Petroleum Price Displays
DF-4000 Series

Installation and Operation Manual

ED-16084 ***Rev 0 – 15 March 2006***

DAKTRONICS

331 32nd Avenue, PO Box 5128, Brookings, SD 57006
Phone 888-325-7446 or 605-697-4300 Fax 605-697-4700
website: www.daktronics.com e-mail: sales@daktronics.com

DAKTRONICS

ED-16084
Project-1356
Rev 0 – 15 March 2006

Please fill in the information below for your DataMaster display and controller; use it for reference when calling Daktronics for assistance.

Display Serial No. _____

Display Model No. _____

Date Installed _____

DataMaster Serial No. _____

DAKTRONICS, INC.

Table of Contents

List of Figures

Section 1: Introduction

This manual explains the installation and operation of ***Daktronics DataMaster™ Outdoor LED Petroleum Price Displays*** and provides details for display maintenance. If you have questions regarding the safety, installation, operation, or service of these systems, contact Daktronics. Customer Service Help Desk telephone numbers are listed on the cover page of this manual.

1.1 How To Use This Manual

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.

Figure 1, below, illustrates the Daktronics drawing numbering system. Daktronics identifies individual drawings with a number (1279-RO4A-181218 in the example), which is located in the bottom right corner of each drawing. This manual refers to drawings by the last set of numbers in their ID as well as the letter preceding them. The example would be **Drawing A-181218**.

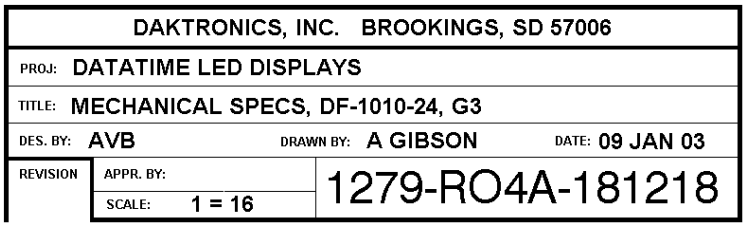


Figure 1: *Daktronics Drawing Label*

Reference drawings in this manual are grouped and inserted in alphanumeric order in the **Appendix.**

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 control room to display, power, and phase requirements.
- **Shop Drawings:** fan locations, transformer locations, mounting information, power and signal entrance points, and access method (front or rear).

- **Schematics:** power wiring, signal wiring, panelboard or power termination panel assignments, signal termination panel assignments, and transformer assignments.
- **Final Assembly:** component locations, part numbers, display dimensions, and assembly/disassembly instructions.

All references to drawing numbers, appendices, figures, or other manuals are presented in **bold** typeface, as in this example: "Refer to **Drawing A-181220** for the location of the driver enclosure." Additionally, any drawings referenced within a particular subsection are listed at the beginning of that subsection in the following manner:

Reference Drawing:
Mechanical Specs, DF-1020-13, G3..... **Drawing A-181220**

Daktronics identifies manuals by their engineering document (ED) number, which is located on the cover page of the manual. For example, this manual would be referred to as **ED-16084**.

The serial and 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. For future reference, note your display model number, serial number, and installation date on the front page of this manual.

Figure 2: *Display Identification Label*

Daktronics displays are built for long life and require little maintenance. However, from time to time, certain display components will have to be replaced. The Replacement Parts List in **Section 4** provides the names and part numbers of components that may require replacement during the life of this display.

Following the Replacement Parts List is an explanation of Daktronics exchange and replacement programs. Refer to these instructions if you must replace or repair any display component.

1.2 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 label “A” on a drawing item typically denotes an assembly. An assembly can be a single circuit board or a collection of components that function together, usually mounted on a single plate or in a single enclosure.

In addition, 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.)

- “0P- _ _ _ _- _ _ _ _” denotes an individual circuit board, such as a driver board.
- “0A-_ _ _ _ - _ _ _ _” 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.
- “T- _ _ _ _ ” denotes a transformer.
- “PR- _ _ _ _ _ - _” denotes a specially ordered part.
- “M- _ _ _ ” denotes a metal part, and “0M-_ _ _ _ _ _” typically denotes a fabricated metal assembly.

1.3 Manual Overview

This manual details outdoor LED numeric displays. It is divided into the following sections:

Section 1: Contains an overview of the DataMaster Series, product safety information, and labeling and numbering descriptions.

Section 2: Lists petroleum price display drawings with mechanical and electrical information and contains a table detailing the mechanical specifications, circuit specifications and power requirements for each model.

Section 3: Contains information needed to perform the mechanical and electrical installation for each model.

Section 4: Contains service and troubleshooting information.

Section 5: Contains an overview of the DataMaster controller, with a description of the types of control systems and instructions for DM 100 setup.

Section 6: Contains an overview of the RC-50 controller, with a description of the types of control systems and instructions for RC-50 setup.

Section 7: Contains an overview of the RC-100 controller, with a description of the types of control systems and instructions for RC-100 setup.

Appendix: Contains all drawings referenced in this manual, quick-start guides, and a list of frequently asked questions.

1.4 Product Overview

DataMaster Petroleum Price displays are part of a family of Daktronics products designed for easy installation, readability, and reliability. Microprocessor control assures consistent operation and accuracy. The DF-4000 Series model Petroleum Price display is illustrated in **Figure 3** below.

Figure 3: *DF-4000 Petroleum Price Display*

The DataMaster Series includes:

- **Petroleum Price Displays:** Standard petroleum price displays in the US employ a 9/10 fraction. International models (DF-4000 series) typically have four full digits and a decimal.

The Petroleum Price displays are available in two styles, a full-cabinet model designed for standalone use (DF-4100), and a front-insertion, or “drop-in”, model designed for installation in an existing or custom sign (DF-4000).

DataMaster displays use light emitting diodes to illuminate their numeric digits. (Light emitting diodes, or LEDs, are tiny, solid-state components that use a semiconductor to transform electrical current into light; they are high-intensity, low-energy lighting units.)

The displays feature highly visible PanaView® digits 10", 13", and 18" tall. (The front-insertion Petroleum Price model is available with 10", 13", and 18" digits.) All DataMaster displays are configured with red or amber LEDs.

Because of their LED technology, the displays consume little power, some barely more than a household lamp. Power usage for individual displays in this series is a maximum 150 W. All models have an option of 120 V or 240 V.

DataMaster cabinets, specially developed for outdoor use, are constructed of heavy-gauge aluminum. Digit faceplates are black, and they are set directly into the surface of the display. Mounting weights and dimensions for each model 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. Also available is a radio controlled RC-100 system, or the RC-50 mini remote control. All controller devices use a keyboard overlay (called an insert) for display control.

1.5 Model Names

Daktronics displays, video screens, and scoreboards are differentiated by their model numbers. The displays described in this manual all carry the two-letter prefix, *DF-*, which indicates that they are DataMaster models. The letter *D* indicates that they are numeric displays; the letter *F* indicates outdoor LED technology.

In the outdoor LED display series, typically the first set of numbers following the prefix identifies the series or product line, while the second set of numbers refers to digit height. A final letter denotes digit color. With *Model DF-4000-13-A*, for example, 4*000* identifies the Petroleum Price full-cabinet line, and *13* signifies that the display's primary digits are a nominal 13" tall. In the example, the letter *A* signifies that the digits are amber, while *R* would indicate red, and *G* green LED digits.

1.6 Product Safety Approval

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

Section 2: Petroleum Price Display Specifications

2.1 Shop Drawings

Use the following table to determine the mechanical specifications for your display. The drawings are listed below by model number; they have been inserted in the **Appendix** in alphanumeric order by drawing number.

Model	Drawing Title	Drawing Number
DF-4000-10	Shop Drawing, DF-4000-10-X-NA-DI	Drawing B-260455
DF-4000-13	Shop Drawing, DF-4000-13-X-NA-DI	Drawing B-258389
DF-4000-18	Shop Drawing, DF-4000-18-X-NA-DI	Drawing B-258025

2.2 Specifications

The table below shows all of the mechanical specifications, circuit specifications, and maximum power requirements for each model in this series. Models are listed in alphanumeric order by digit size.

DataMaster Petroleum Price Displays

Model	Dimensions	Weight	Digit Size/Color	Maximum Power	Circuit
DF-4000-10-A DF-4000-10-R DF-4000-10-G	H1'-3", W3'-6", D0'2" (381 mm, 1067 mm, 51 mm)	35 lb (16 kg)	10" (254 mm) Amber, red, green	72 W	120 V AC 15 A
DF-4000-13-A DF-4000-13-R DF-4000-13-G	H1'-6", W4'-0", D0'2" (457 mm, 1219 mm, 51 mm)	40 lb (19 kg)	13" (330 mm) Amber, red, green	72 W	120 V AC 15 A
DF-4000-18-A DF-4000-18-R	H1'-10", W4'-9", D0'2" (559 mm, 1448 mm, 51 mm)	45 lb (20 kg)	18" (457 mm) Amber, red, green	72 W	120 V AC 15 A
DF-4000-18-G	H1'-10", W4'-9", D0'2" (559 mm, 1448 mm, 51 mm)	45 lb (20 kg)	Green	144 W	120 V AC 15 A

Section 3: Mechanical and Electrical Installation

Mechanical installation typically consists of inserting the DF-4000 into an opening in a large sign, and securing with screws.

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 power connection pigtail in the display.
- 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.

3.1 Electrical installation

Reference Drawing:

RC-50 Quick Install Guide .....**Drawing A-257189**
Address Dip Switch Settings.....**Drawing B-256001**

Each Shop Drawing shows details on Installation and access for electrical and signal connections. Example: B-260453 explains all power needs in the notes and the picture below shows details.

> **Note:** 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.

Power

Reference Drawings:

Wiring Schematic, DF-2000/4000 Series .....**Drawing A-263988**

Daktronics DataMaster displays have been designed for easy access to components, and the power and control signal hookup has been simplified. Front panels are removable or hinged to allow access to the digits, cabling, and other electronic components.

Correct power 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; untrained personnel should not attempt to install these displays or any of the electrical components. Improper installation could result in serious damage to the equipment and could be hazardous to personnel.

The DataMaster outdoor displays require a dedicated, 120 V circuit for incoming power. The display itself has no breakers or fuses.

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.

Refer to the DataMaster display schematics listed below and to the chart in **Section 2** to determine circuit specifications and maximum power requirements for the models described in this manual.

Grounding

Reference Drawings:

Wiring Schematic, DF-2000/4000 Series..... **Drawing A-263988**

Displays MUST be grounded according to the provisions outlined in Article 250 of the National Electrical Code and according to the specifications in this manual. Daktronics recommends 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.** Refer to the schematics, **Drawing A-263988**. Connection for power wires and ground wire is made to supplied harness pigtails inside the display. Standard NEC color code applies. (black = hot, white = neutral, green/yellow = ground).
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 considerations for power installation: installation with ground and neutral conductors provided, and installation with only a neutral conductor provided. These two power installations differ slightly, as described in the following paragraphs:

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.

Installation with Only a Neutral Conductor Provided
Installations where no grounding conductor is provided must comply with Article 250-32 of the National Electrical Code. If the installation in question meets all of the requirements of Article 250-32, the following guidelines must be observed:

- Connect the grounding electrode cable at the local disconnect, never at the display driver/power enclosure.
- Use a disconnect that opens all of the ungrounded phase conductors.

3.2 Power and Signal Connection

Reference Drawings

Address Dip Switch Settings.....**Drawing B-256001**

Power connects to the pigtail inside the display. The pigtail has three wires: black (120 V AC line), white (neutral) and green (ground), and a 5-pin plug on one end. The plug is connected to the mating plug on the transformer. Use wire nuts to connect power wires to the pigtails.

Signal wires are terminated with a telephone-type RJ14 connector. Route the cable from the jack in the j-box to J6 in the driver (see **Figure 4** below).

Address Dip Switch Settings

Reference Drawings:

Address Dip Switch Settings ..... **Drawing B-256001**

One driver at each sign installation is designated as the "host driver." This driver receives its signal directly from the controller on the Signal In connector "J6." The Signal Out connector "J8" is used to connect to "client drivers." Other connectors used for communication are "J11" (Radio, RC-100 system) and "J12" (RC-50 receiver). With the DM-100 and the RC-100, every sign acts as a host and every driver has its own light sensor. With the RC-50, the host receiver sends a signal through J12, and sends the line information out to the clients.

Every driver, either host or client, must have a unique address. The address is set by moving the switches in an eight position to the "Dip switch," located on the driver. Addresses allow the user to set up to eight lines in up to eight sign groups. All displays with the same line number will show the same price. Refer to **Drawing B-256001** for an illustration of the client/host driver setups and for a line number and sign chart.

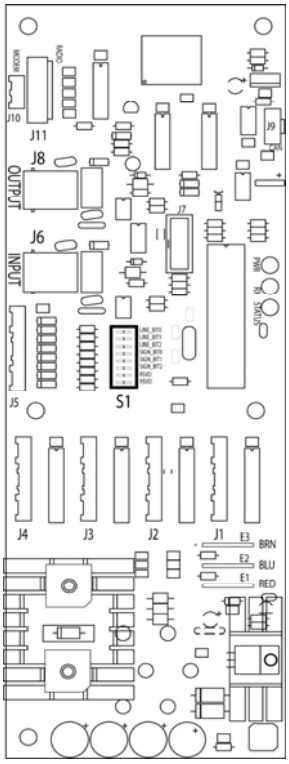


Figure 4: *Driver*

Section 4: Display Maintenance and Troubleshooting

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. Exact dimensions and weights for each model are listed in the chart in **Section 2**. Hinged panels for servicing digits and indicators and for component access are detailed in each model's mechanical specifications drawing.

4.2 Component Location and Access

For the front-access modules in this series, all internal electronic components and digits can be reached by opening the hinged access door on the front of the display. The door swings left when the two latches on the front edge are opened, as shown in **Figure 5**. For front and opened views of the displays, refer to your model's Shop drawings, listed in **Sections 2.1**.

