MODULARM® DAC-55™
Refrigerator/Freezer Door Alarm and Monitor
INSTALLATION AND OPERATING MANUAL

MODULARM®

KitchenBrains™
Well Connected.

NOTICE

Before installing, please thoroughly read these instructions so that you can fully benefit from all of the capabilities offered by the DAC-55.

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PRODUCT OVERVIEW

Kitchen Brains® Modularm® DAC-55™ Refrigerator/Freezer Door Alarm and Monitor is an easy-to-install, full-featured door monitor for walk-in freezer and cooler doors that saves energy, trains personnel to close doors, increases operator safety and operational efficiency, and helps to maintain product integrity. The solution reduces coil icing, thus lowering maintenance costs and saving additional money.

The DAC-55 offers the following features:

• Provides visual and audible alarm with remote notification capability when door is ajar
• Field adjustable freezer door alarm/door monitor settings
• Panic/entrapment alarm (when optional IP-1 Push button is used)
• Automatic control of interior compartment lights
• Automatic control of refrigeration in a variety of user selectable configurations relative to the status of the door
• Replaces ordinary light switches and fan shutoff switches
• ETL listed

DAC-55™ OPERATION

Door status is monitored by the provided low voltage magnetic contacts. Additional contacts may be added to monitor multiple doors (A low current electromechanical switch, opening when the door is opened, may also be utilized). Three internal relays provide independent control of Solenoid Valve, Evaporator Fans and Compartment Lights. An alarm relay is also provided for remote notification.

MONITORED CONDITIONS

SYSTEM FUNCTIONS	DOOR AJAR ALARM	INTERIOR LIGHTS	REFRIGERATION SYSTEM
Door closed *1 (Normal operation)	**No Alarm**	**OFF**	**ON**
Door opened	**Audible alarm delay activates** Field adjustable, 5-45 minutes. See diagram pg 9. Strobe *2 and/or Alarm Relay*3 may activate.	**ON**	**Refrigeration operation may be interrupted depending upon settings of user selectable parameters *4**
Door open for too long (Alarm delay times out)	**Audible alarm activates**	**ON**	**If refrigeration operation has been interrupted and door remains open for 40 seconds after audible sounds, refrigerator will automatically restart** Auto Restart
Door closed	**Alarm functions reset** No Alarm	**Lights turn off 10 minutes after door is closed** Unless optional IP-1 is pressed, if installed See pg 5	**Refrigeration will resume in 8-10 seconds if it was interrupted after the door was closed**

MONITORED CONDITIONS NOTES:

1. Door closed at any time always restores normal operation. No Alarm, Lights Off, Refrigeration On.

2. Use Strobe Select Pin Jumper to select Strobe operation (See diagram on page 9):
   a. Instant: Strobe activates when door is first open.
   b. Delay: Strobe activates when audible sounds.

3. Use Instant On Alarm Relay Switch to select relay operation (See diagram on page 9):
   a. ON: Relay activates when door is open (For connection to an energy management system).
   b. OFF: Relay activates when audible sounds (For secondary alarm annunciation).

4. User selectable parameters for configuring refrigeration interruption are (See diagram on page 9):
   a. Refrigeration Shutoff Pre-Delay Adjustment: Screwdriver adjustment providing a means for creating a period of time from when the door is opened to when fans and solenoid shut off. Prevents refrigeration from being turned off and on every time door is opened and closed. Useful for applications such as foodservice where frequent short duration opening and closing of doors is the norm (Range: 1-120 seconds).
   b. Constant On Refrigeration Switch: When selected (ON), overrides the Refrigeration Shutoff Pre-Delay Adjustment and keeps refrigeration operating whenever the door is open.
   c. Fan Shutoff Switch: Provides capability to separate the operation of evaporator fans from solenoid operation.
      I. When selected (ON), fans will shut off immediately when the door is opened, but the solenoid will continue to respond to the settings of the Refrigeration Shutoff Pre-Delay Adjustment or the Constant On Refrigeration Switch.
      II. When not selected (OFF), fans and solenoid will both operate identically.

