

**DataMaster<sup>®</sup> Gasoline Price  
Display with LED Matrix Display**  
Installation and Operation Manual

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*ED-15043*

*Rev 1 7 December 2006*

**DAKTRONICS**

**ED-15043**  
**P1319**  
**Rev 1 – 7 December 2006**

## **DAKTRONICS, INC.**

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# Section 1: Introduction

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This manual explains the installation, maintenance and troubleshooting of the Daktronics DataMaster<sup>®</sup> Gasoline Price with LED matrix display. For questions regarding the safety, installation, operation, or service of this system, please refer to the telephone numbers listed on the cover page of this manual.

This manual is divided into 8 sections: Introduction, Mechanical Installation, Electrical Installation, Maintenance and Troubleshooting, Gas Price Display Operation, Appendix A, Appendix B, and Appendix C.

- **Introduction** covers the basic information needed to make the most of the rest of this manual – take time to read the entire introduction as it defines terms and explains concepts used throughout the manual.
- **Mechanical Installation** provides general guidance on display mounting.
- **Electrical Installation** gives general guidance on terminating power and signal cables at the display.
- **Maintenance and Troubleshooting** addresses such things as removing basic display components, troubleshooting the display, performing general maintenance and exchanging display components.
- **Gas Price Display Operation** section gives a product overview of the DataMaster controller used to program the Gas Price display.
- **Appendix A** lists the drawings referenced within this manual.
- **Appendix B** lists the Frequently Asked Questions when operating this display.
- **Appendix C** contains a quick reference to the DataMaster when operating the Gas Price with LED matrix displays.

Daktronics identifies manuals by an ED number located on the cover page of the manual. For example, this manual would be referred to as **ED-15043**.

Listed below are a number of drawing types commonly used by Daktronics, along with the information each is likely to provide.

- **System Riser Diagrams:** overall system layout from DataMaster control location to display.
- **Electrical and Mechanical Speciation Drawings:** driver enclosure locations, mounting information, display dimensions; power and signal entrance points, and access method (front or rear).
- **Schematics:** power wiring, signal wiring, panel board or power termination panel assignments, signal termination panel assignments, and transformer assignments.

**Figure 1** illustrates the Daktronics drawing label. The drawing number is located in the lower-right corner of each drawing. Listing the last set of digits and the letter preceding them identifies drawings in the manual. In the example below, the drawing would be referred to as **Drawing A-181218**. Reference drawings are inserted in alphanumeric order in **Appendix A**.

DAKTRONICS, INC. BROOKINGS, SD 57006		
PROJ: DATATIME LED DISPLAYS		
TITLE: MECHANICAL SPECS, DF-1010-24, G3		
DES. BY: AVB	DRAWN BY: A GIBSON	DATE: 09 JAN 03
REVISION	APPR. BY:	1279-RO4A-181218
	SCALE: 1 = 16	

*Figure 1: Daktronics Drawing Label*

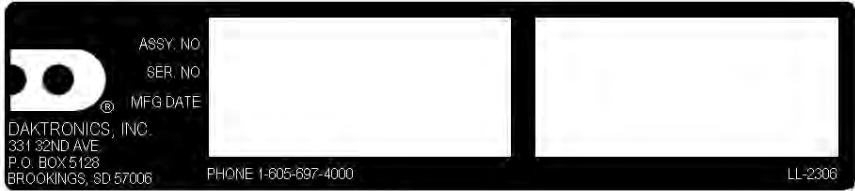
All references to drawing numbers, appendices, figures, or other manuals are presented in **bold** typeface, as shown below.

“Refer to **Drawing A-223298** for the display signal requirements.”

Additionally, drawings referenced within a particular section are listed at the beginning of that section as shown in the following example:

**Reference Drawing:**  
System Riser Diagram, Gas Price Display ..... **Drawing A-223298**

The model numbers of a Daktronics display can be found on the ID label on the display. The label will be similar to the one shown in **Figure 2**. When calling Daktronics Customer Service, please have this information available to ensure that your request is serviced as quickly as possible.



*Figure 2: Display Identification Label*

Daktronics displays are built for long life and require little maintenance. However, from time to time, certain display components may need replacing. The **Replacement Parts List** in **Section 4-8** provides the names and part numbers of components that may require replacement during the life of the display. Most display components have a white label that lists the part number. The component part number is in the following format: OP-\_\_\_\_-\_\_\_\_ (component) or OA-\_\_\_\_-\_\_\_\_ (multi-component assembly).

Following the **Replacement Parts List** is an explanation of **Daktronics Exchange and Repair and Return Programs**. Refer to these instructions if any display component needs replacement or repair.



## 1.1 Safety Precautions

### Important Safeguards:



1. Read and understand these instructions before installing your display.
2. Do not drop the controller or allow it to get wet.
3. Properly ground the display with a ground rod at the sign location.
4. **Disconnect power when the display is not in use.**
5. **Disconnect power when servicing the display.**
6. Do not modify the display structure or attach any panels or coverings without the express written consent of Daktronics, Inc.

## 1.2 Network Concepts

A current loop connection is used to connect between the controller and the display in this display.

### Current Loop

The DataMaster controller connects to the Gas Price Display from a J-box located outside near the display. The communication method is current-loop to the display. Current-loop is a standard communication method that uses a maximum cable length of 600 meters (approximately 2000 feet). Refer to **Section 3** for additional information and connections.

## 1.3 Product Overview

The DataMaster Gasoline Price with an LED matrix display is part of a family of Daktronics digit products designed for easy installation, readability, and reliability. The display is a custom design, which combines message center technology and the fixed digit Gasoline Price display.

The DataTime Series includes time and temperature displays. The DataMaster series includes gasoline, rate, and parking displays, along with lottery and event counters.

These displays have the following features:

- These displays use red LEDs to illuminate their numeric digits.
- Power usage for individual displays in this series is a maximum 500 W. All models have a 120 V power requirement.
- DataMaster cabinets are constructed of heavy-gauge aluminum.
- Digit faceplates are black, and are set directly into the surface of the display.
- Mounting weights and dimensions for the display are listed in **Section 2** of this manual.
- The DataMaster outdoor LED displays have been designed for use with a DataMaster™ 100 hand-held controller. The device uses a keyboard insert for display control. **Section 5** of this manual provides operating instructions.

Typical DataMaster model numbers are described as follows:  
DF-1220-24-R

<b>DF-1220</b>	=	Outdoor Digit Display with LED Matrix Display
<b>24</b>	=	Digit height in inches - 24
<b>R</b>	=	LED Color- R (Red)

## 1.4 Component Identification

The following terms include some of the more commonly used terms when referring to DataMaster displays.

This is only a brief overview. Refer to **Section 4** for additional information on maintaining the various display components.

**DataMaster Controller (DM100):** The handheld keyboard like device used to set the time, date, hold times, dimming etc. on the Gas Price display. The alphanumeric keypad is also used for programming the message center. See **Section 5** for more information on the DataMaster controller.

**Display Address:** The display address is an identification number assigned to each driver in a network. The address is set using an 8-position binary switch on the driver board. For single-line signs such as this gas price display, the display is typically set to address "1". The address will be displayed each time the display powers up.

**Digit Circuit Board:** The LEDs are mounted to circuit boards, which mount to the back of a digit panel. Problems with individual digits, segments or LEDs may require accessing or replacing one of these boards.

**LED (light emitting diode):** LEDs are high-intensity, low-energy lighting units.

**Power Supply:** Converts AC line voltage from the load center to low DC voltage for one or more digit circuit boards.

**Protocol plug:** The protocol-4 plug is inserted in the 5-pin protocol jack to identify the driver as a host driver for the display. For display systems that use more than one driver, this plug would be located in the first or host display only.

## 1.5 Daktronics Nomenclature

To fully understand some Daktronics drawings, such as schematics, it is necessary to know how various components are labeled in those drawings. You will find this information useful when trying to communicate maintenance or troubleshooting efforts.

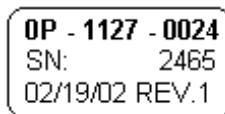
The following labeling formats might be found on various Daktronics drawings:

- “TB \_\_” denotes a termination block for power or signal cable.
- “E \_\_” denotes a grounding point.
- “J \_\_” denotes a power or signal jack.
- “P \_\_” denotes a power or signal plug for the opposite jack.

Finally, Daktronics part numbers are commonly found on drawings. Those part numbers can be used when requesting replacement parts from Daktronics Customer Service. Take note of the following part number formats. (Not all possible formats are listed here.)

- “OP- \_\_\_\_\_ - \_\_\_\_\_” denotes an individual circuit board, such as a driver board.
- “OA- \_\_\_\_\_ - \_\_\_\_\_” denotes an assembly, such as a circuit board and the plate or bracket to which it is mounted. A collection of circuit boards working as a single unit may also carry an assembly label.
- “W- \_\_\_\_\_” denotes a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true for ribbon cables.

Most circuit boards and components within this display carry a label that lists the part number of the unit. If a circuit board or assembly is not listed in the **Replacement Parts List** in **Section 4.7**, use the label to order a replacement. A typical label is shown in **Figure 3**. The part number is in bold.



*Figure 3: Typical Label*



## Section 2: Mechanical Installation

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**Note:** Daktronics **does not** guarantee the warranty in situations where the display is not constantly in a stable environment.

Daktronics engineering staff must approve **any** changes that may affect the weather-tightness of the display. If any modifications are made, detailed drawings of the changes must be submitted to Daktronics for evaluation and approval, or the warranty may be void.

**Daktronics is not responsible for installations of structural integrity or support structures done by others.** It is the customer's responsibility to ensure that a qualified structural engineer approves the structure and any additional hardware.

### 2.1 Mechanical Installation Overview and display specifications

Mechanical installation typically consists of mounting the display and any accompanying panels to the support structure.

The Gasoline Price Display with LED matrix display specifications are as follows:

Model	Dimensions (H x W x D)	Weight	Digit Size
DF-1220-24	60" (1524 mm), 96" (2438 mm), 9" (229 mm)	300 lb (136 kg)	24" (610 mm)
DF-1223-18	48" (1219 mm), 72" (1829 mm), 9" (229 mm)	250 lb (113 kg)	18" (157 mm)

### 2.2 Support Structure Design

**Reference Drawings:**

Shop Drawing, DF-1220-24 ..... **Drawing B- 234578**

Shop Drawing, DF-1223-18 ..... **Drawing B- 227849**

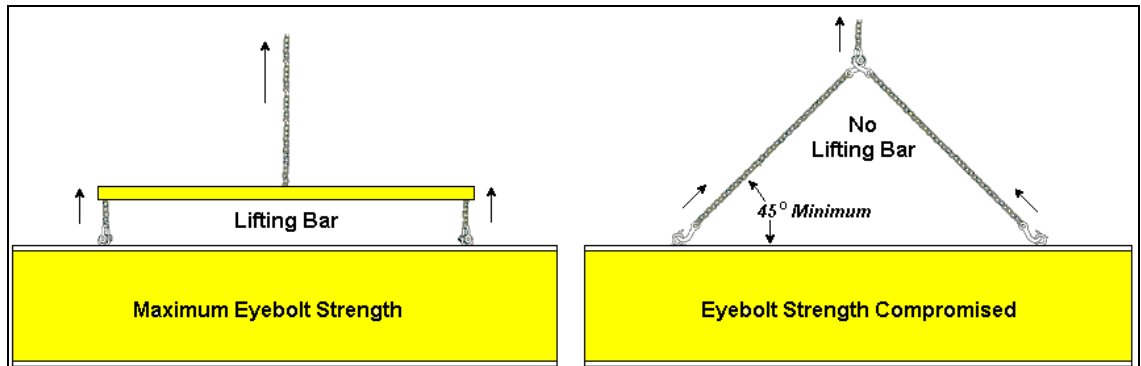
Drill through the side of the display as required for mounting the display. **Be careful not to damage any interior parts.** Power and signal wires can be routed through the side of the cabinet. Refer to **Drawing B-234578** and **Drawing B-227849** for details.

**Note:** The drawings suggest mounting methods and are not to be considered as specifications for construction. **It is the installer's responsibility to ensure the mounting structure and hardware are capable of supporting the sign, and will agree with local codes.**

## 2.3 Lifting the Display

The display is shipped equipped with  $\frac{1}{2}$ " eyebolts that are used for lifting and positioning the modules. Eyebolts are located along the top outer edges of the cabinet.

Daktronics strongly recommends using a spreader bar, or lifting bar, to lift the display. Using a spreader bar ensures that the force on the eyebolts is straight up, minimizing lifting stress. **Figure 4** illustrates both the correct (left example) and the incorrect (right example) method for lifting a display. Lift the display as shown on the left, with a lifting bar. Be sure to use every lifting point provided.



**Figure 4:** Lifting the Display (Correct, Left; Incorrect, Right)

**Note:** Daktronics assumes no liability for display damage or injury resulting from incorrect setup or incorrect lifting methods.

