

**Digital Voice  
Expansion Module (DV-EM)  
Operation and Installation  
Manual**


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# Conventions Used in This Manual


This manual uses the following conventions for notes, cautions, and warnings.

**NOTE:** Notes contain important information and are highlighted as shown in this illustration.

 **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

 **WARNING:** **INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN PROPERTY DAMAGE, SERIOUS PERSONAL INJURY, OR DEATH.**

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 **WARNING:** **ANY MATERIAL EXTRAPOLATED FROM THIS DOCUMENT OR FROM WHEELOCK MANUALS OR OTHER DOCUMENTS DESCRIBING THE PRODUCT FOR USE IN PROMOTIONAL OR ADVERTISING CLAIMS, OR FOR ANY OTHER USE, INCLUDING DESCRIPTION OF THE PRODUCT'S APPLICATION, OPERATION, INSTALLATION AND TESTING IS USED AT THE SOLE RISK OF THE USER AND WHEELOCK WILL NOT HAVE ANY LIABILITY FOR SUCH USE.**

Part Number: P82356

## Revision History

Revision B August 2000  
All prior revisions superseded.

# Preface

The Series DV-EM provides additional dry contact inputs for a Series DV-100 or a Series DV-200. The Series DV-EM does not sense an emergency condition or hazardous fires, but is only a part of a system that does sense such conditions. When used as part of a protective signaling system, the Series DV-EM must be properly connected to a compatible control panel that has been approved by a nationally recognized testing laboratory ("LISTED") and/or a LISTED compatible audio system with LISTED compatible notification appliances for proper operation.

PERSONNEL PROPERLY QUALIFIED IN THE APPLICATION AND USE OF LIFE SAFETY EQUIPMENT ("QUALIFIED PERSONNEL") MUST READ THIS MANUAL CAREFULLY BEFORE PROPERLY PERFORMING ACTIONS TO SPECIFY, APPLY, INSTALL, MAINTAIN AND OPERATIONALLY TEST SERIES DV-100 PRODUCTS IN ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL.

THE SERIES DV-EM IS PART OF A SYSTEM CONTROLLED BY A SERIES DV-100 OR SERIES DV-200. PROPERLY QUALIFIED PERSONNEL MUST READ THE SERIES DV-100 OR SERIES DV-200 MANUAL CAREFULLY BEFORE PROPERLY PERFORMING ACTIONS TO SPECIFY, APPLY, INSTALL, MAINTAIN, AND OPERATIONALLY TEST SERIES DV-EM PRODUCTS. INSTRUCTIONS, PROCEDURES, CAUTIONS, AND WARNINGS FOR THE SERIES DV-100 OR SERIES DV-200, MUST BE FOLLOWED WHEN APPLICABLE TO THE SPECIFYING, APPLYING, INSTALLING, MAINTAINING, AND OPERATIONALLY TESTING OF SERIES DV-EM PRODUCTS.

**⚠ WARNING: IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING INSTRUCTIONS ARE NOT PERFORMED PROPERLY, THE SERIES DV-EM MAY NOT OPERATE IN AN EMERGENCY SITUATION WHICH COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

- **DO NOT** assume any installation, operation and testing details not shown in this manual.
- The Series DV-EM should only be operated with **covers** properly **in place**.
- **KEEP** this manual **WITH THE SERIES DV-EM FOR FUTURE REFERENCE** for the life of the system and make it available to all people who operate, test, maintain, or service the Series DV-EM. We strongly recommend that such personnel read and understand the entire manual

The Series DV-EM WILL NOT WORK WITHOUT POWER. The Series DV-EM is powered by the Series DV-100 or Series DV-200 to which it is connected. If power is cut off for any reason, the Series DV-EM will not provide the additional dry contact inputs. Backup power supplies are recommended for protective signaling systems.

**⚠ WARNING: THE SERIES DV-EM PRINTED CIRCUIT BOARDS ARE SENSITIVE TO STATIC ELECTRICITY AND MAY BE DAMAGED BY MISHANDLING OR STATIC DISCHARGE. TO PREVENT DAMAGE FROM STATIC ELECTRICITY, THE USER SHALL PROPERLY ATTACH GROUNDED WRIST STRAPS BEFORE TOUCHING THE SERIES DV-EM PRINTED CIRCUIT BOARDS. SEE "INSTALLATION" SECTION FOR DETAILS.**

COMPLY WITH ALL OF THE LATEST APPLICABLE CODES, REGULATIONS, LAWS, STANDARDS, GUIDELINES:

For emergency, hazardous, security, life safety and fire protective signaling system applications, the Series DV-EM must be used within their published specifications and only with a LISTED compatible control panel and LISTED compatible audio system in accordance with sound engineering judgment and the instructions of the manufacturer and in accordance with local, state and federal codes, regulations and laws. The Series DV-EM must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these instructions at the time of installation and at least twice a year or more often as required by local, state and federal codes, regulations and laws. Installation, testing and maintenance 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).

**⚠ WARNING: IF THE PROTECTIVE SIGNALING SYSTEM SOUNDS AND/OR FLASHES, IT IS A WARNING OF A POSSIBLY SERIOUS SITUATION AND REQUIRES YOUR IMMEDIATE ATTENTION.**

The Series DV-EM is not a substitute for insurance. All users should have adequate levels of life and property insurance.