OPERATION WITH IP-1 ILLUMINATED PUSHBUTTON

The DAC-55 has been designed to accept a low voltage, Illuminated Pushbutton (Part# IP-1) as an additional means of device activation. The IP-1 is an optional accessory that mounts inside the monitored compartment and includes a piezo horn.

IP-1 FEATURES INCLUDE THE FOLLOWING:

WITH THE DOOR OPEN:

IP-1 functions are dependent on the position of the Pushbutton Enable Switch. See diagram on page 9.

If the Pushbutton Enable Switch is (ON), pressing the IP-1 with the door open when a Door Ajar Alarm occurs will reset the alarm and restart the alarm delay timer. This can be done repeatedly and is useful when a door is opened for a prolonged period of time, such as when loading or unloading.

If the Pushbutton Enable Switch is (OFF), pressing the IP-1 with the door open will not affect DAC-55 or compartment operation. Therefore, when a Door Ajar Alarm occurs, the door must be closed to terminate the alarm and restore normal operation.

WITH THE DOOR CLOSED:

IP-1functions are not dependent on the Pushbutton Enable Switch or by any other variable parameter settings. IP-1 operation with the door closed is always as follows:

When the door is first closed, the IP-1 horn beeps on and off to draw attention to the IP-1 and its Pushbutton Label. The Pushbutton Label, which includes both English and Spanish languages, instructs personnel inside the compartment to press the button in order to keep the lights on and to turn the refrigeration off with the door closed.

1. **If the IP-1 is not pressed within 40 seconds,** the horn stops beeping and, after 10 minutes, the lights turn off automatically.

2. **Pressing the IP-1 with the door closed keeps,** or turns on, interior lights, shuts refrigeration off (Fans and Solenoid) and starts the Automatic Panic Alarm timer (Timer delay is 20 minutes, non-adjustable).

3. If personnel remain in the compartment for 20 minutes with the door closed, the IP-1 horn begins to beep again:

    a. **Re-pressing the button** silences the horn and resets and restarts the Automatic Panic Alarm Timer. This may be done repeatedly.

    b. **Automatic Panic Alarm:** If the button is not re-pressed within 40 seconds after the IP-1 horn begins to beep, the horn and the strobe light on the DAC-55 activate immediately to draw attention to the walk-in. Alarm relay activates as well. AUTOMATIC PANIC ALARM IS A SAFETY FEATURE to protect an individual who may have been injured or is otherwise disabled inside of the compartment and cannot re-press the IP-1.

4. **Manual Panic (Entrapment) Alarm:** Pressing the IP-1 for 2 seconds (as described on the Pushbutton Label) immediately activates the strobe light, audible alarm and alarm relay and is PROVIDED AS A SAFETY FEATURE for situations where personnel may be trapped inside the walk-in.

INSTALLING THE DAC-55™ AND OPTIONAL IP-1

MOUNTING:

MAGNETIC CONTACTS:

1. **INSTALLATION TIP:** IF DESIRED, AND IF DOOR CONFIGURATION PERMITS, THE MAGNETIC CONTACT SWITCH PART MAY BE MOUNTED INSIDE THE DAC-55 ENCLOSURE. THIS WILL ENSURE A CLEANER INSTALLATION AND NOT AFFECT THE OPERATION OF THE CONTACTS.

2. **The included Magnetic Contacts** may be mounted with adhesive backing or the provided screws.

3. **Mount magnet part of Contact onto top edge of door,** as far away from the hinged side as possible.

4. **Mount switch part of Contact onto door frame,** directly above the magnet and positioned so that the contacts close (make contact) when door is closed.

5. **The gap between the magnet and switch should not exceed 1.25" when door is closed.**

NOTE: With steel doors, the steel of the door may reduce this operating gap. Position accordingly.

DAC-55 ENCLOSURE:

1. Remove the faceplate.

2. **If switch part of Magnetic Contact is not mounted inside the DAC-55,** the enclosure may be mounted in any appropriate location on the front of the walk-in.

