULL levers prevent accidental operation. The keylock allows the unit to be easily reset and tested, and the stations are keyed to match the Kidde Scorpio™, PEGAsys™, and Orion™ control panels.

Optional surface backboxes are available, which are painted red and sized to match the manual stations. The SGB-32S is UL Listed for indoor use, and the SGB-32C cast aluminum weatherproof box is UL Listed for outdoor use. The weatherproof box comes with a gasket kit which allows either the B10 or B11 to be mounted outdoors.



B10 or B11 shown with Fire Alarm Label Installed

FIRE ALARM OR SUPPRESSION RELEASE LABELING

The Kidde B10 and B11 Manual Pull Stations have a unique labeling method which provides the installer the greatest amount of flexibility. Six labels are shipped with each station:

FIRE ALARM
FM-200 RELEASE
CO_2 RELEASE
FIRE SYSTEM RELEASE
FE-13 RELEASE
HALON 1301 RELEASE

These permanent, heavy-duty Lexan® self-adhesive labels are die-cut with raised lettering. During installation, the installer simply chooses the appropriate label, removes the protective backing, and places the label into the space on the top of the station. This flexibility allows installations to be customized for each customer, without the expense of having to carry extra inventory.

OPERATION

The dual action B10 and B11 manual stations are operated by simply pushing the PUSH bar inwards, allowing the PULL handle to be grasped in a one-handed motion. The handle is then pulled down as far as it will go. If the optional breakrod is installed, it would break at this point. The handle is now locked in place, and is easily visible from up to 50 feet away. The handle is reset by opening the station with the key, placing the handle in the normal upright position, and re-locking the station.

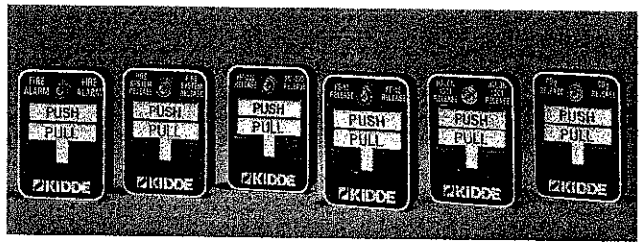
SPECIFICATIONS

B10 & B11 Manual Pull Stations

Style:	Double Action, non-coded.
Dimensions:	4.75"H x 3.25"W x 1"D
Contact:	B10: Single Pole, Single Throw B11: Double Pole, Single Throw
Contact rating:	1 amp @ 125VAC or 30VDC Gold plated contacts.
Wiring:	Terminal block connections with clamping plate for in & out wiring. Suitable for up to 12AWG wiring.
Mounting:	Mounts to a standard single gang box, or the SGB-32S or SGB-32C surface boxes. Two 6/32 screws ship with each unit.
Keylock:	Keyed to match Kidde Scorpio™, PEGAsys™, and Orion™ control panels. One key ships with each unit.
Breakrod:	Optional, order separately. Constructed of clear acrylic tubing. Visible from front of unit if broken.
Temperature:	-12°F to 132°F (-25°C to 56°C)

SGB-32S Interior Surface Backbox

Dimensions:	4.75"H x 3.25"W x 2.25"D
Construction:	Steel sheet metal.
Conduit	Two knockouts for 1/2" conduit connectors, one on top and bottom.
Mounting:	B10 or B11 mounts to the box with (4) 8/32 screws, which ship with each box.



Range of labels supplied with B10 and B11

SGB-32C Weatherproof Surface Backbox

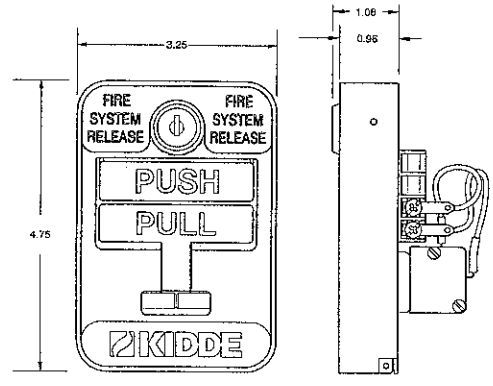
Dimensions:	4.75"H x 3.25"W x 2.25"D
Construction:	Cast aluminum.
Conduit	One threaded opening for 1/2" conduit connector.
Mounting:	B10 or B11 mounts to the box with (4) 8/32 screws and a foam gasket, which ship with each box.

ORDERING INFORMATION

Part Number	Description	Shipping Weight
84-100007-001	B10 Pull Station SPST Includes six labels.	1.2 lb
84-100007-002	B11 Pull Station DPST Includes six labels.	1.3 lb
84-100009-001	SGB-32S Indoor Box	.8 lb
84-100009-002	SGB-32C Outdoor Box	
84-100008-002	Pkg. of (12) Breakrods Must order separately.	>.25 lb
06-118013-001	Spare Key for B10/B11	>.25 lb

DIMENSIONS

(shown with Fire System Release Label installed)



FRONT VIEW SIDE VIEW

84.05 2/97 5M Printed in U.S.A. CP

KIDDE®
Fire Systems

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(508) 881-8920

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM

LISTING SERVICE

TING No. 7150-1076:147

CATEGORY: Boxes/Pull Stations

LISTEE: Kidde-Fenwal, Inc., 400 Main Street, Ashland, MA 01721
Contact: Terrill Garland (508) 881-2000 *Fax (508) 881-1773

DESIGN: Models B10 and B11, 30-195000-002 and 30-195000-004 key lock, push bar, noncoded manual pull stations; Models 30-195000-001 and 30-195000-003 key lock, no push bar, noncoded manual pull stations. Suitable for outdoor use when installed with Model SGB-32C back box. Refer to listee's data sheet for additional detailed product description and operational considerations.

RATING: 30 VDC

INSTALLATION: In accordance with listee's printed installation, applicable codes & ordinances and in a manner acceptable to the authority having jurisdiction.

MARKING: Listee's name, model number, electrical rating and UL label.

APPROVAL: Listed as manual pull stations for use with separately listed and compatible fire alarm control units.

XLF: 7150-1408:107

*Rev. 06-21-2003

Date Issued: **JUNE 21, 2003** *Listing Expires **June 30, 2004***

Authorized By: ***DIANE K. AREND**, Senior Deputy Program Manager*

FIRE ALARM SYSTEMS

Helping People Take Action℠

SERIES MT AND MT STROBE MULTITONE ELECTRONIC APPLIANCES

NEW AND IMPROVED

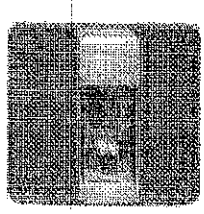
Description:

Wheelock's Series MT and MT Strobe Multitone electronic appliances offer a choice of eight (8) nationally and internationally recognized alerting sounds: Horn, Bell, March Time Horn, Code-3 Tone, Code-3 Horn, Slow Whoop, Siren or Hi/Lo Tone. The Code-3 Horn and tone patterns are engineered to comply with NFPA/ANSI Temporal Pattern specifications without requiring additional equipment. With MT and MT Strobe appliances, one alarm appliance meets most of your signaling needs. Strobe models can be synchronized using the Wheelock SM, DSM Sync Modules or the PS-12/24-8 Power Supply with Wheelock's patented Sync Protocol.

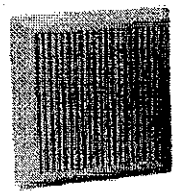
The MT Strobes are designed for ADA applications with maximum performance, reliability and cost-effectiveness while meeting or exceeding the latest requirements of NFPA 72, ANSI 117.1, UFC and UL Standard 1971 as well as meeting ADA requirements concerning photosensitive pilepsy.

Each MT and MT Strobe appliance has two installer selective sound output levels: STANDARD dBA and HIGH dBA. Non-strobe versions provide selectable voltage capability in one unit, 12VDC or 24VDC. Strobe versions are specific for either 12VDC or 24VDC and all models may be used with filtered or unfiltered (full-wave-rectified) input voltages. Separate input terminals are available, shunt wires are provided to enable both tone and strobe to operate simultaneously from a single input.