**⚠ WARNING: WHEELOCK EXPRESSLY DISCLAIMS ALL LIABILITY FOR THE CONTENT, CLARITY AND LANGUAGES OF, AND OUTPUT CHANNEL AND PRIORITY LEVEL ASSIGNED TO, ANY AND ALL MESSAGES. IT IS ESSENTIAL THAT YOU HAVE MESSAGE CONTENT AND LANGUAGE, SEQUENCE, OUTPUT CHANNEL AND PRIORITY ASSIGNMENTS REVIEWED AND APPROVED BY QUALIFIED LEGAL AND SAFETY ADVISORS, QUALIFIED REPRESENTATIVE(S) OF OWNER(S) AND USER(S), AND AUTHORITIES HAVING JURISDICTION.**

**▲ WARNING:** FOR THE SERIES DV-EM TO PROPERLY OPERATE, IT MUST BE PROPERLY CONNECTED TO A SERIES DV-100 OR SERIES DV-200, A LISTED COMPATIBLE AND PROPERLY OPERATING CONTROL PANEL AND AUDIO SYSTEM, OR TO A LISTED COMPATIBLE AND PROPERLY OPERATING AUDIO SYSTEM, THAT CONTROLS ITS ACTIVATION AND PROVIDES PROPER VOLTAGE AND CURRENT. THE OPERATION AND ELECTRICAL RATINGS OF SUCH CONTROL PANEL AND AUDIO SYSTEM, OR SUCH AUDIO SYSTEM, MUST BE COMPATIBLE WITH THE SERIES DV-EM, AND ALL EQUIPMENT MUST BE PROPERLY INTERCONNECTED AND OPERATING. THE INSTALLER MUST CHECK COMPATIBILITY BEFORE INSTALLATION; OTHERWISE, THE SERIES DV-EM AND/OR THE CONTROL PANEL AND/OR THE AUDIO SYSTEM MAY BE DAMAGED. THIS COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

Each manufacturer's fire alarm control panel, audio system, and notification appliance operates differently and has different features. Before specifying, installing, operating, testing, maintaining or servicing a system, carefully read the installation, operation and testing manual for each piece of equipment and applicable codes.

Request that the local authority having jurisdiction inspect the proposed placement of the notification appliances and receive their approval.

**▲ WARNING:** THE OUTPUT OF THE AUDIO SYSTEM MAY NOT BE HEARD IN ALL CASES. SOUND CAN BE BLOCKED OR REDUCED BY WALLS, DOORS, CARPETING, WALL COVERING, FURNITURE, INSULATION, BED COVERINGS, AND OTHER OBSTACLES THAT MAY TEMPORARILY OR PERMANENTLY IMPEDE THE OUTPUT OF THE AUDIO SYSTEM. SOUND IS ALSO REDUCED BY DISTANCE AND MASKED BY BACKGROUND NOISE. THE OUTPUT OF THE AUDIO SYSTEM MAY NOT BE SUFFICIENT TO ALERT ALL OCCUPANTS, ESPECIALLY THOSE WHO ARE ASLEEP, THOSE WHO ARE HEARING-IMPAIRED, THOSE WHO ARE WEARING DEVICES THAT PLUG OR COVER THE EARS, AND THOSE WHO HAVE RECENTLY USED DRUGS OR ALCOHOL. THE OUTPUT OF THE AUDIO SYSTEM MAY NOT BE HEARD BY AN ALERT PERSON IF THE OUTPUT DEVICE IS PLACED IN AN AREA WHICH IS ISOLATED BY A CLOSED DOOR, OR IS LOCATED ON A DIFFERENT FLOOR FROM THE PERSON IN A HAZARDOUS SITUATION OR IS PLACED TOO FAR AWAY TO BE HEARD OVER AMBIENT NOISE SUCH AS, BUT NOT LIMITED TO, RUNNING WATER, TRAFFIC, AIR CONDITIONERS, MACHINERY OR MUSICAL APPLIANCES.

**▲ WARNING:** AUDIBLE SIGNALS MAY MASK MEDICAL EQUIPMENT MONITORING ALARMS. AUDIBLE TONES AND/OR VOICE MESSAGES ARE NOT RECOMMENDED FOR USE IN AREAS WHERE MEDICAL EQUIPMENT MONITORING ALARMS ARE IN USE. SUCH MEDICAL ALARMS MAY NOT BE HEARD DURING PERIODS WHEN AUDIBLE NOTIFICATION APPLIANCES HAVE BEEN ACTIVATED. WHERE MEDICAL ALARMS ARE IN USE, THE INSTALLATION OF VISUAL NOTIFICATION APPLIANCES IN HIGHLY VISIBLE LOCATIONS IS RECOMMENDED.

**▲ WARNING:** IF AUDIBLE TONES AND/OR VOICE MESSAGES CANNOT BE READILY HEARD AND UNDERSTOOD CLEARLY WITHIN THE PROTECTED AREAS AS INTENDED, IT IS NECESSARY TO INCREASE THE NUMBER AND/OR SOUND OUTPUT INTENSITY OF SPEAKERS WITHIN THOSE AREAS SO THAT THEY ARE HEARD AND UNDERSTOOD CLEARLY WHEN ACTIVATED.

NOTIFICATION EQUIPMENT CANNOT LAST FOREVER. EVEN THOUGH NOTIFICATION EQUIPMENT SUCH AS THE SERIES DV-EM PRODUCTS ARE MADE TO LAST UP TO TEN YEARS, THE EXPECTED LIFE OF THE PROTECTIVE SIGNALING SYSTEM, ANY OF THESE PARTS OR COMPONENTS THEREOF COULD FAIL AT ANY TIME AND MAY NEED TO BE REPLACED BEFORE TEN YEARS.

SYSTEM TESTING, INCLUDING ALL NOTIFICATION EQUIPMENT, MUST BE CONDUCTED FREQUENTLY, AT LEAST TWICE EACH YEAR, OR MORE OFTEN AS REQUIRED BY LOCAL, STATE AND FEDERAL CODES, REGULATIONS AND LAWS, BY QUALIFIED PERSONNEL TO ENSURE PROPER OPERATION OF ALL EQUIPMENT. If the notification equipment is not working properly, immediately contact the installer and have all/any problems corrected immediately. Malfunctioning units should be replaced immediately. Do not attempt to repair malfunctioning units. Malfunctioning units should be returned for factory repair or replacement. In the event you cannot contact the installer, contact the manufacturer.