3. **If switch part of Magnetic Contact is mounted inside the DAC-55,** position the DAC-55 enclosure above the magnet mounted on the walk-in door and mount the switch on the inside bottom wall of the DAC-55 enclosure, positioned so that Contacts close when door is closed.

4. **A meter or resistance scale, or a continuity checker, is helpful in checking Magnetic Contacts for proper operation.** A temporary power cord may also be used to help in positioning Contacts as follows: Have the strobe pin jumper in instant position. When Contacts are placed properly, strobe will turn on when door is open and turn off when door is closed.

IP-1 ILLUMINATED PUSHBUTTON:

1. The IP-1 is an Optional Accessory

2. If applicable, mount the IP-1 inside the walk-in next to the unhinged side of the door frame.

WIRING (See diagram on page 9)

NOTE: ALL LINE VOLTAGE AND SIGNALING WIRING CONNECTED TO THE DAC-55 THROUGH ANY SIDE WALL MUST BE ENCLOSED IN CONDUIT WITH SUITABLE FITTINGS FOR CONNECTION TO THE DAC-55 ENCLOSURE. ALL CONDUIT FITTINGS WHICH ENTER THE ENCLOSURE MUST BE CAPPED BY A PLASTIC BUSHING.

CONNECTING THE DAC-55™ AND OPTIONAL IP-1

LOW VOLTAGE CONNECTIONS (See the 4 Green Terminal Strips inside of unit)**:**

1. Strip insulation on all low voltage wires approximately ¼".

   a. Terminal Strip connections are made by pressing down on the respective actuator button with a small screwdriver and inserting the wire into the hole below the actuator.

   b. Removing screwdriver pressure will clamp the wire.

   c. Do not insert wire too far or you may clamp onto insulation.

   d. Tug gently on wires to make sure connections are secure.

1. MAGNETIC CONTACTS: Connect to Door Switch Terminal Strip.

   NOTE: Multiple Contacts wired in series may be used for multi-door compartments. Any door so connected and opened or closed will be sensed by the DAC-55.

2. IP-1 ILLUMINATED PUSHBUTTON: The IP-1 comes with an 8' length of 4 conductor wire. Connect to the **PB Switch** Terminal Strip, observing the color code as shown on the diagram on page 9 (Left to right: Black, White, Red and Yellow). The color code is also printed on the DAC-55 circuit board.

   NOTE: The path for this wiring or any wiring which enters the DAC-55 enclosure from within the monitored compartment must be sealed with silicone or insulating foam to keep moisture out of the DAC-55.

3. ALARM RELAY: Normally open and normally closed dry contacts are provided. Connect to energy management system or to remote notification equipment, if so desired.

LINE VOLTAGE CONNECTIONS (Use top knockout for access)**:**

Connections are typically made through ½" thin wall conduit. Provide 120VAC for DAC-55 operation and connect to 18 AWG black and white wires (Current required: 90mA).

1. Connect the provided 18 AWG green wire to earth ground.

   a. **Control contacts** for fans and solenoid are dry contacts, normally closed and for lights are dry contacts, normally open.

   b. **Dry Contacts** function only as switches and the DAC-55 does not provide any power to the devices being controlled.

2. **Connect as shown on the diagram on page 9 using insulated female .250" connectors sized for the gauge of wire that you are using.** It is recommended that wiring be kept short, approximately 6-8" in length.

3. **When the DAC-55 is being used to operate lights,** a standard light switch is no longer required, and any existing switches should be disconnected.

SETUP AND TEST

1. **Apply Power to the DAC-55.**

   NOTE: If the door is closed when powered up, interior lights will turn on for 10 minutes and then shut off. This is a safety feature to insure that lights will turn back on if a momentary power failure, such as from a thunderstorm, occurs while there are personnel in the compartment.

2. **Determine your desired sequence of DAC-55 operation and set adjustments accordingly** (See Operation Description on page 4). Selections on the 4-position Dip Switch may be combined to produce the desired operation (Press in on the top of the respective Dip Switch to select its function).

