MCS Microprocessor Manual

Table of Contents

Using the Keypad

Magnum Keypad / Display Rev 2.0

(HVAC 8.00 & Higher)

The MCS Commitment

Our commitment is to provide practical solutions for the industries needs and to be both a leader and a partner in the effective use of microprocessor controls.

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(Our Website contains product descriptions, manuals, software releases, troubleshooting aids, training videos, case studies, etc.)

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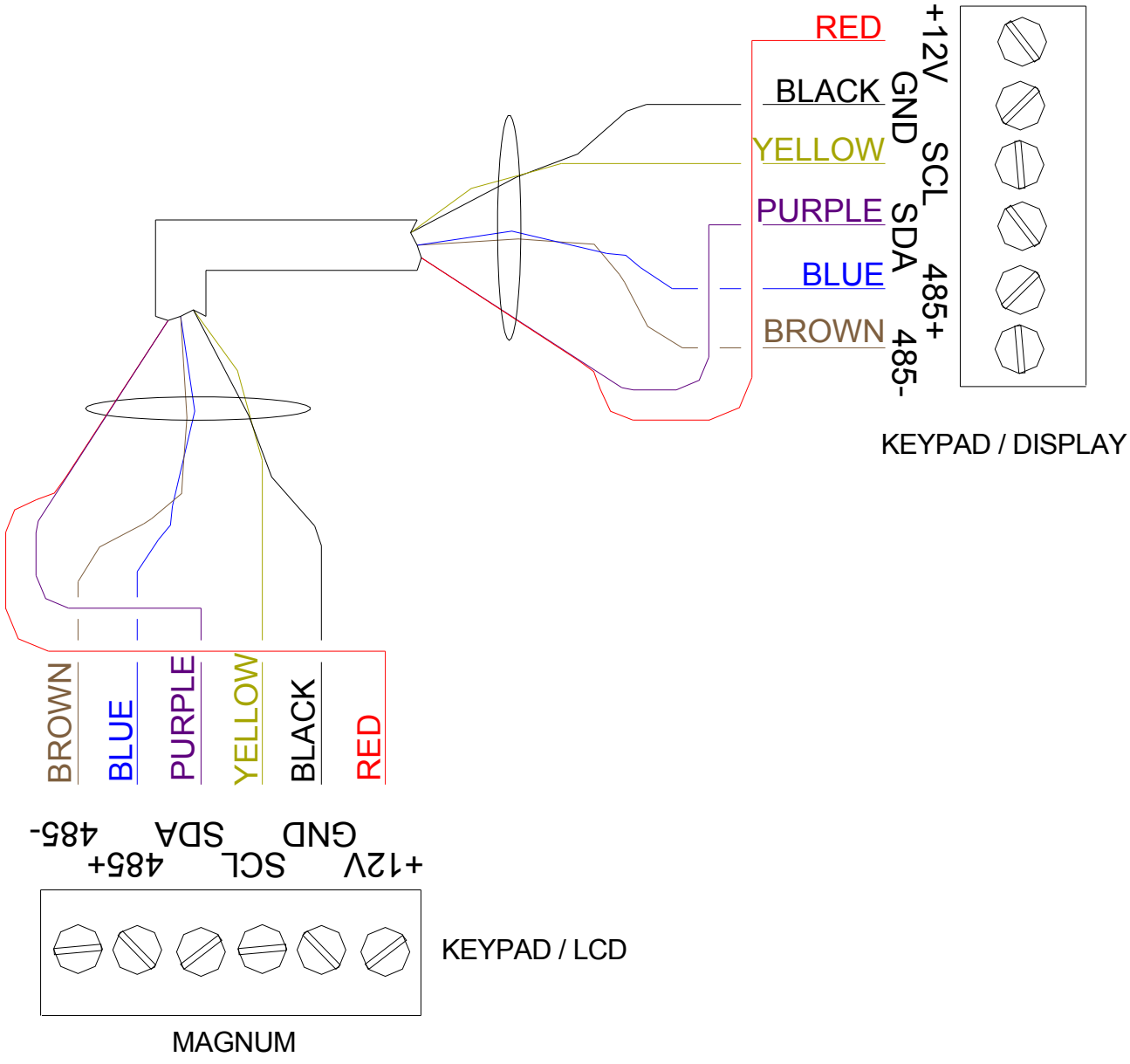
3. Keypad / Display specifications