Additional copies of this manual may be obtained from manufacturer.

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# Introduction To The Series DV-EM

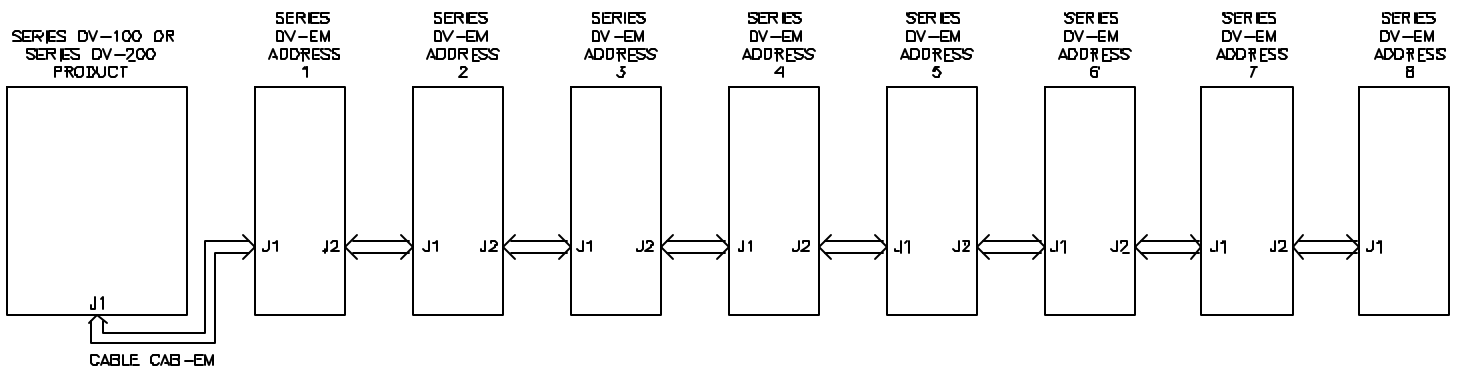
The Digital Voice Expansion Module (Series DV-EM) provides thirty-two additional dry contact or open collector inputs for either the Series DV-100 or Series DV-200 products.

Series DV-100 and Series DV-200 products come standard with eight contact inputs. When a Series DV-EM is used with a Series DV-100 or Series DV-200 product, the eight standard contact inputs on the Series DV-100 or Series DV-200 product shall not be used.

**CAUTION:** When one or more Series DV-EM's are connected to a Series DV-100 or Series DV-200, any attempt to use the eight contact inputs on the Series DV-100 or Series DV-200 will cause a trouble condition and may cause the system to malfunction.

A connector (J1) on the Series DV-100 and Series DV-200 products provides an interface for Series DV-EM products. Up to eight Series DV-EM's can be connected to a Series DV-100 or Series DV-200 product. The eight Series DV-EM's shall be connected in a daisy chain configuration. An illustration of the daisy chain configuration is shown in Figure 1 below.

As a Series DV-EM is connected to a Series DV-100 or Series DV-200 product, it is automatically assigned an address from one thru eight. The address is defined by the location of a Series DV-EM in the daisy chain connected to a Series DV-100 or Series DV-200 series product. An illustration of the address assignments is shown in Figure 1 below.



**FIGURE 1.**

As can be seen, the first Series DV-EM in the daisy chain is assigned address 1, the second Series DV-EM in the daisy chain is assigned address 2, and so on. Table 1 illustrates the file that plays when a given contact input is activated on one of the eight Series DV-EM's.

Each one of the thirty two contact inputs is supervised. The contact input wiring is supervised with a LISTED 10K ohm end-of-line resistor. A 10K ohm resistor is placed on the printed circuit board adjacent to each set of contact input terminals. If a contact input is used and its wiring supervised, its resistor must be removed from the printed circuit board and a LISTED 10K end-of-line resistor installed at the end of the line (contact origination). If a contact input is not used or used but does not require supervision, the resistor remains on the printed circuit board.