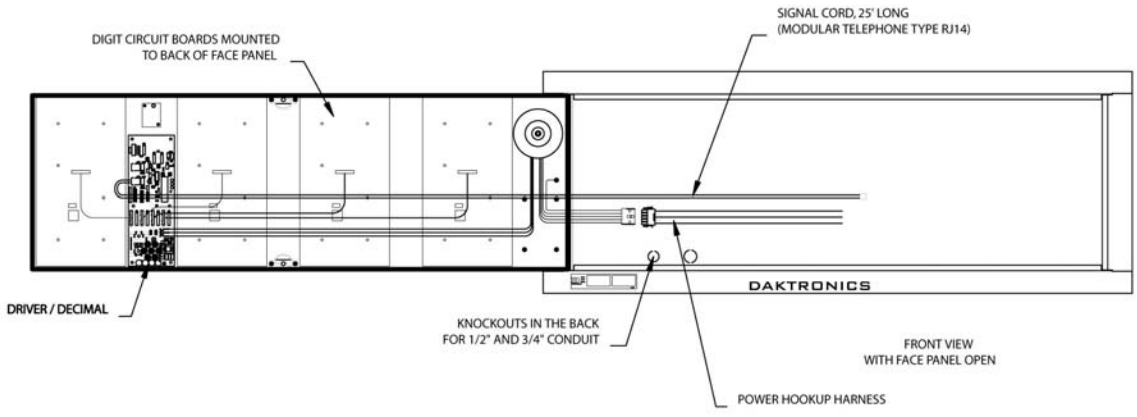


Figure 5: *DF-4000, Front view with face panels open*

Component placement varies slightly with each DataMaster model; consult the model-specific mechanical drawing to determine the layout for your display.

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 Schematics

Reference Drawings:

Specifications; Gas Price Driver, 4 Col. ..... **Drawing A-250728**
Wiring Schematic, DF-2000/4000 Series ..... **Drawing A-263988**

Drawings A-263988 is the schematic diagram and **Drawings A-250728** is the Driver Specification Diagram for the driver used in the DataMaster Petroleum Price displays. The schematic includes power and signal inputs and all wiring for the models described in this manual.

4.4 LED Drivers

Reference Drawings:

Specifications; Gas Price Driver, 4 Col. ..... **Drawing A-250728**

In the display, the LED drivers perform the task of switching digits on and off. Refer to **Drawings A-250728** for a complete listing of driver connector functions and wiring pin numbers.

4-Column LED Driver	
Connector No.	**Function**
J1 – 4	Digits
J5	Not loaded
J6	CL Input
J7	Program
J8	CL Output
J9	Not loaded
J10	Modem
J11	Radio
J12	RC-50 Input

4.5 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. (Refer to the appropriate manual for a list of potential problems with add-on or separately mounted message centers.

Symptom/Condition	Possible Cause
Garbled display	■ Internal driver logic malfunction ■ Control console malfunction
Digit will not light	■ Broken black wire to digit ■ Poor contact at driver connection ■ Driver malfunction
Segment will not light	■ Broken LED or connection ■ Driver shift register failure ■ Broken wire between driver and digit ■ Poor contact at driver connector
Segment stays lit	■ Driver shift register failure ■ Short circuit on digit
Data appears in the wrong place on the display, wrong data on a particular line of the display	■ Incorrect address settings on drivers (Refer to "Power On Self-Test" in the following section, and consult tables to set correct addresses.)

Some DataMaster displays have their own built-in troubleshooting mechanism. 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.

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.

Failure Code	Description	Possible Solution
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 <**UPDATE DISPLAY**> key on the DataMaster 100 controller.

4.6 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 console's circuit.

4.7 Replacement Parts

Refer to the following table for Daktronics replacement parts.

Description	Daktronics Part No.
RC-50 Radio with overlay	0A-1356-0064
Antenna	A-2015
Receiver card	0P-1192-0355
Transformer, wall pack	T-1118
RC-100 hand held assembly	0A-1110-0046
RC-100 Price Display insert	LL-2617
DataMaster 100 hand-held controller	0A-1196-0088
Junction box, outdoor, 9-pin D-male	0A-1196-0093
Junction box, indoor, 9-pin D, male	0A-1196-0099
DataMaster 100 outdoor wired installation kit	0A-1356-0002
DataMaster 100 indoor wired installation kit	0A-1356-0105
Toroid Transformer, Display	T-1124
Digit cable, 1 ft.	W-1575
Digit cable, 3 ft.	W-1576
Gas Price Driver, 4-col	0P-1356-0002
Signal Surge Card	0P-1356-0001
Decimal / Driver, red	0P-1192-0353
Decimal / Driver, amber	0P-1192-0355
Decimal / Driver, green	0P-1192-0354
Digit, 10" 7-segment, red, 14 pin	0P-1192-0356
Digit, 10" 7-segment, amber, 14 pin	0P-1192-0359
Digit, 10" 7-segment, green, 14 pin	0P-1192-0357
Digit, 13" 7-segment, red, 14 pin	0P-1192-0347
Digit, 13" 7-segment, amber, 14 pin	0P-1192-0348
Digit, 13" 7-segment, green, 14 pin	0P-1192-0349
Digit, 18" 7-segment, red, 14 pin	0P-1192-0341
Digit, 18" 7-segment, amber, 14 pin	0P-1192-0342
Digit, 18" 7-segment, green, 14 pin	0P-1192-0343

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 – 877-605-4034 – 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

Section 5: Controller options (DM 100)

This section describes the DataMaster 100, the RC 50, and the RC 100.

5.1 DataMaster 100 Overview

Reference Drawing:

Address Dip Switch Settings.....**Drawing B-256001**

The DataMaster 100 Series controller, shown in **Figure 6**, is a hand-held controller designed to operate Daktronics LED DataMaster displays. This lightweight controller, $6^{1}/_{4}$" high by $4\ ^{1}/_{4}$" wide, is encased in ABS plastic, making it a durable and convenient control option. The console's liquid crystal display (LCD) guides the user through the operation of the system.

Figure 6: *DataMaster 100*

The DataMaster 100, identified by the series number DM 100, can be configured to display petroleum price, motel rates, and time and temperature data. Refer to **Drawing B-256001** for information on possible control options and connection procedures.

Note: When your carrier delivers your Daktronics order, open the packages and inspect for shipping damage such as rattles and dents. See that all equipment is included as shown on the packing slip. Immediately report any deficiencies to Daktronics. Save all packing materials for shipping if warranty repair or exchange is needed.

Replacement Parts List

The following is a list of possible replacement parts for the DataMaster 100 controller. When re-ordering a part, be sure to use its corresponding part number.

Description	Daktronics Part No.
Wall pack transformer	T-1118
DataMaster 100 controller	0A-1196-0088
Control Insert	LL-2551
Cable, DB-9 male to DB-9 female, 10'	W-1267

Refer to **Section 4.8** for details concerning the Daktronics exchange and repair programs.

5.2 Control System Overview

All of the displays in the LED DataMaster Series have three main control options: direct wire, radio, and data download from a junction box at the sign. Refer to the appropriate system riser diagram, listed above, for detailed instructions on control system setup.

Note: This manual covers direct-wire installations only! For systems using modem or radio communication, also refer to the following Daktronics manuals:
ED13953: DataMaster Modem Installation Manual
ED13894: DataMaster Radio Installation Manual

Wire Control

Reference Drawings:

Address Dip Switch Settings .....**Drawing B-256001**

For display systems using a base-of-sign connection, the DataMaster 100 controller, shown with a connecting cable in **Figure 7**, plugs directly into an outdoor junction box, where the operator keys in instructions for the sign. Typically, the j-box is mounted to the display pedestal or column support. The controller draws its power from the display itself. Refer to **Drawing B-256001** for complete details on both indoor and outdoor direct-wire installations.

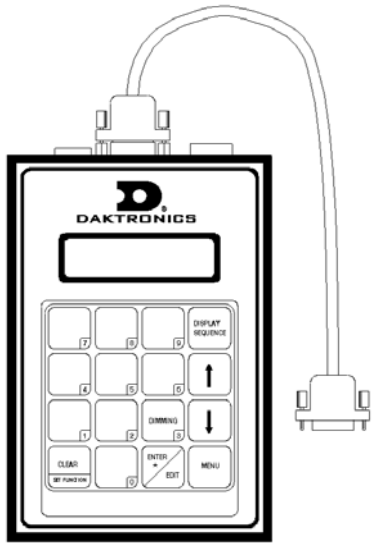


Figure 7: *DataMaster 100 Controller with Signal Cable*

Signal from the junction box enters the sign and travels to the first display driver over 2-pair, shielded signal cable. The 22 AWG cable must be enclosed in conduit. Re-driven signal travels from the driver of the first display to the driver of the next over RJ14 flipped signal cable. The process repeats for as many displays as there are in the system.

Once instructions have been input into the display, the driver's memory retains the data, and the controller can be unplugged. The sign will continue to operate on the stored information.

Signal cabling is similar for systems where the DataMaster displays will be operated remotely from a building location, except that the controller requires a wall pack transformer. The transformer plugs into both the hand-held controller and into a 120 V AC outlet. The DataMaster controller also connects to a junction box to send signal to the display, but the j-box will be located within the store or office. The control location can be up to 2000 feet from the actual sign.

The operator changes the display by entering current prices, rates, and operating instructions on the keypad of the DataMaster controller.

5.3 Controller Signal Connection

Reference Drawing:

Address Dip Switch Settings**Drawing B-256001**

This section provides information on the setting up the signal connection between the DM 100 and DataMaster Petroleum Price displays.
The DataMaster displays may be controlled from a location inside a building, or from the base of the display, depending on customer preference. **Drawing B-256001** and the subsections that follow provide greater detail on both installations using signal wire.

Wire Control from the Base of the Sign

This control option, illustrated in **Figure 8**, permits operation of the sign from the base of the display. The controller is connected to an outdoor junction box mounted on the display pole, which routes the signal to the sign through one 2-pair cable, 22 AWG. Cable is in conduit where required.

This control option does not require the controller to be connected to a power outlet. In this configuration, the DataMaster 100 uses the sign as a power source.

To operate the DataMaster display using this setup, connect the 9-pin to 9-pin cable from the DataMaster controller to the 9-pin j-box mounted on the display pole.

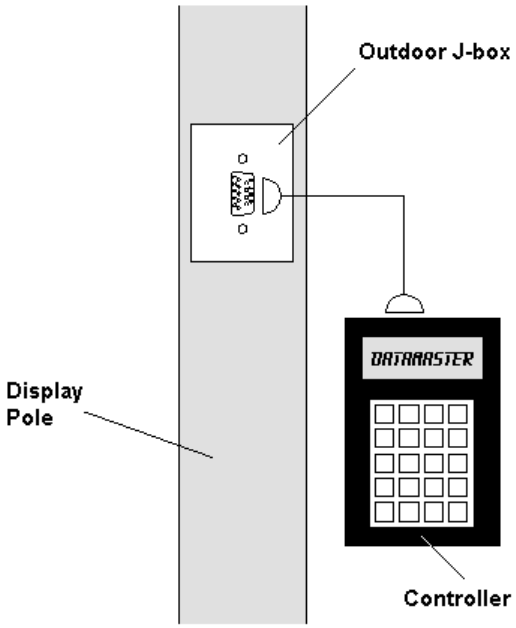


Figure 8: *Wire Control from Base of Sign*

Wire Control from a Building Location

This control option, illustrated in **Figure 9**, permits operation of the sign from an indoor control location. The handheld controller is connected to an indoor junction box (j-box), which routes the signal to the sign through one 2-pair cable, 22 AWG. Cable is in conduit where required.

To operate the DataMaster display using this setup, connect the 9-pin to 9-pin cable from the DataMaster controller to the 9-pin j-box, and plug the controller's wall pack transformer into a 120 V AC outlet.

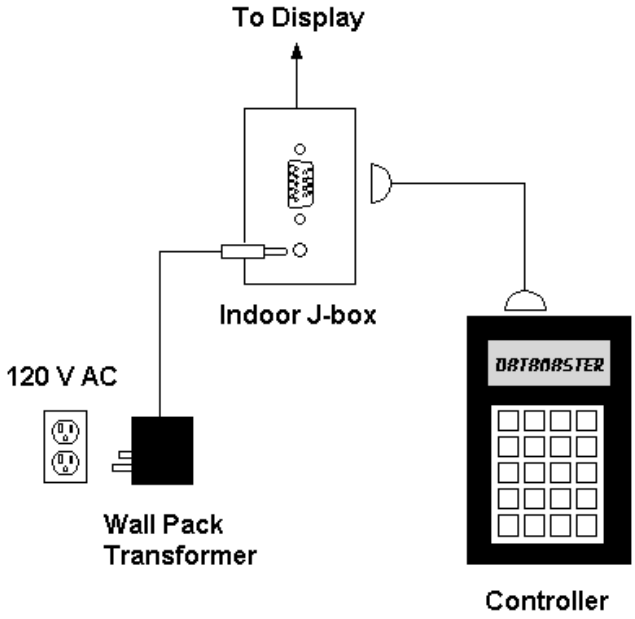


Figure 9: *Wire Control from Building Location*

5.4 DataMaster Insert and Code

Reference Drawing:

Insert, LL-2551 Price/T&T Display ..... **Drawing A-164999**

The DataMaster 100 uses a keypad insert to program rate information into Daktronics LED DataMaster Rate Displays.

Figure 10 illustrates the DM 100 insert used to control the displays. For details refer to **Drawing A-164999.**

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.

5.5 Rate Display Operation

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

Connect the display with the DataMaster. Often when using either a modem or radio an output j-box will also be connected for use if the other means of communication fails.

Note: There is more than one way to get certain LCD screens on the DM 100. One way is by using the menu and then the arrows to reach the desired programming location. The other way is to set the first petroleum price and then continue to enter through the additional screens.