3.1. Cable Connection

- 6 wire (3 twisted pairs) shielded cable 10’ length



4. Magnum Display Summary

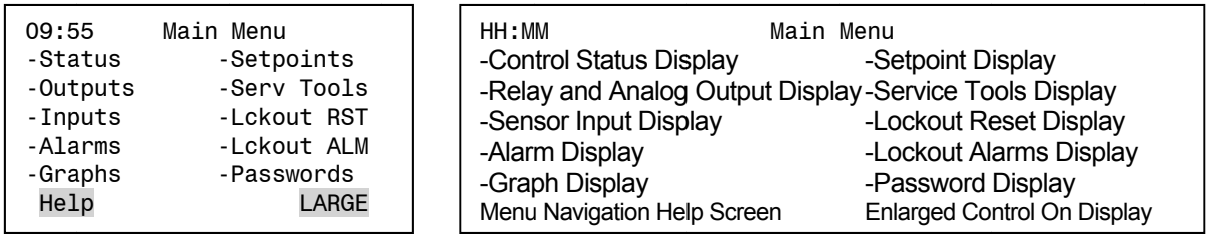
The following is an examination of all the information screens that can be accessed through both the Magnum keypad and MCS-Connect program.

4.1. Magnum keypad and display

4.1.1. Menu Screen

The main menu is accessed by pressing the “Menu” key.

ACTUAL DISPLAY *DESCRIPTION*



```
09:55     Main Menu
-Status        -Setpoints
-Outputs       -Serv Tools
-Inputs        -Lckout RST
-Alarms        -Lckout ALM
-Graphs        -Passwords
 Help                LARGE
```

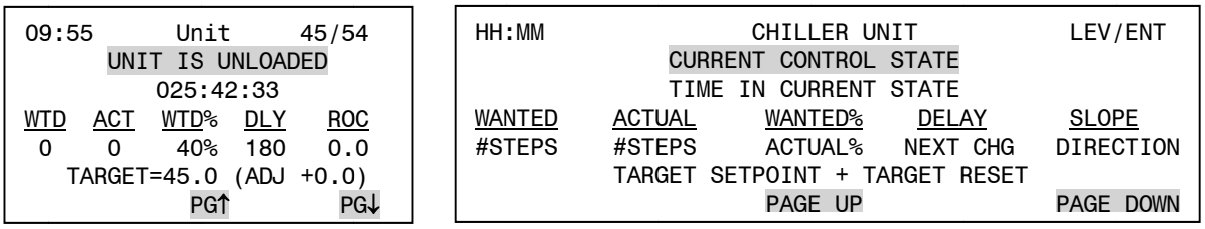
```
HH:MM                  Main Menu
-Control Status Display          -Setpoint Display
-Relay and Analog Output Display -Service Tools Display
-Sensor Input Display            -Lockout Reset Display
-Alarm Display                   -Lockout Alarms Display
-Graph Display                   -Password Display
Menu Navigation Help Screen      Enlarged Control On Display
```

4.1.2. Introduction to Status Screens

The current status of the unit and compressors is displayed by selecting the “Status” option from the “Menu” screen. This following screen will be displayed. By pressing the **PG↑** or **PG↓** function keys you will get additional information on each compressor.

4.1.3. Unit status

ACTUAL DISPLAY *DESCRIPTION*



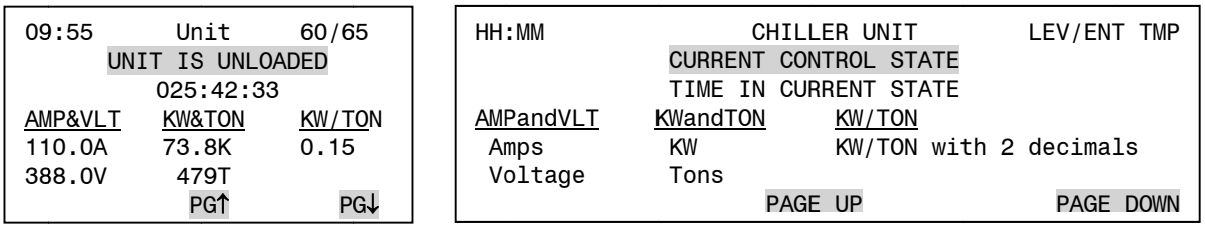
```
09:55      Unit      45/54
       UNIT IS UNLOADED
            025:42:33
WTD   ACT   WTD%  DLY    ROC
 0     0    40%  180    0.0
    TARGET=45.0 (ADJ +0.0)
              PG↑         PG↓
```

```
HH:MM              CHILLER UNIT              LEV/ENT
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
WANTED     ACTUAL      WANTED%     DELAY       SLOPE
#STEPS     #STEPS      ACTUAL%   NEXT CHG    DIRECTION
           TARGET SETPOINT + TARGET RESET
                        PAGE UP               PAGE DOWN
```