   NOTE: Selecting Constant On Refrigeration Switch and Fan Shutoff Switch at the same time is not a recommended mode of operation as compressor damage may result. Additionally, if the Fan Shutoff Switch is selected and Constant On Refrigeration is not selected, the Refrigeration Shutoff Pre-Delay setting should not exceed 15 seconds, as a longer delay time may also cause compressor damage. It is the responsibility of the refrigeration technician to determine proper operation.

3. **A 10-position Alarm Delay Adjust Dip Switch is provided for selecting the door ajar alarm delay and for testing** (Range: 5 minutes to 45 minutes in 5 minute increments, selectable on switches 1 thru 9). Switch 10 is a Test Switch and, when selected, will cause the DAC-55 to annunciate a door ajar condition in 5 seconds. The Test Switch also overrides any Refrigeration Shutoff Pre-Delay setting and turns off refrigeration in 1 second. The Test Switch is provided as a means to quickly verify device operation. If a 5 second time delay is desired for normal usage, the Test Switch may also be used as an operating mode.

4. **Select the Test Switch and simulate various modes of operation to verify that the DAC-55 functions as intended in accordance with selected settings.** Once testing is completed and operation is verified, de-select the Test Switch (unless you are using it for desired operation) and select the desired door ajar alarm delay using ONLY ONE of switches 1 thru 9.

   SELECT ONLY ONE SWITCH OR ERRONEOUS TIME WILL RESULT. A SWITCH <u>MUST</u> BE SELECTED FOR PROPER OPERATION.

5. **Adjustments and selections of any settings may be made with power on or off.** Power outages will not affect user settings. Changes made in user settings with the door opened will store in program memory when the door is closed and will affect operation when the door is next opened.
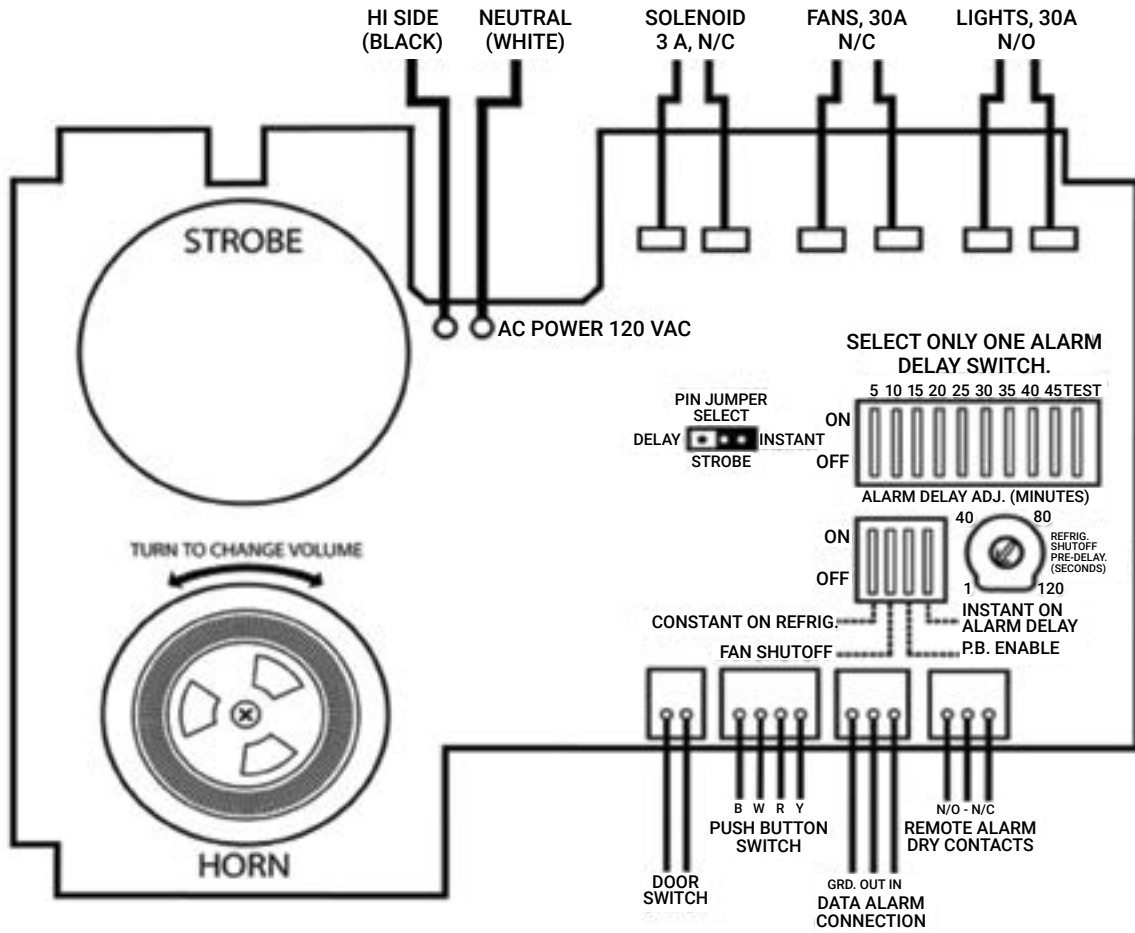
6. **After adjusting and testing, mount the faceplate onto the enclosure and re-fasten with the provided screws.** Make sure that the faceplate is seated onto the four nylon standoffs and the two metal standoffs that it mounts against. You may have to "wiggle" the strobe to seat the faceplate properly. Also, make sure that there are no wires pinched between the faceplate and any of the standoffs. Installation is now complete.