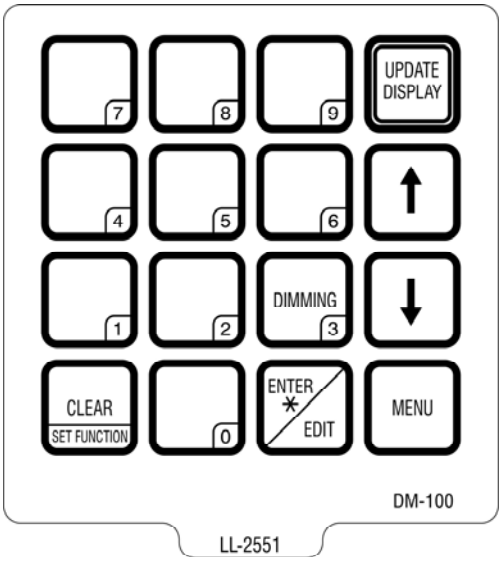


Figure 10: *DataMaster 100 Insert, LL2551*

Rate Display Startup

To operate the DataMaster Rate displays, the DataMaster 100 must first be programmed to the rate display function. Use the <**CLEAR/SET FUNCTION**> key on startup. The following text will be displayed on the LCD during startup.

Daktronics, Inc.
Brookings, SD

DataMaster 100
ED-13374 VX.X

The controller will then list the "Current Function", if it is Rate Display you can continue, otherwise at the next frame: "Current Function? Press Set Function" you need to press <**CLEAR/SET FUNCTION**> and use the < ↑↓> to select Rate Display.

Note: Press the <**CLEAR/SET FUNCTION**> key quickly to enter the function mode. If you miss this step, unplug the power to the DataMaster controller and start again.

Use the following table as a guide to startup procedures.

LCD Screen	Action
CURRENT FUNCTION RATE DISPLAY	Power is provided to the DM 100 through the serial cable or through the wall pack transformer, either directly or by way of the j-box/signal converter. This display appears briefly.
CHANGE FUNCTION? PRESS SET FUNCT	This message appears next on the screen. If “RATE DISPLAY” was shown on the bottom line of the LCD during startup, do nothing. The controller will automatically default to previous Rate Display settings. (The controller will remember the last function used, so you should only have to do this with a new controller or when switching between DataMaster displays.) If a function other than “RATE DISPLAY” was shown on the bottom line of the LCD during startup, press the <**SET FUNCTION**> key while the second LCD prompt is displayed. You only have 1 or 2 seconds to push it. If you miss it, unplug the power to the DM 100 and try again.
SELECT FUNCTION RATE DISPLAY ↓↑	Press the arrow up or down keys <↑↓> until the rate display option is shown. Press the <**ENTER**> key to accept.

Note: The actual Rate Price values will not be displayed on the DataMaster 100 LCD screen because these values are kept in the display itself.

Menu Items

Pressing the **<MENU>** key accesses the following settings:

Key	Setting
1	Price Line 1
2	Price Line 2
3	Price Line 3
4	Price Line 4
5	Price Line 5
6	LED Test?
7	Display Option
8	Modem Settings
9	Display Status
10	Set Time 12HR

Use Menu items 1-5 to edit the price on each line of the display. Lines are typically numbered top to bottom with 1 being the top of the display. For further details, refer to **Modifying Price Line Settings** discussed previously in this section.

For more information about the Modem Settings submenu, refer to **ED-13953: DataMaster Modem Installation Manual**. For additional information about the Display Status or the Set Time submenus, refer to **ED-13894: DataTime Radio Installation Manual,** that manual provides for complete details on installation and setup for a bi-directional radio system.

Rate Display Controller Operation

The DataMaster 100, configured to the rate display option, defaults to showing the current display settings on power up. The following text will be shown on the LCD.

LCD Screen	Action
LINE PRICE 1 ↓ $ DD.CC <EDIT> TO MODIFY 1 ↓ $ DD.CC	The display will toggle between these two screens. DD.CC = dollars and cents value shown on line 1. Press the up or down arrow keys <↑↓> to scroll through the current setting for any of the lines on the display. Press the <**ENTER/EDIT**> key to modify any of the line settings.

Modifying Price Line Settings

The rate price can be modified either by pressing the <**EDIT**> key during operation (Refer to the Rate Display controller operation) or using the <**MENU**> key (refer to the <**MENU**> key operation.)

Use the following key to identify the item to be edited.

L = Current line number to be edited
DD.CC = Current dollars and cents value to edit

LCD Screen	Action
LED TEST ENTER TO TEST	Press the <**ENTER**> key to cycle the display digits between all LEDs on and all LEDs off.
ENTER TO TEST CLEAR TO EXIT	Press <**ENTER**> send the test command to the sign. Press <**CLEAR**> to exit the test mode

Display Option

Use the Display Option menu to select the display configuration.

LCD Screen	Action
DISPLAY OPTION $00.00 ↓	The current configuration is shown on the bottom line of the LCD. Press the down arrow key to select any of the possible configuration values. Possible values are: $00.00 (default) $0.000 $.0000 $0000.00 $000.00 $00 Select the configuration that matches the layout of your display. **Note:** If the wrong configuration is selected, the digits shown on the LCD may not be displayed correctly on the display. Press <**ENTER**> to accept and move on to the next screen.

Modem Settings

The following items for a modem can be set using the DM 100:

Key	Setting
1	Dial Number
2	Dial out prefix
3	Disconnect time
4	Multiple Dial

Display Status

The Display Status menu item can be used with a bi-directional display setup to get display status back from the driver. The controller will cycle through various LCD message screens, illustrated below and on the following page, that show display status. Press <**CLEAR**> at any time to exit the Display Status submenu.

LCD Screen	Action
Display status Get status?	Press <**ENTER**> to get the status of the display that is connected to the DM-100. The LCD will scroll through the status sent back from the display. Following is a list of responses:
Driver Firmware version x.x	▪ *Firmware Version* This is the firmware version programmed on the host MASC driver in the display.
Current day/time mm/dd/yy HH:MM	▪ *Current Day/Time* This is the Day/Time value set in the driver. The time format used will be 24-hour. **Note:** To set the Day/Time, see the "Set Time" section of your DataTime display system's operation manual.
Last reset time Mm/dd/yy hh:mm	▪ *Last Reset Time* This time represents the last time the driver was reset. Note that the time format used will be 24-hour.
Current temp Xx ºf	▪ *Current Temp* This is the temperature read at the display by the temp sensor. (This value does not include the offset, if applicable).
TEMP SENSOR OFFSET Xx ºC	▪ *Temp Sensor Offset* This is the temp sensor offset value programmed into the driver.

LCD Screen	Action
DIM level xx 0=dim 63=bright	▪ *Dim Level* This is the intensity level of the display; 0 is the dimmest setting, and 63 is the brightest setting.
DIMming mode automatic	▪ *Dimming Mode* This is the current mode of dimming used by the display. ▪ *Automatic Dimming* – The light sensor controls dimming. ▪ *Manual Dimming* – The DM 100 console is used to enter all display dimming information.

Set Time

This allows you to set the time and date with the DM 100.

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

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.

Dimming

The dimming level of the Rate display can be adjusted in two ways. A light sensor, mounted on each driver, 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 functions, press <**DIMMING**>. The current setting is shown on the bottom line of the LCD.

LCD Screen	Action
DIMMING AUTOMATIC ↓	Press the down arrow key <↓> to toggle through dim settings: **Automatic** – The display automatically dims based on the light detected at the display **Manual** – The display dimming level is set manually. Once set, this value remains regardless of the level of light detected at the display.

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

LCD Screen	Action
SET AUTO DIMMING MAX INTENSITY?	Press the <**ENTER/EDIT**> 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). Press <**CLEAR**> to keep the current auto dimming maximum setting.

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

LCD Screen	Action
INTENSITY XX↓↑ ENTER TO SET XX – Current intensity (1-16) Max Intensity - 16	Press the up or down arrow key <↑↓> to modify the current intensity of the display (Note: The DataMaster must be connected to the display) Press <**ENTER**> to accept this intensity. If the manual-dimming mode is selected, this will be the new intensity for the display. If the automatic dimming mode is selected, the display will illuminate in full-bright mode, which is the maximum intensity level.

Update Display

Once connected to the display with a j-box, radio, or modem, press <**UPDATE DISPLAY** > to display the new sequence on the display. This button will also allow for a preview of the new sequence on the LCD.

Section 6: Controller options (RC-50)

6.1 RC-50 Rate Display Operation

RC-50 Quick install Guide.....**Drawing A-257189**

6.2 Rate Display Operation

The RC-50 controller can control four unique prices on multiple signs. The instructions provided in this section discuss the functions the operator uses to control the rate display.

Editing the Display

To edit the price on the display, press and hold any button for 5 seconds. When the sign is in Edit mode, the decimal LEDs blink.

On the RC-50, each pair of buttons corresponds to a price line on the display. Each line is numbered to indicate the line it corresponds to.

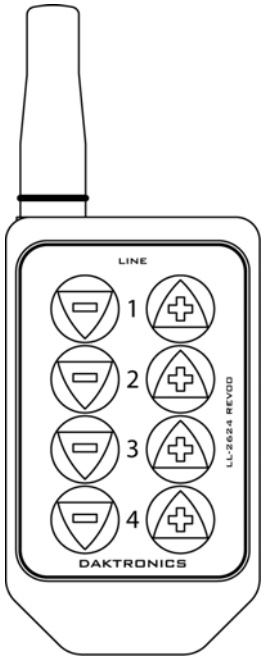


Figure 11: *RC-50 Controller*

Increasing the price

To increase the price by one cent, press [+] for the corresponding line.
Note: Make sure the display is in Edit mode.

Decreasing the price

To decrease the price, press [-] for the corresponding line.
Note: Make sure the display is in Edit mode.

Turbo mode

To rapidly increase or decrease a price, press and hold the button for the corresponding line.
Note: When a button is not pressed for more than 10 seconds, the display exits the Edit Mode. The prices are saved and the display returns to its normal state.

Section 7: Controller options (RC-100)

7.1 RC-100 Rate Display Operation

Price Display Insert LL-2617

System Riser Diagram; RC-100, DataMaster.....**Drawing A-244838**

7.2 Wireless Specific Considerations

Although multiple wireless handheld controllers may be connected to a single wireless base station server, the rate display application allows only one handheld device to be connected at a time.

7.3 Rate Display Operation

The RC-100 controller can be configured to program price variances displayed on the LED DataMaster Rate display. The instructions provided in this section discuss the functions the operator uses to control the rate display.

Rate Display Startup

To operate the DataMaster Rate displays, the RC-100 must first be programmed to the rate display function.

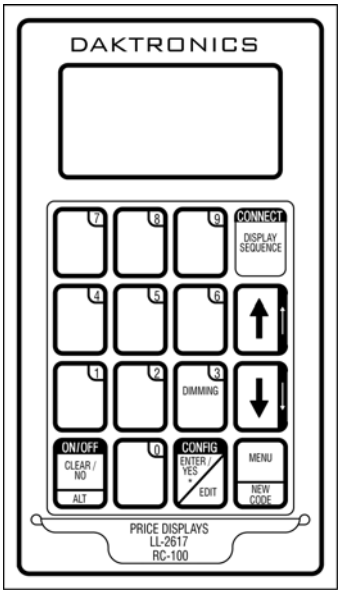


Figure 12: *RC-100 Controller*

New Code Key

To select a new Price Display option (Rate, Lottery, Gas), use the new code key. This key is an alternate function, so the <ALT> key must first be pressed.

LCD Screen	Action
Press Enter to select a new code	Press **<ALT>** then **<NEW CODE>** to select a new price display function. Press **<CLEAR>** to resume normal operation. Press **<ENTER>** to select a new function. Use the **<↑↓>** arrow keys to select the new price function and then press **<ENTER>**.
SELECT FUNCTION Rate Display ↓↑	Press the arrow up or down keys<↑↓> until the rate display option is shown. Press the <**ENTER**> key to accept.
Initializing Display	To accept a new function, the handheld controller will send this information to the display.
Searching for Display	If the wireless base station cannot be found the controller will not work. This may happen if the controller is out of range or if the wireless base station has no power.

Note: The actual rate price values will not be displayed on the RC-100 LCD screen because these values are kept in the display itself.

Rate Display Controller Operation

The RC-100, configured to the rate display option, defaults to showing the current display settings on power up. The following text will be shown on the LCD.

LCD Screen	Action
LINE PRICE 1 ↓ $ D.CC <EDIT> TO MODIFY 1 ↓ $ D.CC	The display will toggle between these two screens. DD.CC = dollars and cents value shown on line 1. Press the up or down arrow keys <↑↓> to scroll through the current setting for any of the lines on the display. Press the <**ENTER/EDIT**> key to modify any of the line settings.

Modifying Price Line Settings

The rate price can be modified either by pressing the <**EDIT**> key during operation (Refer to the rate display controller operation) or using the <**MENU**> key (refer to the <**MENU**> key operation.)

Use the following key to identify the item to be edited.

L= Current line number to be edited
DD.CC= Current dollars and cents value to edit

LCD Screen	Action
EDIT LINE L $ D.CC	Press any of the number keys to edit the price value for this line. 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. Press the down arrow key <↓> to modify the next line, or press the <↑↓> keys to move to the next item or the previous one on the list.

Display Sequence

Once connected to the display with a j-box, radio, or modem, press <**DISPLAY SEQUENCE**> to display the new sequence on the display. This button will also allow for a preview of the new sequence on the LCD.

Menu Items

Pressing the **<MENU>** key accesses the following settings:

Key	Setting
1	Price Line 1
2	Price Line 2
3	Price Line 3
4	Price Line 4
5	Price Line 5
6	LED Test?
7	Display Option
8	Display Status
9	Set Time 12HR

Use Menu items 1-5 to edit the price on each line of the display. Lines are typically numbered top to bottom with 1 being the top of the display

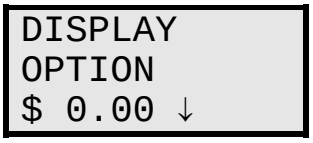
LED Test

Select menu item 6, LED test, by pressing menu and using the <↓>, to test the LED digits on the display.

LCD Screen	Action
LED TEST ENTER TO TEST	Press the <**ENTER**> key to cycle the display digits between all LEDs on and all LEDs off.
ENTER TO TEST CLEAR TO EXIT	Press <**ENTER**> send the test command to the sign. Press <**CLEAR**> to exit the test mode.

