

I. INTRODUCTION TO SEECO MOTOR OPERATORS

Thank you for purchasing a SEECO motor operator. We are excited to be able to provide this product to you and we are certain that it will fulfill your performance expectations. The SEECO motor operator is designed and fabricated with the philosophy of quality, functionality and reliability, as well as installation (application) simplicity in mind. We appreciate all comments with regard to our product and welcome any suggested modifications to the design, which would better suit your future application needs. We are particularly interested in hearing any suggestions related to field installation which may help you perform a more timely and efficient installation.

Following are the installation instructions for the SEECO motor operator. The purpose of these instructions is to outline a step-by-step, descriptive procedure for the field installation of SEECO motor operators.

If you need assistance please contact our factory:
(704)-392-1396 (phone)
(704)-392-7033 (fax)

II. MOTOR OPERATOR INSTALLATION INSTRUCTIONS

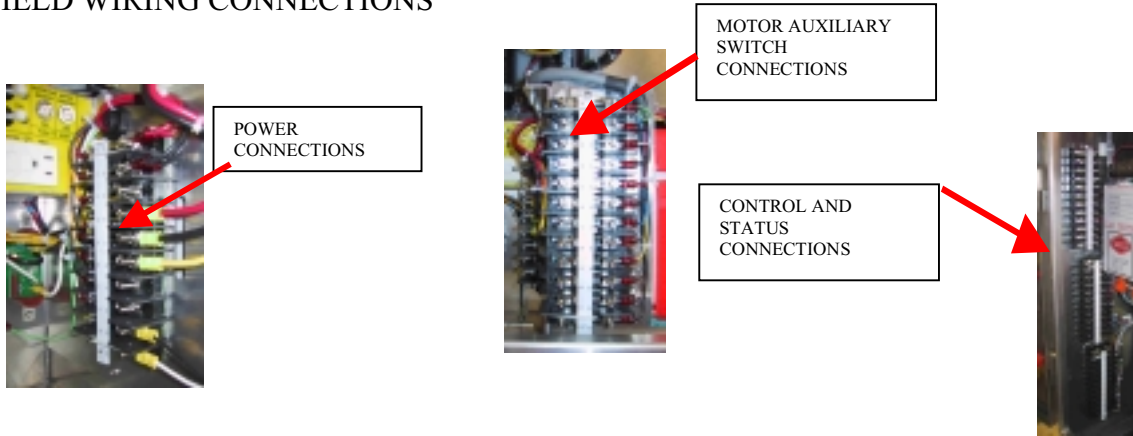
A. SWITCH ADJUSTMENT

- 1) The switch **must** be properly adjusted before beginning the installation of the motor operator.

B. MOTOR ATTACHMENT

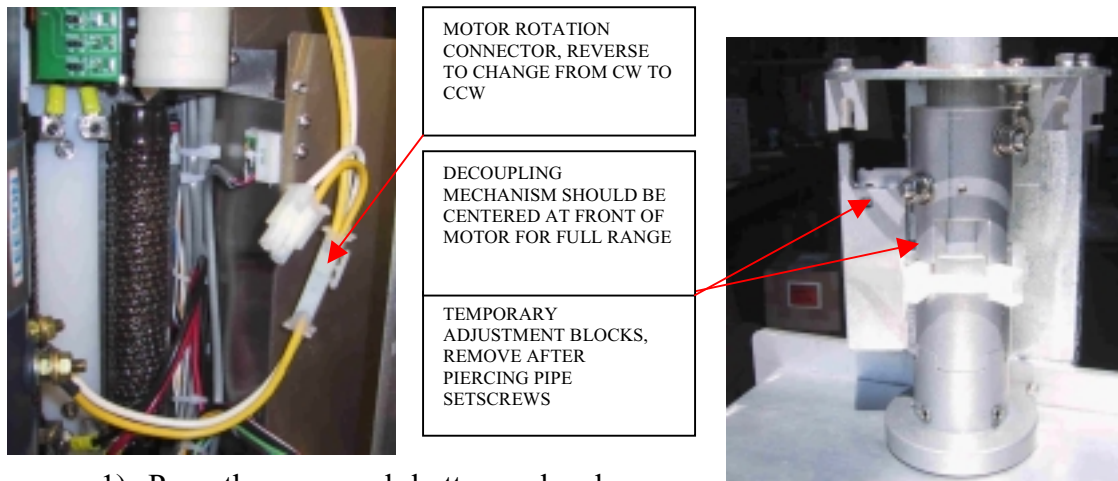
- 1) Remove the existing switch lever handle, lock segment assembly and ground strap (If applicable).
- 2) Determine the motor mounting position as outlined on the mounting drawing provided trying to use as many existing holes on the structure or pole as possible.
- 3) Determine the switch control pipe cutting point; pipe is to extend down into the coupling or universal joint far enough to allow the self-piercing setscrews to grasp the pipe.
- 4) Cut pipe.
- 5) Attach the motor with the mounting bracket to the structure or pole inserting the switch control pipe into the coupling or universal joint.
- 6) **Do not** pierce the set screws