The Series MT Multitone Strobe appliances are UL Listed for indoor wall mount applications under Standard 1971 for Signaling Devices for the Hearing Impaired and under Standard 464 for Audible Signaling Appliances.

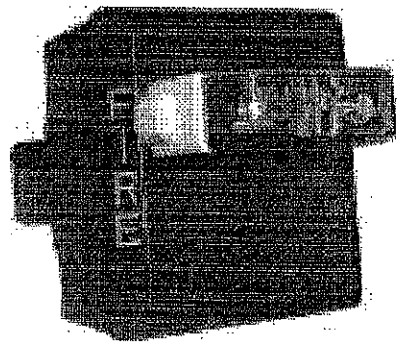


MT4-115-WH



SERIES MT w/o STROBE

For Weatherproof MTWP See Data Sheet S9004



SERIES MT STROBE Mounted to IOB

Features:

- Approvals include: UL Standard 1971, UL Standard 464, California State Fire Marshal (CSFM), New York City (MEA), Factory Mutual (FM) and Chicago (BFP) See approvals by model in Specifications and Ordering Information
- Designed to meet or exceed ADA/NFPA/UFC/ANSI Standards and Accessibility Guidelines
- Complies with OSHA 29, Part 1910.165
- Series MT appliances have IN and OUT wiring terminations that accept two #12 to #18 American Wire Gauge (AWG) wires at each terminal. Inputs are polarized for compatibility with standard reverse polarity type supervision
- One alarm appliance with (8) eight selective signals to provide superior sound penetration for various ambient and wall conditions with two field selectable sound output levels
- Code-3 Horn and Tone meet ANSI/NFPA temporal pattern for standard emergency evacuation signaling
- Audible and strobe can operate from a single NAC circuit with any of the (8) eight audible sounds
- MT Strobe models available with 15/75 and 75 candela ratings for independent or single input activations and can be synchronized using Wheelock's SM or DSM sync module(s) or the PS-12/24-8 Power Supply with built in Wheelock Sync Protocol
- Selectable input voltage on non-strobe versions. Strobe versions are factory set for either 12 or 24VDC, with wide-Listed voltage range, filtered (DC) and FWR
- Mounts to either 4" square or double gang boxes (important for retrofit installations). Attractive flush or surface mounting
- No additional trimplate required for flush mounting

⚠ WARNING: PLEASE READ THESE SPECIFICATIONS AND INSTALLATION INSTRUCTIONS CAREFULLY BEFORE USING, SPECIFYING OR APPLYING THIS PRODUCT. FAILURE TO COMPLY WITH ANY OF THESE INSTRUCTIONS, CAUTIONS AND WARNINGS COULD RESULT IN IMPROPER APPLICATION, INSTALLATION AND/OR OPERATION OF THESE PRODUCTS IN AN EMERGENCY SITUATION, WHICH COULD RESULT IN PROPERTY DAMAGE, AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

General Notes:

- Strobes are designed to flash at 1 flash per second minimum over their "Regulated Voltage Range". Note that NFPA-72 specifies a flash rate of 1 to 2 flashes per second and ADA Guidelines specifies a flash rate of 1 to 3 flashes per second.
- Candela ratings represent minimum effective Multitone Strobe intensity based on UL Standard 1971.
- Strobe models are UL Standard 1971 Listed for indoor use with a temperature range of 32°F to 120°F (0°C to 49°C) and maximum humidity of 93% ±2%. The MT-12/24 and MTWP models for outdoor use are Listed for -31°F to 150°F (-35°C to 66°C) and maximum humidity of 95% (See Data Sheet S9004 or Installation Instruction Sheet P84150 for more detail on MTWP).
- MT Audible is UL Standard 464 Listed.
- **"Regulated Voltage Range" is the newest terminology used by UL to identify the voltage range. Prior to this change UL used the terminology "Listed Voltage Range".**

ALARM TONES

TONE	ALARM TONES PATTERN DESCRIPTION
HORN	BROADBAND HORN (Continuous)
BELL	1560 Hz MODULATED (0.07 sec. ON/Repeat)
MARCH TIME HORN	HORN (0.25 sec. ON/0.25 sec. OFF/Repeat
CODE-3 HORN	HORN (ANSI S3.41 Temporal Pattern)
CODE-3 TONE	500 Hz (ANSI S3.41 Temporal Pattern)
SLOW WHOOP	500-1200 Hz SWEEP (4.0 sec. ON/0.5 sec. OFF/Repeat)
SIREN	600-1200 Hz SWEEP (1.0 sec. ON/Repeat)
HI/LO	1000/800 Hz (0.25 sec. ON/Alternate)

Table 1: dBA and Current Ratings for Multitone Audible Portion

Tone	Average Mean Current Ratings				dBA Reverberant Ratings Per UL 464				dBA Anechoic Ratings	
	@ 24 VDC		@ 12 VDC		@ 24 VDC		@ 12 VDC		@ 12 and 24 VDC	
	HI	STD	HI	STD	HI	STD	HI	STD	HI	STD
Horn	0.040	0.025	0.100	0.020	92	87	90	77	99	93
Bell	0.020	0.013	0.031	0.010	86	80	85	69	92	87
March Time Horn	0.040	0.025	0.100	0.020	89	84	89	74	99	93
Code-3 Horn	0.040	0.025	0.100	0.020	88	83	88	73	99	93
Code-3 Tone	0.028	0.017	0.060	0.015	85	80	84	70	95	90
Slow Whoop	0.048	0.026	0.100	0.025	90	89	89	75	99	94
Siren	0.036	0.023	0.082	0.020	89	84	89	75	98	93
HI/LO	0.021	0.014	0.044	0.012	86	81	86	71	93	88

Table 2: Strobe Current Ratings (AMPS)

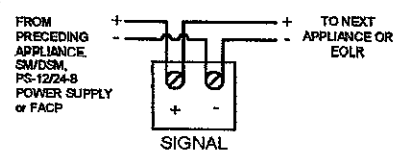
UL 12 and 24 VDC Voltage Range	Average RMS Current*	Average Mean Current*		
	MT-241575W	MT-2475W	MT-121575W	MTWP2475W
16.0 VDC	.101	.215	-	.158
24.0 VDC	.064	.140	-	.107
33.0 VDC	.047	.114	-	.090
8.0 VDC	-	-	.336	-
12.0 VDC	-	-	.179	-
17.5 VDC	-	-	.136	-

Note: If the strobe and audible operate on the same circuit, add the strobe current from Table 2 to the audible current from Table 1. For Peak and Inrush current across the listed voltage range refer to Installation Instructions.

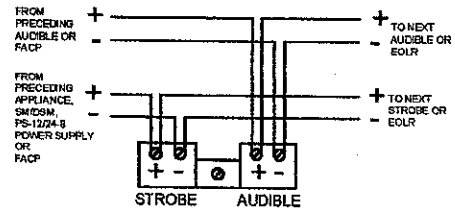
*Average RMS Current is per UL average RMS method and Average Mean Current is per UL average mean method. For rated In Rush and Peak current across the UL listed voltage range for both filtered DC and unfiltered VRMS (FWR), see installation instructions.

Wiring Diagrams (for all models)

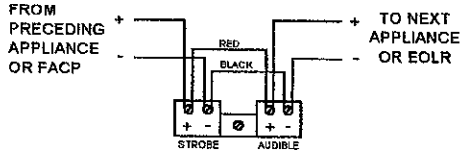
MT SIGNAL



AUDIBLE SIGNAL AND STROBE OPERATE INDEPENDENTLY



AUDIBLE SIGNAL AND STROBE OPERATE IN UNISON. RED AND BLACK SHUNT-WIRES ARE SUPPLIED.



