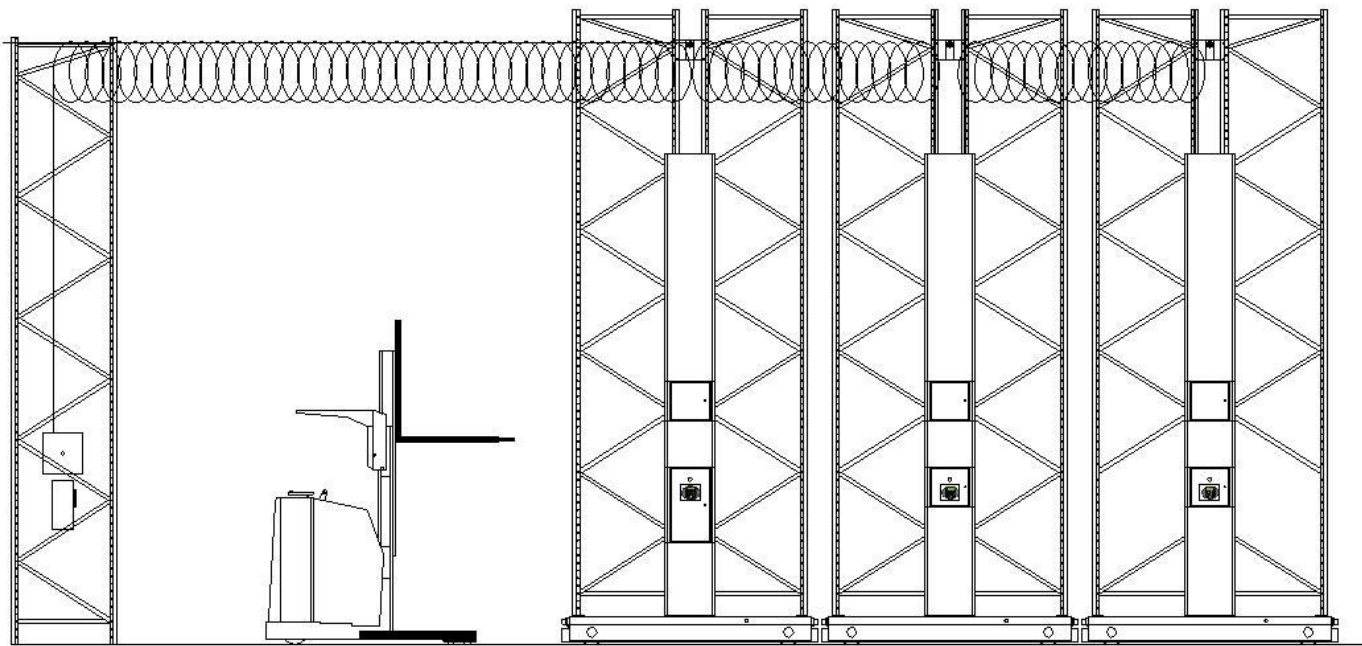




MONTEL
The Intelligent Use of Space

High Density Storage Systems



Mobilex HD

Technical Specifications

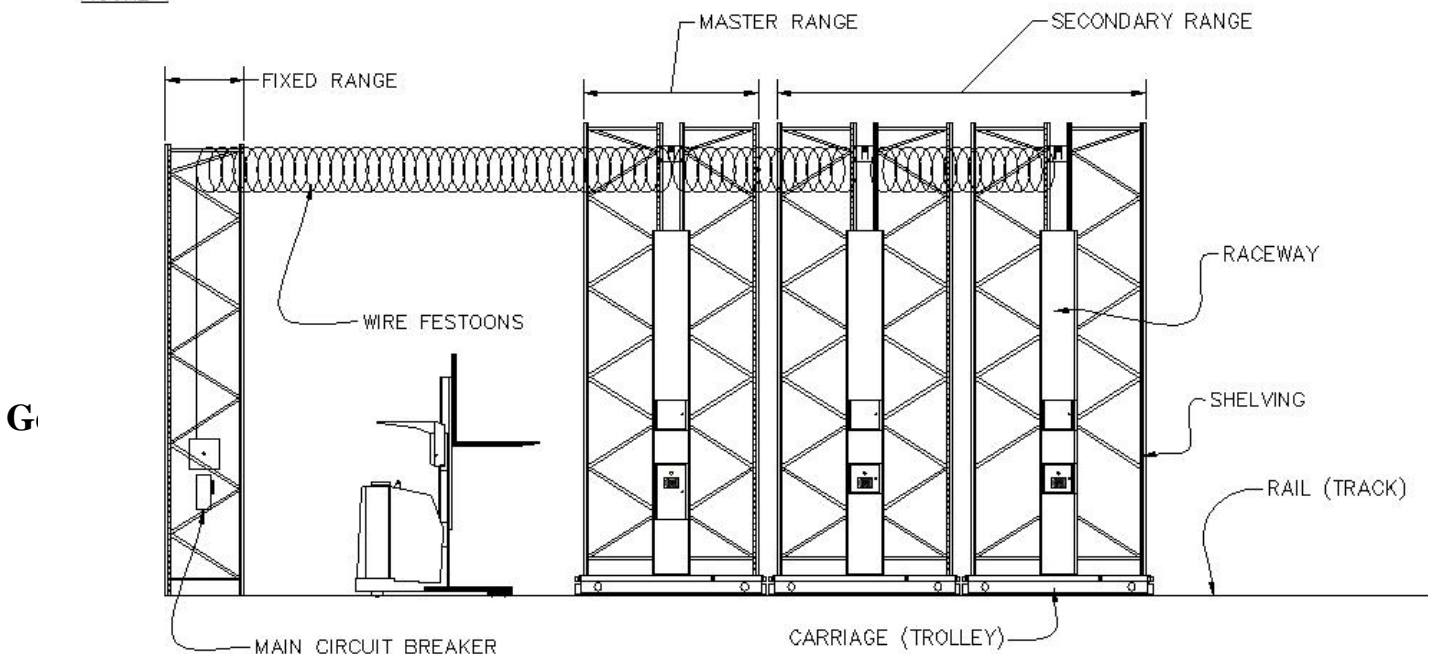
General Description

The Montel electrical Mobilex HD compact storage system consists of shelving mounted on motorized carriages (See figure 1). Different racking types can be used depending on your application. Multiple motors are located in the carriage depending on load and dimensions of a range. Motor locations are indicated on the side of each carriage by the symbol (**M**). In case of electric power failure, ranges can be moved manually by a ratchet tool.

Each group of ranges is called a Module and includes: a fixed range, a master mobile range and at least one secondary mobile range. Aisles are numbered from the fixed range starting with range number one. In each of these aisles there are two infrared foot-level safety devices.

Each range is supplied with a control panel used to operate the system and display its status. Each module includes a fixed range power panel, a master mobile range control panel and at least one secondary mobile range control panel (See Figure 1). The fixed range power panel is always located at the front of the fixed range. The master and secondary mobile range control panels can be provided at the front of a module or at both ends.