4.1.4. Unit Tonnage and KW Information

If tonnage/KW information is available the following screen is added to the status screens:

ACTUAL DISPLAY *DESCRIPTION*



```
09:55      Unit      60/65
       UNIT IS UNLOADED
            025:42:33
AMP&VLT    KW&TON     KW/TON
110.0A     73.8K      0.15
388.0V      479T
              PG↑         PG↓
```

```
HH:MM              CHILLER UNIT          LEV/ENT TMP
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
AMPandVLT     KWandTON      KW/TON
 Amps          KW           KW/TON with 2 decimals
 Voltage       Tons
                        PAGE UP               PAGE DOWN
```

The above screen is based upon flow of 230 GPM and power factor (PF) of 1. All other values in the calculation are displayed on the screen.

4.1.5. Purge Status Screen (only if Purge cycles are active)

ACTUAL DISPLAY

```
09:55      PRG 1      45/54
          A-PRG OFF
    000:00:42      MODE COOL
SUC-LT     FLOAT    24TMR
 20F       NORMAL    27mi

              PG↑          PG↓
```

DESCRIPTION

```
HH:MM            Purge Circuit          LEV/ENT TMP
                CURRENT PURGE STATE
   TIME IN CURRENT STATE              UNIT MODE
SUC-LT                  FLOAT                   24 TMR
Temperature of      Safety Float      Purge Run Time
suction line           Status       in last 24 hours
                     PAGE UP                PAGE DOWN
```

4.1.6. Compressor status

ACTUAL DISPLAY

```
09:56      CMP #1      45/54
          CMP OFF/READY
            000:00;30
SUCT    DISC     OPD     MOTOR
 66P    190P     134P     0%
 55F    177F     ----     OK
              PG↑          PG↓
```

DESCRIPTION

```
HH:MM                 COMPRESSOR          LEV/ENT TMP
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
  SUCTION     DISCHARGE    OIL DIFFERENTIAL    MOTOR
 Pressure      Pressure        Pressure          Amp %
Temperature  Temperature        ----            Status
                     PAGE UP                PAGE DOWN
```

ACTUAL DISPLAY

```
09:55      CMP #1      45/54
          CMP OFF/READY
            000:00:42
SST     SSH      SCT      DSH
 38    16.9      97      79.2

              PG↑          PG↓
```

DESCRIPTION

```
HH:MM                 COMPRESSOR          LEV/ENT TMP
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
SAT.SUCTION  SUCT SHEAT      SAT.COND.    DISC S.HEAT
Temperature  Temperature     Temperature  Temperature

                     PAGE UP                PAGE DOWN
```

4.1.7. Compressor status (only CENT)

ACTUAL DISPLAY

```
09:55      CMP #1      45/54
          CMP OFF/READY
            000:00:42
AROC    LROC     CNT      LIFT
0.0A    0.0P      0c       45F
0.0A    0.0P      0c      0.8F
              PG↑          PG↓
```

DESCRIPTION

```
HH:MM                  COMPRESSOR          LEV/ENT TMP
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
AROC                LROC          CNT          LIFT
Current Comp.   Current Amp     Lift      Current Lift
Amp R.O.C.      Lift R.O.C.     Count
Last Comp.      Last             Lift
Amp R.O.C.      Lift R.O.C.     Count     Lift Ratio
                     PAGE UP                PAGE DOWN
```

4.1.8. EXV status

ACTUAL DISPLAY

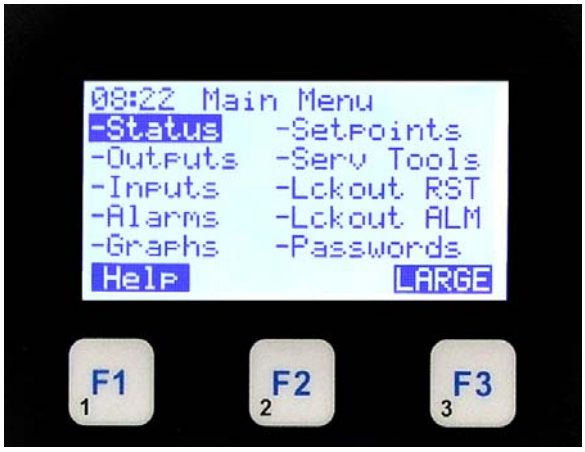
```
09:55      EXV #1      45/54
          IS HOLDING
            000:36:42
VLV%    DELAY    SPHT     ROC
 27      60      12.2     0.0
              PG↑          PG↓
```