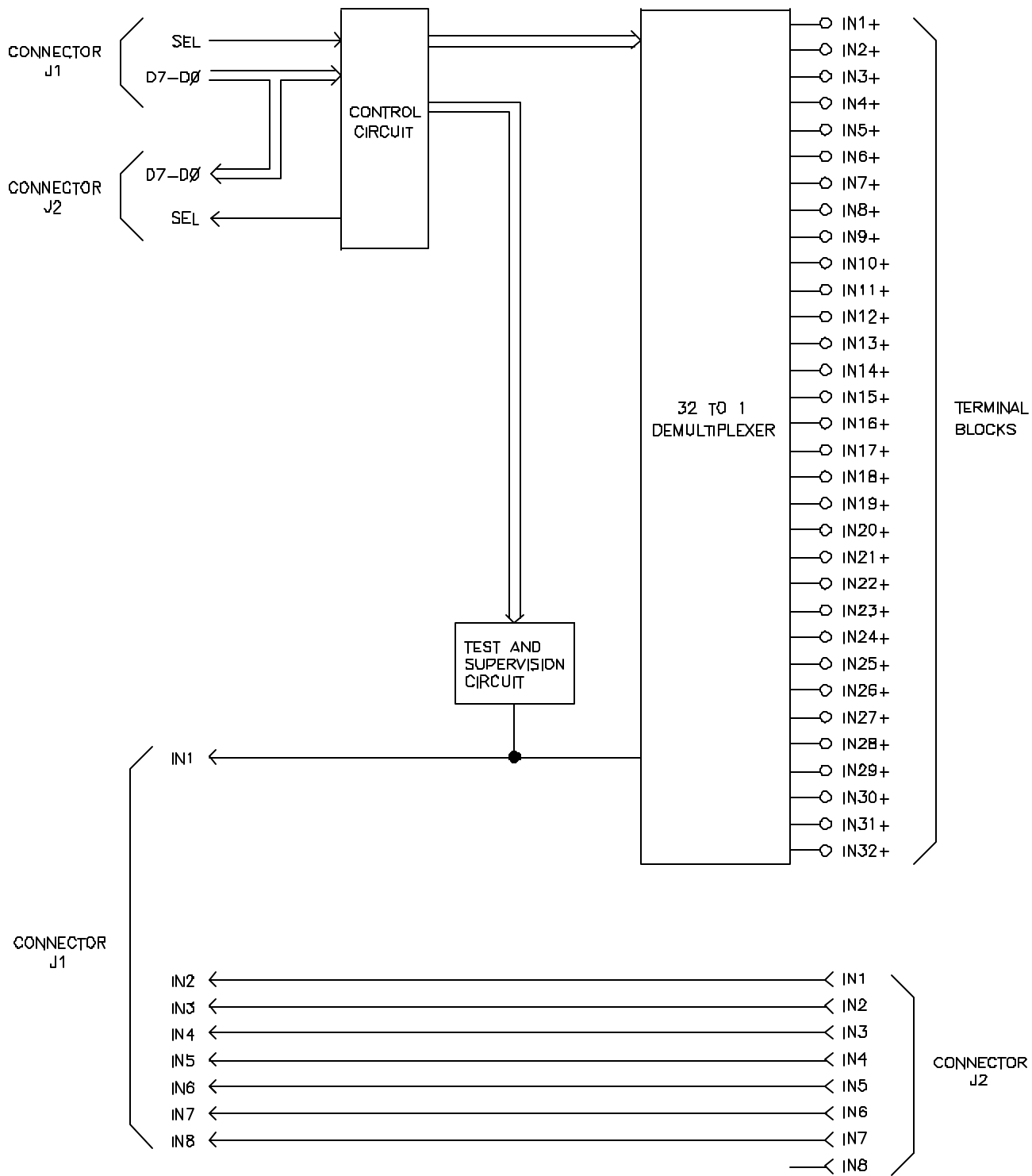
The Series DV-100 or Series DV-200 products should be connected to the first Series DV-EM in the daisy chain using a cable. The cable is Wheelock Model CAB-EM. Successive Series DV-EM's may be connected directly together or have a cable between them. (The maximum length of cable between each Series DV-EM is 3 feet.)

A block diagram of the Series DV-EM is shown in Figure 2. The Series DV-EM printed circuit board is shown in Figure 3.

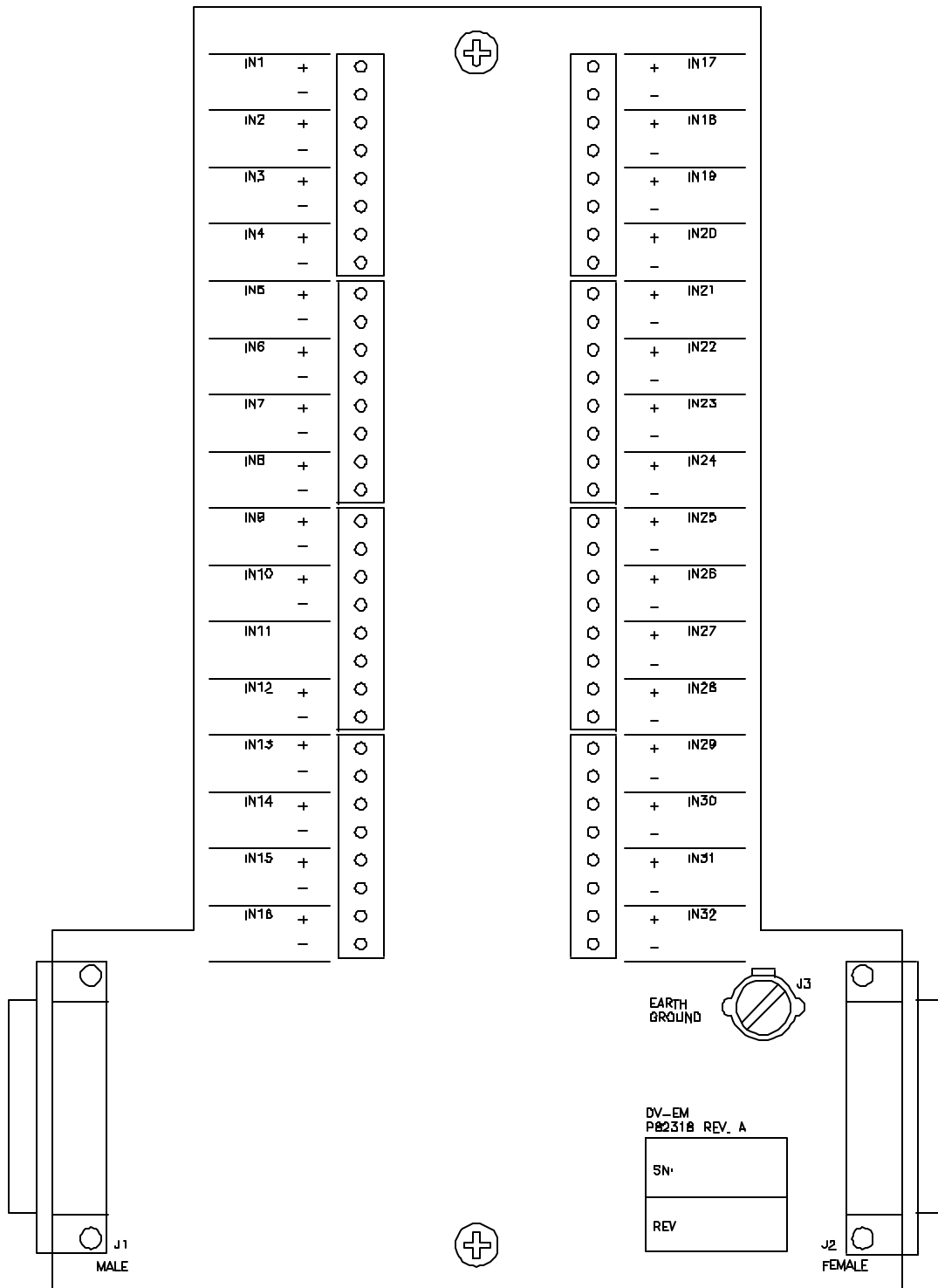
Wheelock models; DV-100, DV-200, MDV-2, DX-100, DX-200, MDX-2 and DV-EM are UL 864 approved for use with Fire Alarm Control Panels (FACP). The above models are used as accessory control units in UL 864 listed protective signaling systems. All models have an operating voltage range of 11.0-29.0VDC. All are operated by a serial port or contact closure with an adjustable output from 0.5-2.0VRMS.