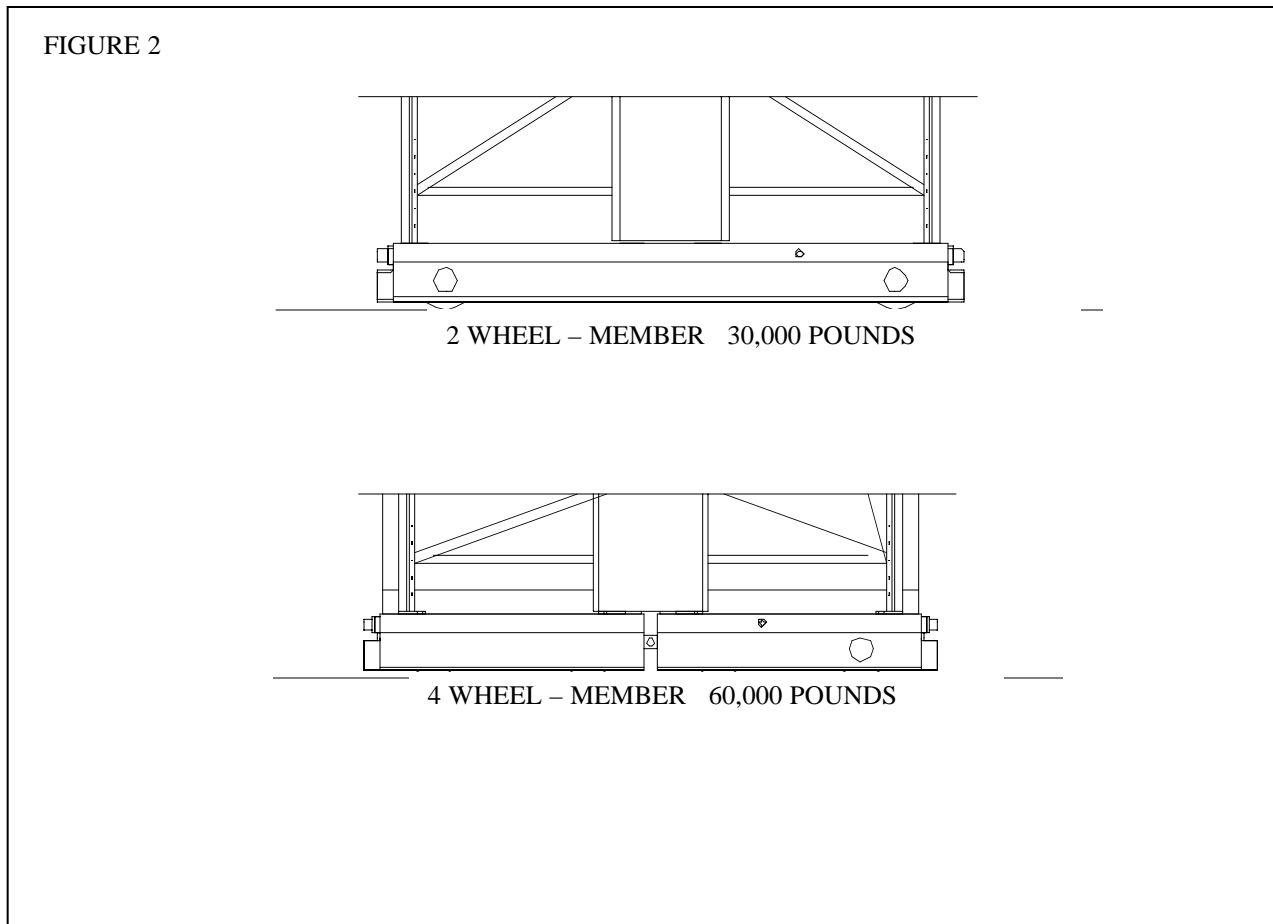
FIGURE 1



The mobile carriage shall travel at approximately 20 feet per minute. At this speed, motor RPM shall be not less than 7.5 RPM.

1.2 Load capacity

Each electrical mobile storage rack unit shall be capable of supporting a live load of 30,000 pounds for a (2) wheels system and 60,000 pounds for a (4) wheels system (see Figure 2).



2.0 Carriages

2.1 Motors and drives

Each carriage is motorized with a shaft-mounted motor. The quantity of motors is in relation to the load to be moved. An override coupling in front of the system is supplied with every system. All wheels on one side are driven by 2" OD x 1 1/2" tubing in order

to move unbalanced loaded systems without any fishtailing effect. Each motor is equipped with a brake and a hand brake release in front of each mobile unit. The brake releases are attached to a limit switch that shut the system down when the brake is released.