Eyebolts are intended for lifting during installation only. **Do not attempt to permanently support the display by the eyebolts.**

In installations in which an ad panel or some other display section may be added to the base display, the lower section is installed first and secured to the support beams, and then the upper section is placed atop or above the lower sign section and attached to the beams. There may be cables extending from the top of the lower section. Guide these cables into the hole in the bottom of the upper section for later connection.

Installers may remove the lift eyebolts once the display is in place. If removing the eyebolts, adequately seal the holes using bolts and sealing washers. For this display, thread  $\frac{1}{2}$ "-13 bolts into the holes. In addition, inspect the top and sides of the display for any holes or openings that may allow moisture to enter the display, and plug and seal those openings with silicone.

## Section 3: Electrical Installation

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Daktronics outdoor displays are ETL listed and tested to CSA standards for outdoor use. Contact Daktronics with any questions regarding the testing procedures.

**Only qualified individuals should perform power routing and termination to the display. It is the responsibility of the electrical contractor to ensure that all electrical work meets or exceeds local and national codes.**

### 3.1 Preparing for Power/Signal Connection

**Reference Drawing:**

System Riser Diagram, Gas Price Display .....**Drawing A-223298**  
Schematic, Gas Price Display with Message Center ..**Drawing B-223253**

Electrical installation consists of the following processes:

- Providing power and ground to a disconnect near the display.
- Routing power and ground from the main disconnect to the display driver/power enclosure.
- Connecting the display ground to a grounding electrode at the sign location.
- Routing the control signal cable from the control location to the sign location.

**Drawings A-223298** and **B-223253** include detailed instructions for power and signal connections for the DataMaster Gas Price with LED matrix display. Refer to these drawings before undertaking any part of the electrical installation.

### 3.2 Power and Grounding Connections

Correct power and grounding installation is imperative for proper display operation. The subsections that follow give details of display power installation. Only qualified individuals should attempt to complete the electrical installation. Improper installation could result in serious damage to the equipment and could be hazardous to personnel.

#### **Power**

Daktronics DataMaster digit displays with message centers have been designed for easy access to components, and the power and control signal hookup. The front panel is hinged to allow access to the digits, cabling, and other electronic components.

The DataMaster, Gas Price displays require a dedicated, 120 VAC, 15 A circuit for incoming power.

**WARNING: It is critical that the display circuit be fused at 15 A, and that all conductors used must be designed to pass a 15 A current in normal operation. Failure to meet wiring and over current protection device requirements is a violation of the National Electrical Code® and will void the display warranty.**

## **Grounding**

### **Reference Drawings:**

System Riser Diagram, Gas Price Display..... **Drawing A-223298**  
Schematic, Gas Price Display with Message Center. **Drawing B- 223253**

Displays **MUST** be grounded according to the provisions outlined in Article 250 and 600 of the National Electrical Code and according to the specifications in this manual. Daktronics requires a resistance-to-ground of 10 ohms or less.

The contractor performing the electrical installation can verify ground resistance. Technicians from Daktronics Sales and Service offices can also provide this service.

The display system **must** be connected to an earth electrode installed at the display. Proper grounding is necessary for reliable equipment operation. It also protects the equipment from damaging electrical disturbances and lightning. The display **must be** properly grounded, or the warranty will be void.

The material for an earth-ground electrode differs from region to region and may vary according to conditions present at the site. Consult the National Electrical Code and any local electrical codes that may apply. The support structure of the display cannot be used as an earth-ground electrode. The support is generally embedded in concrete, and if it is in earth, the steel is usually primed or it corrodes, making it a poor ground in either case.

### ***Power Installation***

There are two types of power installations. Power with ground and neutral conductors provided, and installation with only a neutral conductor provided. For these displays, installation with ground and neutral conductors is used.

#### **Installation with Ground and Neutral Conductors Provided**

For this type of installation, the power circuit **must** contain an isolated earth-ground conductor. Under this circumstance, **do not** connect neutral to ground at the disconnect or at the display. This would violate electrical codes and void the warranty. Use a disconnect so that all hot lines and neutral can be disconnected. The National Electrical Code requires the use of a lockable power disconnect within sight of or at the display.



### 3.3 Lightning Protection

The use of a disconnect near the display to completely cut all current-carrying lines significantly protects the circuits against lightning damage. The National Electrical Code also requires it. In order for this device to provide protection, the power **must** be disconnected when the display is not in use. The control console should also be disconnected from power and from the signal j-box when the system is not being used. The same surges that may damage the display's driver can also damage the driver console's circuit.

### 3.4 Signal Connection

#### Reference Drawings

- System Riser Diagram, Gas Price Display .....**Drawing A-223298**
- Shop Drawing, DF-1220-24 .....**Drawing B- 234578**
- Shop Drawing, DF-1223-18 .....**Drawing B- 227849**

Drill two separate holes and secure conduit fittings. Route power and signal cables into the display from the side or rear. Be careful not to damage any interior components. All power and signal wiring terminates at the driver enclosure.

To gain access to the driver enclosure, open the access door and remove the cover from the enclosure. Refer to **Drawing B-234578** and **Drawing B-227849** for the access location for your sign. Access to the interior components is gained by turning the latches on the hinged door.

#### Current Loop (Direct)

##### Reference Drawings:

- System Riser Diagram, Gas Price Display .....**Drawing A-223298**

A direct controlled display uses a current loop connection from the J-box at the base of the display to the driver enclosure in the sign. All the power and signal wiring terminates at the driver enclosure. The DataMaster hand-held controller receives its power from the display.

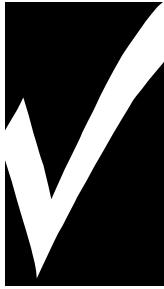
#### J-Box to Driver Enclosure Input Jack

J-Box Pin#	Cable Color	Enclosure Terminal Block
Pin 1	Red	12V DC Out (+) pin 7
Pin 5	Black	12 V DC Out (-) Pin 8
Pin 5	White	Signal IN (-) Pin 2
Pin 6	Green	Signal IN (+) Pin 1
Pin 8	Brown	Signal OUT (+) Pin 4
Pin 9	Blue	Signal OUT (-) Pin 5



## Section 4: Maintenance and Troubleshooting

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### **IMPORTANT NOTES:**

1. **Disconnect power before doing any repair or maintenance work on the display!**
2. **Allow only qualified service personnel access to internal display electronics.**
3. **Disconnect power when not using the display.**

### 4.1 Cabinet Specifications

Cabinets for the Daktronics outdoor LED digit displays are constructed of heavy-gauge aluminum. The displays include hinged panels for component access and to service indicators and digits. The LED message center is accessed using a hex wrench to remove the modules from the face of the display to access to the interior components.

### 4.2 Component Location and Access

#### **Reference Drawings:**

- Shop Drawing, DF-1220-24 ..... **Drawing B- 234578**  
Shop Drawing, DF-1223-18 ..... **Drawing B- 227849**

This display is made up of three main components: the circuit boards that make up the digits, the driver enclosure and the modules on the message display.

#### Display Digits:

- The 24" digits are made of red LED segments
- The 18" digits are made up of a single pc board.

Displays are two sided in one cabinet. One side contains an enclosure that includes the following devices:

- Display Driver
- 24V DC power supply
- 10V AC transformer
- Signal/Power Input Terminal Jack
- Signal Surge Board

The display has a hinged door that swings outward when the two latches on the display face panel are loosened. To open the display, use a straight or flat screwdriver.

**Note: Disconnect power before servicing the display!** Disconnect power, too, when the display is not in use. Prolonged power-on may shorten the life of some electronic components.

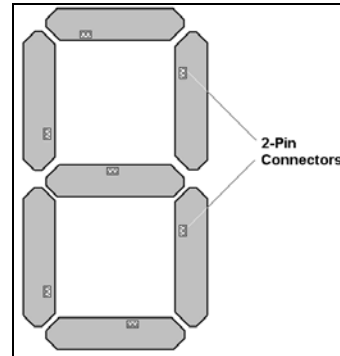
## 4.3 Service and Diagnostics

### Replacing a Digit Segment

When a digit segment malfunctions, in most cases it is necessary to replace just that segment board. The digit, as shown in **Figure 5**, is composed of LED segments. Do not attempt to remove individual LEDs.

To remove a digit segment, follow these steps:

1. Open the digit panel as described in **Section 4.2**.
2. Disconnect the 2-pin power/signal connector from the back of the individual segment.  
Release the connector by squeezing together the locking tabs as you pull the connector free.
3. The individual segments are secured to the inside of the panel with fixed machine screws, spacers, and push nuts. Remove the nuts and lift the segment off the standoff screws.
4. Position a new segment over the screws and tighten the nuts.
5. Reconnect the power/signal connector. **Note:** This is a keyed connector it will attach in one way only. **Do not** attempt to force the connection!
6. Close and secure the digit panel and run a message to test the display.



**Figure 5:** Segmented Digit Panel (Rear View)  
24" Digit

Replace a malfunctioning colon, decimal, or indicator assembly in the same manner.

### Segmentation and Digit Designation

#### Reference Drawing:

Segmentation, 7 Segment Bar Digit ..... **Drawing A-38532**

Digits are composed of segments, or grouping of LEDs that operate in unison.

**Drawing A-38532** illustrates digit segmentation and wiring.

### Replacing an LED Driver

#### Reference Drawings:

8 Column MASC Driver Specifications..... **Drawing A-167237**

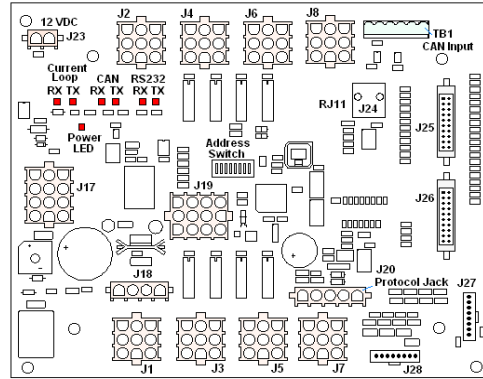
Shop Drawing, DF-1220-24..... **Drawing B- 234578**

Shop Drawing, DF-1223-18..... **Drawing B- 227849**

The driver is mounted inside the display enclosure and behind the digits.

To replace the driver in the display enclosure:

1. Open the digit panel or display face panel as described in **Section 4.2**.
2. Remove the cover from the driver enclosure.  
It is helpful to have the cables labeled as to which was removed from which connector.
3. Disconnect all connectors from the driver. Release each connector by squeezing together the locking tabs as you pull the connector free. **Note:** When reconnecting, remember that these are keyed connectors and will attach in one way only. **Do not** attempt to force the connections.
4. Remove the nuts securing the driver to the inside of the enclosure.
5. Carefully lift the driver from the display and place it on a clean, flat surface.
6. Follow the steps in reverse order to attach a new driver.



**Figure 6: 8-column Digit Driver**

This display uses an 8-column driver. **Figure 6** identifies the major functions of the driver.

In the display, the LED drivers perform the task of switching digits on and off. Refer to **Drawings A-167237**, **Drawing B-234578** and **Drawing B-227849** for connector functions and wiring pin numbers.

The following table lists the functions of the various jacks, including those that are not used in this application.

**LED Driver Jack Functions**

Jack No.	Function
J1-J8 (8-column)	Digits Output
J17	Signal/Power Input
J20	Protocol-4 Location
J23	12 VDC Power Out
J25	Signal OUT to first LED module
TB1	CAN (photo sensor)
J18, J19, J21, J22, J24, J26, J27, J28	Jacks not used in this application

The address of the display is set with the DIP-switches. All DataMaster displays ship with the “Line 1” address already set.

## Replacing a Signal Surge Board

### Reference Drawings:

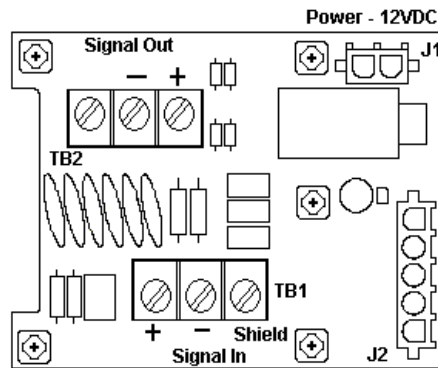
Shop Drawing, DF-1220-24..... **Drawing B- 234578**

Shop Drawing, DF-1223-18..... **Drawing B- 227849**

The surge board is mounted behind the digit inside the display enclosure.

To replace the surge board in the driver enclosure:

1. Open the digit panel or display face panel as described in **Section 4.2**.
2. Remove the cover from the driver enclosure.
3. Disconnect all connectors from the surge board. Release each connector by squeezing together the locking tabs as you pull the connector free. **Note:** When reconnecting, remember that these are keyed connectors and will attach in one way only. **Do not** attempt to force the connections.
4. Remove the nuts securing the driver to the inside of the enclosure.
5. Carefully lift the surge board from the display and place it on a clean, flat surface.
6. Follow the steps in reverse order to attach a new surge board.