Display Option

Use the display option menu to select the display configuration.

LCD Screen	Action
	The current configuration is shown on the bottom line of the LCD. Press the down arrow key to select any of the possible configuration values. Possible values are: $00.00 (default) $0.000 $.0000 $0000.00 $000.00 $000.0 $00 Select the configuration that matches the layout of your display. **Note:** If the wrong configuration is selected, the digits shown on the LCD may not be displayed correctly on the display. Press <**ENTER**> to accept and move on to the next screen.

Display Status

This will look for a bi-directional link to the display, and will allow you to send the sequence changes. Select menu item 7, display status, for display status functions.

LCD Screen	Action
Display status Get status	Press the **<ENTER>** key to get the display status, or **<CLEAR>** to exit the menu. Use the <↑↓> keys to select other display functions. If **<ENTER>** is pressed, the LCD will show the following display items: • Driver Firmware Version • Current Day/Time • Last Reset Time • Current Temp • Temp Sensor Offset • Dimming Level • Dimming Mode • Temp Sensor Status

After pressing <**ENTER**> the get status menu will display:

Display Passcode

LCD Screen	Action
Display Passcode Ent to Exit	Press the <**ENTER**> key to set or change the passcode. Press **<CLEAR>** to exit the menu.
Display Passcode Old code……* Display Passcode New code……* Display Passcode Passcode set	If there was an old passcode, then that must be entered first before entering a new code. Enter the new four-digit passcode, and press <**ENTER**>. The LCD will show Passcode Set, if it was successful. If the <CLEAR> key is pressed and entered during this process, the new passcode will not be set.

Detect Clients

LCD Screen	Action
Detect clients Ent to confirm Clients found 1 Is this correct?	Press the <**ENTER**> key to detect the number of client statuses on the system. This is used so the send sequence key knows how many clients there are for showing error messages. The LCD will show how many clients are found. If the **<YES>** key is pressed, then that is the number the console will use for showing error messages if all expected clients did not respond.

Set Time

This allows you to set the time and date with the RC-100.

Dimming

The dimming level of the rate display can be adjusted in two ways. A temperature/light sensor, mounted near the display, 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 functions, press <**DIMMING**>. The current setting is shown on the bottom line of the LCD.

LCD Screen	Action
DIMMING AUTOMATIC ↓	Press the down arrow key <↓> to toggle through dim settings: **Automatic** – The display automatically dims based on the light detected at the display **Manual** – The display dimming level is set manually. Once set, this value remains regardless of the level of light detected at the display. **Blank Sign** – The display can be blanked out without powering down. Refer to the blank sign section for details.
SET AUTO DIMMING MAX INTENSITY?	Press the <**ENTER/EDIT**> 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.) Press <**CLEAR**> to keep the current auto dimming maximum setting

INTENSITY XX↓↑ ENTER TO SET XX – Current intensity (1-16) Max Intensity - 16	Press the up or down arrow key <↑↓> to modify the current intensity of the display (Note: The DataMaster must be connected to the display) Press <**ENTER**> to accept this intensity. If manual dimming mode is selected, this will be the new intensity for the display. If the automatic dimming mode is selected, the display will illuminate in full-bright mode, which is the maximum intensity level.
DIMMING BLANK SIGN ↓ BLANK THE SIGN? <ENT> YES <CLR> NO	Press <**ENTER**> to accept this option. The next LCD dialog will ask whether you want to blank the screen or escape. The LCD toggles between Yes and No. Pressing <**CLR**> resumes normal operation; pressing <**ENT**> actually blanks the sign.

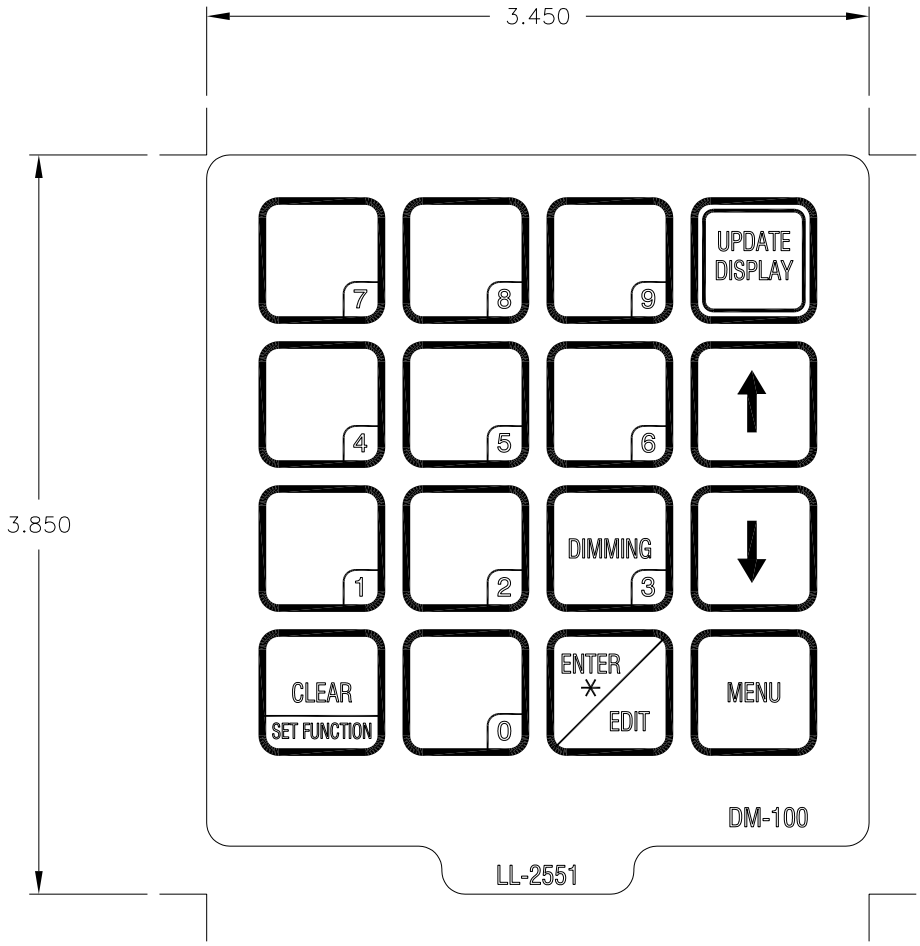
Appendix A: Reference Drawings

The Daktronics drawing number is located in the bottom right corner of the drawing. Refer to **Section 1.1** for instructions on reading the drawing number.

Drawings in this manual are referenced by their last set of digits and the letter preceding them. Drawings in this appendix are first listed in alphanumeric order; a second grouping lists drawings by function.

A-Drawings (All Drawings)

Appendix B: DataMaster Frequently Asked Questions (FAQ)



1. DAKTRONICS PART NUMBER IS LL-2551.
2. ALL COPY IS BLACK.
3. BACKGROUND COLOR IS GRAY TO MATCH PMS# 428
4. FINAL DIE CUT IS PER DRAWING 1196-R07A-139763.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: INSERT, LL-2551 PRICE/T&T DISPLAY

DES. BY: EBRAVEK DRAWN BY: EBRAVEK DATE: 28 MAY 02

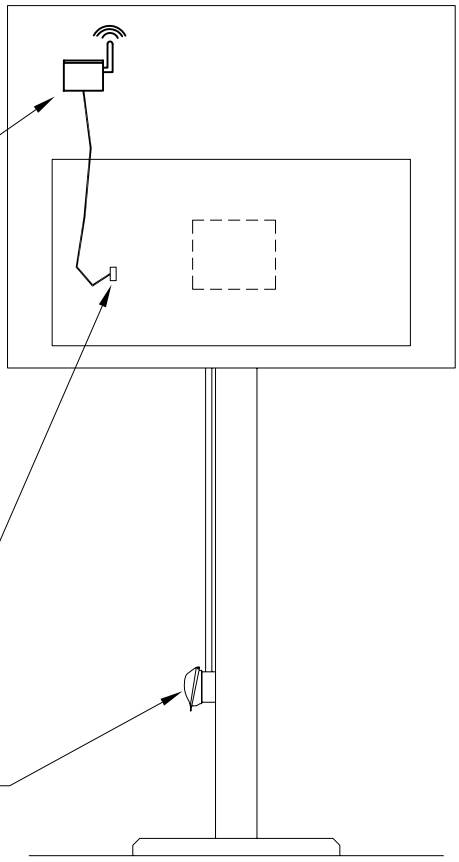
REVISION 01 | APPR. BY: | SCALE: 1=1

1196-E07A-164999

REV.	DATE	DESCRIPTION	BY	APPR.
01	27 OCT 05	DISPLAY SEQUENCE CHANGED TO UPDATE DISPLAY ADDED BORDER AROUND UPDATED DISPLAY KEY	DJU	

NOTE: THIS DETAIL SHOWS A GENERIC PRICE DISPLAY. ACTUAL DISPLAY MAY BE DIFFERENT FROM DRAWING.

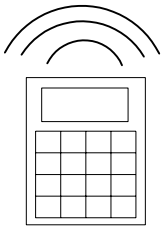
FRONT VIEW



NOTE:
THE WIRELESS BASE STATION COMES PRE-SET TO CHANNEL 1. HOWEVER, CHANNELS 1-15 CAN BE USED.

FUNCTION TABLE

FUNCTION NUMBER	DESCRIPTION
0	DEFAULT FUNCTION (LAST POWER UP FUNCTION)
1	CAN HAND HELD (JUDGES) CONSOLE
2	BASEBALL/TENNIS SCOREBOARD CONTROLLER (ALLSPORT)
3	DATATIME/DATAMASTER DISPLAY CONTROL



0A-1110-0033
INSERT: LL-2617
(GAS PRICE DISPLAY)

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: DATAMASTER LED DISPLAYS

TITLE: SYSTEM RISER DIAGRAM; DATAMASTER, RC-100

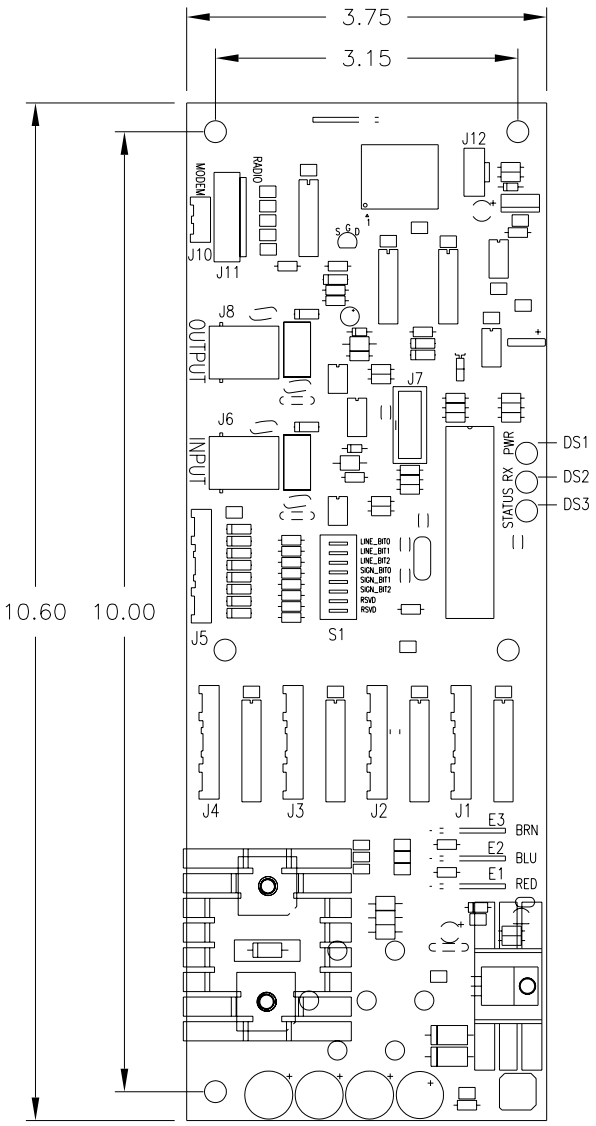
DES. BY: KBIERBA DRAWN BY: KBIERBA DATE: 9 JUN 05

REVISION 01 | APPR. BY: MMILLER | SCALE: NONE

1279-R01A-244838

REV.	DATE	DESCRIPTION	BY	APPR.
01	01 AUG 05	REVISED TEXT	CMG	

GAS PRICE DECIMAL / DRIVER
0P-1192-0353 RED
0P-1192-0354 GRN
0P-1192-0358 AMB



J10: MODEM

PIN	FUNCTION
5	MODEM_RX_P
4	GND
3	MODEM_TX_P
2	MODEM_RESET_P
1	MODEM_RTS_P

J11: RADIO

PIN	FUNCTION
1	RS232_TX_P
2	RS232_RX_P
3	GND_N
4	+V_UNREG_P
5	DCD_P
6	RESET_P

J8: CL_OUTPUT

PIN	FUNCTION
1	N/C
2	CL_OUT_TX_N
3	CL_OUT_TX_P
4	CL_OUT_RX_N
5	CL_OUT_RX_P
6	N/C

J6: CL_INPUT

PIN	FUNCTION
1	+10V_UNREG
2	CL_IN_TX_P
3	CL_IN_TX_N
4	CL_IN_RX_P
5	CL_IN_RX_N
6	GND

J5: SWITCH INPUTS

PIN	FUNCTION
14	N/C
13	N/C
12	N/C
11	N/C
10	+5V_P
9	SW_7_P
8	SW_6_P
7	SW_5_P
6	SW_4_P
5	SW_3_P
4	SW_2_P
3	SW_1_P
2	SW_0_P
1	GND_N

J12: RC 50 INPUT

PIN	FUNCTION
1	+3.3V_P
2	N/C
3	GND
4	DATA_INPUT_P

J7: PROGRAM

FUNCTION	PIN	PIN	FUNCTION
PGC_P	1	2	VPP_P
NC	3	4	GND_N
PGD_P	5	6	GND_N
PGM_P	7	8	+5V_P
NC	9	10	NC

S1: OPTIONS

PIN	FUNCTION
1	LINE_BIT_0
2	LINE_BIT_1
3	LINE_BIT_2
4	SIGN_BIT_0
5	SIGN_BIT_1
6	SIGN_BIT_2
7	RESERVED
8	RESERVED

J1-4: DIGIT OUTPUTS

PIN	FUNCTION
14	+VBB_P
13	+VBB_P
12	+VBB_P
11	+VBB_P
10	+VBB_P
9	N/C
8	SEGH_N
7	SEGG_N
6	SEGF_N
5	SEGE_N
4	SEGD_N
3	SEGC_N
2	SEGB_N
1	SEGA_N

POWER INPUTS

PIN	FUNCTION
E3	VAC_N_RED
E2	10VAC_P_BLU
E1	20VAC_P_BRN

NOTES:

-GREEN LED DS1 INDICATES THAT THE DRIVER HAS POWER.