Specifications and Ordering Information

MTwP-2475W-FR

Model Number	Order Code	Input Voltage	Rated Candela	Mounting Options***	Agency Approvals				
					UL	MEA	CSFM	FM	BFP
MT-12/24+	5023	12/24	-	D,E,F,L,M,O,P,R	X	X	X	X	X
MT-241575W-FR#	8422	24	15 (75 on AXIS)	D,E,F,L,M,O,P,R	X	X	X	X	*
MT-2475W-FR	9475	24	75	D,E,F,L,M,O,P,R	X	X	X	X	*
MT-121575W-FR#	8421	12	15 (75 on AXIS)	D,E,F,L,M,O,P,R	X	X	X	X	*
MTWP-2475W-FR**	8420	24	75** (@ -31°F/-35°C)	M	X	X	X	X	*
MT4-115-R	6223	115VAC	-	D, E, J, K, N, O, R	X	X	X	X	X
MT4-115-WH-VFR##	6224	115 VAC	15	D, E, J, K, N, O, R	X	X	X	X	X
SYNC MODULES**			**Average Current (AMPS)**						
SM-12/24-R	6369	12 OR 24	.017/.028	W	X	X	X	X	X
DSM-12/24-R	6374	12 OR 24	.020/.035	W	X	X	X	X	X

*PENDING

NOTE: +MT-12/24 Audible can be used with Wheelock's RSSP Multi-Candela for applications requiring 15, 30, 75, 110 cd Wall Strobes.

**MTWP-2475W is Weatherproof and rated for 75 cd @ -31°F (-35°C). See Data Sheet S9004 or Installation Instruction P84150.

***For additional information on mounting please refer to Data Sheet S7000.

****SM Sync Modules are rated for 3.0 amperes at 12/24 VDC; DSM Dual Circuit Modules are rated for 3.0 amperes per circuit. Maximum number of interconnected DSM modules is twenty (20). Refer to Data Sheet S3000.

Use MT-241575W or MT-121575W when 15cd is specified. 15/75 is UL Listed for 15cd with 75cd on AXIS.

Series WH Strobe is listed for UL Standard 1638 only. See Instruction Sheet P83159.

⚠WARNING: CONTACT WHEELOCK FOR THE CURRENT "INSTALLATION INSTRUCTIONS" P82467 MT-12/24, P84155 MT w/ Strobe P84150 MTWP WEATHERPROOF "GENERAL INFORMATION" SHEET (P82380) ON THESE PRODUCTS. THESE DOCUMENTS DO UNDERGO PERIODIC CHANGES. IT IS IMPORTANT THAT YOU HAVE CURRENT INFORMATION ON THESE PRODUCTS. THESE MATERIALS CONTAIN IMPORTANT INFORMATION THAT SHOULD BE READ PRIOR TO SPECIFYING OR INSTALLING THESE PRODUCTS, INCLUDING:

- **TOTAL CURRENT REQUIRED BY ALL APPLIANCES CONNECTED TO SYSTEM SECONDARY POWER SOURCES.**
- **FUSE RATINGS ON NOTIFICATION APPLIANCE CIRCUITS TO HANDLE PEAK CURRENTS FROM ALL APPLIANCES ON THOSE CIRCUITS.**
- **COMPOSITE FLASH RATE FROM MULTIPLE STROBES WITHIN A PERSON'S FIELD OF VIEW.**
- **THE VOLTAGE APPLIED TO THESE PRODUCTS MUST BE WITHIN THEIR RATED INPUT VOLTAGE RANGE.**
- **INSTALLATION IN OFFICE AREAS AND OTHER SPECIFICATION AND INSTALLATION ISSUES.**
- **USE STROBES ONLY ON CIRCUITS WITH CONTINUOUSLY APPLIED OPERATING VOLTAGE. DO NOT USE STROBE ON CODED OR INTERRUPTED CIRCUITS IN WHICH THE APPLIED VOLTAGE IS CYCLED ON AND OFF AS THE STROBE MAY NOT FLASH.**
- **FAILURE TO COMPLY WITH THE INSTALLATION INSTRUCTIONS OR GENERAL INFORMATION SHEETS COULD RESULT IN IMPROPER INSTALLATION, APPLICATION, AND/OR OPERATION OF THESE PRODUCTS IN AN EMERGENCY SITUATION,WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**
- **CONDUCTOR SIZE (AWG), LENGTH AND AMPACITY SHOULD BE TAKEN INTO CONSIDERATION PRIOR TO DESIGN AND INSTALLATION OF THESE PRODUCTS, PARTICULARLY IN RETROFIT INSTALLATIONS.**

Wheelock products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with their installation instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ).

ARCHITECTS AND ENGINEERS SPECIFICATIONS

The notification appliance shall be a Wheelock Series MT audible/visual appliance or equivalent. Notification appliance shall be electronic and use solid state components. Electromechanical alternatives are not approved. Each electronic appliance shall provide eight (8) field selectable alarm tones. The tones shall consist of: HORN, BELL, MARCH TIME HORN, CODE-3 HORN, CODE-3 TONE, SLOW WHOOP, SIREN and HI/LO. Tone selection shall be by durable dip switch assembly and not clips or jumpers. The Multitone Audible appliance shall be UL Listed under Standard 464 for Audible Signal Appliances. The audible and the strobe shall be able to operate from a single NAC circuit while producing any of these tones. The appliance shall provide two output sound levels: STANDARD and HIGH dBA. The HIGH dBA setting shall provide a minimum 5 dBA increase in sound output at nominal voltage. The HIGH anechoic dBA measurement at 10 feet at the alarm HORN SETTING shall be 101 dBA minimum for MT and 92 dBA minimum for MT Strobes, at nominal voltage. Operating voltages shall be either 12 VDC or 24 VDC using filtered power or unfiltered power supply (full-wave-rectified). All models shall have provisions for standard reverse polarity type supervision and IN/OUT field wiring using terminals that accept #12 to #18 AWG wiring.

Combination audible/visual appliances shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens or equivalent with solid state circuitry. Strobe shall produce a flash rate of one (1) flash per second minimum over the voltage range. The strobe intensity shall be rated per UL and Listed under Standard 1971 for Signaling Devices for the Hearing Impaired for 15/75 or 75 candela. The 15/75 candela strobe shall be specified when 15 candela or with 75 candela intensity on-axis is required. Strobe Models shall incorporate circuitry for synchronized strobe flash and shall be designed for compatibility with Wheelock SM and/or DSM Sync Modules or Wheelock's PS-12/24-8 Power Supply with Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the module fails to operate (i.e., contacts remain closed), the strobes shall revert to a non-synchronized default flash rate.

Strobe activation shall be via independent input or from the same input circuit as the audible.

The combination audible/visual appliances shall be installed indoors and may be surface or flush mounted. They shall mount to standard electrical hardware requiring no additional trimplate or adapter. The aesthetic appearance shall not have any mounting holes or screw heads visible when the installation is completed. The appliance shall be finished in a textured red color.

The Series MT-12/24 audible appliance may be installed indoor or outdoor with the proper back box.

For Weatherproof applications where specifications require 75 cd @ -31°F (-35°C) and full temperature range of -31°F to 150°F refer to Data Sheet S9004 and/or Installation Instructions P84150.

NOTE: Due to continuous development of our products, specifications and offerings are subject to change without notice in accordance with Wheelock Inc. standard terms and conditions.

WE SUPPORT AND ENCOURAGE NICET CERTIFICATION
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3 YEAR WARRANTY

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800-631-2148
Canada 800-397-5777
E-Mail: Info@wheelockinc.com
http://www.wheelockinc.com

NEMA Member

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CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM

LISTING SERVICE

TING No. 7135-0785:118

CATEGORY: Audible Devices

LISTEE: Wheelock Inc., 273 Branchport Ave., Long Branch NJ 07740
Contact: Luy Nguyen (732) 222-6880 Fax (732) 222-5607

DESIGN: Model MT-12/24, MT-115 and MT4-12/24, and MT4-115 multi-tone audible devices followed by R, W, S, or X to indicate package color.

Models MT-12, MT4-12, MT-24, MT4-24 multi-tone audible/strobe signals followed by A, B, G, R or W to indicate lens color, followed by S (15 cd), H (15 cd) or M (117 cd) to indicate strobe intensity, and other suffixes to designate orientation, lens lettering and plate color.

Models MT-115-WH and MT4-115-WH multi-tone audible/visual devices (Rated 15 cd).

Refer to listee's data sheet for additional detailed product description and operational considerations.