**Figure 7:** Signal Surge Suppression Board

In the display, the signal surge suppression board is an inline device used to filter the current loop data line. The suppression board protects the controller from high voltage surges. Refer to **Drawing B-234578** and **Drawing B-227849** for the location of the surge board inside the driver enclosure. The surge board is pre-wired before the display is shipped.

**Note:** The surge suppressor must be firmly connected to the driver enclosure, and the display must be properly grounded in order to be effective.

## 4.4 Light Sensor Location

### Reference Drawing:

Light Sensor Installation, G3 ..... **Drawing A-183775**

This display uses a light sensor to regulate sign dimming functions. Use **Drawing A-183775** and the following instructions to replace the light sensor in your DataMaster Gasoline Price display. The light sensor is found in the primary face only.

1. Open the digit panel or display face panel as described in **Section 4.2**.
2. Locate the  $\frac{5}{8}$ " sensor plughole on the front panel of the display. Refer to **Drawing B-234578** and **Drawing B-227849** for the specific information.
3. There are two 6-32 studs above and below the plughole. The internal light sensor assembly (Daktronics part #0A-1279-0203) is positioned on the studs, with the clear lens toward the front of the cabinet and the cable at the bottom. Secure the sensor with the provided plastic wing nuts.
4. Route the signal cable to the driver and insert the 6-position plug into the mating jack on the driver, TB1.
5. Close the hinged access doors and tighten the latches.

## 4.5 Message Center

The message center that is built into the display is made up of eight, 34 mm modules. A 20-position ribbon cable connects from J25 (Home) on the LED driver to J2 on the first module of the message center. The output (J1) from the last module in the line connects to the input (J2) of the first module on the second side.

The following sections will explain how to access the interior parts.

### Accessing the Display

Daktronics LED matrix, 34 mm displays are front accessible; meaning access to the internal components can be gained only from the front of the display.

1. Locate the latch access fasteners on the module (one is centered below the second row of pixels and one is centered above the bottom two rows)
2. With a 1/8" Allen wrench, turn the latch access fasteners a quarter turn as shown in one latch turns clockwise and the other counter-clockwise to open, and reverse to close.
3. Gently pull the module far enough forward to reach behind the back and disconnect the power and ribbon cables.
4. Reverse the above steps to reinstall the module.

### Power Supplies

#### Reference Drawing:

Schematic, Gas Price Display W/Message Center .....**Drawing B-223253**

The LED power supplies are identified as assemblies, with each power supply controlling up to eight modules. The 34 mm message center uses red LEDs for a monochrome display.

1. Access display
2. Locate power supply, label and remove wires
3. Put in a new power supply and reconnect wires using **Drawing B-223253** as a reference

## 4.6 Troubleshooting

This section lists potential problems with the display, indicates possible causes, and suggests corrective action. This list does not include every possible problem, but it does represent some of the more common situations that may occur.

Symptom/Condition	Possible Cause
Entire Display Fails to Work	<ul style="list-style-type: none"> <li>• Check for proper line voltage at termination panel</li> <li>• Check connections from power supply to driver</li> <li>• Check power LED on driver</li> </ul>
Cannot communicate with Display via Current Loop	<ul style="list-style-type: none"> <li>• Check connections at J-box and display</li> <li>• Make sure DataMaster is receiving power</li> <li>• Check serial cable from DataMaster to J-box</li> <li>• Remove screws and plug DataMaster directly into the J-box</li> </ul>
Garbled digit display	<ul style="list-style-type: none"> <li>• Internal driver logic malfunction</li> <li>• DataMaster malfunction</li> </ul>
Digit will not light	<ul style="list-style-type: none"> <li>• Black wire to digit broken</li> <li>• Poor contact at driver connection</li> <li>• Driver malfunction</li> </ul>
Segment will not light	<ul style="list-style-type: none"> <li>• Broken LED or connection</li> <li>• Broken wire between driver and digit</li> <li>• Poor contact at driver connector</li> </ul>
Segment stays lit	<ul style="list-style-type: none"> <li>• Driver shift register failure</li> <li>• Short circuit on digit</li> </ul>
Data appears in the wrong place on the display, wrong data on a particular line of the display	<ul style="list-style-type: none"> <li>• Incorrect address settings on drivers (Refer to "Power On Self-Test" in the following section, and consult tables to set correct addresses.)</li> </ul>
A section of the LED matrix display is not working. The section extends all the way to the right side of the display	<ul style="list-style-type: none"> <li>• Replace/check ribbon cable</li> <li>• Replace/move the first module that is not working</li> <li>• Replace/move the first module on the left side of the module that is not working</li> <li>• Check/replace the power supply assembly on the first module that is not working</li> </ul>
Row of modules does not work or is distorted	<ul style="list-style-type: none"> <li>• Replace/check ribbon cable to and from the first non-working module</li> <li>• Check for bent pins on the module and controller</li> <li>• Replace/move module that is distorted</li> <li>• Replace/move the first module to the left of the one that is not working</li> <li>• Replace controller</li> <li>• Check the voltage to the module</li> </ul>



	<ul style="list-style-type: none"> <li>• Check the wire connections at the power supply and at the module</li> <li>• Replace the power supply assembly</li> </ul>
--	---

Failures that may occur in the display driver are described using codes. In the event a sign malfunctions, a failure code registers by displaying an “E(x)” value on the first two digits of the display. “E” simply indicates an error, and the letter “x” represents the actual code number. Refer to the following table for a description of each failure code and for possible solutions.

Failure Code	Description	Possible Solution
E1	Protocol Setting Error: There is an unsupported driver protocol setting.	Check the value set in the protocol plug of the driver (J20).
E2	Time Error: There is no valid time stored in the driver; it may be a failure of the real-time clock on board or other timekeeping device.	Set the time in the display using the Set Time menu option on the DataMaster 100 controller. (DataMaster Time & Temp displays only)
E3	Temp Error: There is no response from the temp sensor or light sensor, or general temp sensor failure.	The temp sensor takes approximately 10 seconds to initialize on power-up. The sign will display this error until initialization is complete.
E4	No Message Error: This code is shown when there are no messages downloaded to the display	Download a new message to the display using the <DISPLAY SEQUENCE> key on the DataMaster 100 controller.
E5	No Line Number Selected Error: The driver for this line has a Protocol 4 plug installed in J20, but all address switches are “OFF”. (Note: In some older drivers this happens when no address plug installed is in J19.)	Set the line number by setting the binary address on S1 (or installing the correct plug in J19). The Protocol 4 plug designates this driver as the “host.” If this is not the host, remove the Protocol 4 plug from J20.

**Note:** The LCD screen on the DataMaster 100 controller will not show the failure codes described in the table below. Failure codes will only be displayed on the DataMaster sign.

## Power On Self-Test:

A useful troubleshooting tool is the power on self-test the host driver performs every time it powers up:

- The first digit on the digit display will show an “r”, followed by two numbers that are the revision of the software on the driver. The LED matrix display will read: “rev. x.x”.
- If the signal wiring to the controller is correct, the first two digits of each display will show “Ad” momentarily, and the first digit will then flash three numbers indicating the decimal address that is set with the dipswitch. The LED matrix display will read: Address 00X, depending on the address set.
- Next, the first two digits of each line will display “Lx”, where “x” is the line number that the driver is set to control (set with the Dip Switches). The LED matrix display will read: Line 1.
- Finally, each line will display “1234...” according to the column number of each of its digits. Every line should show “1” on the left-most digit, and all digits should be numbered consecutively from left to right. If this is not the case, either the wrong address is set, or the driver or digit harness is connected incorrectly. If there is no address set on the driver, the driver will display “E5”. The LED matrix display will show the sign the message has been set to: 8x64.

## 4.7 Replacement Parts

Refer to the following table for Daktronics replacement parts.

Description	Daktronics Part No.
Driver, 8-column MASC, LED	0P-1192-0082
Light sensor	0A-1279-0203
Protocol plug (Protocol 4)	0A-1279-0089
Enclosure, w/Driver	0A-1279-0175
Signal surge suppression board	0P-1110-0011
Mod; AF-3400-8x8-34-2R-30x70	0A-1208-4000
Ribbon Assy, 20 Pos. 96"	0A-1000-0024
Ribbon Assy, 20 Pos. 42"	0A-1000-0019
Ribbon Assy, 20 Pos. 18"	W-1387
24" Red, vert. LED segment	0P-1192-0204
24" Red, horiz. LED segment	0P-1192-0205
18" Red, 7 segment	0P-1192-0202
Handheld DataMaster 100	0A-1196-0142
J-box; Outdoor 9 pin -D-, Male	0A-1196-0093

## 4.8 Daktronics Exchange and Repair and Return Programs

To serve customers' repair and maintenance needs, Daktronics offers both an Exchange Program and a Repair and Return Program. Daktronics' unique Exchange Program is a quick, economical service for replacing key components in need of repair. If a component fails, Daktronics sends the customer a replacement, and the customer, in turn, sends the failed component to Daktronics. This not only saves money but also decreases display downtime. Daktronics provides these plans to ensure users get the most from their Daktronics products, and it offers the service to qualified customers who follow the program guidelines explained below. Please call the Help Desk – 877-605-1113 – if you have questions regarding the Exchange Program or any other Daktronics service.

When you call the Daktronics Help Desk, a trained service technician will work with you to solve the equipment problem. You will work together to diagnose the problem and determine which exchange replacement part to ship. If, after you make the exchange, the equipment still causes problems, please contact our Help Desk immediately.

If the replacement part fixes the problem, package the defective part in the same box and wrapping in which the replacement part arrived, fill out and attach the enclosed UPS shipping document, and **RETURN THE PART TO DAKTRONICS**. In most circumstances, you will be invoiced for the replacement part at the time it is shipped. This bill is due when you receive it.

Daktronics expects immediate return of an exchange part if it does not solve the problem. The company also reserves the right to refuse equipment that has been damaged due to acts of nature or causes other than normal wear and tear.

If the defective equipment is not shipped to Daktronics within 30 working days from the invoice date, it is assumed you are purchasing the replacement part, and you will be invoiced for it. This second invoice represents the difference between the exchange price and the full purchase price of the equipment. The balance is due when you receive the second invoice. If you return the exchange equipment after 30 working days from the invoice date, you will be credited for the amount on the second invoice, minus a restocking fee.

**To avoid a restocking charge, please return the defective equipment within 30 days from the invoice date.**

Daktronics also offers a Repair and Return program for items not subject to exchange.

**Return Materials Authorization:** To return parts for service, contact your local representative prior to shipment to acquire a Return Material Authorization (RMA) number. If you have no local representative, call the Daktronics Help Desk for the RMA. This expedites repair of your component when it arrives at Daktronics.

**Packaging for Return:** Package and pad the item well so that it will not be damaged in shipment. Electronic components such as printed circuit boards should be installed in an enclosure or placed in an antistatic bag before boxing. Please enclose your name, address, phone number and a clear description of symptoms.

**This is how to reach us:**

**Mail:** Customer Service  
Daktronics, Inc.  
PO Box 5128  
331 32nd Ave  
Brookings SD 57006

**Phone:** Daktronics Help Desk: 877-605-1113 (toll free)  
or 605-697-4034

**Fax:** 605-697-4444

**E-mail:** [helpdesk@daktronics.com](mailto:helpdesk@daktronics.com)

# Section 5: Gas Price Display with Matrix Display Operation

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These sections describe the DataMaster 100 controller, and how it is used to set the information on the Gas Price Display.

**Note:** A special DM-100 alphanumeric keypad insert has been created for this display. Refer to **Section 5.2** for details

## 5.1 DataMaster 100 Overview

The DataMaster 100 Series controller, shown in **Figure 8**, is a hand-held controller designed to operate Daktronics LED DataMaster displays. The console's liquid crystal display (LCD) guides the user through the operation of the system.

The DataMaster 100, identified by the series number DM-100, is configured to program and display items and their prices. The display in the LED DataMaster Series will use a junction box at the base of the sign. Refer to **Section 3** for information on connection procedures.

For details on configuring the DataMaster to operate the display, refer to **Section 5.3: Gas Price Display with Matrix Operation**.



**Figure 8:** DataMaster 100

## 5.2 DataMaster™ Insert and Code

### Reference Drawing:

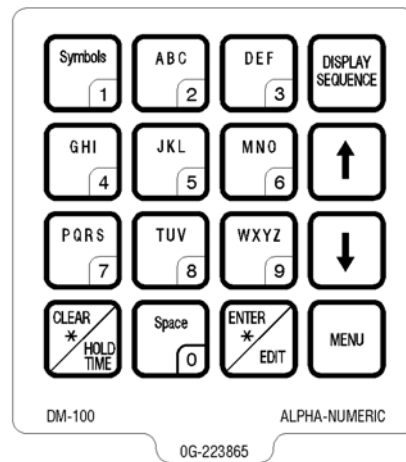
Custom Insert, Alpha-Numeric Keypad.....**Drawing A-223865**

The DataMaster 100 uses a keypad insert to program product names and price information into Daktronics LED DataMaster displays.