DESCRIPTION

```
HH:MM           ELECTRONIC EXP VLV       LEV/ENT TMP
                CURRENT CONTROL STATE
                TIME IN CURRENT STATE
VLV OPEN%    TIME DELAY     SUCT SHEAT     ROC
Percent      Delay To       Temperature    Rate Of
           Next Change                     Change
                     PAGE UP                PAGE DOWN
```

4. Screen Layouts

4.1. MENU KEY

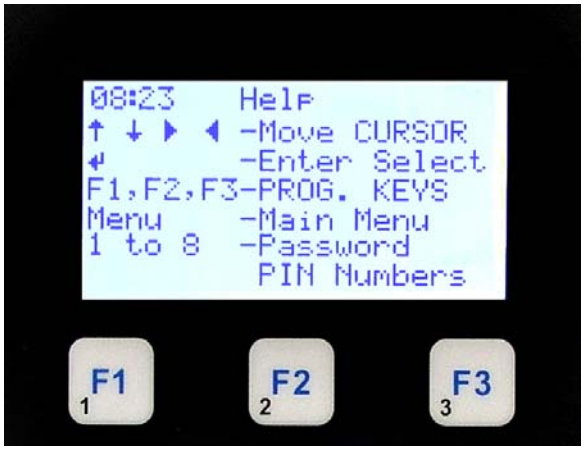


Select 'F 1' (Help)

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Status display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- For a LARGE display of the current chillers performance press F3.

4.2. HELP F1



Select 'Menu' then F3 (LARGE)

Pressing the F1 (Help) Key

- By selecting the Help function you get a short description of the control keys.
- The 3 function keys change depending on the screen.
- Notice that only the numbers (lower bottom left of keys) 1 thru 8 is available from the keypad.
- From here you need to return back to the Menu key to make another selection.

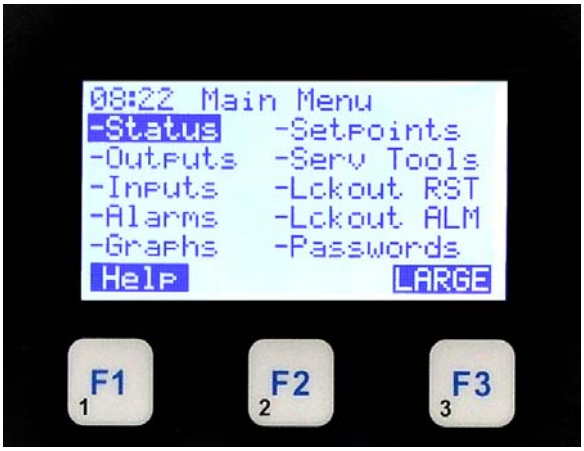
4.3. LARGE F3

Next Select 'Menu'

Pressing the F3 (Large) key

- To get to Large you can only do so from the Menu display.
- Once positioned at the menu key press the function key F3 which says LARGE.
- The display shows the controlling sensor first in large characters.
- The refrigerant type is displayed at the bottom of the display.

4.4. MENU (STATUS)

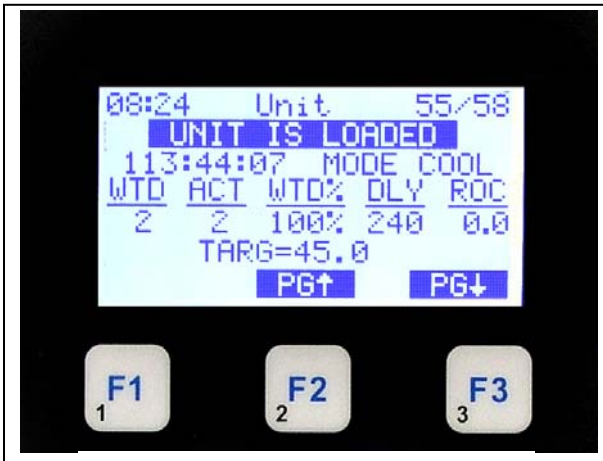


Press ↵

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Status display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↵.
- To understand the options select F1 for help.
- To display the current Status Screens press the Enter Key.

4.5. UNIT STATUS (WTD/ACT)



Press F3 PG↓

Unit Status WTD/ACT

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows system status.
- The third line shows mode & time in that mode.
- The next two lines show the following:
  -Steps wanted on -Steps actually on
  -Wanted capacity % -Integration delay
  -Rate of change.
- The next line shows the current target.

4.6. UNIT STATUS (KW/TON)

Press F3 PG↓

Unit Status KW/TON

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows Unit status.
- The third line shows time in that mode.
- The next two lines show the following:

  -Current amps -Current voltage
  -Current KW -Current tons
  -Current KW/Ton
- This information is only available if the sensors are provided.