RATING:

Suffix	-12:	*8-17.5 VDC
	-24:	*16-33 VDC
	-115:	120 VAC

INSTALLATION: In accordance with listee's printed installation instructions, NFPA 72, applicable codes and ordinances and in a manner acceptable to the authority having jurisdiction. Models MT series are surface mount and suitable for outdoor with Model IOB back box. Models MT4 series are flush mount and suitable for outdoor with model WBB back box.

MARKING: Listee's name, model number, electrical/candela rating and UL label.

APPROVAL: Listed as audible and audible/visual signaling devices for use with separately listed electrically compatible fire alarm control units. Not suitable for the hearing impaired application.

These appliances can produce a distinctive three-pulse Temporal Pattern Fire Alarm Evacuation Signal (for total evacuation) in accordance with NFPA 72, 1999 Edition. Refer to manufacturer's Installation Manual for details.

*Rev. 12-22-2002KK

Date Issued: **JUNE 16, 2003** *Listing Expires* ***June 30, 2004***

Authorized By: ***DIANE K. AREND****, Senior Deputy Program Manager*

KIDc200 Kidde Fire Systems CO2Calc KID2.00a

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

Project Report

---- Distributor ----

Name: LIFE SAFETY ENGINEERING
Address: SHAWN SEN
: 562 WEDDELL DR. SUITE 6
: SUNNYVALE, CA 94089
Phone: PH# 408-747-0457 FAX# 408-747-0612

---- Customer ----

Name: U.S. DEPARTMENT OF ENERGY
Address: STANFORD LINEAR ACCELERATOR
: STANFORD, CALIFORNIA
:

Phone:
Contact:
Title:

---- Project ----

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
Designer: RON DEMARTINI
Number:
Account:
Location:

Desc.: CO2 SYSTEM PROTECTS 3 PSN CABINETS FROM ONE 75 LB. CYLINDER VIA 3 SEPARATE NOZZLES.

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

Hazard Report

Type Of CO2 System: Total Flooding
Design Total Discharge: 2.0 minutes
Design Liquid Discharge: 1.4 minutes

Hazard Number: 1
Name: PSN CABINET NO.1
Type Of Hazard: Total Flooding
Number of Nozzles: 1
Agent Required: 25.0 lbs
Estimated Flow Rate: 12.5 lbs/min

Hazard Number: 2
Name: PSN CABINET NO.2
Type Of Hazard: Total Flooding
Number of Nozzles: 1
Agent Required: 25.0 lbs
Estimated Flow Rate: 12.5 lbs/min

Hazard Number: 3
Name: PSN CABINET NO.3
Type Of Hazard: Total Flooding
Number of Nozzles: 1
Agent Required: 25.0 lbs
Estimated Flow Rate: 12.5 lbs/min

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

Agent Source Report

Agent:	CO2 High Pressure
Adjusted Agent Required:	75.0 lbs
Cylinder Name:	75 lb. cylinder, upright
Cylinder Part Number:	870287
Number of Main Cylinders:	1
Number of Reserve Cylinders:	0
Manifold:	No Manifold
Agent Per Cylinder:	75.0 lbs
Total Agent Quantity:	75.0 lbs
Weight, Empty Cylinder:	130.0 lbs
Weight, All Cylinders + Agent:	205.0 lbs
Floor Area Per Cylinder:	0.47 square ft
Floor Loading Per Cylinder:	439 lbs / square feet

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

Pipe Network Report

PART 1 - PIPE

Description	---Node-- Start	End	Pipe Type	Diameter	Length	Elevation
Main Cyl. X 1	1	2		1/2 in	5.00 ft	5.46 ft
Flex Hose	2	3		1/2 in	0.63 ft	-
Flex Hose	3	4		1/2 in	0.58 ft	0.58 ft
Pipe	4	5	40 TC	3/8 in	0.67 ft	0.67 ft
Pipe	5	6	40 TC	3/8 in	8.00 ft	-
Pipe	6	7	40 TC	3/8 in	12.00 ft	-
Pipe	7	8	40 TC	3/8 in	12.00 ft	-
Pipe	8	9	40 TC	3/8 in	1.50 ft	1.50 ft
Pipe	9	10	40 TC	3/8 in	6.00 ft	-
Pipe	10	11	40 TC	3/8 in	1.00 ft	-1.00 ft
Pipe/H3-T01	11	12	40 TC	1/2 in	0.17 ft	-0.12 ft
Pipe	7	13	40 TC	3/8 in	1.50 ft	1.50 ft
Pipe	13	14	40 TC	3/8 in	6.00 ft	-
Pipe	14	15	40 TC	3/8 in	1.00 ft	-1.00 ft
Pipe/H2-T01	15	16	40 TC	1/2 in	0.17 ft	-0.12 ft
Pipe	6	17	40 TC	3/8 in	1.50 ft	1.50 ft
Pipe	17	18	40 TC	3/8 in	6.00 ft	-
Pipe	18	19	40 TC	3/8 in	1.00 ft	-1.00 ft
Pipe/H1-T01	19	20	40 TC	1/2 in	0.17 ft	-0.12 ft

PART 2 - EQUIVALENT LENGTH

-Node- Str	End	Pipe Parts 90	45	Thru	Side	Union	Other	Equivalent Length Added	Total
1	2	-	-	-	-	-		-	29.0 ft
2	3	-	-	-	-	-	FlexN1	-	1.0 ft
3	4	1	-	-	-	-	FlexN2	-	1.0 ft
4	5	-	-	-	-	-		-	0.7 ft
5	6	1	-	-	-	-		-	9.3 ft
6	7	-	-	1	-	-		-	12.8 ft
7	8	-	-	1	-	-		-	12.8 ft
8	9	1	-	-	-	-		-	2.8 ft
9	10	1	-	-	-	-		-	7.3 ft
10	11	1	-	-	-	-		-	2.3 ft
11	12	-	1	-	-	-		-	1.0 ft
7	13	-	-	-	1	-		-	4.2 ft
13	14	1	-	-	-	-		-	7.3 ft
14	15	1	-	-	-	-		-	2.3 ft
15	16	-	1	-	-	-		-	1.0 ft
6	17	-	-	-	1	-		-	4.2 ft
17	18	1	-	-	-	-		-	7.3 ft

18	19	1	-	-	-	-	-	2.3 ft
19	20	-	1	-	-	-	-	1.0 ft

PART 3 - PRESSURE

Node Start	Node End	Pipe Type	Pipe Diameter	Pipe Length	Required Agent	psia Start	psia End
1	2		1/2 in	5.00 ft	75.0 lbs	750	746
2	3		1/2 in	0.63 ft	75.0 lbs	746	746
3	4		1/2 in	0.58 ft	75.0 lbs	746	746
4	5	40 TC	3/8 in	0.67 ft	75.0 lbs	746	746
5	6	40 TC	3/8 in	8.00 ft	75.0 lbs	746	744
6	7	40 TC	3/8 in	12.00 ft	50.0 lbs	744	743
7	8	40 TC	3/8 in	12.00 ft	25.0 lbs	743	743
8	9	40 TC	3/8 in	1.50 ft	25.0 lbs	743	742
9	10	40 TC	3/8 in	6.00 ft	25.0 lbs	742	742
10	11	40 TC	3/8 in	1.00 ft	25.0 lbs	742	742
11	12	40 TC	1/2 in	0.17 ft	25.0 lbs	742	742
7	13	40 TC	3/8 in	1.50 ft	25.0 lbs	743	742
13	14	40 TC	3/8 in	6.00 ft	25.0 lbs	742	742
14	15	40 TC	3/8 in	1.00 ft	25.0 lbs	742	742
15	16	40 TC	1/2 in	0.17 ft	25.0 lbs	742	742
6	17	40 TC	3/8 in	1.50 ft	25.0 lbs	744	743
17	18	40 TC	3/8 in	6.00 ft	25.0 lbs	743	743
18	19	40 TC	3/8 in	1.00 ft	25.0 lbs	743	743
19	20	40 TC	1/2 in	0.17 ft	25.0 lbs	743	743

PART 4 - NOZZLE

Node Str	Node End	Required Agent	Nozzle Name	Nozzle Diameter	Nozzle Type	Orifice Code
1	2	75.0 lbs				
2	3	75.0 lbs				
3	4	75.0 lbs				
4	5	75.0 lbs				
5	6	75.0 lbs				
6	7	50.0 lbs				
7	8	25.0 lbs				
8	9	25.0 lbs				
9	10	25.0 lbs				
10	11	25.0 lbs				
11	12	25.0 lbs	H3-T01	1/2 in	S	2
7	13	25.0 lbs				
13	14	25.0 lbs				
14	15	25.0 lbs				
15	16	25.0 lbs	H2-T01	1/2 in	S	2
6	17	25.0 lbs				
17	18	25.0 lbs				
18	19	25.0 lbs				
19	20	25.0 lbs	H1-T01	1/2 in	S	2

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

Part List Report

Cylinder(s)	Count	Part #
75 lb. cylinder, upright	1	870287

Manifold Type: No Manifold
Manifold Parts

Description	Length/Count
No parts found.	