**Figure 9** illustrates the DM-100 insert used to control the displays. For more details on the insert, refer to **Drawing A-223865**.

If an insert is lost or damaged, a copy of the insert drawing located in **Appendix A** can be used until a replacement is ordered.

To start the controller and use the insert, read the next section carefully to fully understand the operation instructions.



**Figure 9:** DataMaster 100 Insert 0G-223865

### 5.3 Gas Price Display with LED Matrix Operation

The DataMaster 100 controller can be configured to program gas price information displayed on the LED DataMaster Gas Price sign. The instructions provided in this section discuss the functions the operator uses to control the Gas Price display. In the unlikely event that the Gas Price Display malfunctions, refer to **Appendix B** for the **Frequently Asked Questions** section for this display.

Connect to the display with a serial cable from the DataMaster 100 to the outdoor J-box.

#### Gas Price with Matrix Display Startup

The following text will be displayed on the LCD during startup:

DAKTRONICS, INC.  
BROOKINGS, SD

ALPHA-NUM KEYPAD  
ED-15002 VER. X.X

The DM100 handheld controller should now be ready for use. The controller will “remember” the last items input, so they will not need to be re-entered every time you use the DM100.


#### Menu Items

Pressing the <MENU> key accesses the following settings:

1. Hold Time Option
2. Dimming
3. LED Test
4. Modem Settings
5. Display Status
6. Set Time 12HR
7. Sign Width
8. Preview Option

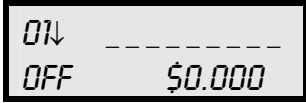
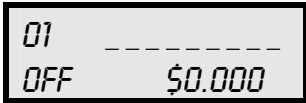
## Gas Price with Matrix Controller Operation

The Gas Price Controller LCD display will default to showing the current display settings on power up. The following text will be shown on the LCD.

LCD Screen	Action
 <p>"01" is the current frame number.</p> <p>OFF/ON represents the status of the hold time.</p>	<p>Press the up or down arrow keys &lt;↑↓&gt; to scroll through the 13 frames on the display.</p> <p>Press the &lt;ENTER/EDIT&gt; key to modify the corresponding frame settings. (The text and the price are edited in this manner).</p>

## Modifying A Frame

The frame can be modified by pressing the <ENTER/EDIT> key.

LCD Screen	Action
  <p>The cursor ( _ ) will blink in the first position.</p>	<p>Press &lt; ENTER/EDIT &gt; to modify this frame.</p> <p>After pressing &lt;ENTER/EDIT&gt;, the user will begin to edit the text field.</p>



01 DIESEL\_\_\_\_\_  
OFF \$0.000

Enter text by pressing the number keys just like cellular phone text entry. For a detailed explanation, refer to the **Text Entry** section.

Press < **ENTER** > to save this text or press <**CLEAR**> to abort the changes.



01 DIESEL\_\_\_\_\_  
H:2.0\* \$0.000

When set to the manual hold time option, select a hold time with the arrow keys or numerically entering a specific hold time. Valid hold times range from 0.2 to 9.9 seconds. To turn the frame off, select a hold time of 0.0.

**(Note:** To adjust the hold time for the individual frames, it must be selected in the menu items. When SET BY FRAME is selected, an H:X.X will appear in the lower left corner of the LCD screen rather than the ON or OFF)

Press < **ENTER** > to save the hold time and begin editing the price or press <**CLEAR**> to abort the changes.



01 DIESEL\_\_\_\_\_  
H:2.0 \$1.959\*↓

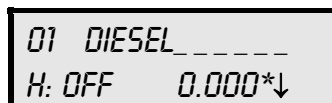
Press the number keys to edit the price value for each line. Press the down arrow key <↓> to remove or add the tenth cent digit.

Press <**ENTER**> to accept the new value or press <**CLEAR**> to abort the changes.

**Note:** The flashing asterisk on the LCD shows the current data being edited.

## Text Entry

Press <**ENTER**> and input text on the line with the flashing cursor. For instance, to type in the word DIESEL, press the “3 or DEF” key once. The “D” should appear in the first space. The “D” will continue to flash for a couple seconds then move to the next letter. To put in the letter “I” press the “4 or HGI” key three times until the “I” appears. Continue in this manner until all the letters for the word have been entered. Press <**ENTER**> to accept the text and edit the hold time or price. The LCD will show the following:



01 DIESEL\_\_\_\_\_  
H: OFF 0.000\*↓




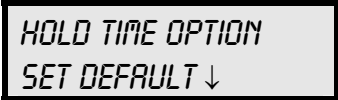

Note the following:

1. If you press the key too many times and miss the letter, simply keep pressing the key until the letter appears again.
2. If you make an error when entering a letter press <CLEAR> or use <↑> to go back.
3. If you do not want to wait for the letter to quit flashing, use the <↓> to move to the next location.
4. The <Symbols> key can be used to put in a variety of 22 symbols.
5. To edit text, use the <↑↓> to move back and forth between letters.
6. If you press <ENTER>, which exits the text entry section, and takes you to the next section, and you did not want to quit editing, keep pressing the <ENTER> key until you go to the next frame. Then use the <↑> to return to the previous frame and press <ENTER> to begin editing the text again.

### Hold Time Option


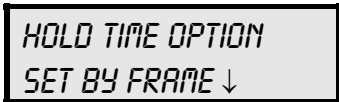
Select menu item 1, Hold Time Option, to change the hold time option. There are two different hold time options: a separate hold time for each frame or a single default hold time for all frames.

#### *Setting a Default Hold Time*

LCD Screen	Action
	Press the <ENTER> key to modify the hold time option.
	Press <ENTER> to set a default hold time. Press <↓> to move to the next option.
	Enter a hold time using the arrow keys or the number keys. Press <ENTER> to save the hold time or <CLEAR> to abort.

### Setting Hold Time by Frame

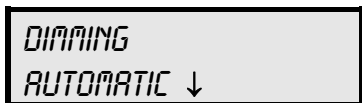
If a default hold time has been set, select the Hold Time Option menu item again to disable the default hold time and allow a separate hold time for each frame.

LCD Screen	Action
	Press the <ENTER> key to modify the hold time option.
	Press <↓> to move to the next option. Press <ENTER> to set the hold time option to enable a separate hold time for each frame. (The hold time will now be set when you edit each frame.)

### Dimming

The dimming level of the Gas Price display can be adjusted in two ways. A light sensor, mounted in the display face, can detect the level of ambient light at the display location and dim the sign's LEDs accordingly. This function is known as automatic dimming. When the manual dimming function is selected, the LEDs remain at the same level of brightness regardless of the level of light detected at the display.

To select either of these dimming functions, or to enter the **Blank Sign** function, select the **Dimming** menu item. The current setting is shown on the bottom line of the LCD.

LCD Screen	Action
	<p>Press the down arrow key &lt;↓&gt; to toggle through dim settings:</p> <p><b>Automatic</b> – The display automatically dims based on the light detected at the display.</p> <p><b>Manual</b> – The display dimming level is set manually. Once set, this value remains regardless of the level of light detected at the display.</p> <p><b>Blank Sign</b> – Will blank the display of all items.</p>

If AUTOMATIC dimming is selected, the following LCD prompt will be shown:

LCD Screen	Action
	<p>Press the &lt;ENTER/EDIT&gt; key to edit the auto dimming max intensity. This is the maximum intensity that the display will use in full-bright modes (during daylight hours.)</p> <p>Press &lt;CLEAR&gt; to keep the current auto dimming maximum setting</p>

The following LCD prompt is shown for either Manual or Automatic dimming selections:

LCD Screen	Action
<p>XX – Current intensity (1-16) Max intensity – 16 (Default is 16)</p>	<p>Press the up or down arrow key &lt;↑↓&gt; to modify the current intensity of the display</p> <p>Press &lt;ENTER&gt; to accept this intensity. If the manual-dimming mode is selected, this will be the new intensity for the display all the time. However, if the automatic dimming mode is selected, the display will dim between the dim mode and the maximum intensity level you have set.</p>

## LED Test

Select menu item, LED Test, to test the LED digits on the display.

LCD Screen	Action
	<p>Press the &lt;ENTER&gt; key to cycle the display digits between all LEDs on and all LEDs off.</p>
	<p>Press &lt;ENTER&gt; send the test command to the sign.</p> <p>Press &lt;CLEAR&gt; to exit the test mode</p>

## Modem Settings

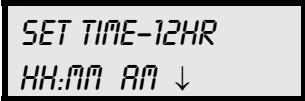
This section would allow you to edit the modem settings and phone number to call, if the display was connected through a modem. The displays for this contract do not use a modem; therefore this section is not applicable.

## Display Status

Once connected to the display, press <DISPLAY SEQUENCE> to display the new sequence on the display. If the preview is enabled, it will be shown now. If satisfied with the preview, press <DISPLAY SEQUENCE> again or <ENTER> to send the sequence to the sign. If not satisfied with the preview, press <CLEAR> to exit the preview without updating the sign. For details on how to enable or disable the preview, refer to the Preview Option section.

## Set Time



Use the Set Time menu to set the time on the display.

LCD Screen	Action
 <p>Note: The flashing asterisk shows the current data being edited.</p>	<p>HH – Current hours value MM – Current minutes value AM – Current AM/PM setting (not shown when 24-hour time is selected)</p> <p>Using the number keys, enter the Time in the 12-hour (or 24-hour) format. Press the down arrow key &lt;↓&gt; to modify the AM/PM setting.</p> <p>To save changes, press the &lt;ENTER&gt; key when finished editing.</p> <p>Press the &lt;CLEAR&gt; key to cancel changes</p>

After setting the time you will need to set the date. If the date is already correct, enter through the date and press <ENTER> to send the time to the display.


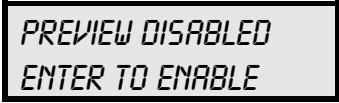
## Sign Width

Use the Sign Width menu item to set the width of the matrix display in pixels. If this is not done, text will not be centered correctly on the display.

LCD Screen	Action
	<p>Press &lt;ENTER&gt; to modify the matrix sign width.</p>
	<p>Using the arrow keys &lt;↓↑&gt;, select the sign width in pixels.</p> <p>When finished editing, press the &lt;ENTER&gt; key to save changes. (Note: The sign width for your display is: 64.)</p> <p>Press the &lt;CLEAR&gt; key to cancel changes</p>

## Preview Option

Use the Preview Option menu item to set enable or disable the preview option. If the preview is enabled and <DISPLAY SEQUENCE> is pressed, a preview of the sequence will be shown on the DM-100 before updating the sign.

LCD Screen	Action
	<p>If this screen is showing, press &lt;ENTER&gt; to disable the preview option.</p>
	<p>If this screen is showing, press &lt;ENTER&gt; to enable the preview option.</p>

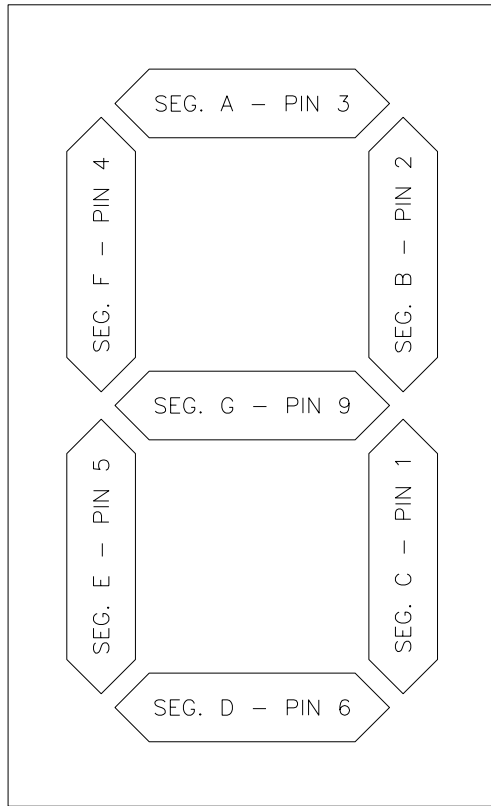


## **Appendix A: Reference Drawings**

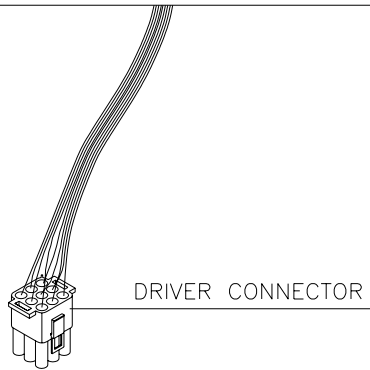
---

Drawings in this manual are referenced by their last set of digits and the letter preceding them. Drawings in this appendix are listed in alphanumeric order.