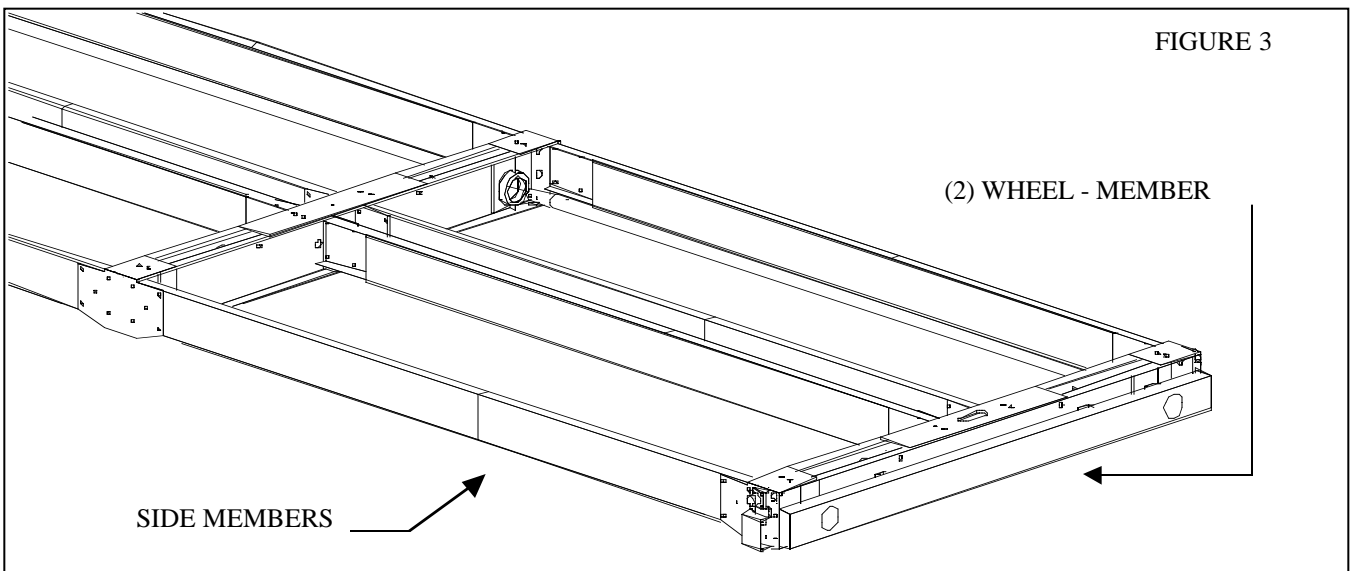
2.2 Trolleys

Each trolley is constructed with several pieces welded together and painted with baked enamel. Girders are welded to the main frame to optimize trolley capacity. The C-shaped members are made of 10" high steel (11Ga thick SAE 1020). Base plates of 3/16" thick steel are welded on top to support racking.

Each wheel has a minimum capacity of 15,000 pounds and is 10" in diameter. All wheels are made of SAE 