Input Number	DV-EM ADDRESS							
	1	2	3	4	5	6	7	8
1	1	33	65	97	129	161	193	225
2	2	34	66	98	130	162	194	226
3	3	35	67	99	131	163	195	227
4	4	36	68	100	132	164	196	228
5	5	37	69	101	133	165	197	229
6	6	38	70	102	134	166	198	230
7	7	39	71	103	135	167	199	231
8	8	40	72	104	136	168	200	232
9	9	41	73	105	137	169	201	233
10	10	42	74	106	138	170	202	234
11	11	43	75	107	139	171	203	235
12	12	44	76	108	140	172	204	236
13	13	45	77	109	141	173	205	237
14	14	46	78	110	142	174	206	238
15	15	47	79	111	143	175	207	239
16	16	48	80	112	144	176	208	240
17	17	49	81	113	145	177	209	241
18	18	50	82	114	146	178	210	242
19	19	51	83	115	147	179	211	243
20	20	52	84	116	148	180	212	244
21	21	53	85	117	149	181	213	245
22	22	54	86	118	150	182	214	246
23	23	55	87	119	151	183	215	247
24	24	56	88	120	152	184	216	248
25	25	57	89	121	153	185	217	249
26	26	58	90	122	154	186	218	250
27	27	59	91	123	155	187	219	251
28	28	60	92	124	156	188	220	252
29	29	61	93	125	157	189	221	253
30	30	62	94	126	158	190	222	254
31	31	63	95	127	159	191	223	255
32	32	64	96	128	160	192	224	256

TABLE 1.



**DV-EM BLOCK DIAGRAM  
FIGURE 2.**



**DV-EM PRINTED CIRCUIT BOARD  
FIGURE 3.**

# Installation

The lives of people depend upon your safe installation of the Series DV-EM. Please read, understand and follow the specific installation instruction set forth below.

**⚠ WARNING:** **SHUT OFF ALL POWER BEFORE STARTING THE INSTALLATION. ELECTRICAL SHOCK CAN CAUSE DEATH OR SERIOUS INJURY.**

**⚠ CAUTION:** Installation should be conducted only by qualified persons in accordance with the procedures in this manual.

**⚠ CAUTION:** In order to comply with the latest NFPA and UL requirements for interconnection of fire alarm control equipment, the Series DV-EM units must be located in the same room as, and within 20 feet of, a LISTED compatible fire alarm control panel and LISTED compatible audio system, or a LISTED compatible audio system, with the wiring enclosed in conduit and properly connected to such control panel and/or audio system.

**⚠ CAUTION:** Follow these installation instructions, procedures, and diagrams carefully to avoid damage to the Series DV-EM and equipment connected to it.

**⚠ CAUTION:** The Series DV-EM must be properly installed, maintained, and operationally tested; see Warnings, Cautions and guidelines in the "Preface" section.

**⚠ WARNING:** **THE SERIES DV-EM PRINTED CIRCUIT BOARDS ARE SENSITIVE TO STATIC ELECTRICITY AND HAVE DELICATE COMPONENTS MOUNTED ON THEM. BEFORE HANDLING EITHER A BOARD OR ANY COMPONENT ON A BOARD, DISCHARGE ANY STATIC ELECTRICITY FROM YOUR BODY BY TOUCHING A GROUNDED OBJECT SUCH AS A METAL SCREW WHICH IS CONNECTED TO EARTH GROUND. HANDLE THE BOARD BY ITS EDGES, AND BE CAREFUL NOT TO TWIST OR FLEX IT. THE SERIES DV-EM IS TO BE INSTALLED IN A STATIC FREE AREA AND THE USER IS TO PROPERLY ATTACH GROUNDED WRIST STRAPS BEFORE TOUCHING ANY STATIC SENSITIVE AREAS.**

## Installation Sequence

To install the Series DV-EM, follow these steps carefully:

1. Prepare a drawing of the complete system wiring. (Keep a copy of the system wiring drawing with the Series DV-EM manual as a permanent record of the system wiring.) See the "Wiring Guidelines" and the "Field Wiring" sections to help develop this drawing.
2. Carefully unpack the Series DV-EM and make sure each item described on the packing slip is present and undamaged.
3. Mount the Series DV-EM in the desired location as described in the "Mounting" section.
4. Mount any additional wiring boxes or junction boxes needed to interconnect field wiring.
5. Connect conduit fittings or bushings as needed using knockouts provided on the top and bottom of the Series DV-EM units.
6. Install field wiring in conduit when necessary, following the National Electrical Code and local codes for the type of system being installed. Make all necessary connections at any additional wiring or junction boxes.