C. FIELD WIRING CONNECTIONS

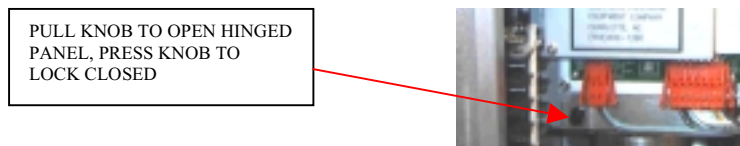


- 1) Connect field wiring, (AC voltage, and DC voltage). See connection diagram on interior cabinet wall or wiring diagram for the connection points at the terminal blocks.
- 2) Connect main power connector, close knife switches and circuit breakers. Observe lights on charger, yellow light should be on, green light will be on when charge reaches 90% or flashing when battery is fully charged

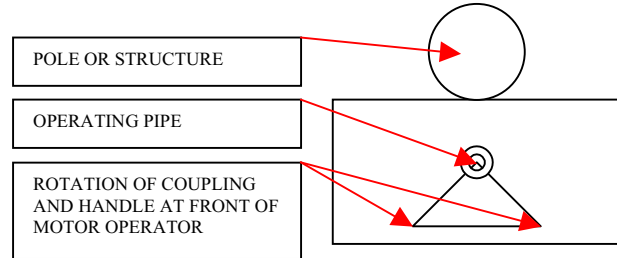
D. POSITIONING OF COUPLING COMPONENTS



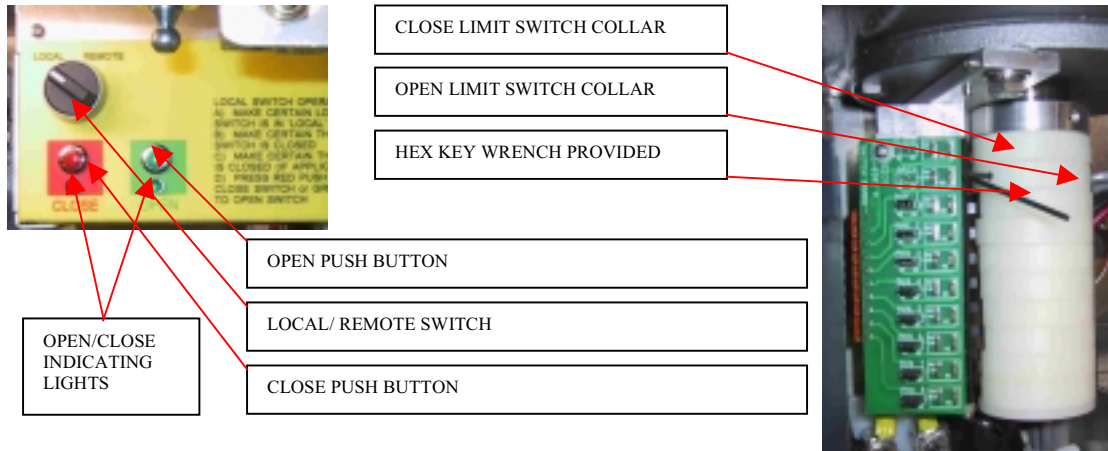
- 1) Press the open push-button and make certain that the motor rotation matches the rotation required to open the switch.
- 2) If rotation is not correct, reposition connector exiting motor to adjacent unoccupied connector. Connector is located behind the hinged panel on units with battery and charger. Open panel by pulling on black plastic knob located at lower left corner of LAB tester plate.



- 1) Place the overhead switch in the closed position. Press the closed pushbutton. Adjust the closed limit switch using the hex key wrench provided until the closed to open range of travel is centered at the front of the motor operator enclosure. This allows easy access to the coupling and swing handle in both the open and closed positions.



- 2) Pierce the setscrews on the coupling or universal joint. Remove the temporary coupling adjustment blocks and padlock the movable portion of the coupling in the uncoupled position.



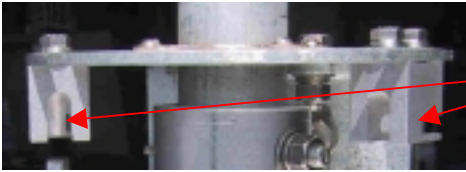
E. ADJUSTING LIMIT SWITCHES

- 1) At this time the limit switch should be correctly positioned for the closed switch position.
- 2) Move the switch to the open position using the manual operation swing handle. Leave the switch in the decoupled position.
- 3) Press the Open pushbutton on the motor operator.
- 4) Using the hex key wrench, loosen the setscrew on the open switch collar.
- 5) Rotate the collar in the opposite direction of the desired rotation. Lightly tighten the setscrew. Press the related pushbutton.
- 6) Repeat step 6 to allow the motor to incrementally step forward until the arrow on the switch position of the coupling matches the arrow on the motor portion of the coupling.

- 1) Padlock the movable coupling into the coupled position and operate the switch with the motor operator.
- 2) Fine-tune the adjustment of the limit switches in both the open and closed positions to compensate for the twist in the control pipe by repeating step six.

F. HANDLE, LOCK SEGMENT ADJUSTMENT

- 1) Make certain the swing handle is correctly positioned for the open and closed positions. Tighten the swing handle bolt and piercing setscrews.
- 2) Adjust and tighten the lock stops for the switch open and closed positions.