1020 steel. A precision sealed bearing is inserted in the hub of the trolley on the drive side and in the wheel on the free side.

2.3 Base frames

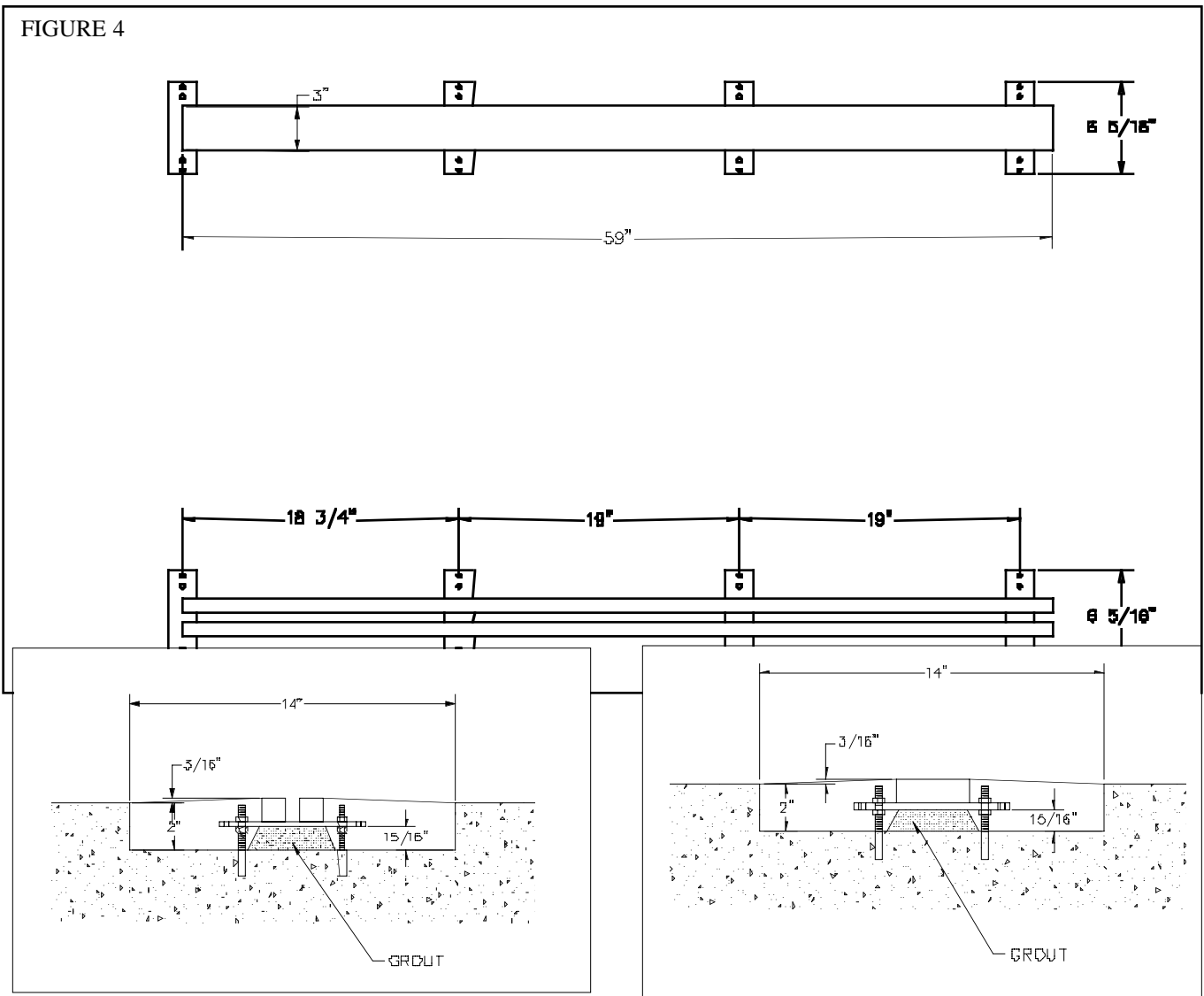
Each frame is composed of (4) side members joining the trolleys (2 1/2" x 8" x 11Ga). Members are designed to support the first level of pallets in order to gain space in height. A guide channel is added to keep pallets from hitting side members. See figure 3 for details.