**⚠ CAUTION:** It is the responsibility of the installer to provide proper strain relief for all wiring not in conduit.

7. Check the integrity of all field wiring following the directions in the "Field Wiring Checkout" section of this manual. Confirm that the specified cable is installed and that there is continuity between required points (no open circuits), with no unwanted connections (shorts) to other conductors, chassis, or earth ground.
8. Connect the wiring to the appropriate terminals of the Series DV-EM modules following the directions in the "Field Wiring" section of this manual and the system wiring drawing you created in Step 1.
9. Apply power and perform the operational tests described in the "System Checkout" section of this manual.

# Wiring Guidelines

Although the Series DV-EM incorporates noise filtering circuitry on its input, induced voltages or noise on the input wiring can cause improper operation. Therefore, use shielded twisted pair wire for all field input wiring. The audio output lines (and the auxiliary music input lines) should also be wired with shielded twisted pair to minimize noise pick-up. For all other connections, twisted pair is recommended to reject common mode noise, but shielding is optional.

The shield of each cable shall be connected only at one end. Each shield of each cable that connects to the Series DV-EM is to connect to the ground bus bar. The green ground screw on the DV-EM printed circuit board shall also be connected to the ground bus bar. The ground bus bar shall be connected to earth ground.

**WARNING:** ALL SERIES DV-EM WIRING SHOULD BE ROUTED AWAY FROM ANY HIGH VOLTAGE OR HIGH CURRENT LINES (SUCH AS AC OR DC POWER LINE, AUDIO POWER LINES, AND MOTOR OR RELAY ACTUATION LINES). THE SERIES DV-EM WIRING SHOULD NEVER BE INSTALLED IN THE SAME CONDUIT WITH HIGH VOLTAGE OR HIGH CURRENT LINES.

The National Electrical Code defines two types of circuits for protective signaling systems: **power limited** circuits and **non-power limited** circuits. Series DV-EM input circuits have been designed as power limited circuits.

**CAUTION:** The National Electric Code limits the maximum number of conductors that can be installed in conduit and wiring boxes depending on the size of the conduit, the volume of the boxes, and the gauge of the wire used. Make sure that wiring used for Series DV-EM installation complies with the latest NEC requirements for power limited circuits.

**CAUTION:** If auxiliary music input is connected to the Series DV-EM, then the music source must be power limited.

See the Series DV-EM Field Wiring Connection section of this manual for recommended wire sizes and wire type to use for all Series DV-EM input lines.

# Mounting

The Series DV-EM shall be mounted in a location within the environmental limits specified in the latest UL Standard for indoor control panels. The Series DV-EM shall not be located in a hazardous location. Refer to the "Technical Specifications" section.

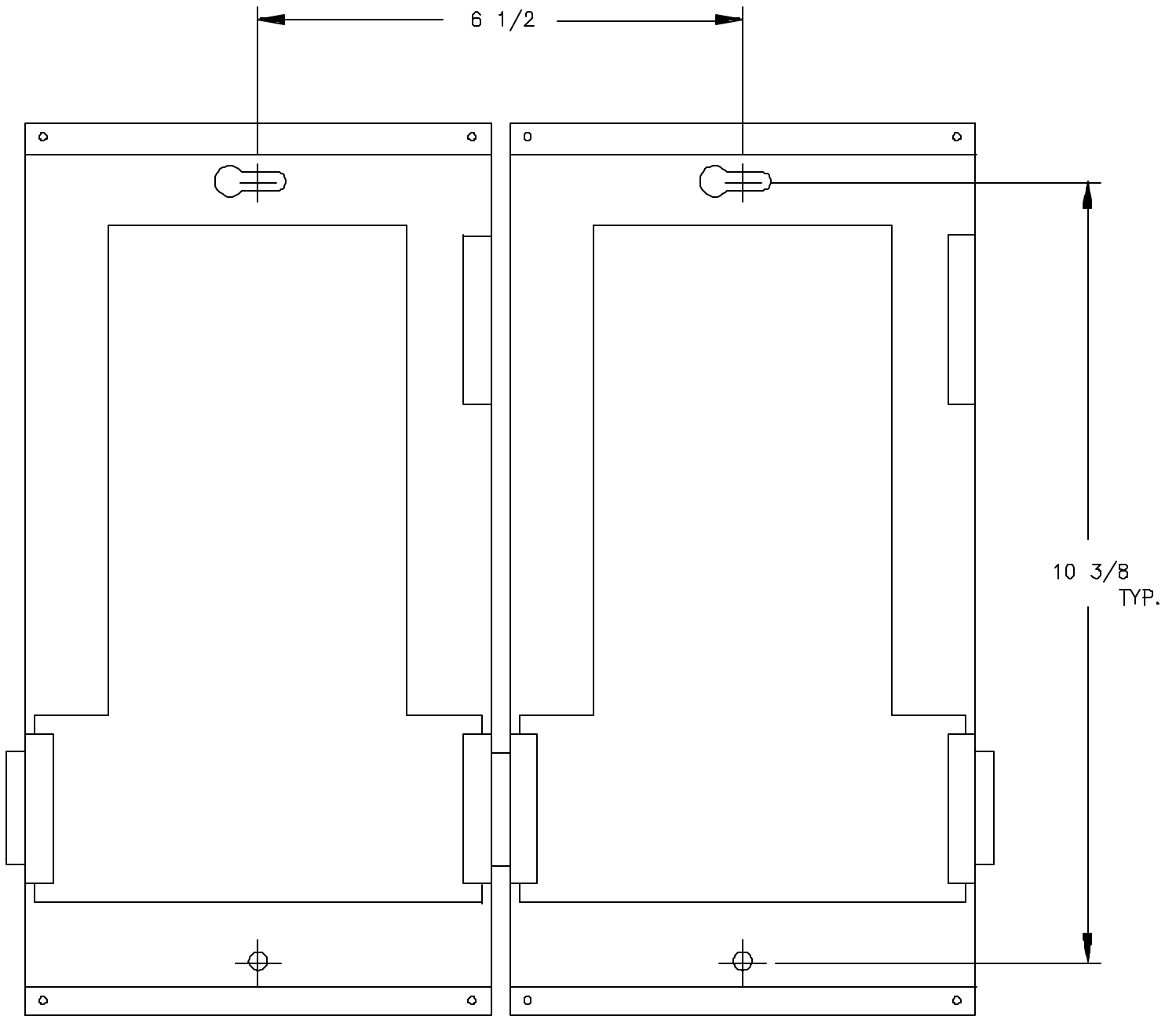
**CAUTION:** In order to comply with the latest NFPA and UL requirements for interconnection of fire alarm control equipment, the Series DV-EM units must be located in the same room as, and within 20 feet of, a LISTED compatible fire alarm audio system with the wiring enclosed in conduit and properly connected to such panel.