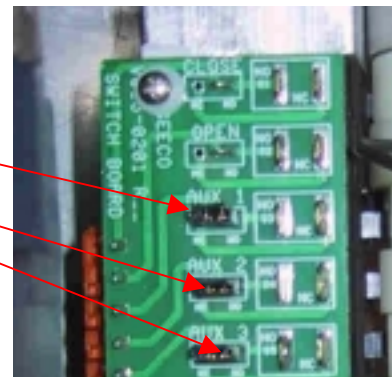


LOCK STOPS FOR PADLOCKING THE SWITCH OPEN OR CLOSED IN THE DECOUPLED POSITION

G. FINAL ADJUSTMENTS AND INSPECTION

- 1) Adjust any required Auxiliary switches in the same manner as the switch limit switches. A shunt is provided to convert the Auxiliary switches from NO as set at the factory to NC in the field as required.

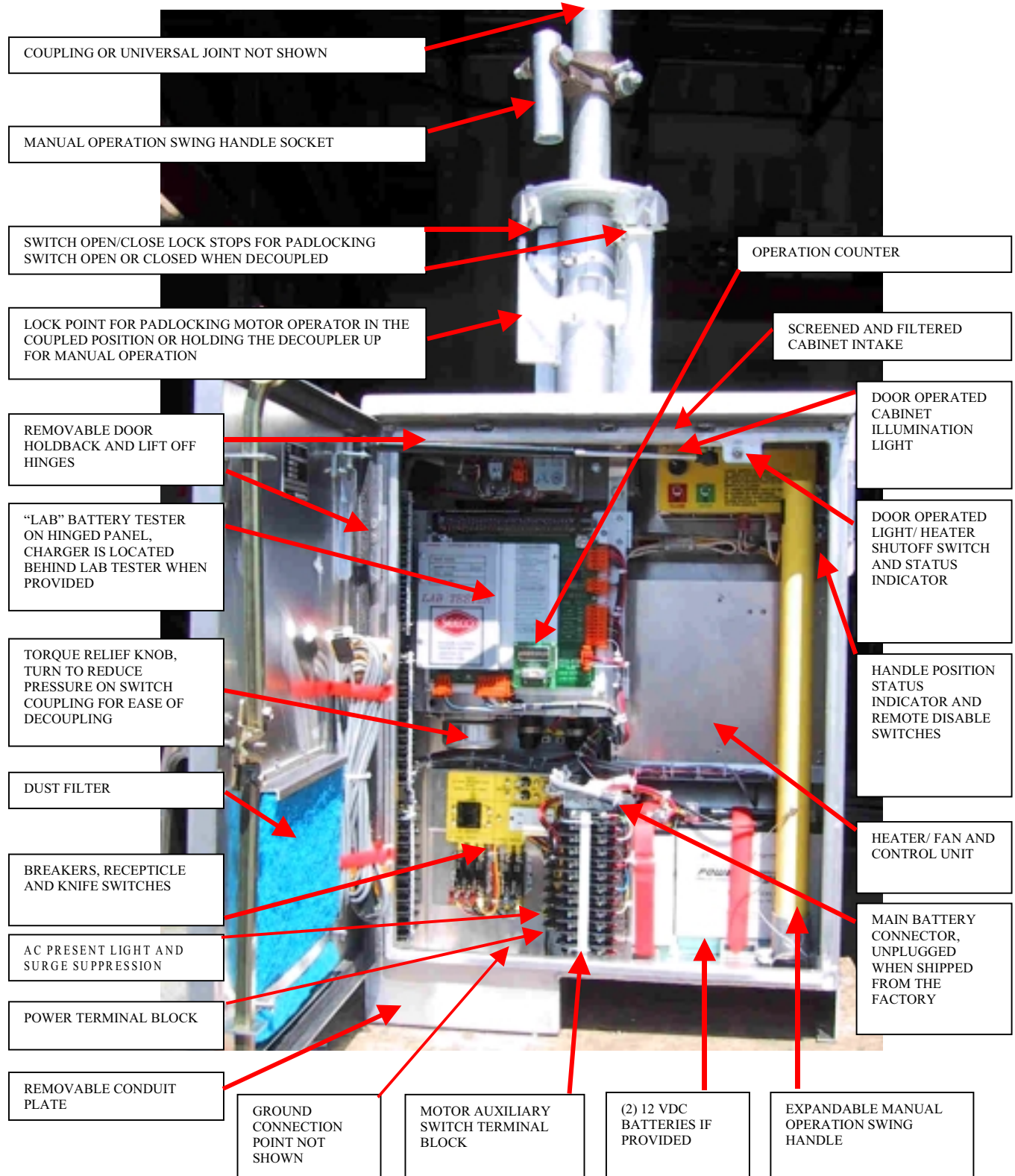
MOVE SHUNTS FROM NO POSITION TO NC POSITION TO CHANGE FROM NO TO NC IN THE FIELD



- 1) Change LAB Tester settings for load and check tests if desired (factory preset at 14 days for the check test and 30 days for the load test). Consult the LAB instructions for information on how to change and view settings.
- 2) Change Heater/ Fan settings if desired (factory preset at 25 degrees C for the upper limit and 15 degrees C for the lower limit). Consult the heater instructions for information on how to view and change settings.
- 3) Make certain all sliding links on the terminal blocks (if ordered) are in the closed positions.
- 4) Make certain ground wires are connected to the ground connection points supplied.
- 5) Leave the AC and DC knife switches and circuit breakers in the closed and on positions.
- 6) Leave the Local/ Remote switch in the Remote position
- 7) Make certain all bolts and setscrews have been tightened.
- 8) Operate the switch multiple times to ensure a reliable accurate installation.
- 9) Make Certain the ground strap has been reconnected to the operating pipe.