4.7. COMPRESSOR1 STATUS (PSI & Temp)

Press F3 PG↓

Compressor 1 PSI & Temp

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows Circuit status.
- The third line shows time in that mode.
- The next two lines show the following:

-Suct psi	-Suct temp
-Disc psi	-Disc temp
-Oil psi differential	-Oil temp
-Motor %	-Motor temp

4.8. COMPRESSOR1 STATUS (Superheats)

Press F3 PG↓

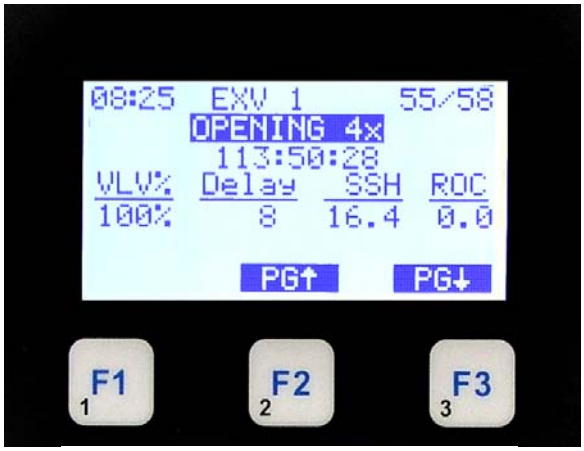
Compressor 1 Superheats

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows Circuit status.
- The third line shows time in that mode.
- The next line shows the following:

-Sat Suct Tmp	-Suct Superheat
-Sat Cond Tmp	-Disc Superheat

- The function keys F1 & F2 allow paging up or down.

4.9. COMPRESSOR1 STATUS (EXV or LLS)



Press F3 PG ↓

Compressor 1 EXV or LLS

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The line also shows EXV or LLS status.
- The third line shows time in that mode.
- The display shows information for the EXV or LLS for circuit 1. If EXV the information is as follows:

-Valve % open	-Delay till next chg
-Curr Suct SH	-Slope of SH

4.10. COMPRESSOR2 STATUS (PSI & Temp)

Press F3 PG ↓

Compressor 2 PSI & Temp

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows circuit status.
- The third line shows time in that mode..
- The next two lines show the following:

-Suct psi	-Suct temp
-Disc psi	-Disc temp
-Oil psi differential	-Oil temp
-Motor %	-Motor temp

4.11. COMPRESSOR2 STATUS (Superheats)

Press F3 PG ↓

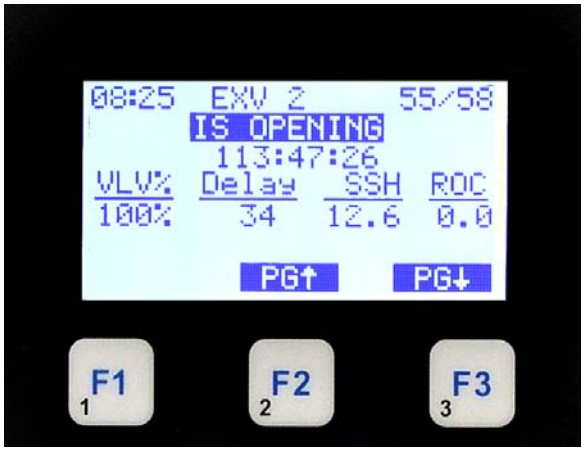
Compressor 2 Superheats

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The second line shows circuit status.
- The third line shows time in that mode.
- The next two lines show the following:

-Sat Suct Tmp	-Suct Superheat
-Sat Cond Tmp	-Disc Superheat

- The function keys F2 & F3 allow paging up or down.

4.12. COMPRESSOR2 STATUS (EXV or LLS)



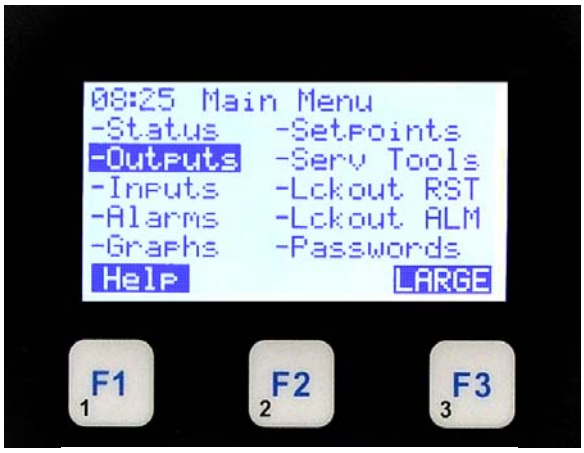
Press 'Menu'