Main Pipe System

Description	Length/Count
Pipe - 40 TC - 1/2 in	0.51 ft
Pipe - 40 TC - 3/8 in	58.17 ft
Elbow(s) 90 - 3/8 in	8
Elbow(s) 45 - 1/2 in	3
Tees - 3/8 in	2
Flex Hose 90 Degree	1

Nozzles	Type	Code	Count	Part #
1/2 in	S	2.0	3	803381

KIDc200 Kidde Fire Systems CO2Calc KID2.00a

Project: PSN CABINETS-NLCTA MODULATOR, BUILDING 062
File Name: C:\KIDC200A\PROJECTS\SLAC-PSN.CO2
Calculation Date/Time: Aug 15, 2003, 1:11:39 PM

System Acceptance Report

System Type: Total Flooding
Cylinder Name: 75 lb. cylinder, upright
Number of Main Cylinders: 1
Number of Reserve Cylinders: 0
Manifold: No Manifold
Total Design Discharge Time: 2.0 minutes
Liquid Discharge (Designed): 1.4 minutes

Calculation based on 75 degree Fahrenheit
pre-discharge pipeline temperature.

Total Flooding Nozzle Summary

Nozzle	Selected Nozzle Code	Calced Nozzle Code	Press (psia)	Designed Mass (lbs)	Calced Mass (liq&vap) (lbs)	Designed Total Time (min)	Calced Total Time (liquid) (min)
H1-T01	2.0	1.93	743	25.0	25.1	2.0	1.5
H2-T01	2.0	1.94	742	25.0	25.0	2.0	1.5
H3-T01	2.0	1.94	742	25.0	24.8	2.0	1.5

WARNING - The calculated mass is less than the designed mass.

Additional Nozzle Information

Nozzle	Diameter	Type	Type	Fluid Mass (lbs)	Initial Vapor (sec)	Liquid Dischrg Time (sec)	End Of Liquid Time (sec)
H1-T01	1/2 in	S	Total	25.1	2.0	85.3	87.3
H2-T01	1/2 in	S	Total	25.0	3.0	84.4	87.3
H3-T01	1/2 in	S	Total	24.8	4.7	82.7	87.3

End of Report

Part Five
Equipment Installation

5.1 Introduction

This section contains installation instructions for KIDDE hose reel and rack systems as well as fixed carbon dioxide systems.

Equipment installation shall be such that the components are located and arranged to permit inspection, testing, recharging and any other required maintenance that may be necessary. Components must not be located where they may be subject to severe weather conditions, mechanical, chemical, or other damage which could render them inoperative.

5.2 Discharge Pipe, Tubing, and Fittings

Pipe, tubing, and fittings must be installed in strict accordance with the system drawings and good commercial practices. The piping between the cylinders and nozzles must be the shortest route possible, with a minimum of fittings. Any deviations in the routing or number of fittings must be approved by the design engineer prior to installation.

Piping and tubing must be reamed free of burrs and ridges after cutting, welding or threading. All threaded joints must conform to ANSI B1-20-1. Joint compound tape or thread must be applied only to the male threads of the joint, excluding the first two threads. Welding must be in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. Each pipe section must be swabbed clean, using a nonflammable organic solvent.

All piping must be blown out with nitrogen, carbon dioxide, or compressed air prior to installing the discharge nozzles. Dirt traps must be installed at the end of each nozzle header, or branch lines. The piping system must be securely braced to account for discharge reaction forces and thermal expansion/contraction. Care must be taken to insure the piping is not subjected to vibration, mechanical, or chemical damage. Refer to ANSI B-31.1 for additional bracing requirements.

IMPORTANT

ALL VALVES MUST BE INSTALLED WITH THE ARROW ON THE VALVE BODY POINTING IN THE DIRECTION OF THE FLOW.

5.6 Discharge Manifold

Securely attach the discharge manifold to the structural member. The manifold must be installed such that it is level and the inlets are aligned to connect with the cylinder valve. Manifolds greater than 2 inches in size should be welded.

5.7 Carbon Dioxide Cylinder Assemblies

The carbon dioxide cylinders must be located as close to the hazard area as possible. The cylinders must be located in an environment protected from the weather and where ambient storage does not exceed 130°F, nor fall below -20°F. External heating or cooling may be required to maintain this temperature range.

Orient the cylinders according to the system drawings. Mount the cylinder securely to the structural supports with the straps and/or brackets provided. Elevate the cylinders at least 2 inches off the floor if moisture is present.

WARNING

EACH CYLINDER STRAP AND/OR BRACKET MUST BE SECURELY ATTACHED TO STRUCTURAL SUPPORTS TO ABSORB THE FORCE GENERATED BY CYLINDER DISCHARGE.

5.8 Installation of Discharge Head to Cylinder Valve

Install the discharge head as follows:

1. Wipe off cylinder valve sealing surface.

2. Verify that o-rings are installed in the mating surface grooves at the bottom of the swivel nut cavity. O-rings must be free of dirt or other contaminants. The o-rings have been lightly greased at the factory and should not require further greasing.

3. Make certain the pilot orifice located between the inner and outer o-ring is unobstructed.

4. Make certain the discharge port is clean and unobstructed.

5. Install discharge head on cylinder valve. Tighten securely.

CAUTION

THE DISCHARGE HEAD MUST BE PERMANENTLY CONNECTED INTO THE SYSTEM PIPING. DO NOT ASSEMBLE THE DISCHARGE HEAD TO THE CYLINDER VALVE UNTIL THE CYLINDER IS SECURED IN THE CYLINDER BRACKETING.

5.9 Installation of Flexible Discharge Hose to Piping

Connect the discharge hose to the piping or manifold as shown on system drawings. Apply Teflon tape or pipe dope to all male threads. Cylinders may have to be loosened to assure proper alignment. Make certain the hose is not kinked.

WARNING

ALWAYS CONNECT THE FLEXIBLE DISCHARGE HOSE INTO DISCHARGE MANIFOLD FIRST BEFORE CONNECTING TO THE DISCHARGE HEAD.

5.10 Remote Pull Cable Components

A maximum of fifteen corner pulleys and 100 feet of cable may be used to connect the remote pull box to a cable operated control head and a maximum of six corner pulleys and 100 feet of cable may be used to connect the remote pull box to a pneumatic control head.

Locate the remote pull boxes as shown on the system installation drawings. Connect the pull boxes to the control heads using 3/8 inch, galvanized schedule 40 pipe. Do not run more than one cable in each pipe run. Install a corner pulley at each change in pipe direction. Do not bend the pipe. A dual-pull equalizer must be installed where one pull box operates two controls.

Beginning at the pull boxes, remove the covers of the first corner pulley. Feed the 1/16 inch cable through the pulley into the 3/8 inch pipe. Connect one end of the cable to the cable fastener in the pull box. Route the other end to the control heads, taking up as much slack as possible. Attach the end of the cable to the fastener in the control head. Reattach the corner pulley covers. Make certain the control heads are in the "SET" position prior to attaching the control heads to the cylinders or stop valves.

After installation is complete, test remote cable actuation for travel and pull force. Ensure the installation does not exceed the 40 pound, 14 inch requirement.