MOTOR BREAKER, HEATER BREAKER, MAIN DC BREAKER, MAIN AC BREAKER, DC KNIFE SWITCH AND AC KNIFE SWITCH ARE LOCATED AT LOWER LEFT CORNER OF MOTOR OPERATOR
AC/DC BREAKERS AND AC KNIFE SWITCH ARE OPTIONAL



H. LAB24 OPERATION INSTRUCTIONS

The SEECO Lead Acid Battery (LAB) Tester is standard equipment on “MNM2” series operators. It is shipped from the factory fully functional. You may adjust the settings per the following instructions:



Figure 1
Null Modem Cable



Figure 2
LAB Tester

Optional
Operations
Counter



Figure 3
Hyper-terminal Setup disk

Step 1: Confirm all above listed and shown components are present. One cable and setup disk is provided per customer.

Step 2: Insert Disk provided (Figure 3) into Computer, drag contents to desktop within Windows.

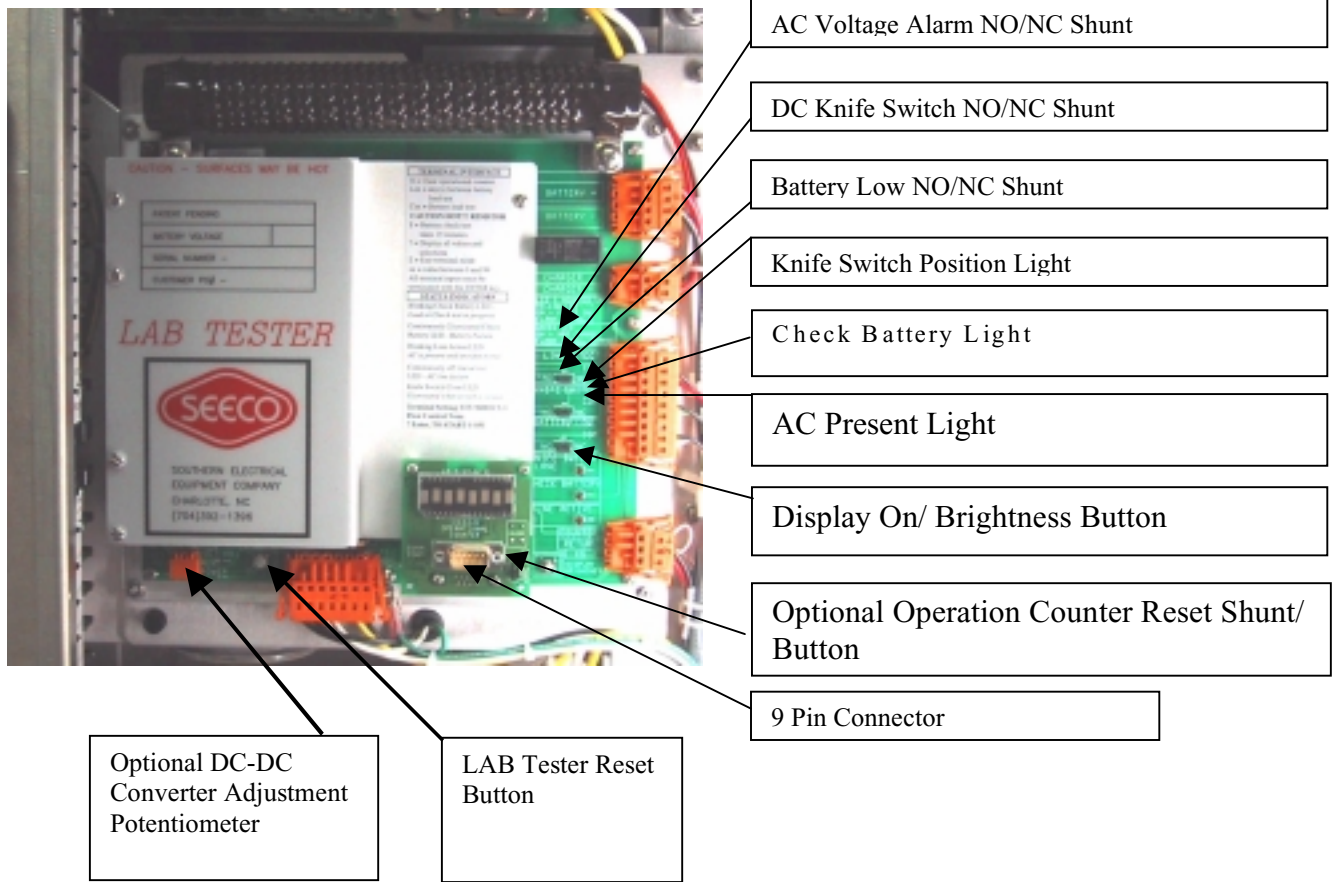


Figure 4
 Lab Tester Layout

Step 4: Make certain that the Lab tester has power applied to it, Make connector at batteries, close DC knife switch and DC Breaker if applicable.

Step 5: Type “Shift ? Enter” twice. At this point the menu as shown in figure 5 should be visible.