Refer to Figure 4 for Series DV-EM mounting hole layout. Drill mounting holes for appropriate screws and anchors to ensure secure mounting to the type of surface at the selected location. Keep out dust and dirt during installation. Dust and dirt can interfere with the operation and reduce the life of the equipment.

Remove the cover and mount the Series DV-EM at the selected location. **Use care to avoid damage to the PC board during installation.** Do not apply excessive pressure to the PC board or its components, including field wiring terminals and connectors.


Mount any additional wiring boxes or junction boxes needed to interconnect field wiring.


Connect conduit fittings or bushings as needed using knockouts provided on the top and bottom of the Series DV-EM units.



**FIGURE 4.**

# Field Wiring

 **CAUTION:** You must read and follow the following notes:

 **CAUTION:** The Authority Having Jurisdiction (AHJ) should be consulted by the installer prior to installation.

Before installation the system specifier must determine the proper wire gauge for all field wiring.

 **WARNING:** **ALL FIELD WIRING SHALL CONFORM TO LATEST APPLICABLE CODES, STANDARDS AND GUIDELINES INCLUDING NFPA, NEC, UL, LOCAL, STATE, COUNTY, PROVINCE, DISTRICT AND FEDERAL CODES AND STANDARDS.**

## Input Wiring **Error! Reference source not found.** Connection

All Series DV-EM wiring terminals are designed to accept #22 AWG to #16 AWG wiring (one wire per terminal). Connect the field wiring to the Series DV-EM terminals while referring to Figure 5.

 **WARNING:** **NEVER CONNECT OR DISCONNECT FIELD WIRING TO THE SERIES DV-EM WHEN INPUT VOLTAGE IS CONNECTED TO THE SERIES DV-100 OR SERIES DV-200.**

The gauge of the wire necessary for input wiring may vary for each input on the Series DV-EM. The field wiring for each input shall not exceed 100 ohms of resistance and 0.050 microfarads of capacitance.

## Connection to Series DV-100 or Series DV-200

Attach the first Series DV-EM (J1, male plug) to the Series DV-100 or Series DV-200 (J1, female socket) with cable assembly CAB-EM. Connect the cable's male plug to the J1 female socket on the right-side bottom of the Series DV-100 or Series DV-200. Connect the cable's female socket to the J1 male plug on the left-side of the Series DV-EM. To install additional Series DV-EMs, attach the next Series DV-EM (J1, male plug) to the previous Series DV-EM (J2, female socket). Optionally, the Series DV-EMs can also be interconnected using the CAB-EM cable assembly.

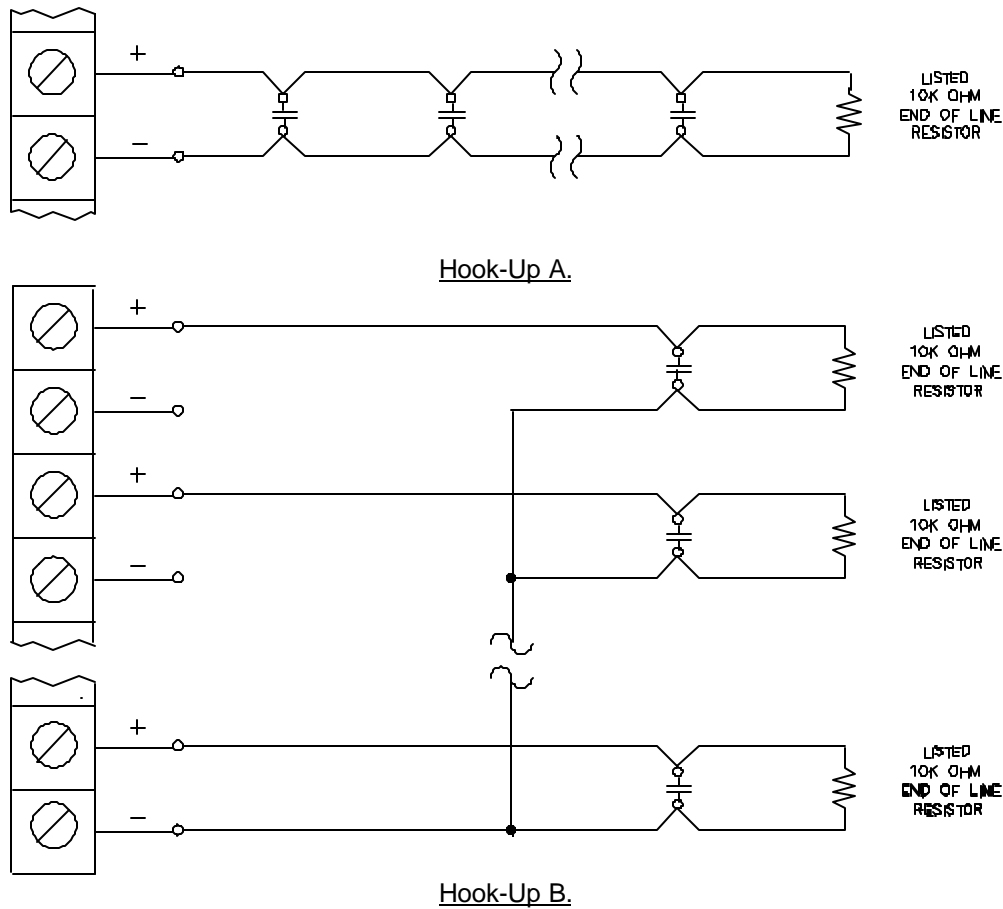
 **WARNING:** **THE DV-EM's, WHEN USED, SHALL BE ATTACHED TO J1 ON THE SERIES DV-100 OR SERIES DV-200.**