-RED LED DS2 WILL FLICKER WHEN THE DRIVER RECEIVES SIGNAL.

-AMBER LED DS3 WILL BLINK WHEN THE DRIVER IS RUNNING.

-IF DS3 IS ON OR OFF CONTINUOUSLY THE MICROCONTROLLER IS NOT WORKING.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: REDUCED DEPTH GAS DISPLAYS

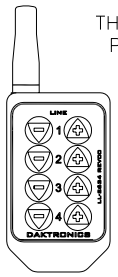
TITLE: SPECIFICATIONS; GAS PRICE DRIVER, 4 COL.

DES. BY: THENDRI DRAWN BY: DULSCHM DATE: 11 AUG 05

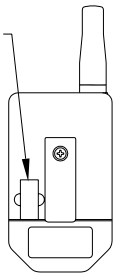
REVISION 02 APPR. BY: SCALE: 1 = 2

1356-R04A-250728

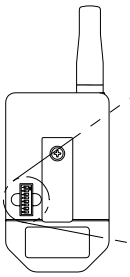
REV.	DATE	DESCRIPTION	BY	APPR.
02	28 FEB 06	REMOVED FUNCTION TABLE FOR J9: CAN ADDED FUNCTION TABLE FOR J12: RC 50	DJU	
01	04 OCT 05	UPDATED DRAWING FOR REV 01 PCB	DJU	



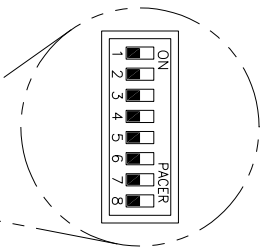
FRONT VIEW
RC-50
CONTROLLER



REAR VIEW
RC-50
CONTROLLER



REAR VIEW
RC-50
CONTROLLER



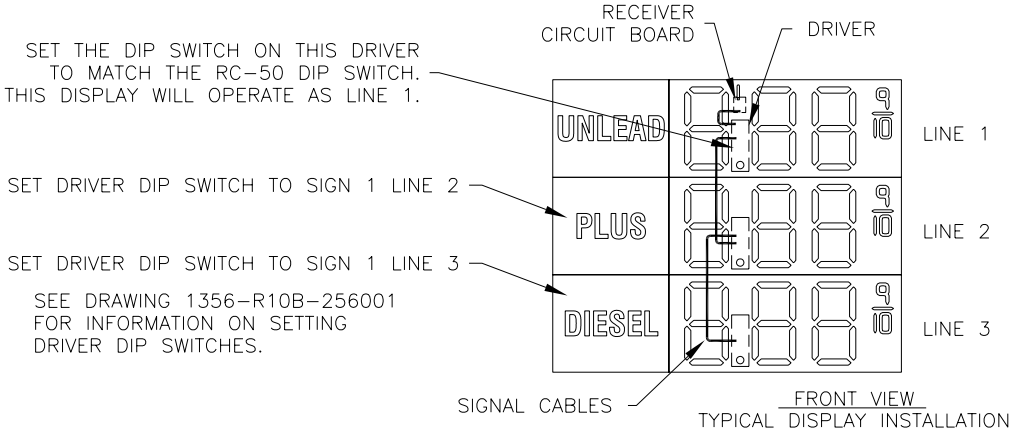
DIP SWITCH DETAIL
SCALE 2=1
(THIS IS AN EXAMPLE ONLY,
NOT THE ACTUAL SETTINGS)

REMOVE THE DIP SWITCH COVER ON THE BACK OF THE RC-50 CONTROLLER.

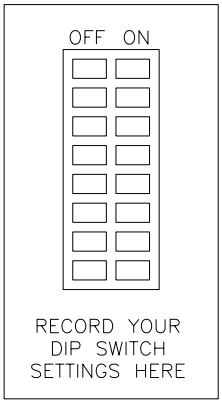
USE A THIN, POINTED OBJECT TO MOVE THE SWITCHES RIGHT OR LEFT TO TURN THEM ON OR OFF.

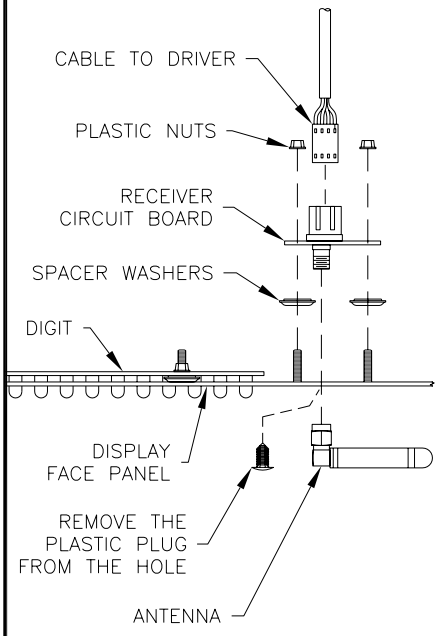
SET THE RC-50 DIP SWITCH TO A RANDOM UNIQUE SETTING. RECORD YOUR SETTING IN THE TABLE BELOW.

REPLACE THE COVER.



FRONT VIEW
TYPICAL DISPLAY INSTALLATION





TOP VIEW
RECEIVER INSTALLATION

1. SET THE RC-50 DIP SWITCH TO A UNIQUE RANDOM SETTING. RECORD YOUR SETTING FOR FUTURE REFERENCE.

2. SET THE DIP SWITCH ON THE DRIVER THAT WILL BE CONNECTED TO THE RECEIVER, USING THE SAME SETTING AS THE RC-50 SWITCHES.

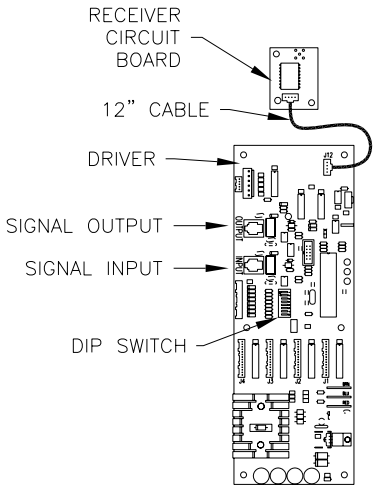
3. MOUNT THE RECEIVER CIRCUIT BOARD IN THE DISPLAY, AS SHOWN AT LEFT.

4. CONNECT SIGNAL CABLE FROM OUTPUT ON THAT DRIVER TO INPUT ON THE NEXT DRIVER. CONTINUE CONNECTING FROM OUTPUT TO INPUT UNTIL ALL DRIVERS ARE CONNECTED.

5. SET THE DIP SWITCHES ON THE OTHER DRIVERS TO BE LINE 2, LINE 3, ETC. SEE DRAWING 1356-R10B-256001 FOR INFORMATION ON SETTING DRIVER DIP SWITCHES.

6. POWER UP THE SIGN AND OPERATE THE RC-50 CONTROLLER. LINE 1 WILL OPERATE THE DISPLAY WITH THE RECEIVER, ALONG WITH ANY OTHER DISPLAY THAT IS SET TO LINE 1.

7. PRESS AND HOLD ANY KEY ON THE RC-50 FOR 5 SECONDS. THE DECIMAL ON THE DISPLAY WILL FLASH. PRESS [-] OR [+] TO DECREASE OR INCREASE THE PRICE BY 1 CENT.



REAR VIEW
RECEIVER AND DRIVER

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

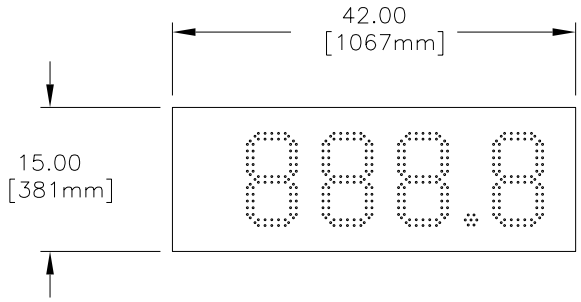
TITLE: RC-50 QUICK INSTALL GUIDE

DES. BY: KBIERBA DRAWN BY: KBIERBA DATE: 11 NOV 05

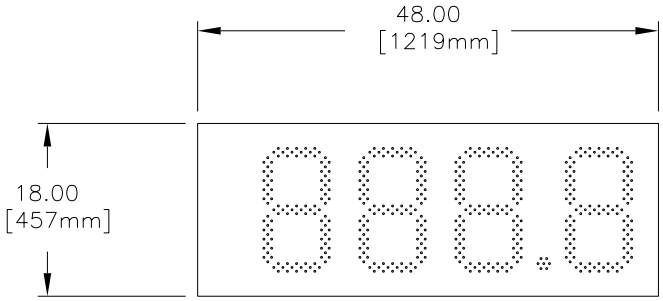
REVISION 00 | APPR. BY: | SCALE: NONE

1356-R10A-257189

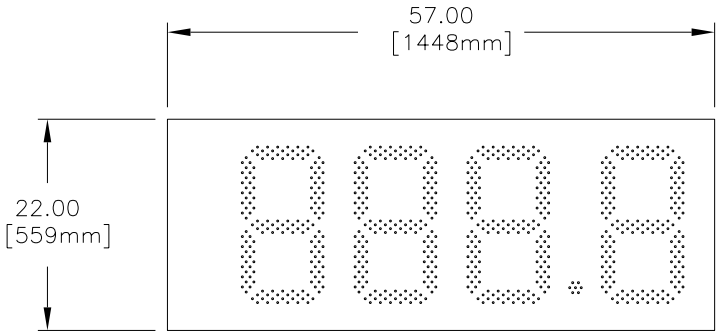
REV.	DATE	DESCRIPTION	BY	APPR.



DF-4000-10-DI



DF-4000-13-DI



DF-4000-18-DI

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

TITLE: MODELS, DF-4000 DROP IN DISPLAYS

DES. BY: AVB DRAWN BY: AVANBEM DATE: 15 DEC 05

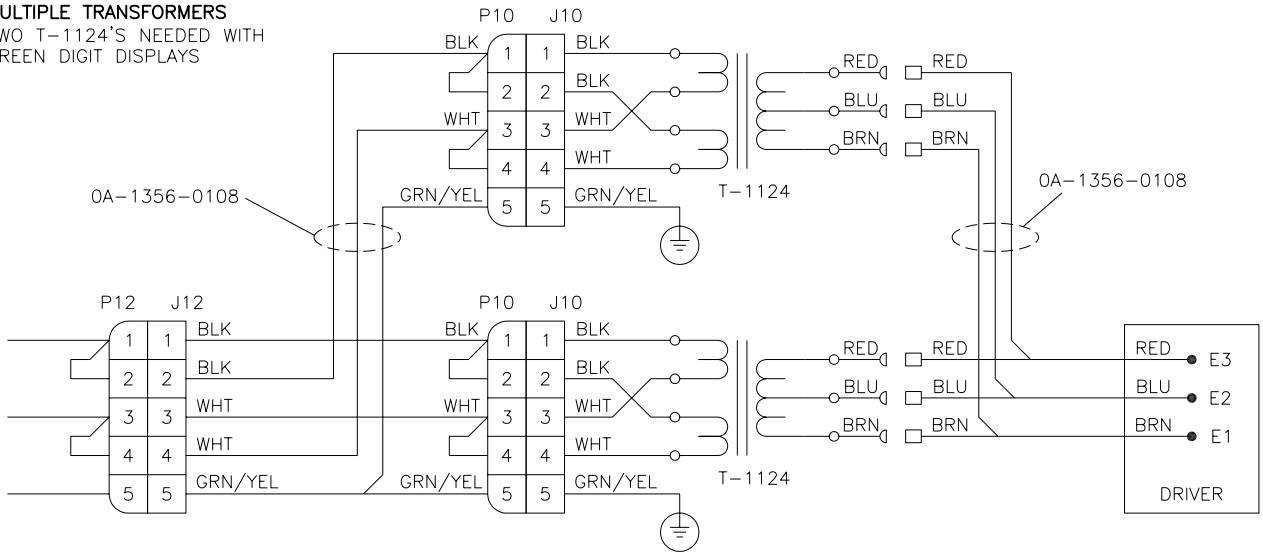
REV.	DATE	DESCRIPTION	BY	APPR.