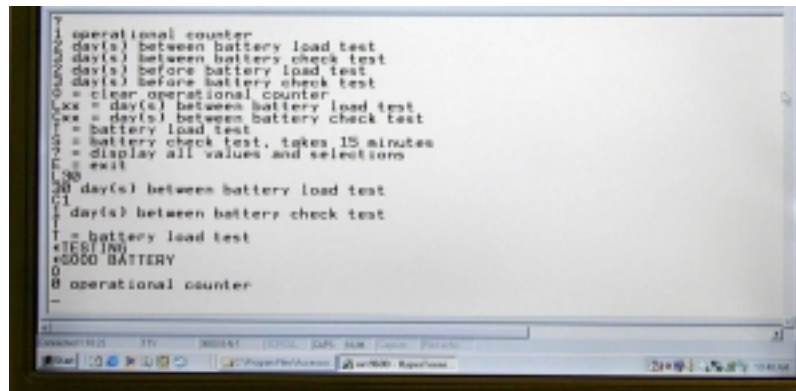


Figure 5
 Screen Layout

Step 6: Modify and/or view desired parameters, a typical screen print is shown below displaying the default settings.

a----- 0 operation counter
b----- 30 day(s) between battery load test
c----- 14 day(s) between battery check test
d----- O = clear operational counter
e----- Lxx = day (s) between battery load test
f----- Cxx = day (s) between battery check test
g----- T = battery load test
h----- S = battery check test, takes 15 minutes
i----- Zxx = Count on time 16.66ms steps
j----- 20 count on time 16.66ms steps
k----- Yxx = Count off time 1 second steps
l----- 1 Count off time 1 second steps
m----- ? = Display all values and selections
n----- E = exit

a----- Displays the current number of motor operator operations, open and close since the last reset. This is available even if the operational counter display option is not ordered.
b----- Displays the number of days between the battery load tests. This test automatically disconnects the charger and places a load resistor across the battery for 15 seconds. If the battery voltage drops below 20 volts during the test duration, a contact and indicating light alarm are provided.
c----- Displays the number of days between the battery check tests. This test automatically disconnects the charger and lets the normal motor operator load run off the battery for 15 minutes. If the battery voltage drops below 20 volts during the test duration, a contact and indicating light alarm are provided.
d----- Type "O" to clear the operational counter.
e----- Type "Lxx", where xx is the number of days between the load test. For example L20 would set the load test interval to 20 days between the tests.
f----- Type "Cxx", where xx is the number of days between the check test. For example C20 would set the check test interval to 20 days between the tests.
g----- Type "T" to initiate a battery Load test immediately.
h----- Type "S" to initiate a battery Check test immediately. Please keep in mind that this test will continue for 15 minutes.
i,j,k,l-- These are for SEECO Internal use only, no need to alter these settings.
m----- Type "?" to refresh the screen and display all values and selections.
n----- Type "E" to exit from the menu and store all updated values.

Step 7: Confirm that the AC Voltage, DC Knife Switch, and Battery Low dry contact status alarms are as desired (Normally Open or Normally Closed). If a change is needed, reposition the related shunt to the opposite pins. The location of each of these shunts is shown in Figure 4.

Step 8: Press the Display Brightness pushbutton to turn on and increase the intensity of the optional operational counter display. The location of this pushbutton is shown in figure 4.

Step 9: To reset the optional counter display without accessing the LAB tester through Hyper-terminal. Move the shunt shown in figure 4 to the reset position and press the button located on the backside of the board directly above the shunt. Return the shunt to the normal position upon reset.

Step 10: To adjust the output voltage on the DC to DC converter. Turn the Adjustment Potentiometer shown in figure 4 until the desired voltage is obtained.

I. BATTERY CHARGER SPECIFICATIONS AND INSTRUCTIONS.

(Provided as standard with the Lab Tester)