3.0 Tracks

The track members and spacing is defined by the racking dimensions. A rail is installed under each racking post and is set with non-shrinking grout under its full length. Tracks are either guide or flat. The guide type is grooved in the center with a gap of $5/8$ " and is 1" x 3" wide. They are made of SAE 1045 steel and are set by means of a base plate (see Figure 4).

FIGURE 4



4.0 Anti-tip (optional)

Each unit is supplied with an anti-tip device to prevent any tipping from lateral load applied to the system. These are made of a 3/16" thick hook attached to each side of the carriages and slide inside a C shaped channel installed beside rail. Anti-tip devices will be installed at proper locations to give maximum safety.

5.0 Electrical power and wiring

Each module is powered by a three-phase 60 Hz, 460 volts source (600 volts for Canada). All wiring between each range is made of a flexible cord suspended by a steel cable. All wiring is plug-in type.

6.0 Standard control panel functions

6.1 POWER BUTTON

A green lighted push button is located on the fixed range power panel (see Figure 5). When this button is depressed, power is supplied to all ranges composing a module. The POWER BUTTON light then comes out. Power to the module can be cut by depressing any PANIC BUTTON.

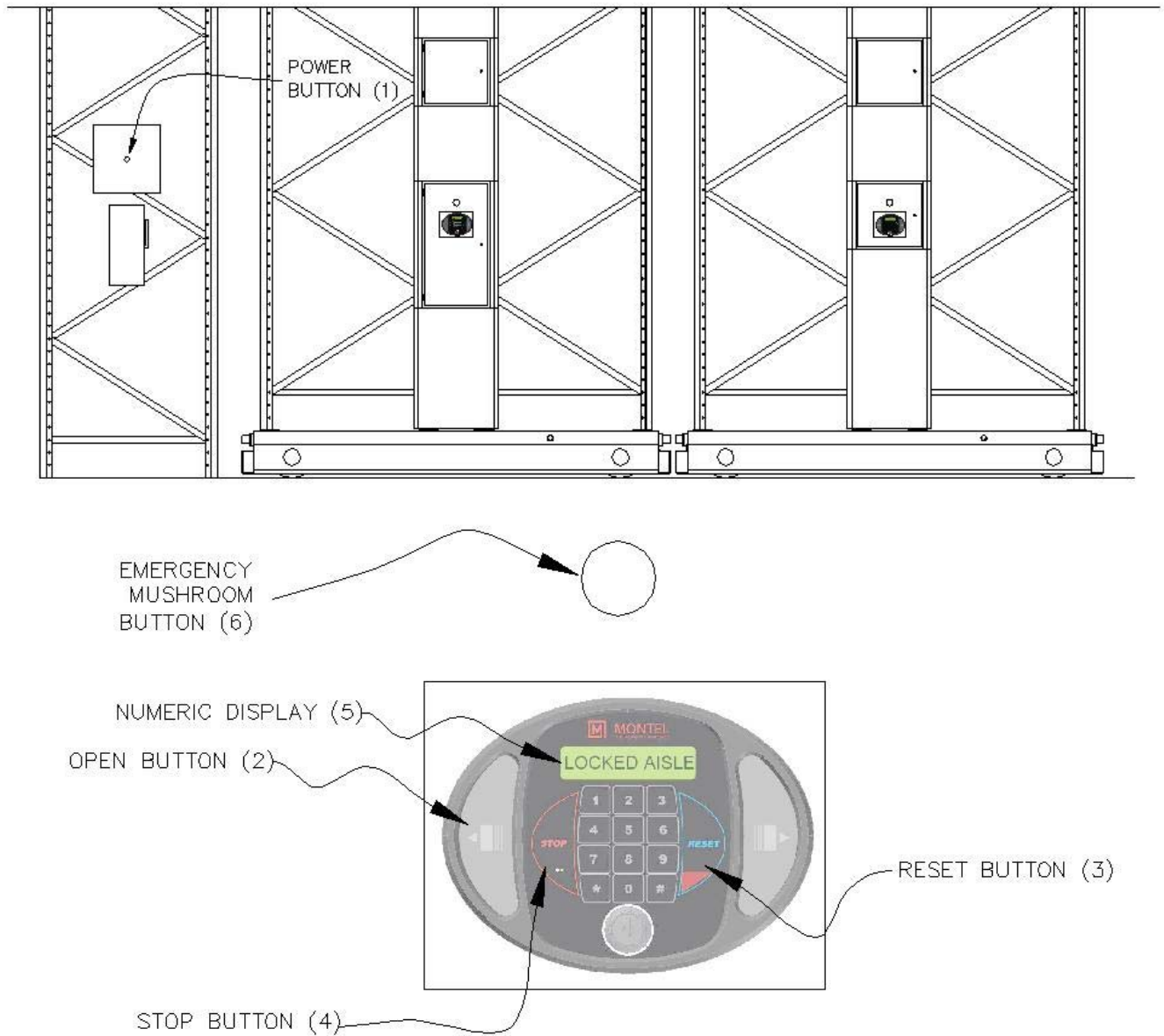
6.2 OPEN BUTTON

These arrow shaped green push buttons are located on the control panel of the master and secondary mobile ranges. They are used to open an aisle. Only both OPEN BUTTONS located next to the aisle to be opened (at either end of a range when available) can be used (see figure 4). A new aisle can be opened only if the opened aisle is unlocked.

6.3 RESET BUTTON (R)

These blue push-buttons (R) are located on the keypad at the control panel of the master and secondary mobile ranges. They have two functions: The RESET BUTTON can be used to unlock the open aisle. Only the RESET BUTTON located next to the open aisle (at either end of a range when available) can be used (see Figure 5 below).