5.11 Electric Control Head

WARNING

BEFORE INSTALLING CONTROL HEAD ON CARBON DIOXIDE CYLINDER VALVE, ENSURE CONTROL HEAD IS IN "SET" POSITION (E.G., ACTUATING PIN IS IN THE FULLY RETRACTED OR "SET" POSITION). FAILURE TO POSITION CONTROL HEAD IN "SET" POSITION WILL RESULT IN ACCIDENTAL CARBON DIOXIDE CYLINDER DISCHARGE WHEN CONTROL HEAD IS INSTALLED ON THE CYLINDER VALVE.

Install electric control head as follows:

1. Remove protective cap from cylinder valve. Ensure control head is in "SET" position.

2. Install electric control head on cylinder actuation port. Tighten swivel nut.

3. Make all electrical connections.

5.12 Electric and Cable Operated Control Head

WARNING

BEFORE INSTALLING CONTROL HEAD ON CARBON DIOXIDE CYLINDER VALVE, ENSURE CONTROL HEAD IS IN "SET" POSITION (E.G., ACTUATING PIN IS IN THE FULLY RETRACTED OR "SET" POSITION). FAILURE TO POSITION CONTROL HEAD IN "SET" POSITION WILL RESULT IN ACCIDENTAL CARBON DIOXIDE CYLINDER DISCHARGE WHEN CONTROL HEAD IS INSTALLED ON THE CYLINDER VALVE.

The following procedures are to be performed before attaching control head to cylinder valve:

1. Remove four screws holding cable housing cover on control head. Remove cover.

Part Seven
Maintenance & Recharge

WARNING

CO2 AND NITROGEN CYLINDER VALVE ASSEMBLIES MUST BE HANDLED, INSTALLED, AND SERVICED ONLY BY TRAINED PERSONNEL IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THIS SECTION AND COMPRESSED GAS ASSOCIATED (CGA) PAMPHLETS C-1, C-6, G-6, AND P-1. CGA PAMPHLETS MAY BE OBTAINED FROM : COMPRESSED GAS ASSOCIATION, 1235 JEFFERSON DAVIS HIGHWAY, ARLINGTON, VA 22022.

BEFORE PERFORMING MAINTENANCE PROCEDURES, REFER TO THE MATERIAL SAFETY DATA SHEETS AND SAFETY BULLETINS IN THE APPENDIX.

ALL PRESSURIZED EQUIPMENT MUST BE ISOLATED FROM ACTUATION DEVICES PRIOR TO PERFORMING SYSTEM MAINTENANCE. OBSERVE ALL SAFETY PRECAUTIONS APPLICABLE TO HANDLING PRESSURIZED EQUIPMENT. RECHARGE OF CO_2 AND NITROGEN CYLINDER VALVE ASSEMBLIES MUST BE ACCOMPLISHED ONLY BY KIDDE DISTRIBUTORS.

7.1 General

Fire suppression systems require proper care to ensure normal operation at all times. Periodic inspections must be made to determine the exact condition of the system equipment.

A regular program of systematic maintenance is essential for proper operation of the carbon dioxide system. A periodic maintenance schedule must be followed and an inspection log maintained for ready reference. As a minimum, the log should record inspection interval, inspection procedure performed, maintenance performed, if any, as a result of inspection, and name of inspector performing task. If inspection indicated areas of rust or corrosion, immediately clean and repaint the area.

7.2 Preventive Maintenance

Perform preventive maintenance as instructed in Table 7-1. The inspection procedures and intervals are recommended and can be modified to fit into normal facility schedules providing the intervals do not exceed the time periods shown in Table 7-1.

Schedule	Requirement	Reference Paragraph
Monthly	Inspect hazard area system components	7-3
	Check nitrogen cylinder pressure	7-3
Semi-Annually	Check CO_2 cylinder weight	7-4
	Test electric control head	7-5
	Test pressure switch	7-6
Every 2 years	Blow out distribution piping	7-7
	Test pneumatic detection system	7-8
Every 5 years	Inspect and/or hydrostatically test CO_2 and nitrogen cylinders and flexible discharge and actuation hoses	7-9

Table 7-1
Preventive Maintenance Schedule

7.3 Inspection Procedures - Monthly

1. Make a general inspection survey of all cylinders and equipment for damaged or missing parts. If any equipment requires replacement, refer to paragraph 7-12.

2. Ensure access to hazard areas, remote nitrogen or cable pull stations, discharge nozzles, and cylinders is unobstructed and there are no obstructions to the operation of the equipment or distribution of carbon dioxide.

3. Inspect flexible actuation hoses for loose fittings, damaged threads, cracks, distortion, cuts, dirt and frayed wire braid. Tighten loose fittings. Replace hoses having stripped threads or other damage. If necessary, clean parts as directed in paragraph 7-10. Inspect flexible actuation hose adapters for stripped threads and damage. Replace damaged adapters. Inspect couplings and tees for tightness. Tighten if necessary. Replace damaged parts.

4. Inspect CO_2 cylinder pressure operated control heads for physical damage, deterioration, corrosion, distortion, cracks, dirt, and loose couplings. Tighten loose couplings. Replace damaged caps. Replace control head if damage is found. If necessary, clean as directed in paragraph 7-10.

5. Inspect carbon dioxide cylinder and valve assembly for leakage, physical damage such as cracks, dents, distortion, and worn parts. Check burst disc for damage, and replace if necessary. If necessary, clean cylinder and associated parts as described in paragraph 7-10.

6. Inspect cylinder straps, cradles, and attaching hardware for loose, damaged, or broken parts. Check straps and associated parts for corrosion, oil, grease, grime, etc. Tighten loose hardware. Replace damaged parts. If necessary, clean as directed in paragraph 7-10.

7. Inspect flexible discharge hoses for loose fittings, damaged threads, cracks, rust, kinks, distortion, dirt, and frayed wire braid. Tighten loose fittings, and replace hoses which have stripped threads. If necessary, clean as directed in paragraph 7-10.

8. Inspect discharge manifold for physical damage, corrosion, and dirt. Inspect manifold support brackets and clamps for looseness and damage. Inspect connections to manifold for tightness. Inspect check valves where applicable, for deformation, leakage, cracks, wear, corrosion, and dirt. Secure loose parts. Replace damaged parts. If necessary, clean as directed in paragraph 7.10.

9. Inspect discharge nozzles for dirt and physical damage. Replace damaged nozzles. If nozzles are dirty or clogged, refer to paragraph 7-11.

CAUTION

Nozzles must never be painted. The part number of each nozzle is stamped on the nozzle. Nozzles must be replaced by nozzles of the same part number. Nozzles must never be interchanged, since random interchanging of nozzles will adversely affect proper CO_2 distribution within a hazard area.

10. Inspect pressure switches for deformations, cracks, dirt or other damage. Replace switch if damage is found.

11. Check nitrogen cylinder for proper operating pressure. If pressure loss (adjusted for temperature) exceeds 10%, recharge with nitrogen to 1800 PSIG at 70°F.

7.4 Semi-Annual Weighing of CO_2 Cylinders

WARNING

THE CO_2 CYLINDERS ARE EQUIPPED WITH A HIGH RATE DISCHARGE VALVE, WHICH WHEN ACTUATED, WILL OPEN, REMAIN OPEN, AND CAN NOT BE CLOSED. ACCIDENTAL ACTUATION OF THE DISCHARGE VALVE ON AN UNSECURED, DISCONNECTED CYLINDER WILL RESULT IN A DISCHARGE THRUST CAPABLE OF PROPELLING THE CYLINDER TO VELOCITIES THAT WILL CAUSE SEVERE PROPERTY DAMAGE AND BODILY INJURY.

IT IS THEREFORE EXTREMELY IMPORTANT THAT THE EXACT SEQUENCE OF CYLINDER REMOVAL ALWAYS BE FOLLOWED. FURTHER CYLINDER REMOVAL OR CYLINDER REPLACEMENT MUST ALWAYS BE SUPERVISED TO ASSURE FULL COMPLIANCE WITH THE INSTRUCTIONS IN THIS MANUAL.