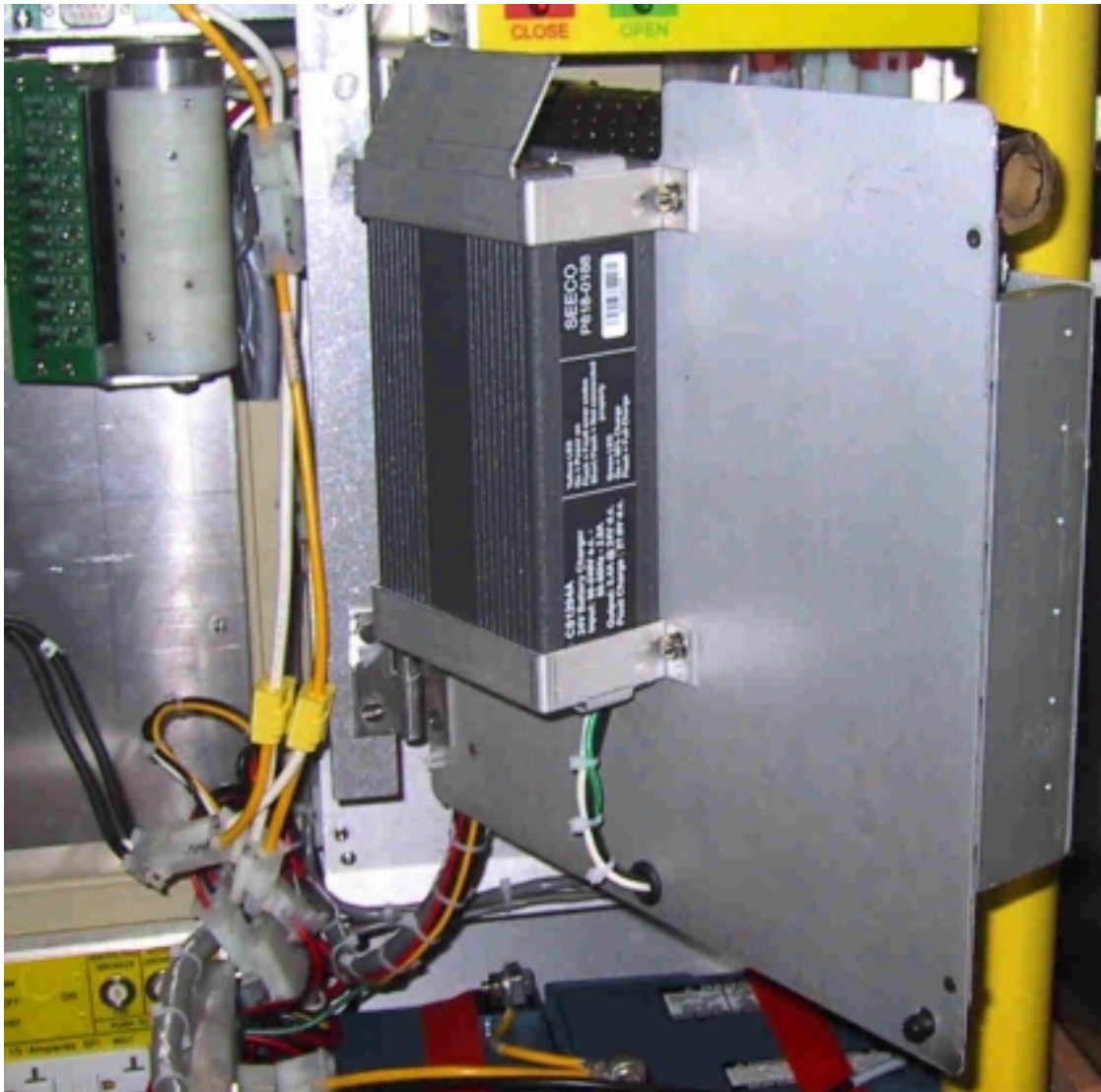


Figure 1
SEECO Battery Charger

Specifications:

- 1) 130 Watt constant output power
- 2) Designed to charge two 12 Volt, 33 Amp-hour sealed lead acid batteries wired in series.
- 3) Three stage charging: Bulk charge, Over charge, and Float charge.
- 4) AC Input voltage surge suppression.
- 5) Short circuit protection across output.
- 6) Reverse polarity protection on output.
- 7) Over temperature protection.
- 8) Temperature Compensation.
- 9) Constant voltage, not pulsed output.

- 1) Cooling fan.
- 2) LED status indication light.

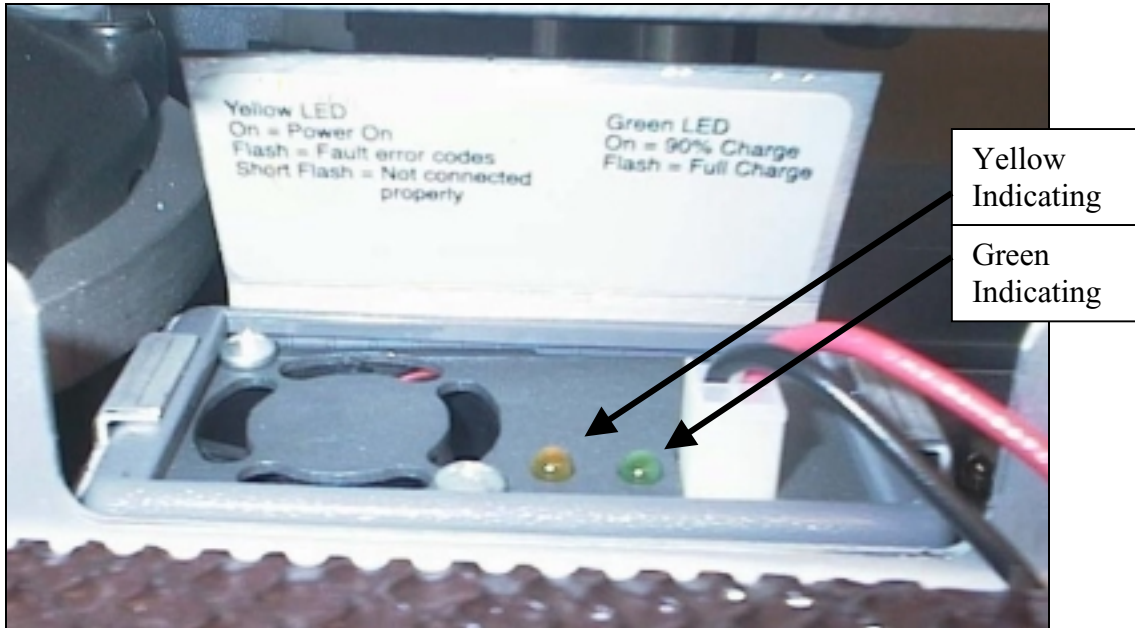


Figure 2
SEECO Battery Charger Indicating lights (visible w/lab tester in secured position)