FIGURE 5A



6.4 RESET LIGHT

These red lights are located on the RESET BUTTON on the control panel of the master and secondary mobile ranges (see Figure 5). They have two functions:

A) A blinking RESET light indicates that the opened aisle can not be closed. All OPEN BUTTONS are deactivated. To open a new aisle the RESET BUTTON located next to

the open aisle (at either end of a range when available) must be used. The RESET LIGHT then turns off.

B) The RESET LIGHT is permanently illuminated. This indicates that a safety device has been activated either in the aisle next to the RESET LIGHT, or in the corresponding range.

6.5 EMERGENCY MUSHROOM BUTTON

In case of an emergency situation, any "PANIC BUTTON" in a module can be used to immediately stop all carriage movement (there is one PANIC BUTTON per moving range) (see figure 5B).

This control is totally independent from the electronic control and shuts down the main electric power line. After an emergency stop, the POWER BUTTON must be pushed again to energize the module.

A PANIC BUTTON can be located in the aisle as a backup system to the electronic safety system.

7.0 OPERATION

7.1 ACTIVATING ON A MODULE

Push the green lighted ON / OFF POWER BUTTON (1). The green light will turn off indicating that electric power is now supplied to the module.

7.2 CREATING A NEW AISLE

To open a new aisle, the opened aisle must be unlocked. The opened aisle can be located by looking for the blinking RESET LIGHT (4). When located **you must go to the opened aisle to unlock it.** To open a new aisle, push the RESET BUTTON (R) (3) next to the opened aisle and verify if the aisle is clear. If so, walk to the aisle you want to open, and press the OPEN BUTTON (2) next to it. The ranges will start moving in sequence to open the selected aisle. The RESET LIGHT (4) of the new opened aisle will blink indicating the new aisle is locked.