   NOTE: DAC-55 Part# 231-4000-04 door alarm time delay has been modified with the following sequence:

   Switch #6 = 30 seconds   Switch #8 = 90 seconds
   Switch #7 = 60 seconds   Switch #9 = 120 seconds

DAC-55™ DIAGRAM

DAC-55™ DOOR MONITOR WIRING AND SETUP DIAGRAM

HI SIDE (BLACK)   NEUTRAL (WHITE)   SOLENOID 3 A, N/C   FANS, 30A N/C   LIGHTS, 30A N/O

STROBE

AC POWER 120 VAC

SELECT ONLY ONE ALARM DELAY SWITCH.

5 10 15 20 25 30 35 40 45 TEST

PIN JUMPER SELECT
DELAY   INSTANT
STROBE

ON
OFF

ALARM DELAY ADJ. (MINUTES)

TURN TO CHANGE VOLUME

40   80

ON
OFF

REFRIG. SHUTOFF PRE-DELAY. (SECONDS)

1   120

CONSTANT ON REFRIG.

INSTANT ON ALARM DELAY

FAN SHUTOFF

P.B. ENABLE

HORN

B W R Y
PUSH BUTTON SWITCH

N/O - N/C
REMOTE ALARM DRY CONTACTS

DOOR SWITCH

GRD. OUT IN
DATA ALARM CONNECTION

INSTALLATION, GENERAL SAFETY MEASURES AND PRODUCT LIMITATIONS

- This product ("Product") must be installed by a licensed electrician experienced in working in the types of environments for which this Product is intended to be utilized; specifically, commercial Cooler/Freezer coolers and freezers ("Equipment").

- Personnel installing the Product must carefully and completely read the Modularm® DAC-55™ Refrigerator/Freezer Door Alarm and Monitor Operating Manual ("Instructions"), and instructions and specifications, of the Equipment manufacturers, before attempting to operate and install the Product. Failure to comply with the Instructions, and the instructions and specifications of the Equipment manufacturers, may result in personal injury and/or property damage and may void the warranty of the Product. Retain the Instructions for future reference or view them on the Kitchen Brains website at www.kitchenbrains.com.

- The Product shall only be used for the purposes described in the Instructions.