Segmentation, 7 Segment Bar Digit .....	<b>Drawing A-38532</b>
Schematic; Multipurpose LED Drvr .....	<b>Drawing A-165028</b>
8 Column MASC LED Driver Specifications .....	<b>Drawing A-167237</b>
Light Sensor Installation .....	<b>Drawing A-183775</b>
System Riser Diagram, Gas Price Display .....	<b>Drawing A-223298</b>
Insert, 0G-223865 Alpha-Numeric Keypad .....	<b>Drawing A-223865</b>
Schematic, Gas Price Display with Message Center .....	<b>Drawing B-223253</b>
Shop Drawing, DF-1223-18 .....	<b>Drawing B- 227849</b>
Shop Drawing, DF-1220-24 .....	<b>Drawing B- 234578</b>

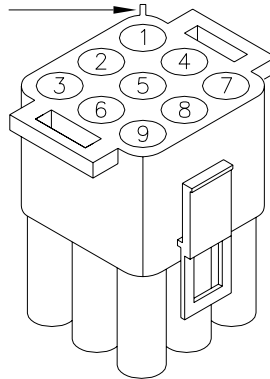


7 SEGMENT BAR DIGIT  
FRONT VIEW



COLOR CODE		
PIN NO.	WIRE COLOR	DRIVER SEGMENT
1	ORN	C
2	RED	B
3	BRN	A
4	BLU	F
5	PNK	E
6	TAN	D
7	BLK	COM.
8	GRY	H
9	VIO	G

CONNECTOR PIN NUMBERING  
NOTE SPLINE NEAR NO. 1



NOTE: "H" SEGMENT, GRAY WIRE IS NOT USED ON 7 SEGMENT BAR DIGIT.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: BASKETBALL
TITLE: SEGMENTATION, 7 SEGMENT BAR DIGIT
DES. BY: _____ DRAWN BY: HEIDERSCHIEDT DATE: 5 JUN 89
REVISION 02 APPR. BY: AVB SCALE: 1=4
1009-R04A-38532

REV.	DATE	DESCRIPTION	BY	APPR.
2	30 APR 97	ADDED SEGMENT DESIGNATIONS TO DIGIT FIGURE.	AVB	AVB
1	2 JAN 92	CHANGED FROM B-SIZE TO A-SIZE DWG.	C FICK	

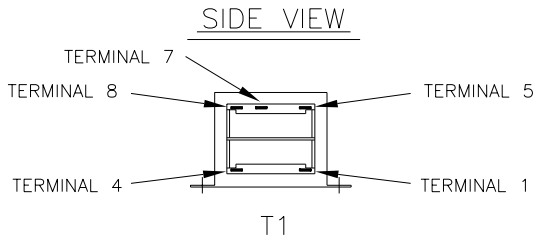
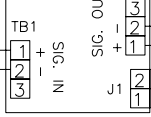


LANDLINE MODEM  
OP-1279-0003  
COATED MODEM  
(INSTALL OPTION)

OP-1110-0011

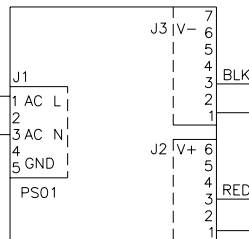
TB3

- 1 TAN
- 2 RED
- 3
- 4 GRY
- 5 BRN
- 6 RED
- 7 BLK
- 8

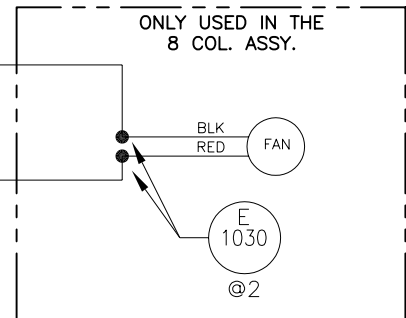


TB4

- 1
- 2
- 3



A-1720  
POWER SUPPLY



4 COL. DRIVER  
OP-1192-0067  
NON-COATED DRIVER  
OP-1192-0068  
COATED DRIVER

8 COL. DRIVER  
OP-1192-0081  
NON-COATED DRIVER  
OP-1192-0082  
COATED DRIVER

NOTES:

ALL CONDUCTORS ARE 18AWG.

REV.	DATE	DESCRIPTION	BY	APPR.
08	17 DEC 03	CHANGED WIRE COLORS OF T1 CONNECTIONS. ADDED SIDE VIEW OF T1.	JBS	
07	29 APR 03	ADDED T1, FOR TIMING.	TAS	MWM
06	24 FEB 03	CHANGED J3 ON POWER SUPPLY TO 7 PINS PER ECO-27985.	AVB	
05	14 JAN 03	CHANGED THE BLU TEXT TO RED ON TB3 CONNECTOR	CME	
04	24 OCT 02	CHANGED 12V DC WIRING CONNECTIONS FROM MASC DRIVER TO SIGNAL SURGE PROTECTOR, LANDLINE MODEM AND TERMINAL BLOCK	JBS	
03	29MAY02	MOVED WIRES GOING INTO PIN 6 & 9 OF P17 TO PIN 10 & 12 OF P17	NMB	
02	06 MAY 02	CHANGED WIRE COLORS FOR TB3 CONNECTIONS	MWM	
01	24APR02	ADDED TB3-7 & 8 CONNECTIONS TO 4 COL. LED DRIVER. ADDED P22 AND J22 ALSO.	THS	

0A-1279-0086  
MULTI PURPOSE HARNESS ASSY.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: DATA TIME LED DISPLAYS

TITLE: SCHEMATIC; MULTIPURPOSE LED DRVR

DES. BY: MMILLER

DRAWN BY: MMILLER

DATE: 08 APR 02

REVISION

APPR. BY:

08

SCALE: 1=1

1279-R03A-165028

J23 +12VDC	
PIN	FUNCTION
1	+12VDC-P
2	GND-N

OP-1192-0081 UNCOATED  
OR OP-1192-0082 COATED  
8 COLUMN MASC LED DRIVER

TB1 - CAN	
PIN	FUNCTION
1	N/C
2	+5V-P
3	CANH-P
4	CANL-P
5	GND-N
6	GND-N

J24	
PIN	FUNCTION
1	MODEM_RTS-P
2	MODEM_RESET-P
3	MODEM_TX-P
4	GND-N
5	MODEM_RX-P
6	MODEM_DCD-P

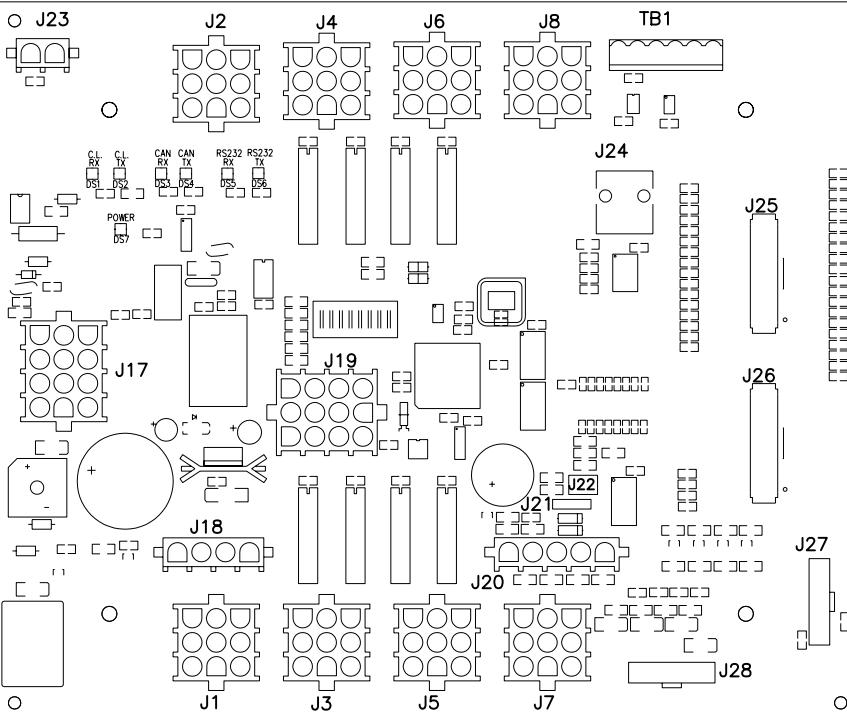
J25			
FUNCTION	PIN	PIN	FUNCTION
ID3-P	21	20	GND-N
FREE0-P	22	19	GND-N
ID2-P	23	18	GND-N
ROWSEL2-P	24	17	GND-N
GRN.DIM-P	25	16	GND-N
CLK-P	26	15	GND-N
GRN4-P	27	14	GND-N
RED4-P	28	13	GND-N
GRN3-P	29	12	GND-N
RED3-P	30	11	GND-N
GRN2-P	31	10	GND-N
RED2-P	32	9	GND-N
GRN1-P	33	8	GND-N
RED1-P	34	7	GND-N
RED.DIM-P	35	6	GND-N
LAT-P	36	5	GND-N
ROWSEL1-P	37	4	GND-N
ROWSEL0-P	38	3	GND-N
ID1-P	39	2	GND-N
ID0-P	40	1	GND-N

J19 - ADDRESS	
PIN	FUNCTION
1	GND-N
2	ADD0-N
3	ADD1-N
4	GND-N
5	ADD2-N
6	ADD3-N
7	GND-N
8	ADD4-N
9	ADD5-N
10	GND-N
11	ADD6-N
12	ADD7-N

J17 - MAIN	
PIN	FUNCTION
1	CLIN-P
2	CLIN-N
3	232IN-P
4	CLOUT-P
5	CLOUT-N
6	16VAC-P
7	GND-N
8	N/C
9	16VAC-N
10	GND-N
11	N/C
12	+VBB-P

J18 - RELAY	
PIN	FUNCTION
1	HORNOUT-N
2	AUXOUT-N
3	120SW1-N
4	120SW1-P

J1-8 DIGITS	
PIN	FUNCTION
1	SEGC-N
2	SEGB-N
3	SEGA-N
4	SEGF-N
5	SEGE-N
6	SEGD-N
7	+VBB-P
8	SEGH-N
9	SEGG-N



J20 - PROTOCOL	
PIN	FUNCTION
1	GND
2	PRO-N
3	PR1-N
4	PR2-N
5	PR3-N

J21 - ISP	
PIN	FUNCTION
1	VFP-P
2	BKD-P
3	GND-N
4	RESET-P

J22 - ISP	
PIN	FUNCTION
1	BKD-P
2	GND-N
3	N/C
4	RESET-P
5	VFP-P
6	+5V-P

J28 - SWITCH	
PIN	FUNCTION
1	SWITCH1-P
2	SWITCH1-N
3	SWITCH2-P
4	SWITCH2-N
5	SWITCH3-P
6	SWITCH3-N
7	SWITCH4-P
8	SWITCH4-N

J27 - TPIC	
PIN	FUNCTION
8	GND-N
7	GND-N
6	DIG.DATA-P
5	DIG.STROBE-P
4	DIG.CLK-P
3	DIG.OE-N
2	+VBB-P
1	+5V-P

J26			
FUNCTION	PIN	PIN	FUNCTION
N/C	21	20	GND-N
FREE0-P	22	19	GND-N
N/C	23	18	GND-N
ROWSEL2-P	24	17	GND-N
GRN.DIM-P	25	16	GND-N
CLK-P	26	15	GND-N
N/C	27	14	GND-N
N/C	28	13	GND-N
N/C	29	12	GND-N
N/C	30	11	GND-N
GRN2-P	31	10	GND-N
RED2-P	32	9	GND-N
GRN1-P	33	8	GND-N
RED1-P	34	7	GND-N
RED.DIM-P	35	6	GND-N
LAT-P	36	5	GND-N
ROWSEL1-P	37	4	GND-N
ROWSEL0-P	38	3	GND-N
N/C	39	2	GND-N
N/C	40	1	GND-N

NOTES:

- WITH NO ADDRESS PINS SELECTED THE DRIVER WILL DEFAULT TO STANDARD PROTOCOL.
- RED LED DS1 WILL BE ON WHEN THE DRIVER IS RECEIVING CURRENT LOOP SIGNAL AND OFF WHEN THERE IS NO SIGNAL.
- GREEN LED DS2 WILL BE ON WHEN THE DRIVER TRANSMITS CURRENT LOOP SIGNAL.
- RED LED DS3 WILL BLINK WHEN THE DRIVER RECEIVES CAN SIGNAL.
- GREEN LED DS4 WILL BLINK WHEN THE DRIVER TRANSMITS CAN SIGNAL.
- IF BOTH DS3 AND DS4 ARE ON CONTINUOUSLY, THE CAN BUS IS IN AN ERROR STATE (NO CONNECTION TO CAN NETWORK).
- RED LED DS5 WILL BE ON WHEN THE DRIVER RECEIVES RS-232 SIGNAL.
- GREEN LED DS6 WILL BE ON WHEN THE DRIVER TRANSMITS RS-232 SIGNAL.
- GREEN LED DS7 INDICATES THAT THE DRIVER HAS POWER.