Compressor 2 EXV or LLS

- On the top line right chiller out & chiller in is displayed rounded to a whole number.
- The line also shows EXV or LLS status.
- The third line shows time in that mode.
- The display shows information for the EXV or LLS for circuit 2. If EXV the information is as follows:

-Valve % open	-Delay till next chg
-Curr Suct SH	-Slope of SH

4.13. MENU (Outputs)

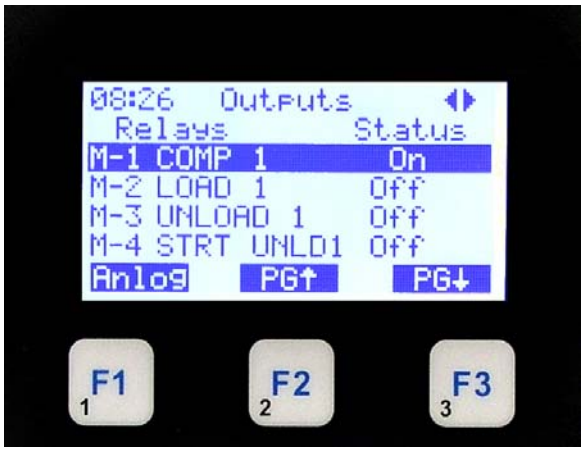


Select 'Outputs' & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Outputs.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- For a LARGE display of the current chillers performance press F3.

4.14. RELAY OUTPUTS (Status)



To scroll right Press ►

Relay Outputs Status

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays and their status.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

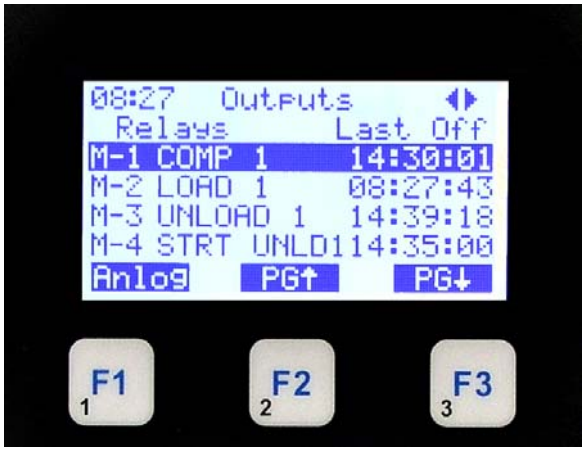
4.15. RELAY OUTPUTS (Last ON)

To scroll right Press ►

Relay Last On

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & last time turned on.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.16. RELAY OUTPUTS (Last Off)



To scroll right Press ►

Relay Outputs Last Off

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & last time turned off.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

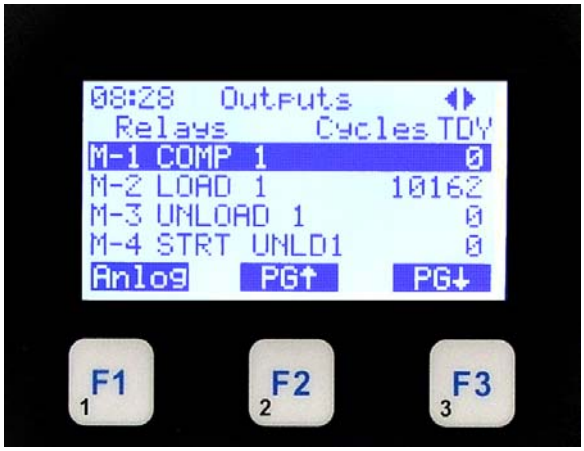
4.17. RELAY OUTPUTS (Run TDY)

To scroll right Press ►

Relay Outputs Run TDY

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & run time today.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.18. RELAY OUTPUTS (Cycles TDY)



To scroll right Press ►

Relay Outputs Cyclt TDY

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & cycles today.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

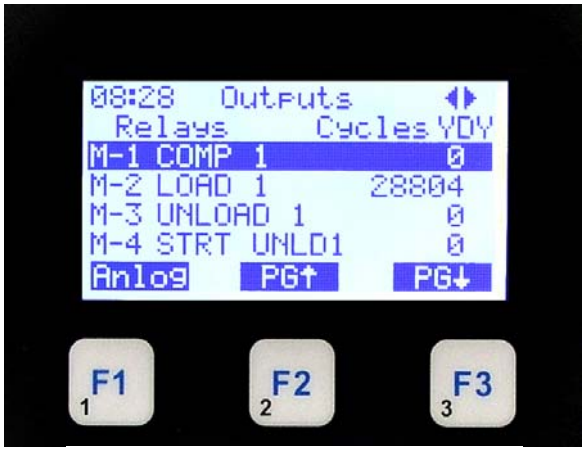
4.19. RELAY OUTPUTS (Run YDY)