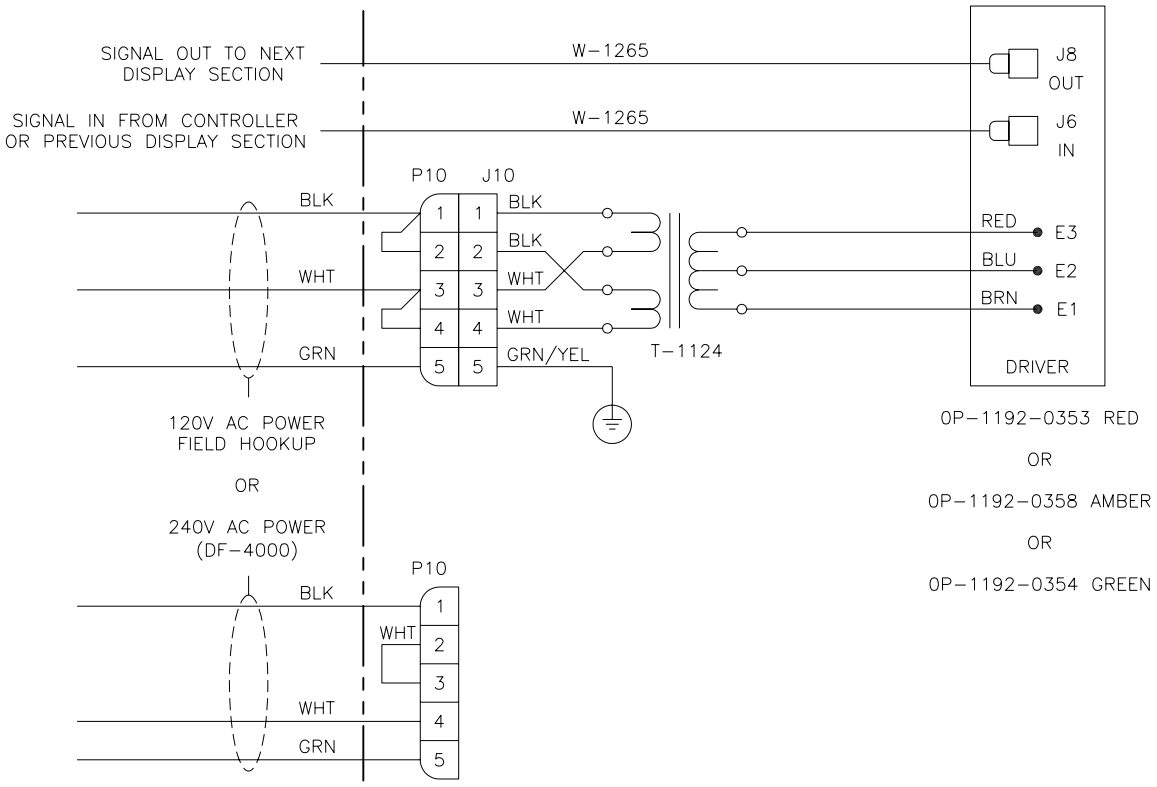
REVISION 00 APPR. BY:

SCALE: 1=20

1356-R08A-259603

MULTIPLE TRANSFORMERS
TWO T-1124'S NEEDED WITH GREEN DIGIT DISPLAYS

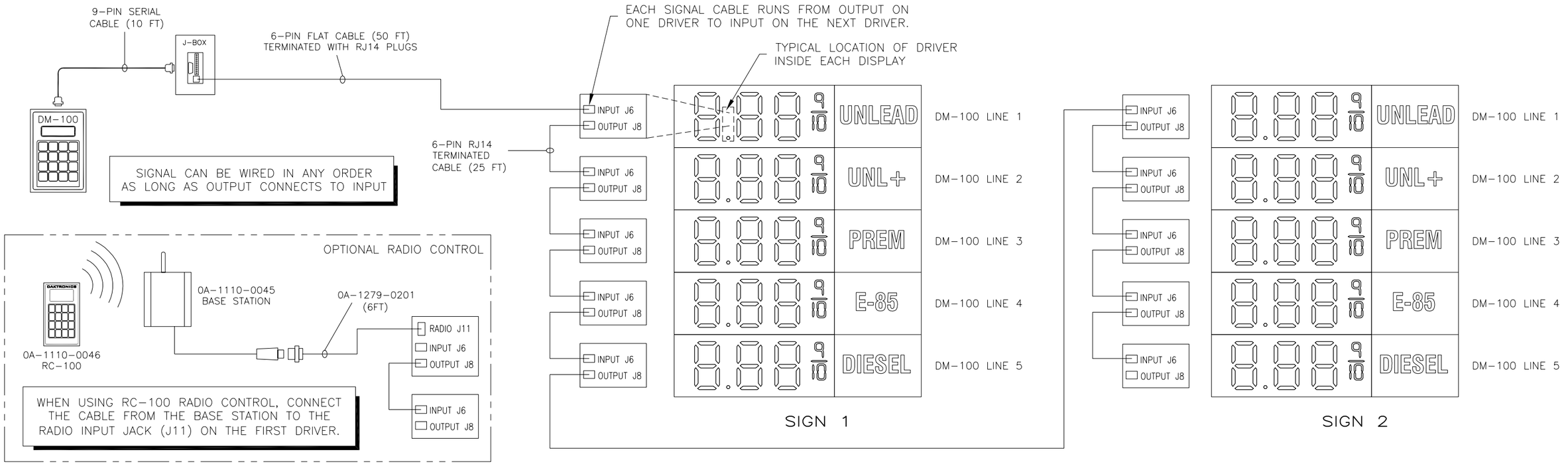




DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS
TITLE: WIRING SCHEMATIC, DF-2000/4000 SERIES
DES. BY: AVB DRAWN BY: KBIERBA DATE: 09 FEB 06
REVISION 00 APPR. BY:
SCALE: NONE
1356-R03A-263988

REV.	DATE	DESCRIPTION	BY	APPR.



LINE NUMBER

SET LINE NUMBER USING ONE-OFFSET BINARY NOTATION.

LINE 1	OFF		LINE_BIT0	SWITCH 1
	OFF		LINE_BIT1	SWITCH 2
	OFF		LINE_BIT2	SWITCH 3
LINE 2		ON	LINE_BIT0	SWITCH 1
	OFF		LINE_BIT1	SWITCH 2
	OFF		LINE_BIT2	SWITCH 3
LINE 3	OFF		LINE_BIT0	SWITCH 1
		ON	LINE_BIT1	SWITCH 2
	OFF		LINE_BIT2	SWITCH 3
LINE 4		ON	LINE_BIT0	SWITCH 1
		ON	LINE_BIT1	SWITCH 2
	OFF		LINE_BIT2	SWITCH 3
LINE 5	OFF		LINE_BIT0	SWITCH 1
	OFF		LINE_BIT1	SWITCH 2
		ON	LINE_BIT2	SWITCH 3
LINE 6		ON	LINE_BIT0	SWITCH 1
	OFF		LINE_BIT1	SWITCH 2
		ON	LINE_BIT2	SWITCH 3
LINE 7	OFF		LINE_BIT0	SWITCH 1
		ON	LINE_BIT1	SWITCH 2
		ON	LINE_BIT2	SWITCH 3
LINE 8		ON	LINE_BIT0	SWITCH 1
		ON	LINE_BIT1	SWITCH 2
		ON	LINE_BIT2	SWITCH 3

SIGN NUMBER

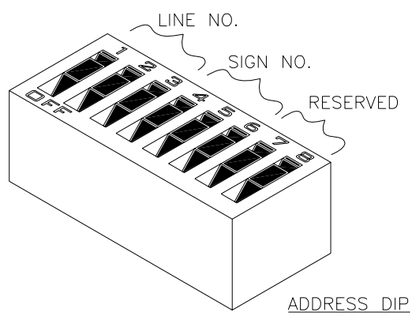
SET SIGN NUMBER USING ONE-OFFSET BINARY NOTATION.

SIGN 1	OFF		SIGN_BIT0	SWITCH 4
	OFF		SIGN_BIT1	SWITCH 5
	OFF		SIGN_BIT2	SWITCH 6
SIGN 2		ON	SIGN_BIT0	SWITCH 4
	OFF		SIGN_BIT1	SWITCH 5
	OFF		SIGN_BIT2	SWITCH 6
SIGN 3	OFF		SIGN_BIT0	SWITCH 4
		ON	SIGN_BIT1	SWITCH 5
	OFF		SIGN_BIT2	SWITCH 6
SIGN 4		ON	SIGN_BIT0	SWITCH 4
		ON	SIGN_BIT1	SWITCH 5
	OFF		SIGN_BIT2	SWITCH 6
SIGN 5	OFF		SIGN_BIT0	SWITCH 4
	OFF		SIGN_BIT1	SWITCH 5
		ON	SIGN_BIT2	SWITCH 6
SIGN 6		ON	SIGN_BIT0	SWITCH 4
	OFF		SIGN_BIT1	SWITCH 5
		ON	SIGN_BIT2	SWITCH 6
SIGN 7	OFF		SIGN_BIT0	SWITCH 4
		ON	SIGN_BIT1	SWITCH 5
		ON	SIGN_BIT2	SWITCH 6
SIGN 8		ON	SIGN_BIT0	SWITCH 4
		ON	SIGN_BIT1	SWITCH 5
		ON	SIGN_BIT2	SWITCH 6

RESERVED

OFF		RESERVED	SWITCH 7
OFF		RESERVED	SWITCH 8

LEAVE RESERVED SWITCHES "OFF"



ADDRESS DIP SWITCH
SCALE 2=1

NOTES:

EVERY DRIVER MUST HAVE A UNIQUE ADDRESS.

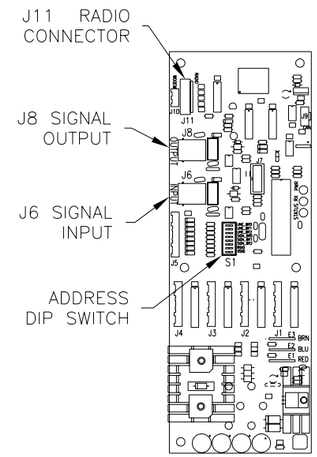
THE ADDRESS IS SET BY FLIPPING THE SWITCHES IN AN 8 POSITION "DIP" SWITCH ON THE DRIVER, LOCATED IN EACH DISPLAY. A TYPICAL DRIVER IS SHOWN AT RIGHT.

THE DIP SWITCH IS SHOWN AT LEFT. ALL SWITCHES ARE SHOWN IN THE OFF POSITION IN THIS FIGURE.

THREE SWITCHES ARE USED TO SET THE LINE NUMBER, AND THREE SET THE SIGN NUMBER. TWO SWITCHES ARE NOT USED.

ADDRESSES ALLOW UP TO EIGHT SIGNS WITH UP TO EIGHT LINES EACH.

ALL DISPLAYS WITH THE SAME LINE NUMBER WILL SHOW THE SAME PRICE.

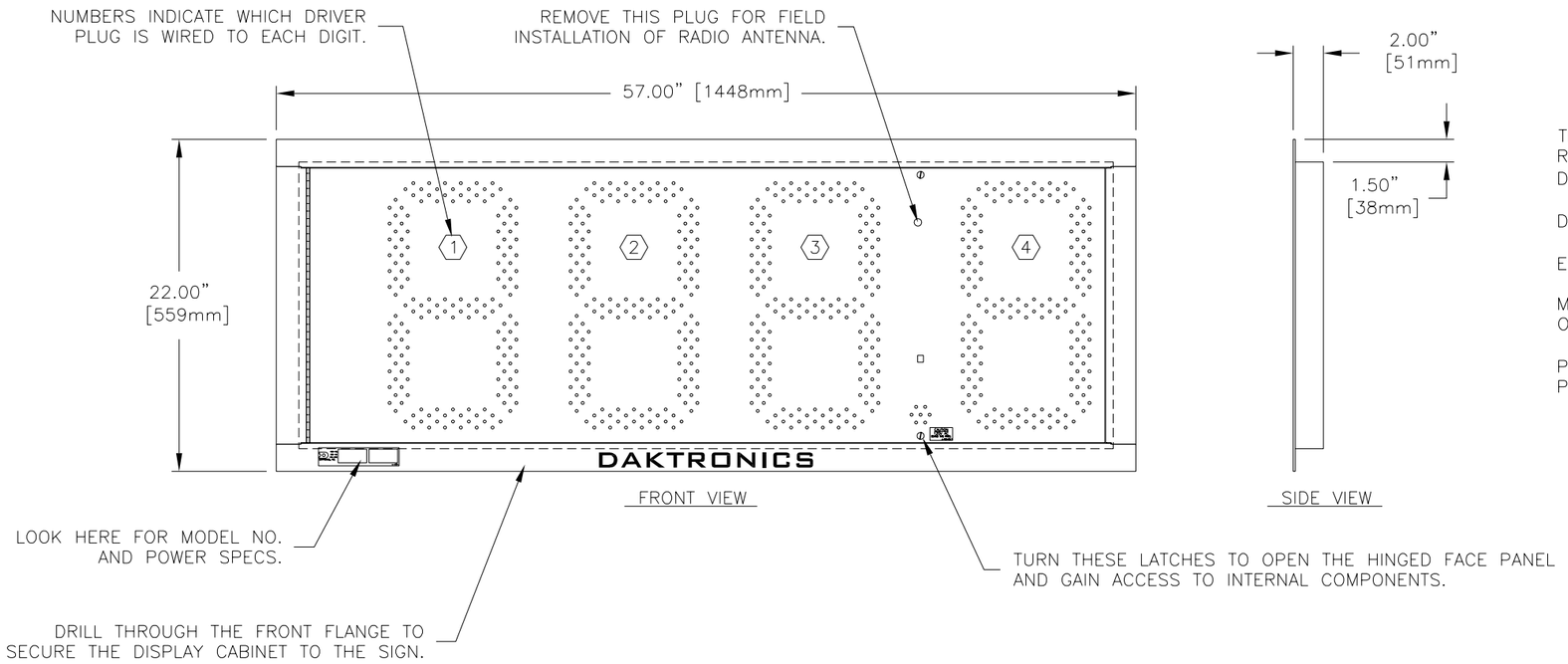


DISPLAY DRIVER
SCALE 1=4

REV.	DATE	DESCRIPTION	BY	APPR.
02	09 FEB 06	ADDED FIGURE FOR OPTIONAL RADIO CONTROL.	AVB	
01	28 DEC 05	ADDED DRIVER FIGURE. ADDED SOME NOTES.	AVB	

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS
TITLE: ADDRESS DIP SWITCH SETTINGS
DES. BY: THENDRI DRAWN BY: THENDRI DATE: 27 SEP 05
REVISION 02 APPR. BY:
SCALE: NONE
1356-R10B-256001