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DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.
02	22 NOV 04	CHANGED NOTES RELATING TO LED FUNCTIONS.	AVB	
01	06 JUN 02	ADDED NEW NOTES ADDED LABELS TO LEDS	JJS	

PROJ:	TITLE: 8 COLUMN MASC LED DRIVER SPECIFICATIONS		
DES. BY:	DRAWN BY: JSPAHR	DATE: 16 MAY 02	
REVISION	APPR. BY:	1192-R07A-167237	
02	SCALE: 1=2		

**FOR DM-100 OR VENUS 1500 CONTROLLED SYSTEMS:**

IF THE SIGN HAS MORE THAN ONE DISPLAY, INSTALL THE LIGHT SENSOR IN THE HOST DISPLAY ONLY.

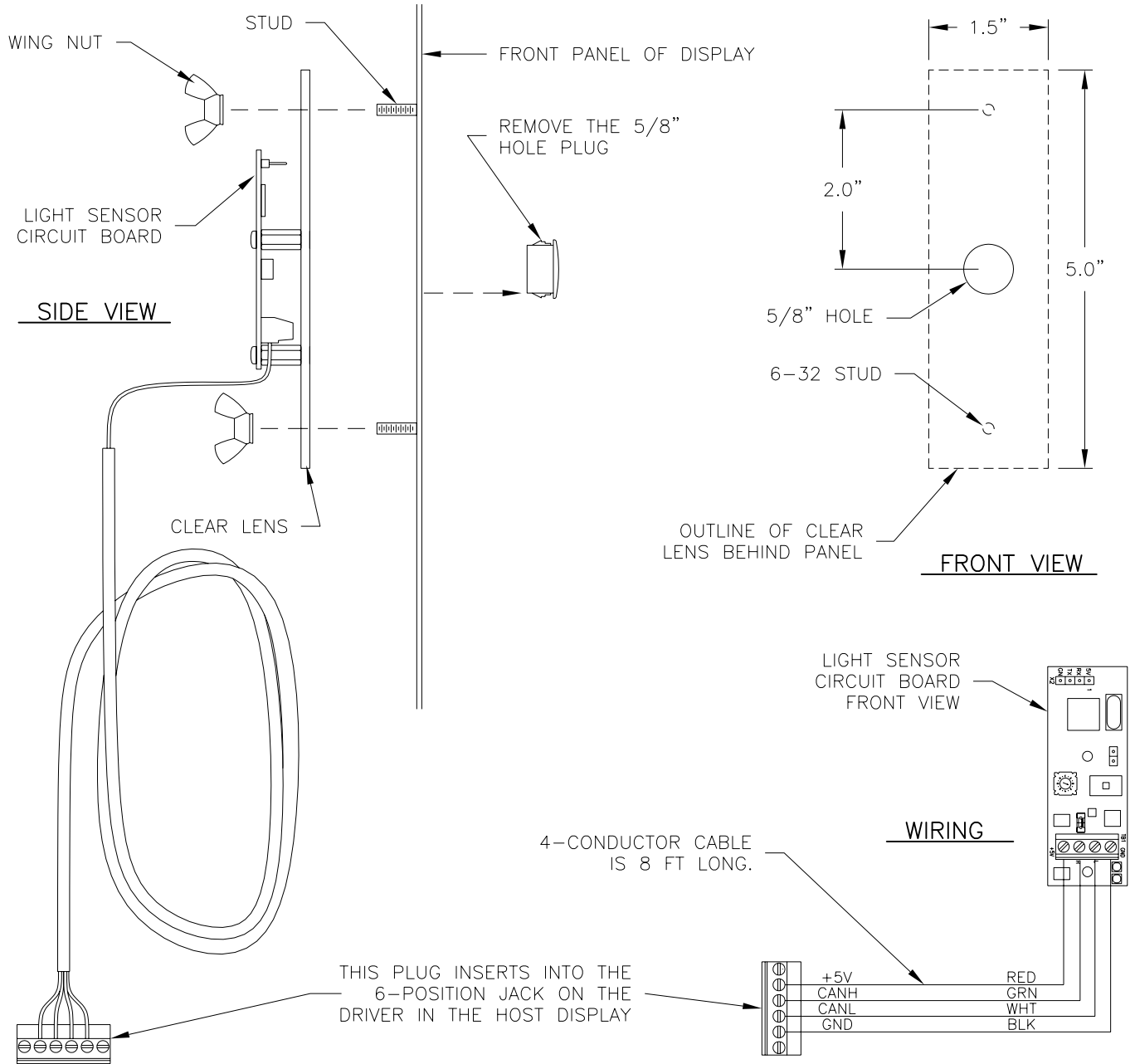
**FOR DAKMAP (MULTIDROP) CONTROLLED SYSTEMS:**

REFER TO DRAWING A-210516 FOR WIRING OPTIONS.

LOCATE THE 5/8" [16 MM] HOLE IN THE FRONT OF THE DISPLAY. THE LOCATION VARIES WITH THE SIZE AND MODEL OF THE DISPLAY. THE HOLE IS CAPPED WITH A BLACK PLASTIC PLUG. REMOVE THE PLUG. IF THE HOLES DO NOT EXIST IN THE DISPLAY, DRILL HOLES AS SHOWN AT RIGHT AND USE 6-32 MACHINE SCREWS TO MOUNT THE SENSOR ASSEMBLY.

THERE ARE TWO 6-32 STUDS ABOVE AND BELOW THE HOLE. POSITION THE LIGHT SENSOR ASSEMBLY OVER THE STUDS WITH THE CABLE AT THE BOTTOM. SECURE THE LIGHT SENSOR TO THE STUDS WITH THE TWO PLASTIC WING NUTS PROVIDED WITH THE LIGHT SENSOR KIT.

CONNECT THE 6-PIN PLUG ON THE END OF THE CABLE TO THE MATING JACK ON THE DRIVER.



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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: DATATIME LED DISPLAYS

TITLE: LIGHT SENSOR INSTALLATION, G3

DES. BY: AVB

DRAWN BY: A VANBEMMEL

DATE: 21 FEB 03

REVISION

APPR. BY:

02

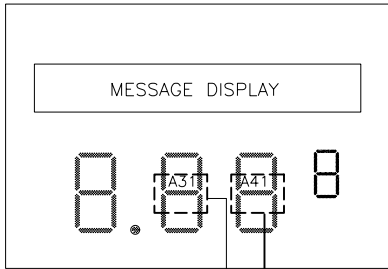
SCALE: 1=2

1279-R10A-183775

REV.	DATE	DESCRIPTION	BY	APPR.
02	10 MAY 04	UPDATED TEXT.	RT	
01	03 JUN 03	ADDED HOLE PATTERN DIMENSIONS.	AVB	

FRONT VIEW

DISPLAY IS TWO SIDED, IN ONE CABINET. ALL INTERNAL WIRING BY DAKTRONICS FOR BOTH SIDES.



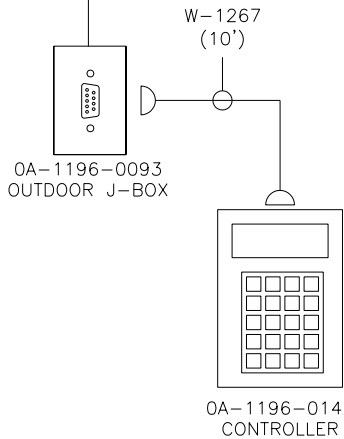
A31 -- INTERNAL SIGNAL ENTRANCE ENCLOSURE, BY DAKTRONICS

A41 -- INTERNAL POWER TERMINATION PANEL, BY DAKTRONICS.

TOTAL POWER REQUIRED:

VOLTAGE-PRIMARY	
120VAC	2 WIRES + GND
# OF PHASES	SINGLE
AMPERES PER LINE	2.9
MAXIMUM WATTS	350
VOLTAGE-SECONDARY	N/A

1, 6 COND, 18AWG CABLE (W-1370) @50', PROVIDED BY DAKTRONICS. CONDUIT, IF REQUIRED, BY CUSTOMER.



NOTES:

THIS IS NOT A SCALED DRAWING AND SHOULD BE USED FOR POWER AND SIGNAL REQUIREMENTS ONLY.

IT IS THE RESPONSIBILITY OF THE ELECTRICAL INSTALLATION CONTRACTOR TO ENSURE THAT ALL ELECTRICAL WORK PERFORMED ON SITE MEETS OR EXCEEDS ALL LOCAL AND NATIONAL ELECTRICAL CODES.

ALL SIGNAL CABLE RUNS SHOULD BE LABELED AS TO ORIGIN AND DESTINATION.

ALL DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE WITH NO MORE THAN 10 OHMS GROUND RESISTANCE.

POWER CONTROL FOR DAKTRONICS SUPPLIED EQUIPMENT NOT PROVIDED BY DAKTRONICS.

DAKTRONICS IS NOT RESPONSIBLE FOR THE QUALITY OF THE POWER DELIVERY SYSTEM TO THE DISPLAY SYSTEM.

BECAUSE EACH INSTALLATION IS UNIQUE, DAKTRONICS OFFERS THESE INSTRUCTIONS AS GUIDELINES ONLY. DAKTRONICS, INC. ASSUMES NO LIABILITY IF INSTALLATION STEPS HAVE BEEN OMITTED OR OTHER NECESSARY PROCEDURES ARE NOT INCLUDED IN THIS SYSTEM RISER DIAGRAM.

POWER AND SIGNAL REQUIREMENTS ARE SPECIFIED TO THE EQUIPMENT AND SETUP SHOWN. ANY CHANGES MADE TO EQUIPMENT OR THEIR SETUP SHOULD BE DISCUSSED WITH DAKTRONICS DESIGN PERSONNEL AND WILL REQUIRE AN UPDATED RISER DIAGRAM DRAWING.

THE CONTRACTUAL AGREEMENT WILL DETERMINE THE PARTY OR PARTIES RESPONSIBLE FOR ITEMS LISTED AS FIELD INSTALLED. THIS DRAWING IS NOT INTENDED TO DETERMINE RESPONSIBILITIES AND SHOULD BE USED FOR REFERENCES ONLY.

DO NOT REFERENCE THIS DRAWING FOR ACTUAL DISPLAY PLACEMENT DETAILS. PLEASE REFERENCE THE SYSTEM SHOP DRAWING FOR THIS DETAIL.

——— EXTERNALLY MOUNTED HARDWARE  
 - - - - INTERNALLY MOUNTED HARDWARE

J-BOX TO DISPLAY WIRING TABLE

9-PIN J-BOX		HOST DISPLAY TB3, DRV R ENCLOSURE	
PIN#	COLOR	FUNCTION	PIN#
1	RED	12VDC-P	7
5	BLK	GND-N	8
6	GRN	SIG. IN +	1
5	WHT	SIG. IN -	2
8	BRN	SIG. OUT +	4
9	BLU	SIG. OUT -	5

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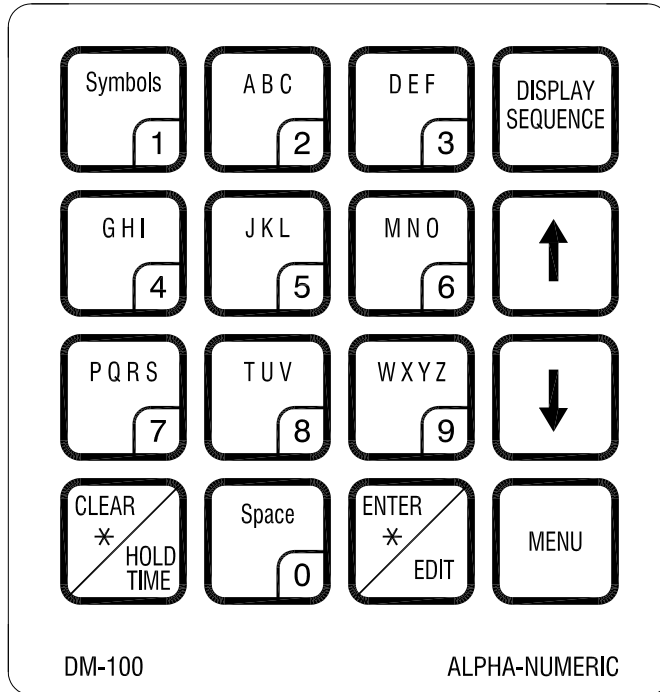
PROJ: CENEX

TITLE: SYSTEM RISER DIAGRAM; GAS PRICE DISPLAY

DES. BY: MMILLER DRAWN BY: MMILLER DATE: 13 SEP 04

REVISION 02 APPR. BY: SCALE: NONE 11707-R01A-223298

REV.	DATE	DESCRIPTION	BY	APPR.
02	23 NOV 04	CHANGED 0A-1196-0088 TO 0A-1196-0142	ADH	
01	30 SEP 04	UPDATED J-BOX TABLES AND CABLE REQUIREMENTS.	MWM	