Yellow Light

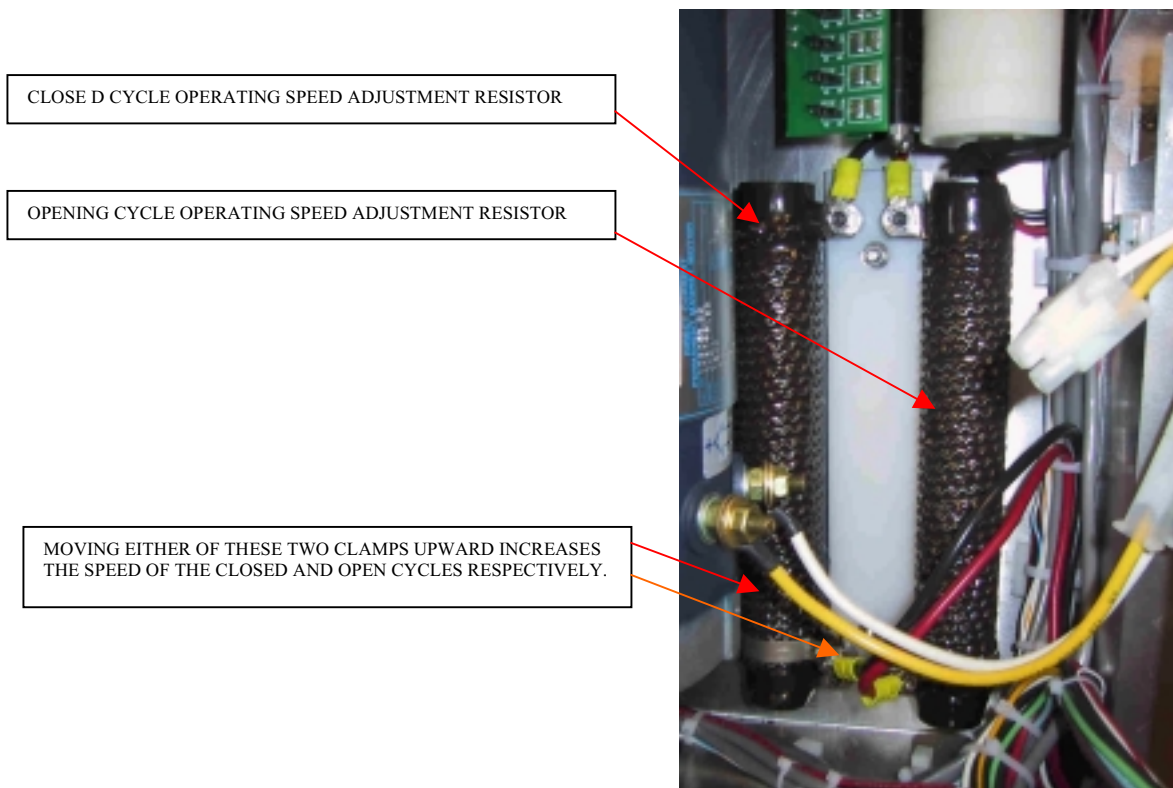
- | | |
|-------------|------------------------------------|
| ON | =Power is on |
| Flashing | =Fault error codes |
| Short Flash | =Charger is not connected properly |

Green Light

- | | |
|-------|---|
| ON | =The Batteries are 90% Charged |
| Flash | =The Batteries have reached full Charge |

J. SPEED ADJUSTMENTS (Optional Equipment Provided on 2-Speed versions, suffix 'T' in part number)

Motor Operators used on certain switches require a variable open and close speed. The right hand resistor is used to control the open speed. The left hand resistor is used to control the close speed. Loosening the clamp and increasing the distance between the upper terminal connection and the clamp will slow the motor operator. Decreasing the clamp to upper terminal distance will increase the motor operator speed. Generally a fast close and slow open is desired.



K. MSM - Motor / Switch Monitor (Optional equipment, provided when suffix G is present in part number)

The MSM is utilized when switch true position and motor operator coupler status is desired. An additional function is the monitoring of the power required to operate the switch via the motor operator. Status contacts are provided, reference applicable wiring diagram.



Figure 1
Null Modem Cable



Figure 2
MSM Board



Figure 3
Hyper-terminal Setup disk

Step 1: Confirm all above listed and shown components are present. One cable and setup disk is provided per customer.

Step 3: Connect Null Modem Cable (Figure 1) into Computer and 9 pin connector at front of MSM (See Figure 4).