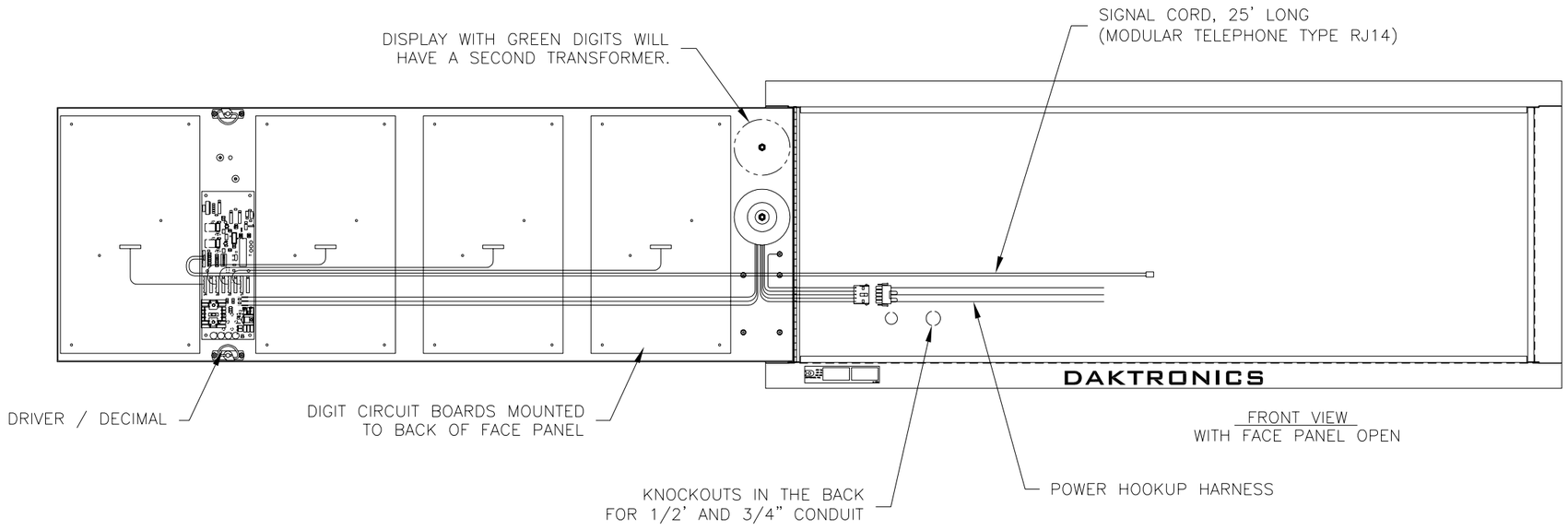
THIS IS A SINGLE FACED DROP-IN DISPLAY, INTENDED TO BE MOUNTED IN A RECTANGULAR OPENING IN A LARGER SIGN. RECOMMENDED ROUGH OPENING DIMENSIONS ARE: 54.5" X 19.5" [138.4 cm X 495.3 cm].

DISPLAY CABINET IS CONSTRUCTED OF ALUMINUM SHEET, 0.063" [1.6 mm] THICK.

ESTIMATED WEIGHT IS APPROXIMATELY 45 LB [20 KG]

MAXIMUM POWER DEMAND IS 72 WATTS FOR DISPLAY WITH RED OR AMBER DIGITS, OR 144 WATTS WITH GREEN DIGITS.

PROVIDE A 120V AC, 15 AMP CIRCUIT (TWO CONDUCTORS PLUS GROUND) FOR POWER



REV.	DATE	DESCRIPTION	BY	APPR.
01	24 JAN 06	ADDED DRIVER ASSIGNMENT NUMBERS.	MGL	

DAKTRONICS, INC. BROOKINGS, SD 57006

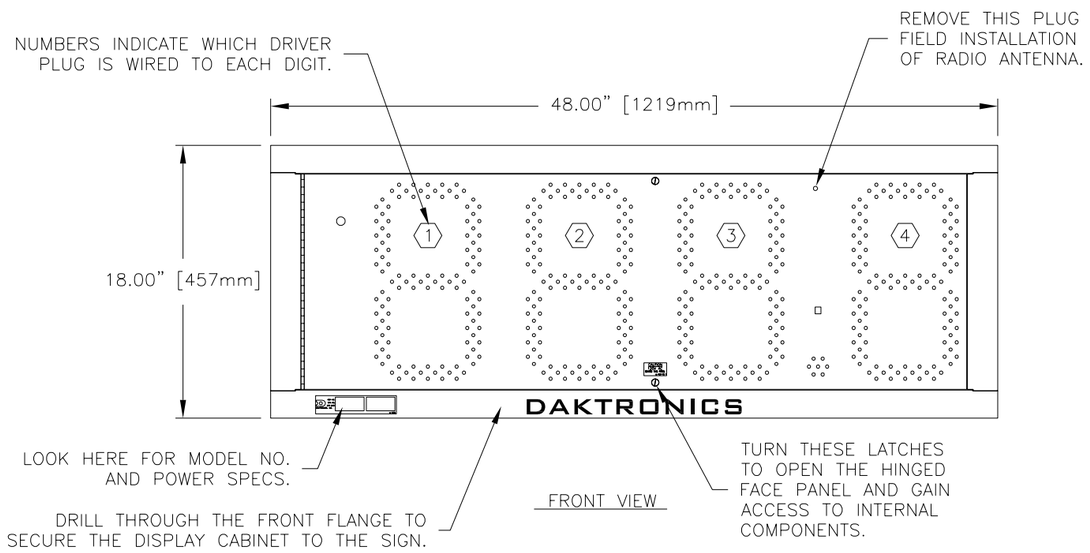
PROJ: GAS PRICE DISPLAYS

TITLE: SHOP DRAWING, DF-4000-18-X-NA-DI

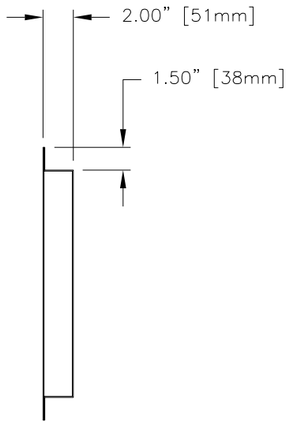
DES. BY: AVB DRAWN BY: A VANBEMMEL DATE: 22 NOV 05

REVISION 01 APPR. BY: SCALE: 1=10

1356-R04B-258025



FRONT VIEW



SIDE VIEW

THIS IS A SINGLE FACED DROP-IN DISPLAY, INTENDED TO BE MOUNTED IN A RECTANGULAR OPENING IN A LARGER SIGN.

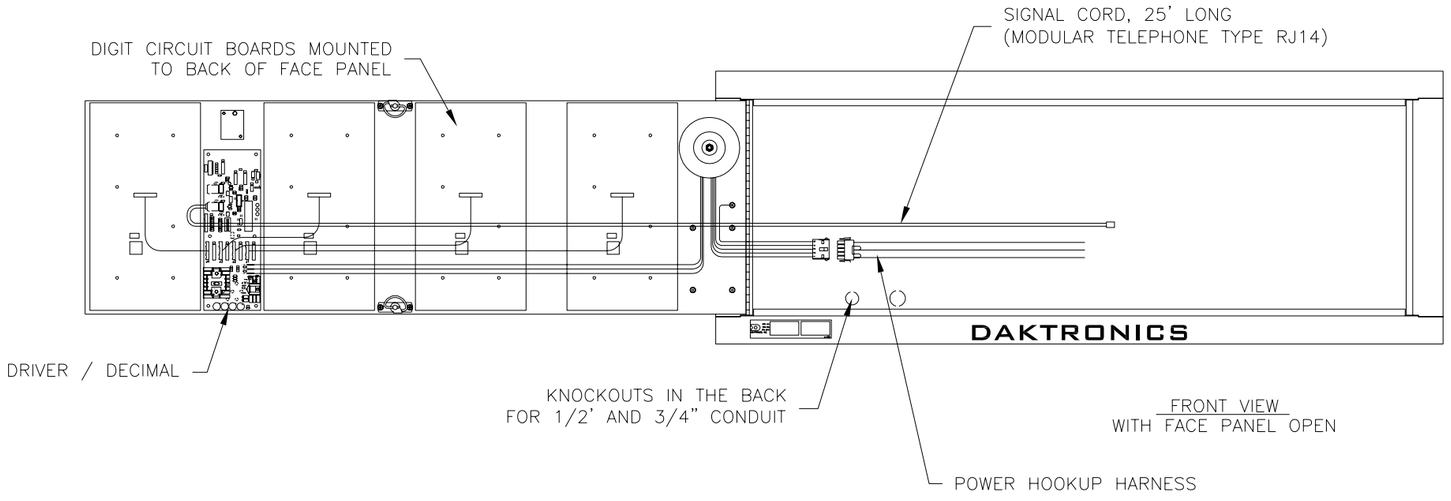
RECOMMENDED ROUGH OPENING DIMENSIONS: 45.5" X 15.5".

DISPLAY CABINET IS CONSTRUCTED OF ALUMINUM SHEET, 0.063" THICK.

ESTIMATED WEIGHT IS APPROXIMATELY 40 LB [19 KG]

MAXIMUM POWER DEMAND IS 72 WATTS FOR ALL DISPLAY MODELS.

PROVIDE A 120V AC, 15 AMP CIRCUIT (TWO CONDUCTORS PLUS GROUND) FOR POWER



FRONT VIEW
WITH FACE PANEL OPEN

REV.	DATE	DESCRIPTION	BY	APPR.
01	24 JAN 06	REMOVED DIGIT MOUNTING HOLES FROM FRONT VIEW AND ADDED DRIVER ASSIGNMENT NUMBERS.	MGL	

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

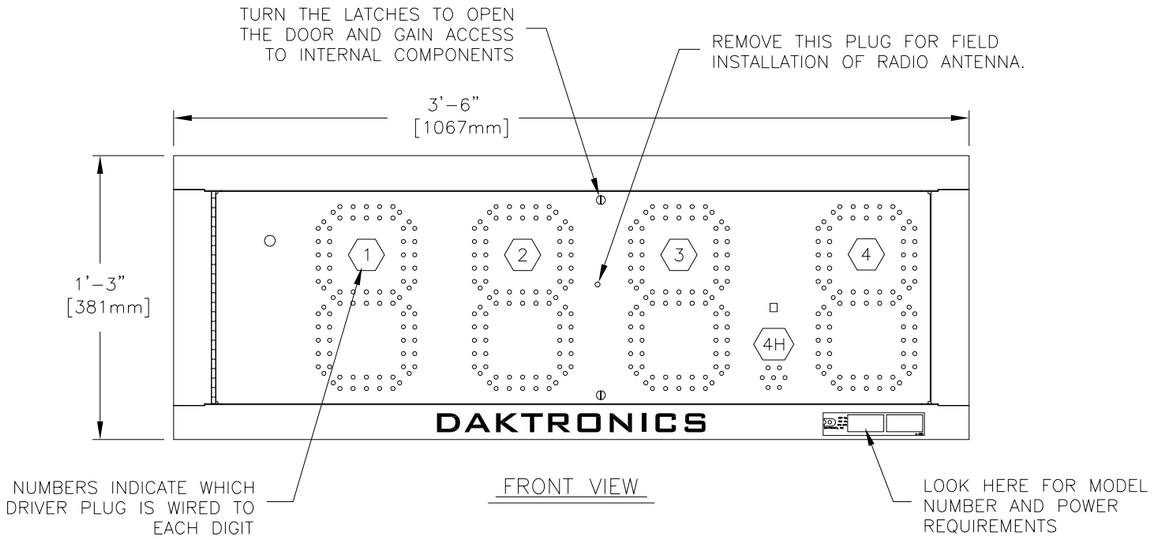
TITLE: SHOP DRAWING, DF-4000-13-X-NA-DI

DES. BY: AVB DRAWN BY: TJOHNSON DATE: 30 NOV 05

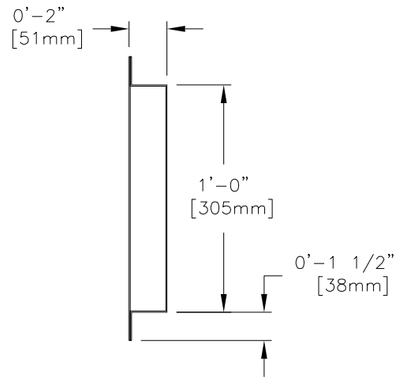
REVISION 01 APPR. BY:

SCALE: 1=10

1356-R04B-258389



FRONT VIEW



SIDE VIEW

NOTES:

THIS IS A SINGLE FACED DROP-IN DISPLAY, INTENDED TO BE MOUNTED IN A RECTANGULAR OPENING IN A LARGER SIGN.

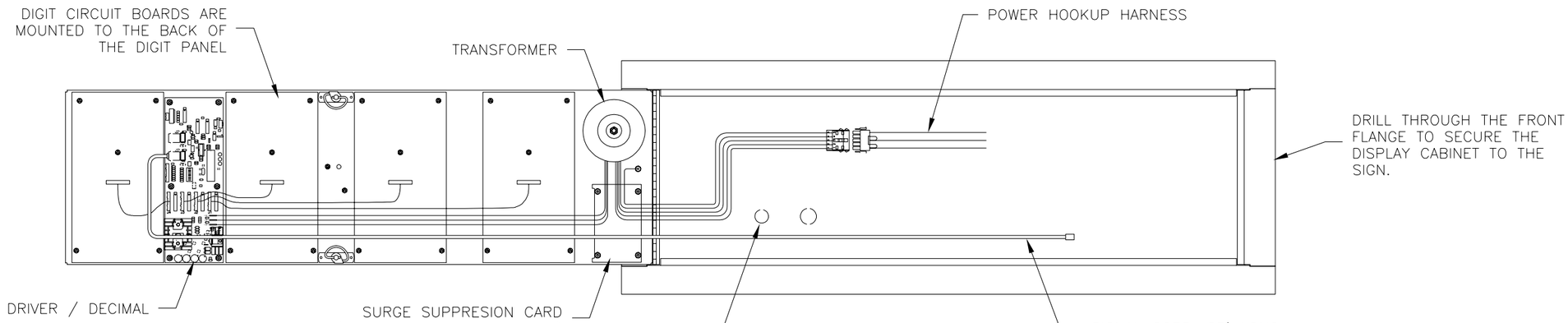
RECOMMENDED ROUGH OPENING DIMENSIONS: 39.5" X 12.5".