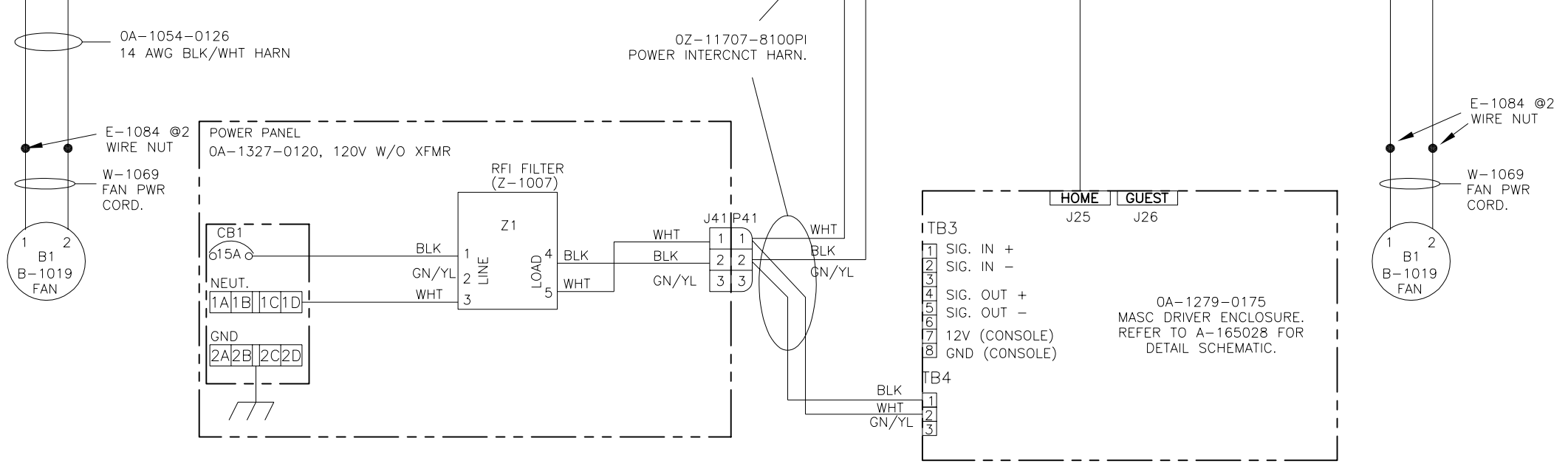
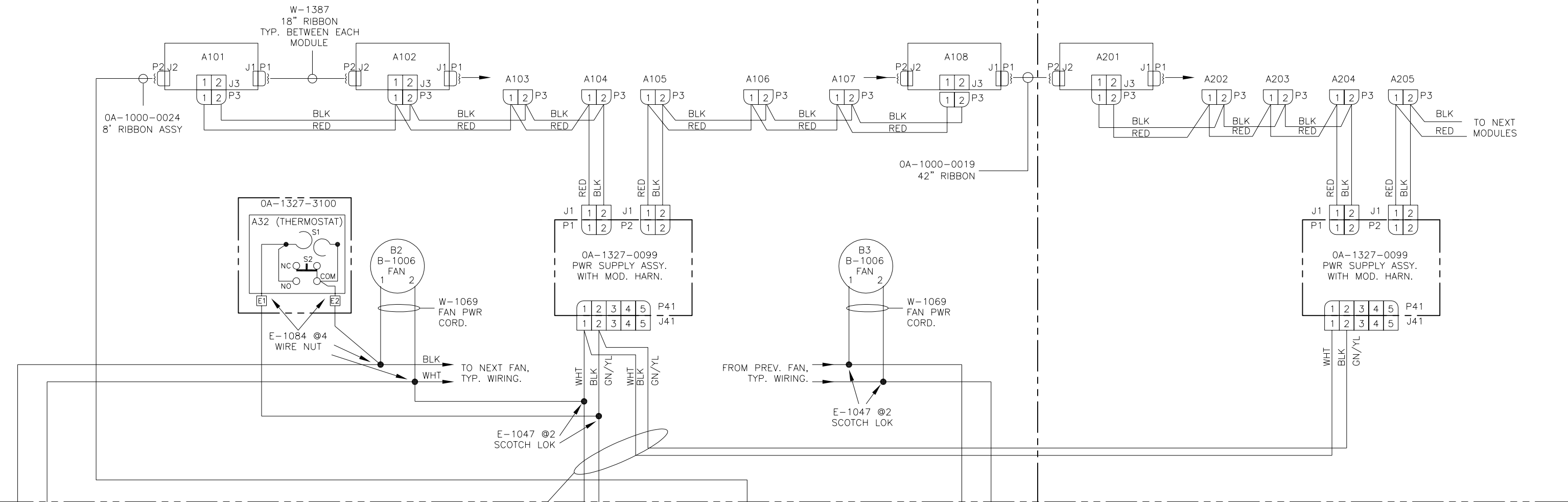
OG-223865

<small>THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2004 DAKTRONICS, INC.</small>			
<b>DAKTRONICS, INC. BROOKINGS, SD 57006</b>			
PROJ:			
TITLE: INSERT; DM-100, ALPHA-NUMERIC KEYPAD			
DES. BY: THENDRI		DRAWN BY: DULSCHM	
DATE: 22 SEP 04			
<b>REVISION</b>	APPR. BY:	11707-E07A-223865	
01	SCALE: 1 = 1		

01	12 OCT 04	REMOVED ESC TEXT FROM CLEAR KEY ADDED HOLD TIME TEXT TO CLEAR KEY	DJU	
REV.	DATE	DESCRIPTION	BY	APPR.

FACE 'A' MODULE A101-A108

FACE 'B', MODULE A201-A208



LOWER DIGIT SECTION

OVERALL POWER SPECIFICATIONS:

VOLTAGE-PRIMARY		120V	3 WIRES + GND
# OF PHASES	SINGLE		
AMPERES PER LINE	4.5		
MAXIMUM WATTS	500		
VOLTAGE-SECONDARY	N/A		

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: CENEX

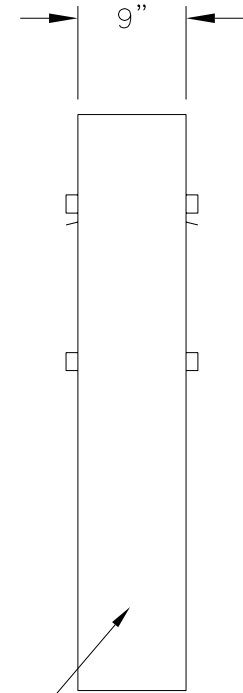
TITLE: SCHEMATIC; GAS PRICE DISPLAY WITH MESSAGE CENTER

DES. BY: MMILLER DRAWN BY: MMILLER DATE: 13 SEP 04

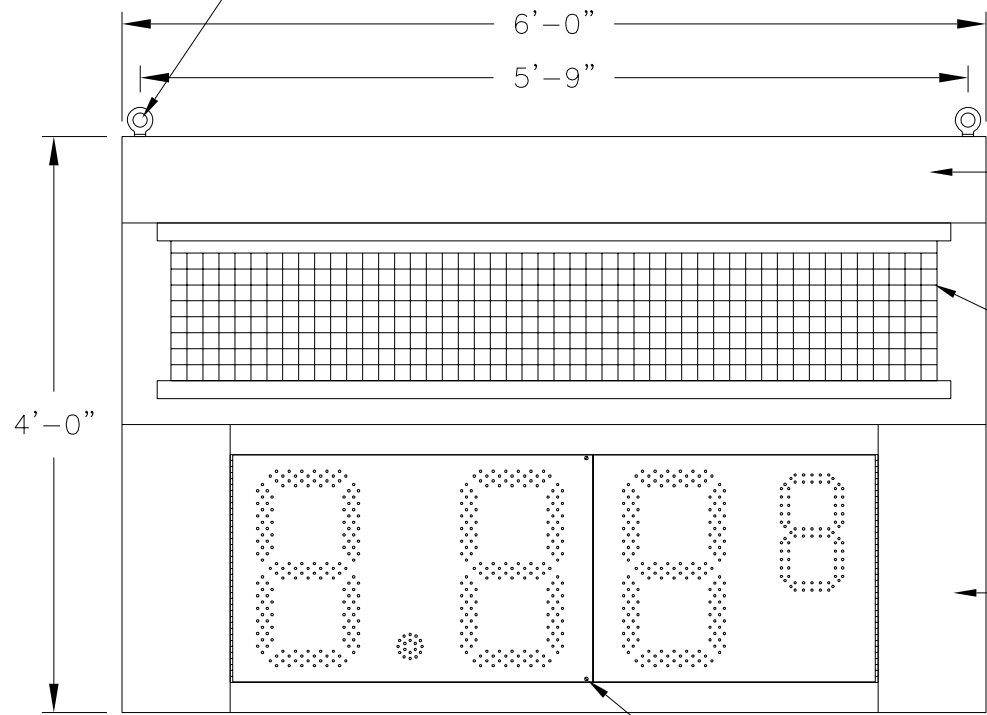
REVISION 01 APPR. BY: SCALE: NONE 11707-R03B-223253

REV.	DATE	DESCRIPTION	BY	APPR.
01	19 DEC 04	ADDED POWER SPECIFICATIONS	RT	

EYEBOLTS ARE FOR LIFTING DURING INSTALLATION ONLY AND ARE NOT TO BE USED FOR SUSPENDED MOUNTING.



SIDE VIEW



FRONT VIEW

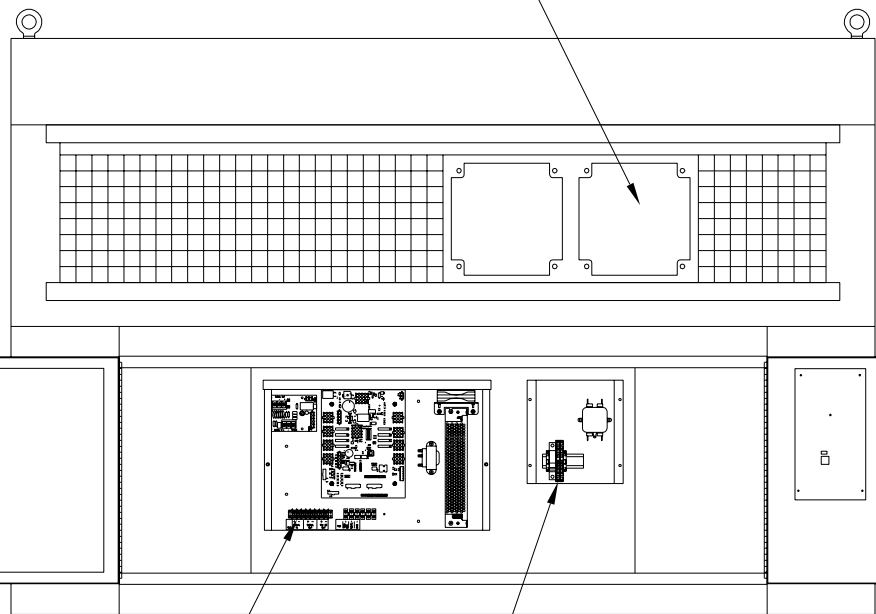
THIS PANEL MAY BE REMOVED TO HELP WITH INSTALLATION IF NECESSARY.

8 X 48, 34 MM MESSAGE CENTER

THESE SIDE PANELS MAY BE REMOVED TO HELP WITH INSTALLATION IF NECESSARY.

TURN THESE LATCHES TO OPEN THE HINGED FACE PANELS AND GAIN ACCESS TO POWER AND SIGNAL HOOKUP TERMINALS

MESSAGE CENTER MODULES MAY BE REMOVED FROM THE FRONT FOR SERVICE ACCESS



FRONT VIEW WITH FRONT PANELS OPEN

DIGIT CIRCUIT BOARDS MOUNTED TO THE HINGED FRONT PANELS

CONNECT SIGNAL WIRES HERE

CONNECT 120V AC POWER HERE

DRILL THROUGH THE SIDE OF THE CABINET AS REQUIRED TO MOUNT THE DISPLAY.  
POWER AND SIGNAL WIRES CAN BE ROUTED INTO SIDE OF THE CABINET.

NOTES:

GENERAL

DIGITS ARE 18" AND 10" NOMINAL HEIGHT.  
ALL DIGITS USE RED LEDS.  
MESSAGE CENTER USES RED LEDS. CHARACTERS ARE 9" NOMINAL HEIGHT.

MECHANICAL

CABINET FRAME IS EXTRUDED ALUMINUM CHANNEL, 0.10" THICK. FRONT AND BACK ARE ALUMINUM SHEET, 0.063" THICK.  
ESTIMATED WEIGHT IS ABOUT 250 LBS.

IF THE EYEBOLTS ARE TO BE REMOVED AFTER INSTALLATION, PLUG HOLES BY THREADING IN 1/2"-13 BOLTS, NOT PROVIDED.

DRILL THROUGH THE SIDES OF THE CABINET TO ATTACH THE DISPLAY TO BASE STRUCTURE USING APPROPRIATE HARDWARE FOR THE SITE CONDITIONS.

DAKTRONICS IS NOT RESPONSIBLE FOR THE MOUNTING STRUCTURE OR FOR THE ADEQUACY OF ATTACHMENT TO THE STRUCTURE. STRUCTURE AND ATTACHMENT MUST CONFORM TO ALL APPLICABLE BUILDING CODES.