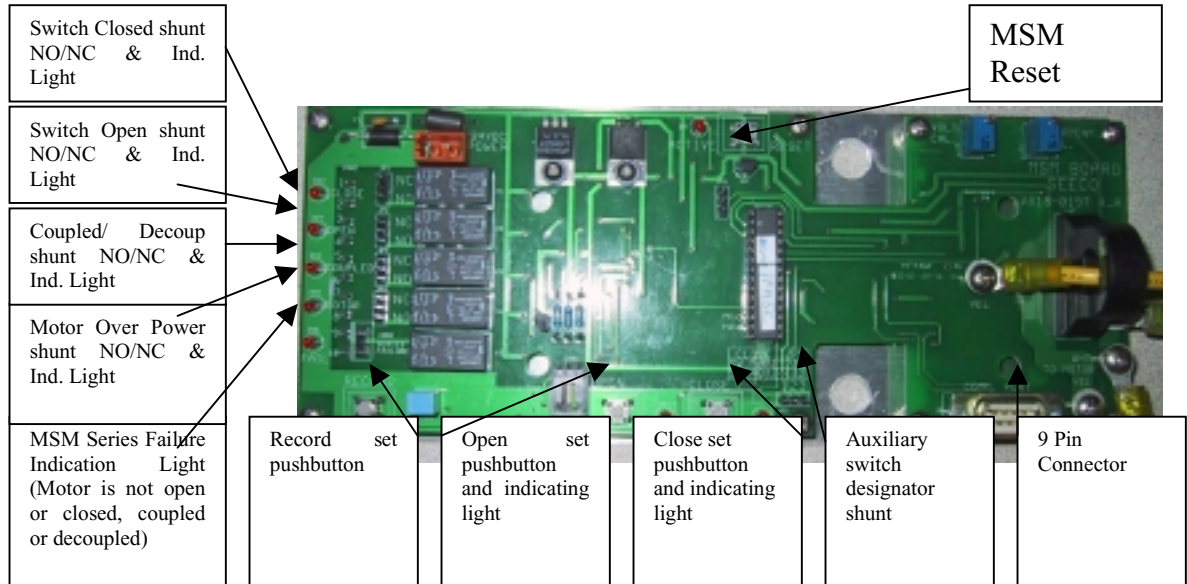


Figure 4

MSM Board Layout (Located in upper left hand corner of motor cabinet)

Step 4: Make certain that the motor operator cabinet has power applied to it. Make connector at batteries, close DC knife switch and DC Breaker if applicable.

Step 5: Type “Shift ? Enter” twice. At this point the menu as shown in figure 5 should be visible.

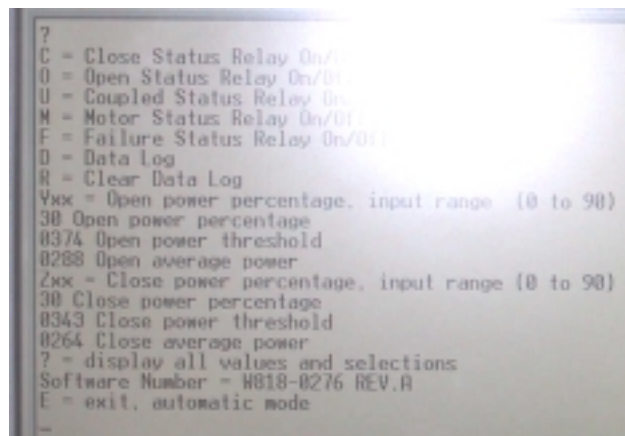


Figure 5

Screen Layout

Step 6: Modify and/or view desired parameters, a typical screen print is shown below displaying the default settings.

a-----C = Close Status Relay On/Off
b-----O = Open Status Relay On/Off
c-----U = Coupled Status Relay On/Off
d-----M = Motor Status Relay On/Off
e----- F = Failure Status Relay On/Off
f----- D = Data Log
g-----R = Clear Data Log
h-----Yxx = Open power percentage, input range (0 to 90).
i----- 30 Open power percentage
j-----0000 Open power threshold
k----- 0000 Open average power
l----- Zxx = Close power percentage, input range (0 to 90).
m----- 30 Close power percentage
n----- 0000 Close power threshold
o----- 0000 Close average power
p----- ?=Display all values and selections.
q----- Software Number = W818-0276 Rev. A
r----- E = exit, automatic mode

a----- Type "C" to toggle the Sw. closed relay on or off in order to perform function tests.
b----- Type "O" to toggle the Sw. open relay on or off in order to perform function tests.
c----- Type "U" to toggle the Coupled Status relay on or off in order to perform function tests.
d----- Type "M" to toggle the Motor Status relay on or off in order to perform function tests.
e----- Type "F" to toggle the Failure Status relay on or off in order to perform function tests.
f----- Type "D" to view the switch operation data
g----- Type "R" to delete the contents of the switch operation data log.
h----- Type "Yxx" where xx is the percentage (0 to 90) above the initial set open power value that an alarm contact indication is desired (factory preset to 30).
i----- Indicates the currently set open power percentage
j----- Calculated open power threshold value as it relates to h
k-----Calculated average open power.
l----- Type "Zxx" where xx is the percentage (0 to 90) above the initial set close power value that an alarm contact indication is desired (factory preset to 30).
m-----Indicates the currently set close power percentage
n-----Calculated close power threshold value as it relates to h
o-----Calculated average close power.
p-----Type ? to redisplay all current values & selections (refresh screen)
q----- Current software number and release in use.
r----- Type "E" to exit and allow system to return to automatic mode.

Step 7: With the motor operator coupled to the switch and the overhead switch in the fully open or closed position, ensure that the correct indicating light is illuminated (i.e. 'OPEN' or 'CLOSE'). If a change is required, position the "Auxiliary switch designator shunt" in the alternate position.

Step 8: Confirm that the Close, Open, Coupled and Motor contact status alarms are as desired (NO or NC). If a change is needed, reposition the related shunt located to the right of the indicating light to the opposite pins.

Step 9: Once the switch is operating properly with the motor operator and any necessary adjustments have been performed on the switch. Couple the motor operator to the switch and while in the closed position, press and hold the record and open buttons simultaneously. Release the buttons and press the motor open pushbutton. Once, the motor operator and switch open. Press and hold the record and close buttons simultaneously. Release the buttons and press the motor close pushbutton. This procedure stores in memory the power required to perform each operation.