DISPLAY CABINET IS CONSTRUCTED OF ALUMINUM SHEET, 0.063" THICK.

ESTIMATED WEIGHT IS APPROXIMATELY 35 LBS [16 KG]

MAXIMUM POWER DEMAND IS 72 WATTS FOR ALL DISPLAY MODELS.

PROVIDE A 120V AC, 15 AMP CIRCUIT (TWO CONDUCTORS PLUS GROUND) FOR POWER.



FRONT VIEW
(WITH DIGIT PANEL OPEN)

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GAS PRICE DISPLAYS

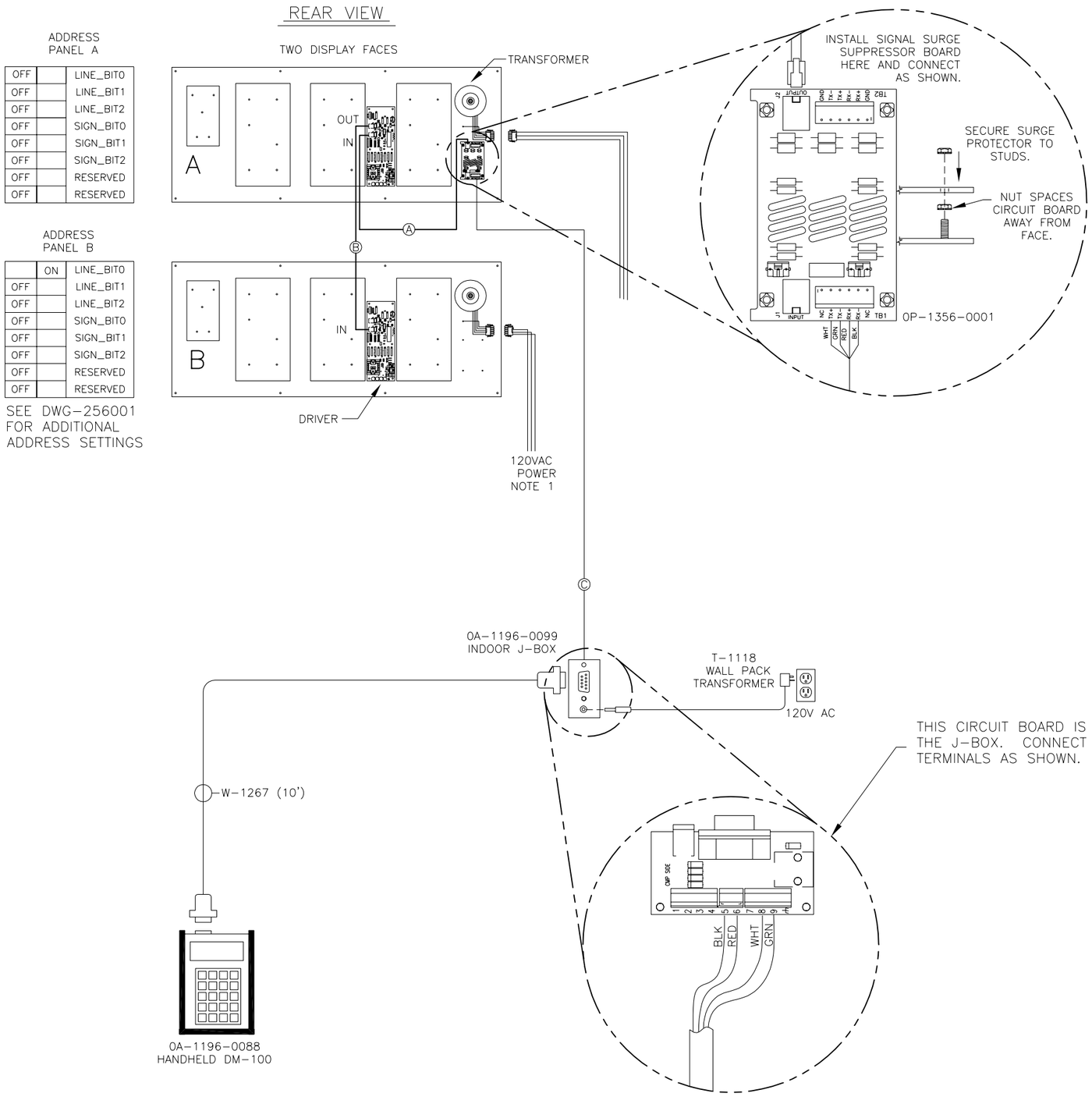
TITLE: SHOP DRAWING, DF-4000-10-X-NA-DI

DES. BY: DRAWN BY: M LEOPOLD DATE: 28 DEC 05

REVISION 00 | APPR. BY: | SCALE: 1=8

1356-R04B-260455

REV.	DATE	DESCRIPTION	BY	APPR.



BASIC INSTALLATION PROCEDURE

1. PROVIDE 120V AC POWER TO THE DISPLAY LOCATIONS. THE COMBINED DISPLAY SECTIONS WILL REQUIRE A 15 AMP CIRCUIT. POWER WILL BE CONNECTED TO A TRANSFORMER MOUNTED ON THE LEFT SIDE OF EACH DISPLAY. DAKTRONICS IS NOT RESPONSIBLE FOR THE QUALITY OF POWER OR GROUNDING THE DISPLAYS. INSTALLATION TO FOLLOW LOCAL CODE, IN CONDUIT WHERE REQUIRED. FOR POWER REQUIREMENTS, REFER TO MANUAL.

2. MOUNT THE DISPLAYS TO THE STRUCTURE.

3. MOUNT THE SIGNAL SURGE SUPPRESSION BOARD TO THE STUDS AS SHOWN.

4. MOUNT THE CONTROL J-BOX INSIDE THE BUILDING AND ROUTE SIGNAL CABLE (TWO PAIR, 22 AWG) TO THE SIGNAL SURGE SUPPRESSION BOARD. ROUTE SIGNAL CABLE FROM SIGNAL SURGE SUPPRESSION BOARD TO DISPLAY A. THEN ROUTE SIGNAL FROM DISPLAY A TO DISPLAY B.

5. TURN ON THE POWER. THE DISPLAYS WILL GO THROUGH A SELF-TEST CYCLE AND THEN THE MESSAGE "E4" SHOULD SHOW ON THE DIGITS. THIS MEANS THAT NO DATA HAS BEEN LOADED INTO THE DISPLAY FROM THE CONTROLLER.

6. CONNECT THE DATAMASTER 100 CONTROLLER TO THE J-BOX AND SELECT THE "GAS PRICE" OPTION. OPERATE THE CONTROLLER ACCORDING TO THE DM-100 CONTROLLER REFERENCE, ED-13960, TO SET THE GAS PRICE DATA.

Ⓐ – RJ11 TERMINATED CABLE STRAIGHT (4') (0A-1356-0134)

Ⓑ – RJ14 TERMINATED CABLE (25') (W-1265), IN CONDUIT WHERE REQUIRED

Ⓒ – ONE, 4 COND, 22AWG CABLE (W-1234) IN CONDUIT WHERE REQUIRED

0A-1356-0105
INDOOR INSTALL KIT

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: DATATIME/DATAMASTER DISPLAYS

TITLE: RISER DIAGRAM, INDOOR WIRED CONTROL, GAS PRICE DISP

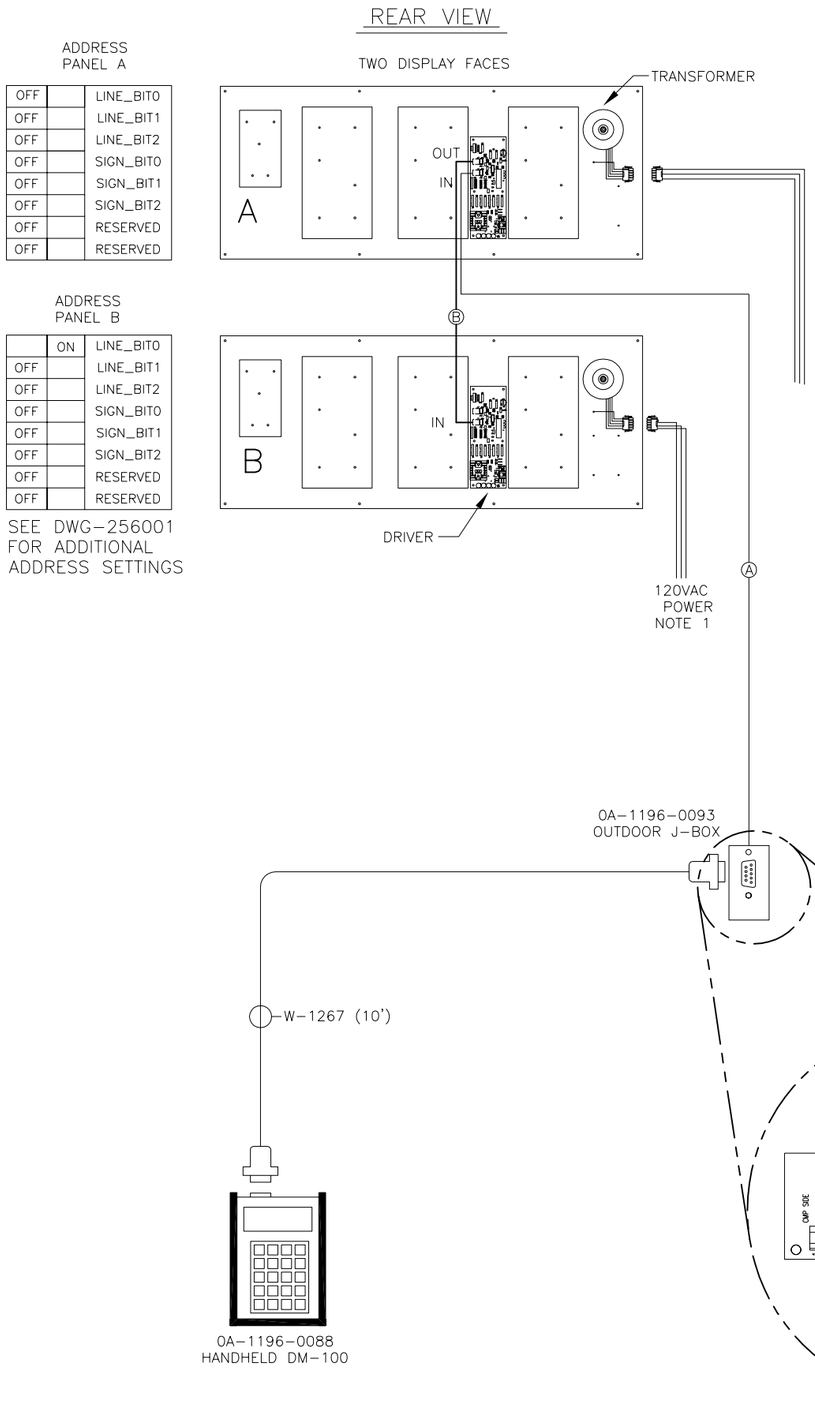
DES. BY: JAHO DRAWN BY: KBIERBA DATE: 16 MAR 06

REVISION 00 APPR. BY:

SCALE: NONE

1356-R01B-267067

REV.	DATE	DESCRIPTION	BY	APPR.



BASIC INSTALLATION PROCEDURE

1. PROVIDE 120V AC POWER TO THE DISPLAY LOCATIONS. THE COMBINED DISPLAY SECTIONS WILL REQUIRE A 15 AMP CIRCUIT. POWER WILL BE CONNECTED TO A TRANSFORMER MOUNTED ON THE LEFT SIDE OF EACH DISPLAY. DAKTRONICS IS NOT RESPONSIBLE FOR THE QUALITY OF POWER OR GROUNDING THE DISPLAYS. INSTALLATION TO FOLLOW LOCAL CODE, IN CONDUIT WHERE REQUIRED. FOR POWER REQUIREMENTS, REFER TO MANUAL.

2. MOUNT THE DISPLAYS TO THE STRUCTURE.

3. MOUNT THE SIGNAL SURGE SUPPRESSION BOARD TO THE STUDS AS SHOWN.

4. MOUNT THE CONTROL J-BOX INSIDE THE BUILDING AND ROUTE SIGNAL CABLE (TWO PAIR, 22 AWG) TO THE SIGNAL SURGE SUPPRESSION BOARD. ROUTE SIGNAL CABLE FROM SIGNAL SURGE SUPPRESSION BOARD TO DISPLAY A. THEN ROUTE SIGNAL FROM DISPLAY A TO DISPLAY B.

5. TURN ON THE POWER. THE DISPLAYS WILL GO THROUGH A SELF-TEST CYCLE AND THEN THE MESSAGE "E4" SHOULD SHOW ON THE DIGITS. THIS MEANS THAT NO DATA HAS BEEN LOADED INTO THE DISPLAY FROM THE CONTROLLER.

6. CONNECT THE DATAMASTER 100 CONTROLLER TO THE J-BOX AND SELECT THE "GAS PRICE" OPTION. OPERATE THE CONTROLLER ACCORDING TO THE DM-100 CONTROLLER REFERENCE, ED-13960, TO SET THE GAS PRICE DATA.

Ⓐ – ONE, RJ14 TERMINATED CABLE (50') (0A-1356-0062), IN CONDUIT WHERE REQUIRED

Ⓑ – ONE, RJ14 TERMINATED CABLE (25') (W-1265), IN CONDUIT WHERE REQUIRED

0A-1356-0002
OUTDOOR INSTALL KIT

REV.	DATE	DESCRIPTION	BY	APPR.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: DATATIME/DATAMASTER DISPLAYS

TITLE: RISER DIAGRAM, OUTDOOR CONTROL, GAS PRICE DISP

DES. BY: JAHO DRAWN BY: KBIERBA DATE: 16 MAR 06

REVISION 00 APPR. BY:

SCALE: NONE

1356-R01B-267090