7.3 CLEARING AN OBSTRUCTION

If an obstruction has been encountered, all ranges will stop.

The RESET LIGHT (4) next to the obstructed aisle will light up.

Locate the obstructed aisle by looking for the illuminated RESET LIGHT (4).

Go to the obstructed aisle, and press its OPEN BUTTON (2).

The ranges will start to move away from the obstructed aisle. The RESET LIGHT (4) of the obstructed aisle will then blink indicating that the access to the aisle is safe.

Remove the obstruction and resume normal system operation.

7.4 STOPPING MOVING RANGES

All moving ranges of a module can be stopped in three different ways:

A) By pressing any STOP BUTTON (5) from any end control panel.

B) By cutting any infrared beam running along the bottom sides of the carriages.

C) By pressing any mushroom-shaped EMERGENCY BUTTON (6) from any end control panel.

7.5 IN CASE OF ELECTRIC POWER FAILURE

In case of electric power loss, a ratchet tool can be used to manually move the ranges one at a time.

Manually disengage the motor brake by pulling or unscrewing the red button located on the front trolley. Engage the socket head, use the extended handle to crank the carriage into position. The direction can be reversed using the knob at the back of the socket head. If the electric power is restored while the ratchet tool is still engaged, the RESET LIGHT of the corresponding range will illuminate, indicating a safety is activated. The motor(s) can not run until the ratchet is removed. Then the RESET LIGHT must be pressed to reactivate the system.

7.6 FOOT-LEVEL INFRARED SAFETY

There are two foot-level infrared safeties for each aisle. They consist of an infrared transmitter/receiver pair mounted at each end of a carriage. As soon as a beam is broken all carriage movement within a module is stopped. After a foot-level safety has been activated the operation procedure: "CLEARING AN OBSTRUCTION" must be followed.

NOTE:

Foot-level infrared safeties operate in a fail-safe mode. If for any reason, the safety beam is interrupted, the module will operate as if an obstruction is in the aisle of the faulty device.

7.7 EMERGENCY STOP

ANY EMERGENCY STOP BUTTON (6) can be used to immediately stop all carriage movement within a module. After an emergency stop, the operation procedure: "TURNING ON A MODULE" must be followed.

7.8 MOTOR OVERLOAD PROTECTION WITH AUTOMATIC RESET

If for any reason the driving mechanism of a carriage becomes jammed, the motor thermal overload protection will trip. Electric power to the carriage motor(s) will immediately be turned off. The carriage RESET LIGHT (4) led will illuminate and the display will show MOTOR OVERLOAD WAIT FOR RESET. The motor thermal overload protection will reset automatically after the motor has cooled. Then the message SYSTEM FAULT will appear and the RESET BUTTON will have to be pressed. The motor thermal overload protection activation is generally caused by objects in rails. If motor thermal overload protection activation occurs frequently, advise service personnel.

7.9 MOTOR AUTOMATIC TIME OUT

If for any reason, an aisle opening is not completed within a preset time, all carriage movement is stopped. If this occurs frequently, advise service personnel.

8.0 OPTIONAL SAFETY FEATURES

8.1 FLASHING LIGHT AND HORN

These features may be located at each end of the stationary range. They are activated each time a range is in motion. They provide visual and audible warnings.

8.2 AISLE ENTRANCE MONITORING

Each module has an infrared beam running along its full length. When the beam is broken the aisle automatically locks. If the carriages are in movement, they all stop.

8.3 AISLE LOCK

Each aisle control can be equipped with a key switch to lock an aisle open. The key can be removed in lock an unlock position. As long the aisle is locked it can not be closed.

8.4 IN AISLE EMERGENCY BUTTON

PANIC BUTTONS can also be located within each aisle.

8.5 HUMAN PRESENCE DETECTION SYSTEM

This system detects the infrared thermal energy emitted by the human body. The **Human Presence Detection System** will detect the presence of humans in an aisle without any mechanical device which means it needs practically no maintenance. In addition, the **HPDS** is a totally passive safety system which means that it does not require any conscious action from the user. The status of each detector is indicated by an LED.

1-When someone enters an aisle, the HPDS detects their presence and automatically locks the mobile storage system. The RESET LIGHT start to blink at this range indicating that someone is in the aisle. New aisle selection is then impossible.

2 When the user leaves the aisle; the system automatically resets itself. Then the RESET LIGHT switches off. A new aisle can then be opened.