To scroll right Press ►

Relay Outputs Run YDY

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & run time yesterday.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.20. RELAY OUTPUTS (Cycles YDY)

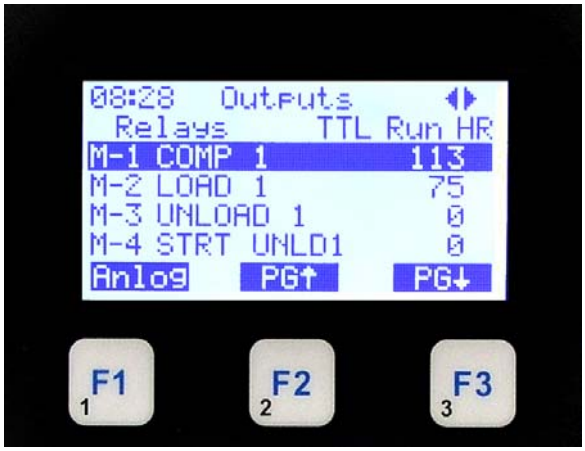


To scroll right Press ►

Relay Outputs Cycles YDY

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & cycles yesterday.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.21. RELAY OUTPUTS (TTL Run HR)

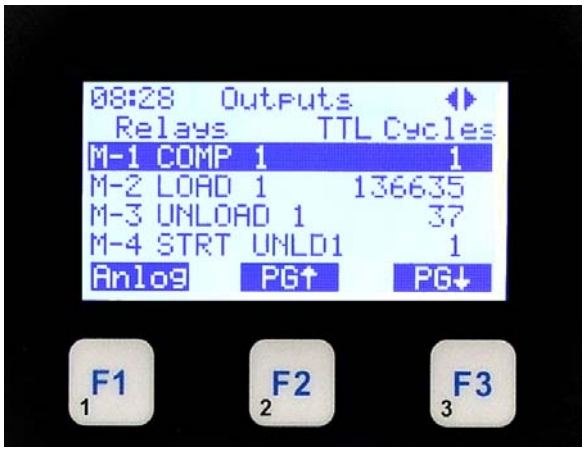


To scroll right Press ►

Relay Outputs TTL Run HR

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & total run hours.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.22. RELAY OUTPUTS (TTL Cycles)

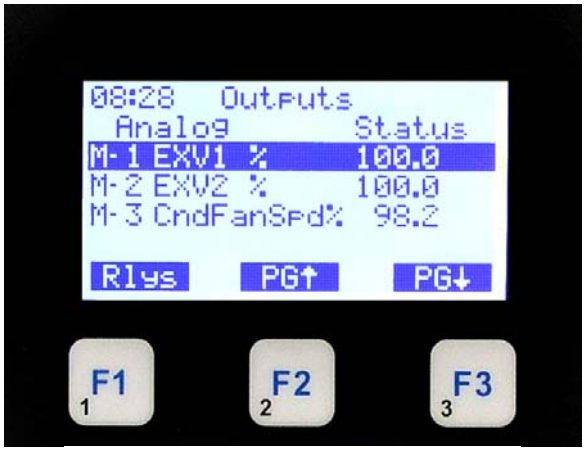


Select F1 for Anlog

Relay Outputs TTL Cycles

- On the top line shows Outputs & ◄► which allows you to move screen left to right.
- The second line shows column headings.
- The third through sixth line shows up to four relays & total cycles.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Analog outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.23. ANALOG OUTPUTS (Status)

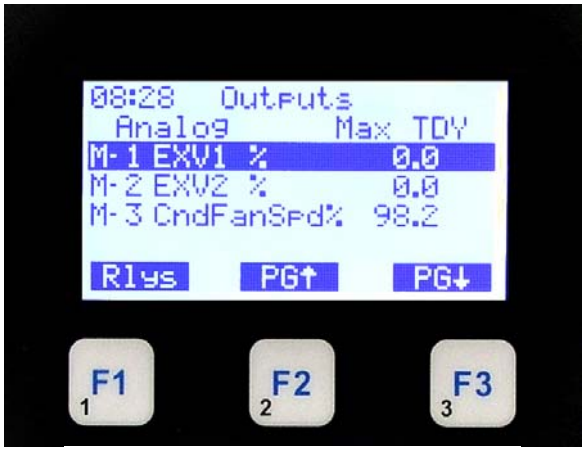


To scroll right Press ►

Analog Outputs Status

- On the top line shows Outputs.
- The second line shows column headings.
- The third through fifth line shows up to four analog outputs.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.24. ANALOG OUTPUTS (Max TDY)