- During installation of the Product, all applicable laws, regulations and industry rules, including local electrical and safety codes, the National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA), must be strictly followed. Consistent therewith, follow applicable electrical codes regarding running of low voltage wiring and high voltage wiring in separate conduits and use appropriately rated wire (insulation type, voltage rating and wire gauge) for all connections. Supply connection wiring must be rated at least 90°C. Use copper conductors only.

- Confirm that the power source conforms to the requirements of the Product before connecting.

- Do not exceed the rated limits of the Product. Refer to the Product specifications for suitability of the Product to the application.

- The Product is not suitable for use in wet locations. Do not expose the Product to water, moisture or condensation. In no event should the Product be exposed to environments where sudden temperature changes with high humidity may result in the formation of condensation.

- Any openings in the walls, ceiling or floor of the Equipment for wiring or other reason must be sealed (made airtight and watertight) with appropriate materials (e.g., silicone, caulk or foam), both on the outside and inside of the Equipment, to prevent moisture or condensation from entering the compartment of the Equipment and forming and accumulating on the interior walls of the compartment and the contents of the compartment, including the Product. Failure to properly seal such openings may (i) result in damage to the Equipment and contents of the compartment (ii) pose a safety hazard and (iii) void the warranty of the Product.

- To prevent moisture or condensation from entering or forming in the enclosure used for the Product, any openings in this enclosure (for wiring access or other purpose) must be appropriately sealed with materials such as silicone, caulk or foam.

- Installation of the Product should be inspected and the Product tested by qualified personnel to ensure the Product performs safely and in accordance with the Product specifications. Periodic testing of the Product should be performed on an ongoing basis (at least quarterly) to ensure the Product continues to perform properly.

- All personnel operating, maintaining, repairing or interfacing with the Product must be instructed in the use of the Product and provided with the Instructions, which are accessible on the Kitchen Brains website at www.kitchenbrains.com.

- WARNING: Hazard of electric shock! Power sources must be turned off or otherwise disconnected prior to installation or servicing of the Product. Lock and tag power disconnects to prevent an unexpected application of power.

SPECIFICATIONS

DAC-55™

DIMENSIONS
8" L x 6" W x 1.8" D

POWER SUPPLY
120VAC/60Hz @ 90mA max
20mA Quiescent
Surge Protected
Other operating voltages available

AMBIENT TEMPERATURE
-10ºC to 52ºC (14ºF to 126ºF)

CABLE LENGTH
30 meters max

FAN CONTACTS
N/O, 30A @ 120VAC OR 240VAC

SOLENOID CONTACTS
N/C, 3A @ 120VAC OR 240VAC

LIGHT CONTACTS
N/O, 30A @ 120VAC or 240VAC

ALARM CONTACTS
N/O & N/C, 1A @ 12VDC

IP-1

DIMENSIONS
4.5" L x 2.75" W x 2.0" D
(Dimensions include outdoor type single gang outlet box)

POWER SUPPLY
5-15VDC @ 20mA Max from DAC-55

AMBIENT TEMPERATURE
-40ºC to 40ºC (-40ºF to 104ºF)

CABLE LENGTH
30 meters max

HUMIDITY
90% Noncondensing

MOUNTING
Outdoor, single gang outlet box

Alternate enclosure for mounting must be UL listed enclosure, providing multiple wire access hubs for running low voltage

MC-1 S

POWER SUPPLY
SURF: 2-5VDC @ 100mA max Metal:- 2-5VDC @ 0.5A max from DAC-55

AMBIENT TEMPERATURE
-10ºC to 52ºC (14ºF to 126ºF)

CABLE LENGTH
30 meters max

ETL LISTED
CONFORMS TO
UL STD 464A
CERTIFIED TO
CAN/CSA STD C22.2 NO. 205

Modularm® DAC-55™

Save the instructions for future reference.

24/7 Toll-Free Technical Support
In the U.S., Canada and the Caribbean
1-800-FASTRON (1-800-327-8766)

Elsewhere
1-203-377-4414
or
saashelpdesk@kitchenbrains.com

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