1. Remove control head at the coupling nut only.

2. Disconnect flexible hose from discharge head.

3. Loosen cylinder framing until cylinders are free.

4. Hook scale on weighing angle, and slip yoke under discharge head.

5. Pull down until cylinder is just clear of floor and lever is horizontal.

6. Read weight directly off scale. The scale is calibrated to compensate for leverage. Empty cylinder weight is stamped on the cylinder valve body; therefore, deduct empty weight from scale reading. Also, deduct 3.75 pounds for weight of discharge head. The result is the amount, known as the charge weight, of carbon dioxide in the cylinder.

7. If charge weight loss exceeds 10%, forward charged cylinder **WITH DISCHARGE AND CONTROL HEADS REMOVED AND SAFETY CAP AND PROTECTION CAP INSTALLED** to a KIDDE distributor.

8. After all cylinders have been weighed, reconnect flexible hose from discharge head. Tighten clamps, and reinstall control heads on cylinders. Tighten control head coupling nuts securely.

7.5 Electric Control Head Test

The electric control head must be tested semi-annually for proper operation. This test can be performed without discharging the carbon dioxide cylinders. Test one hazard area at a time before proceeding to the next hazard area as follows:

CAUTION

All control heads must be removed from carbon dioxide cylinders prior to testing to prevent accidental cylinder discharge.

1. Remove electric control head from master carbon dioxide cylinder within the hazard area being tested. Let the electric control head hang freely from the flexible electric conduit connections. Leave all pressure operated control heads and actuation hoses attached to the cylinders.

2. Operate carbon dioxide system electrically. This can be accomplished by actuation of the carbon dioxide system at the system control panel or by manual operation of an electric pull station.

3. Ensure the electric control head has operated. Observe that the actuating pin has moved to its fully actuated position. If any control heads have not operated, check circuit for electric continuity to these particular heads and repeat test. Replace all damaged heads. Repeat test if any control heads have been replaced.

CAUTION

Electric control heads must be reset manually before reconnecting to the cylinder valves.

4. Replace any damaged head which fails to reset properly before reconnecting to the cylinder. Reattach all electric control heads to threaded port on cylinder valves. Tighten swivel nuts securely. Make certain electric control heads are in the SET position before reconnecting to the carbon dioxide cylinders. Failure to follow this procedure will result in an accidental carbon dioxide discharge.

7.6 Pressure Switch Test

Perform pressure switch test as follows:

1. Contact appropriate personnel and obtain authorization for shutdown.

2. Check that hazard area operations controlled by pressure switch are operative.

3. Manually operate switch.

4. Check that hazard area operations controlled by pressure switch shut down.

5. Return pressure switch to SET position.

6. Reactivate all systems shut down by pressure switch. This includes power and ventilation systems, compressors, etc.

7.7 2 Year Inspection

Before blowing out system, remove the dust caps from the ends of the distribution piping to allow any foreign matter to blow clear. Blow out all distribution piping with dry air or CO_2 to make sure it is not obstructed.

WARNING

DO NOT USE WATER OR OXYGEN TO BLOW OUT PIPE LINES. THE USE OF OXYGEN IS ESPECIALLY DANGEROUS AS THE POSSIBLE PRESENCE OF EVEN A MINUTE QUANTITY OF OIL MAY CAUSE AN EXPLOSION.

1. Remove any caps on dirt traps from piping to allow any foreign matter to blow clear.

2. Remove all discharge heads from carbon dioxide cylinders.

WARNING

DO NOT DISCONNECT DISCHARGE HEAD FROM FLEXIBLE HOSE. ACCIDENTAL DISCHARGE OF CO_2 SYSTEM WILL CAUSE FLEXIBLE HOSE WITHOUT DISCHARGE HEAD ATTACHED TO FLAIL VIOLENTLY, RESULTING IN POSSIBLE EQUIPMENT DAMAGE AND SEVERE BODILY INJURY TO PERSONNEL.

3. Open distributing valves and keep open long enough to insure cleanliness.

4. Discharge test cylinder into system manifold.

5. Reconnect all control heads.

7.8 Pneumatic Detection System Tests

CAUTION

Before conducting any of the tests outlined below, remove the pneumatic control heads from the cylinders.

WARNING

WHEN DISCONNECTING CONTROL HEADS (TANDEM MOUNTED), DO NOT LET THE HEADS TURN. IF INTERCONNECTING CABLE HOUSING IS A LOOSE FIT, THIS WILL PREVENT ACCIDENTAL DISCHARGE.

7.8.1 Pneumatic Control Head Test - Pressure Setting

1. Connect the test fitting of the manometer test set to the diaphragm chamber of the control head.

2. Make certain sufficient clearance is provided at mounting nut so control head will not be damaged upon operation.

3. If control head has been operated, reset by placing screwdriver in reset stem and turning clockwise until stem locks in position. This occurs when the arrow on the reset stem is lined up with the SET arrow on the nameplate.

NOTE

Slight resistance will be met just before stem locks.

4. Use manometer test set P/N 840041, and pour water into the open tube until the water level in both tubes is exactly at the zero mark.

5. Close off the rubber tube "A" by squeezing tightly with the fingers or use a crimp clamp. Apply pressure by gradually squeezing the rubber bulb "C". The control head should operate at the factory pressure setting with +/- 10% tolerance allowed. The pressure required to operate the control head is the difference, in inches, between the water levels in the two tubes and is equal to twice the reading of either tube.

lining up with the "Set" arrow on the nameplate. (Slight resistance will be met just before the stem locks.)

6. If the application of heat does not cause the control head to operate within 15 seconds, remove the container of water and investigate the cause:

- Heat differential was inadequate.
- Leakage in the tubing system (tubing connections not tight).
- Obstruction in the tubing.

7.8.4 Troubleshooting of Pneumatic Detection System

Failure of the system to operate pneumatic detection system testing when applying heat to the detectors may be caused by: Insufficient heat applied, obstructions in tubing, or leaks in the system. The manometer can be used to assist in troubleshooting the system as follows:

1. Install manometer in system tubing at pneumatic control head connection. Replace union connection with a control head "T." Connect manometer tube B to "T." Close open tube A of the manometer with crimp clamp. The manometer is now an integral part of the system and provides a visual record of pressure to which system is subjected by heat or cold at the detector.

2. The installation of the manometer as described above provides a visual indication of the pressure build-up within the system and will assist in determining if there is sufficient or insufficient pressure build-up during the test of the system.

7.9 5 Year Inspection and Test Guidelines

7.9.1 Carbon Dioxide Cylinders

Caution

These guidelines do not apply to cylinders containing commodities other than CO2.

All KIDDE CO2 cylinders are designed, fabricated, and factory tested to comply with DOT CFR 49 Regulations 2A-2015, 3AA-1800 or 3AA-2300 as stamped on each cylinder.

CO2 cylinders must be hydrostatically tested and marked in accordance with DOT CFR 174.04-1 as follows:

1. Any cylinder which has been discharged or removed from the system subsequent to five (5) years from the date of the last hydrostatic test, as indicated by the marking on the cylinder shoulder, must be emptied, retested and remarked.

2. A cylinder continuously in service for a period of time exceeding five (5) years, must, after twelve (12) years have elapsed from the date of the previous test and marking, be removed from service, its contents discharged, and the cylinder retested and remarked.

3. A cylinder must also be hydrostatic tested and remarked immediately if the cylinder shows evidence of distortion, damage, cracks, corrosion, or mechanical damage. Any cylinder failing the hydrostatic pressure test must be destroyed.

7.9.2 Nitrogen Cylinders

Nitrogen cylinders must be hydrostatic pressure tested every five (5) years in accordance with NFPA 10 and DOT regulation CFR Title 49, Paragraph 173.34. The cylinder must also be hydrostatic pressure tested immediately if the cylinder shows evidence of distortion, damage, cracks, corrosion, or mechanical damage. Any cylinder failing the hydrostatic pressure test must be destroyed.

7.9.3 Flexible Hoses

Flexible hoses must be hydrostatic pressure tested every five years in accordance with NFPA 12.