 **WARNING:** **DO NOT SUBSTITUTE ALTERNATE CABLES. DO NOT CONNECT FIELD WIRING TO THE (8) SERIES DV-100 OR SERIES DV-200 FILE INPUTS WHEN ANY DV-EM MODULES ARE USED.**

Install field wiring following the latest National Electrical Code and local codes for the type of system being installed. Make all necessary connections.

Check the integrity of all field wiring following directions in the "Field Wiring Checkout" section. Confirm that the specified cable is installed and there is continuity between required points (no "opened circuits"), with no unwanted connections ("shorts" to other conductors, chassis, or earth ground). **Perform the field wiring checkout before continuing with any connections to the Series DV-EM wiring terminals.**

Follow the procedures in the "System Checkout" section of the Series DV-100 or the Series DV-200 manual, to ensure that the field wiring has been properly connected and that the Series DV-EM is functioning as intended.



**INPUT WIRING  
FIGURE 5.**

The inputs to the Series DV-EM shall be dry contacts or open collector devices. Dry contacts or open collectors from multiple devices may be connected in parallel as shown in Hook-up A. Total wire resistance shall not exceed 100 ohms. Total wire capacitance shall not exceed 0.050 microfarads. Wire shall be 16 AWG maximum, 22 AWG minimum. Each input circuit must have a LISTED 10K end-of-line resistor across the last input contact. All unused or unsupervised inputs should have a LISTED 10K end-of-line resistor installed across input terminals. LISTED 10K end-of-line resistors shall have a 1/8W minimum power rating and a 5% maximum tolerance.

If multiple activation inputs are located at the same location, the (-) input leg may be commoned to reduce wiring requirements. See Hook-up B above.

All Series DV-EM input wiring should be routed away from any high voltage or high current lines (such as AC or DC power lines, audio power lines, and motor or relay actuation lines). The Series DV-EM wiring should never be installed in the same conduit with high voltage or high current lines.

## Field Wiring Checkout

Refer to NFPA for guidelines on testing signaling system wiring.

**CAUTION:** Do not connect input voltage to any equipment until the field wiring has been inspected and approved.

Verify that the field wiring is in full agreement with this manual and with the detailed wiring layout prepared for this installation.

Ensure that no unwanted voltages are present on circuit conductors and ground. Test all ungrounded connectors for electrical isolation from ground. Test all wires that are not intentionally connected for electrical isolation from each other. Measure and record the resistance of each circuit pair (this can be done by temporarily short circuiting one end of the circuit).

## System Checkout

Follow the procedures in the "System Checkout" section of the Series DV-100 or the Series DV-200 manual, to ensure that the field wiring has been properly connected and that the Series DV-EM is functioning as intended.

## Troubleshooting

Follow the procedures in the "Troubleshooting" section of the Series DV-100 or the Series DV-200 manual, to troubleshoot the system.

# Technical Specifications

## Mechanical

Dimensions (H x W x D)	12" x 6.5" x 2"
Weight	3.5 pounds
Enclosure	0.050" Steel
Finish	Black
Mounting	Indoor Surface Mount Top and Bottom Wiring Entry

## Environmental

(Meets UL requirements)	
Operating Temperature	0° to +49° C
Storage Temperature	-20° to 70° C
Humidity	85±5% @ 30±2° C Non-condensing

## Electrical

DV-100/200 Supply Voltage	11.0V	24.0V	29.0V
Additional DV-100/200 Current Draw Per Expansion Module	6.0mA	3.0mA	2.5mA

## End-of-Line Resistor

Resistance	10K Ohms
Tolerance	5% Maximum
Power Dissipation	1/8W Minimum

# Limited Warranty

Wheelock products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these 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), Underwriters' Laboratories of Canada (ULC), 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). Wheelock products when properly specified, applied, installed, operated, maintained and operationally tested as provided above are warranted against mechanical and electrical defects for a period of three years (as determined by date code). Correction of defects by repair or replacement shall be at Wheelock's sole discretion and shall constitute fulfillment of all obligations under this warranty. THE FOREGOING LIMITED WARRANTY SHALL IMMEDIATELY TERMINATE IN THE EVENT ANY PART NOT FURNISHED BY WHEELOCK IS INSTALLED IN THE PRODUCT. THE FOREGOING LIMITED WARRANTY SPECIFICALLY EXCLUDES ANY SOFTWARE REQUIRED FOR THE OPERATION OF OR INCLUDED IN A PRODUCT. WHEELOCK MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS, IMPLIED OR STATUTORY WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.

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