ELECTRICAL

PROVIDE A 120V AC, 15 AMP CIRCUIT FOR POWER.

MAX POWER IS 450 WATTS.

CONTROL CONNECTION REQUIRES TWO-PAIR CABLE, 22 AWG.

SERVICE AND ELECTRICAL HOOKUP ACCESS IS THROUGH THE FRONT OF THE DISPLAY ONLY.

REAR VIEW OF DISPLAY IS SIMILAR, EXCEPT FOR DRIVER ACCESS. DRIVER ACCESS IS POSSIBLE ONLY FROM THE FRONT.

IF THE POWER TO THE DISPLAY IS TEMPORARILY DISRUPTED, DISPLAY FUNCTIONS WILL BE RETAINED IN MEMORY TO CONTINUE OPERATION WHEN POWER IS RESTORED.

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2004 DAKTRONICS, INC.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

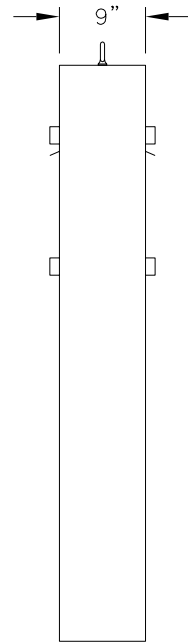
TITLE: SHOP DRAWING, DF-1223-18

DES. BY: AVB DRAWN BY: A VANBEMMEL DATE: 16 NOV 04

REVISION 00 APPR. BY: SCALE: 1=16

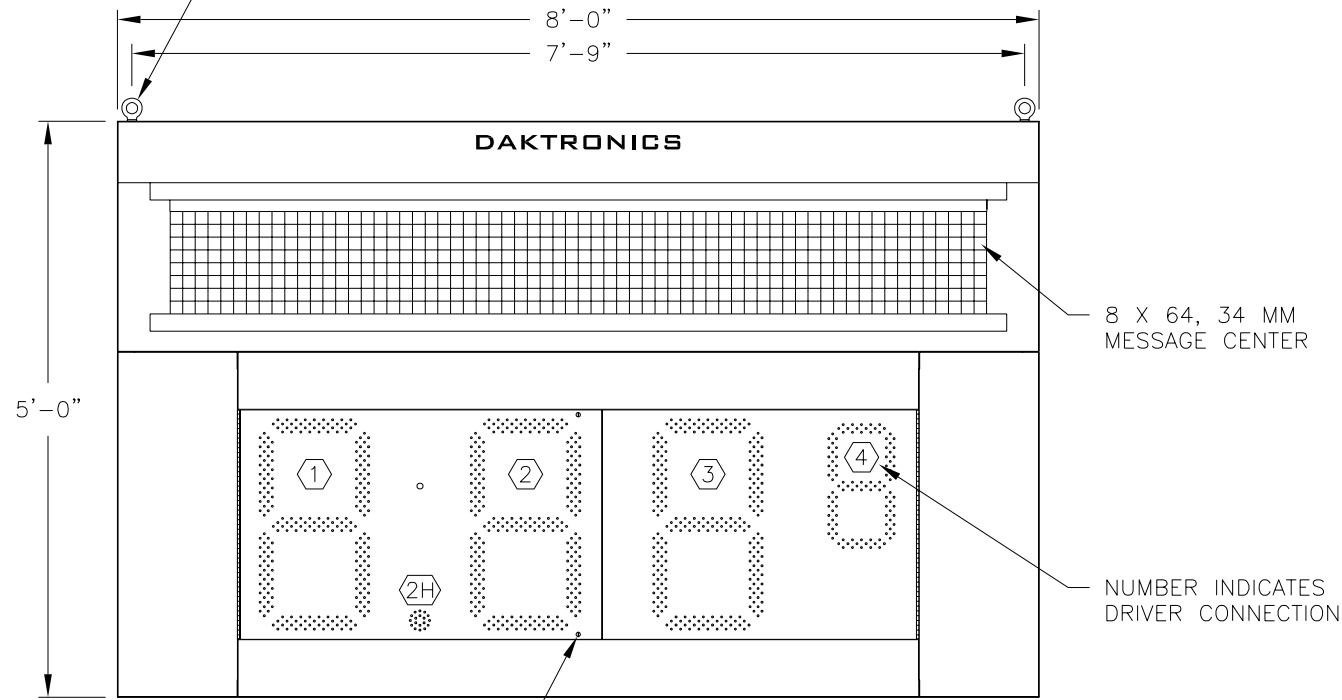
1319-R04B-227849

REV.	DATE	DESCRIPTION	BY	APPR.



SIDE VIEW

LIFT EYES ARE FOR USE DURING INSTALLATION ONLY, AND ARE NOT TO BE USED FOR PERMANENT SUSPENSION.



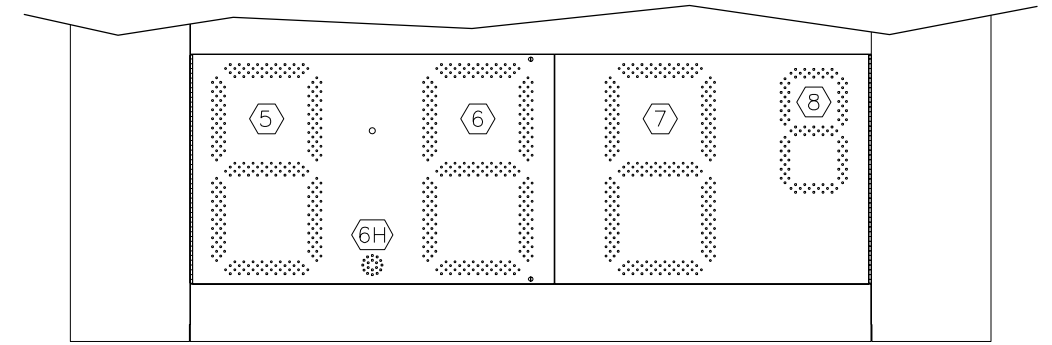
FRONT VIEW

TURN LATCHES TO OPEN THE HINGED FACE PANELS AND GAIN ACCESS TO INTERNAL COMPONENTS.

NUMBER INDICATES DRIVER CONNECTION

8 X 64, 34 MM MESSAGE CENTER

THIS IS A DOUBLE FACED DISPLAY. THE FRONT AND BACK WILL LOOK THE SAME. THE FRONT OF THE DISPLAY IS THE SIDE THAT THE DRIVER CAN BE ACCESSED FROM.



REAR VIEW  
(DIGIT SECTION ONLY)

NOTES:

GENERAL

DIGITS ARE 24" AND 13" NOMINAL HEIGHT. DIGITS MAY USE EITHER RED, GREEN, OR AMBER LEDS. MESSAGE CENTER USES RED LEDS. CHARACTERS ARE 9" NOMINAL HEIGHT.

MECHANICAL

CABINET FRAME IS EXTRUDED ALUMINUM CHANNEL, 0.10" THICK. FRONT AND BACK ARE ALUMINUM SHEET, 0.063" THICK. ESTIMATED WEIGHT IS ABOUT 300 LBS.

IF THE EYEBOLTS ARE TO BE REMOVED AFTER INSTALLATION, PLUG HOLES BY THREADING IN 1/2"-13 BOLTS, NOT PROVIDED.

DRILL THROUGH THE SIDES OF THE CABINET TO ATTACH THE DISPLAY TO BASE STRUCTURE USING APPROPRIATE HARDWARE FOR THE SITE CONDITIONS.

DAKTRONICS IS NOT RESPONSIBLE FOR THE MOUNTING STRUCTURE OR FOR THE ADEQUACY OF ATTACHMENT TO THE STRUCTURE. STRUCTURE AND ATTACHMENT MUST CONFORM TO ALL APPLICABLE BUILDING CODES.

ELECTRICAL

PROVIDE A 120V AC, 15 AMP CIRCUIT FOR POWER.

MAX POWER IS 450 WATTS.

CONTROL CONNECTION REQUIRES TWO-PAIR CABLE, 22 AWG.

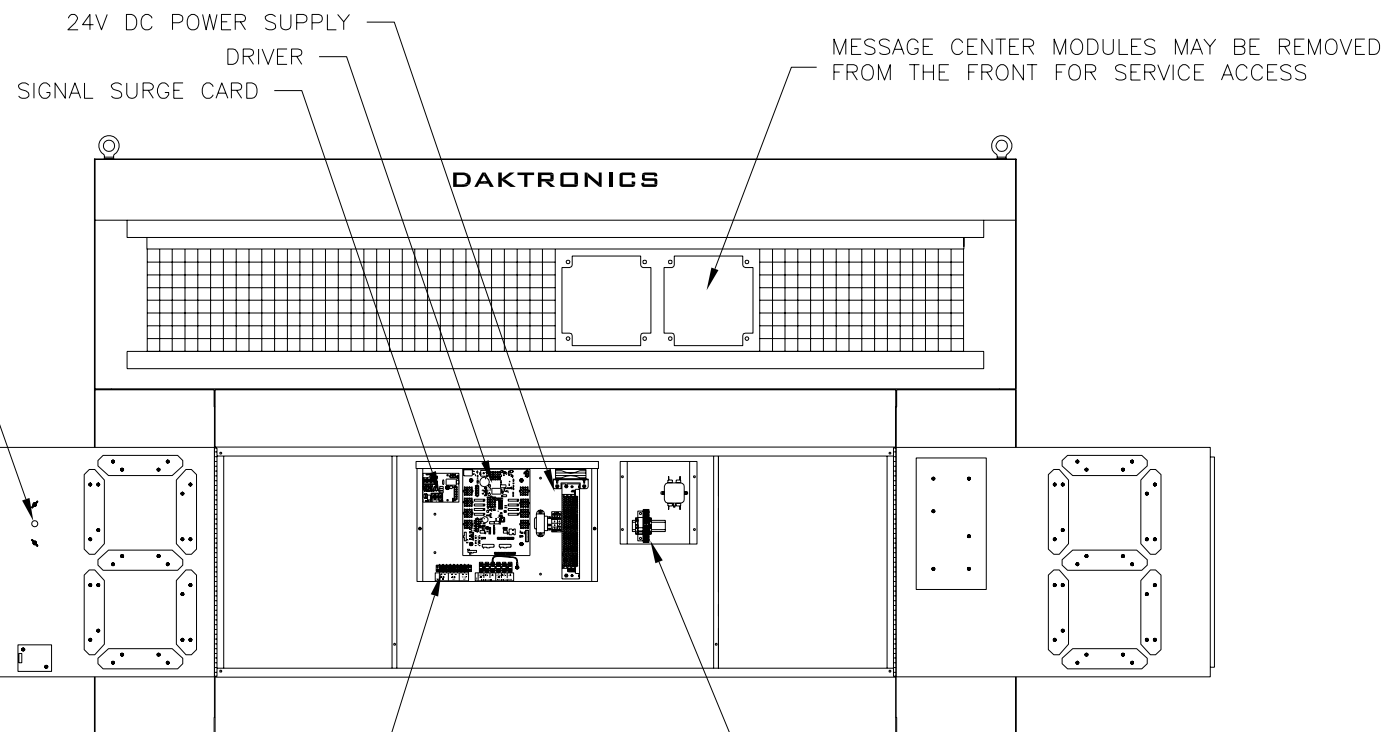
SERVICE AND ELECTRICAL HOOKUP ACCESS IS THROUGH THE FRONT OF THE DISPLAY ONLY.

REAR VIEW OF DISPLAY IS SIMILAR, EXCEPT FOR DRIVER ACCESS. DRIVER ACCESS IS POSSIBLE ONLY FROM THE FRONT.

IF THE POWER TO THE DISPLAY IS TEMPORARILY INTERRUPTED, DISPLAY FUNCTIONS WILL BE RETAINED IN MEMORY TO CONTINUE OPERATION WHEN POWER IS RESTORED.

- DRILL THROUGH THE SIDE OF THE CABINET AS REQUIRED TO MOUNT THE DISPLAY.

- POWER AND SIGNAL WIRES CAN BE ROUTED INTO THE SIDE OF THE CABINET.



FRONT VIEW

(WITH HINGED PANELS OPEN)  
(WIRES NOT SHOWN)

REMOVE PLASTIC PLUG AND INSTALL LIGHT SENSOR HERE.

DIGIT CIRCUIT BOARDS ARE ATTACHED TO THE BACK OF THE HINGED FACE PANELS.

CONNECT SIGNAL INPUT HERE.

CONNECT 120V AC POWER HERE.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

TITLE: SHOP DRAWING, DF-1220-24

DES. BY: A VANBEMMEL DRAWN BY: M LEOPOLD DATE: 17 FEB 05

REVISION 01 APPR. BY: SCALE: 1=20

1319-R04B-234578

REV.	DATE	DESCRIPTION	BY	APPR.
01	16 MAR 05	MOVED DRIVER PAN TO CENTER OF CABINET. CHANGED TO AN 8-COL DRIVER.	MGL	