7.10 Cleaning

Remove dirt from metallic parts using a lint-free cloth moistened with dry cleaning solvent. Dry parts with clean, dry, lint-free cloth or air blow dry. Wipe non-metallic parts with clean, dry lint-free cloth. Remove corrosion with crocus cloth.

7.11 Nozzle Service

Service nozzles after use as follows:

1. Clean outside of nozzles with rag or soft brush.

2. Examine discharge orifices for damage or blockage. If nozzles appear to be blocked, unscrew nozzles and clean by immersing in dry cleaning solvent and drying thoroughly with lint-free cloth. Replace damaged nozzles. Nozzles must be replaced with same part number.

7.12 Repairs

Replace all damaged parts during inspection. Replacement procedures for CO2 cylinders are provided below. Since replacement for other system components are simple, refer to installation drawings and component assembly drawings provided in Section 4 for guidance. Part numbers of the components are provided in Section 9 and may be used to procure replacement parts as required.

7.13 Removal of Cylinders

6.13.1 CO2 Cylinders

WARNING

WHEN REMOVING CHARGED CYLINDERS, ALWAYS DISCONNECT THE DISCHARGE HEADS FIRST. THIS WILL ELIMINATE THE POSSIBILITY OF DISCHARGING THE CO2, RESULTING IN POSSIBLE EQUIPMENT AND PROPERTY DAMAGE OR INJURY TO PERSONNEL.

1. These instructions must be carefully performed in the exact order given when any cylinder or group of cylinders is to be removed at any time.

2. Remove discharge head from cylinder valve by loosening mounting nut (right hand thread). On two cylinder installations, swing discharge head and hose away from cylinder and allow to hang.

3. Remove all control heads from the cylinder valve by loosening mounting nut (right hand thread).

4. Screw large top protection cap to threads on top of cylinder valve. Cap control head outlet by screwing on side protection cap.

5. Remove cylinder rack.

6. Remove cylinder.

WARNING

CYLINDER CAP MUST BE SCREWED ON TO PREVENT DAMAGE TO CYLINDER VALVE DURING REMOVAL. DAMAGE TO CYLINDER VALVE COULD CAUSE CYLINDER TO DISCHARGE, CAUSING POSSIBLE EQUIPMENT AND PROPERTY DAMAGE OR INJURY TO PERSONNEL. THIS CAP IS NOT INCLUDED IN THE EMPTY WEIGHT OF THE CYLINDER.

7.15.2 Nitrogen Cylinders

WARNING

WHEN REMOVING PRESSURIZED CYLINDER DUE TO PRESSURE LOSS, CONTROL HEAD LEVEL MUST BE IN THE CLOSED POSITION WITH LOCKING PIN INSTALLED. CONTROL HEAD LEVEL IN THE OPEN POSITION WILL RESULT IN DISCHARGE OF REMAINING CONTENTS OF CYLINDER, RESULTING IN INADVERTENT SYSTEM ACTIVATION, PROPERTY DAMAGE, OR POSSIBLE BODILY INJURY.

1. Remove control head from nitrogen cylinder valve.

2. Install protective cap over nitrogen cylinder valve.

3. Remove clamps and hardware securing nitrogen cylinder to mounting racks.

7.16 Installation of Cylinders

7.16.1 CO2 Cylinders

WARNING

WHEN INSTALLING CHARGED CYLINDERS, ALWAYS REPLACE THE DISCHARGE HEADS LAST. THIS WILL ELIMINATE THE POSSIBILITY OF DISCHARGING THE CO2, RESULTING IN POSSIBLE EQUIPMENT AND PROPERTY DAMAGE OR INJURY TO PERSONNEL.

1. These instructions must be carefully performed in the exact order given below when any cylinder or group of cylinder is to be installed at any time.

2. Place fully charged cylinder in cylinder rack before removing cylinder cap.

3. Install the cylinder rack and tighten bolts only enough to allow for turning of cylinder as may be required later.

4. Remove the cylinder cap and top protection cap from the cylinder valve. Remove the side protection cap from the cylinder valve to be equipped with control head. Return cap to the storeroom. Assemble control head to valve actuation port and tighten mounting nut.

5. Turn cylinder so that the control head outlet points in the proper direction; tighten bolts of the cylinder rack securely.

6. Make certain control head has been reset as follows:

a. Return level to SET position. The plunger should fully recede into the control head body. Replace any control head that fails to reset properly.

b. Reinstall locking pin and install new seal wire.

7. Assemble discharge head to cylinder valve and tighten mounting nut.

WARNING

TO AVOID ACCIDENTAL DISCHARGE, DO NOT INSTALL THE DISCHARGE HEAD UNTIL CONTROL HEAD HAS BEEN INSTALLED ON THE CYLINDER VALVE.

7.16.2 Nitrogen Cylinders

1. Install nitrogen cylinder in position in mounting rack.

2. Tighten sufficiently to hold cylinder in place while allowing cylinder enough free play to be manually rotated.

3. Remove nitrogen cylinder valve protection cap.

4. Manually rotate cylinder until cylinder valve discharge outlet is in desired position.

CAUTION

Nitrogen cylinder must be positioned so that control head, when installed, is readily accessible and cannot be obstructed during manual operation.

5. Securely tighten mounting bracket clamps and hardware.

6. Remove protective cap from cylinder valve control head port.

7. Remove pipe plug and reconnect flexible actuation hose to cylinder valve outlet port.

8. Install control head to cylinder valve; tighten securely.

7.17 Post Fire Maintenance

After a CO2 system discharge, qualified fire suppression system maintenance personnel must perform post fire maintenance as directed in this section. Observe all warnings, especially those pertaining to the length of elapsed time before entering the hazard area following discharge.

WARNING

DO NOT ENTER THE HAZARD WITH AN OPEN FLAME OR LIGHTED CIGARETTE. THE POSSIBLE PRESENCE OF FLAMMABLE VAPORS MAY CAUSE RE-IGNITION OF FLAMMABLE VAPORS OR EXPLOSION. FOR DEEP SEATED HAZARDS, THE HAZARD MUST BE KEPT TIGHTLY CLOSED FOR 20 TO 60 MINUTES AFTER SYSTEM DISCHARGE. BE SURE FIRE IS COMPLETELY EXTINGUISHED BEFORE VENTILATING AREA. BEFORE PERMITTING ANYONE TO ENTER THE HAZARD, VENT AREA THOROUGHLY OR USE SELF-CONTAINED BREATHING APPARATUS.

1. Return all cylinders to a KIDDE distributor.

2. Recharge carbon dioxide and nitrogen cylinders in accordance with procedures outlined in this manual.

3. Reset all control heads. Replace any control head that fails to reset properly. Reinstall locking pins. Replace seal wires.

WARNING

VERIFY CONTROL HEAD IS IN SET POSITION WITH PLUNGER FULLY RETRACTED BEFORE INSTALLING ON A CHARGED CYLINDER. CONTROL HEAD IN THE RELEASED POSITION WITH PLUNGER EXTENDED WILL CAUSE CYLINDER TO DISCHARGE, RESULTING IN POSSIBLE PROPERTY OR EQUIPMENT DAMAGE, PERSONAL INJURY OR DEATH.

4. If pneumatic transmitter is installed, reset as follows:

CAUTION

Pneumatic control head must be reset before resetting pneumatic transmitter.

a. Unscrew the slotted indicator cap.

b. Reverse cap and screw onto plunger.

c. Pull plunger out until it clicks into position.

d. Unscrew cap and reinstall over plunger. Green indicator showing through slots in cap indicates transmitter is in "SET" position.

5. If system was operated using a nitrogen pilot cylinder, remove the control head from the nitrogen cylinder. This will vent nitrogen pressure from the actuation piping and reset and level/pressure operated control heads on the carbon dioxide cylinders.

6. If system was operated using a manual pull station, reset manual pull station.

7. If time delay was manually overridden, reset manual control lever on time delay assembly. Reinstall locking pin. Replace seal wire.

7.18 Cylinder Recharge

CAUTION

CO2 cylinders must not be recharged without a retest if more than five (5) years have elapsed from the date of last test. Retest shall be in accordance with the requirements of CFR 49, Paragraph 173.34. After retest, cylinder must be thoroughly dried and free of any water.