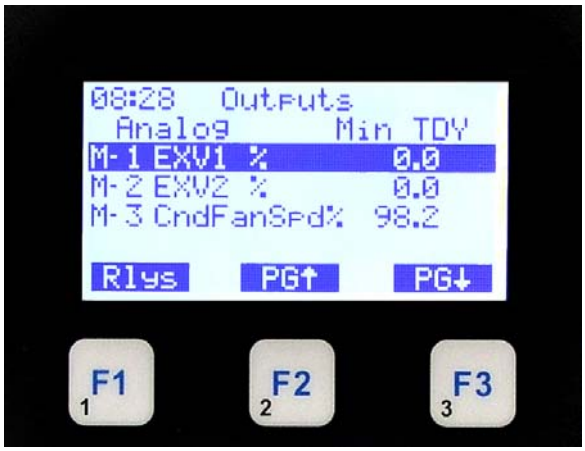


To scroll right Press ►

Analog Outputs Max TDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four relays & max value today.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.25. ANALOG OUTPUTS (Min TDY)

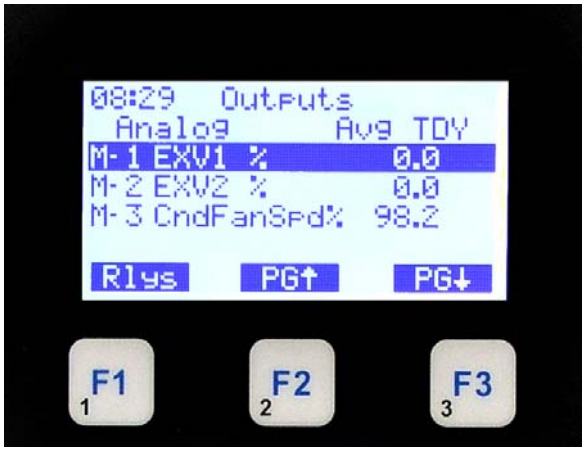


To scroll right Press ►

Analog Outputs Min TDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four analog outputs & minimum value seen today.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.26. ANALOG OUTPUTS (Avg TDY)

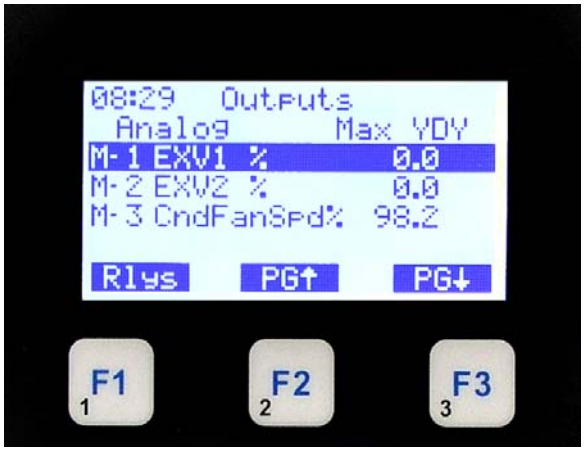


To scroll right Press ►

Analog Outputs AVG TDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four analog outputs & average value today.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.27. ANALOG OUTPUTS (Max YDY)

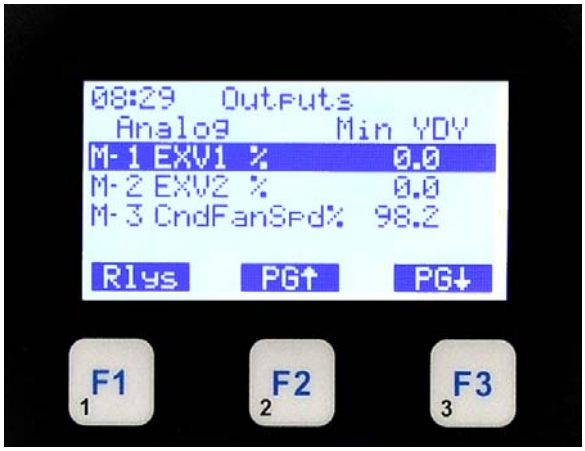


To scroll right Press ►

Analog Outputs Max YDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four analog outputs & maximum yesterday.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.28. ANALOG OUTPUTS (Min YDY)

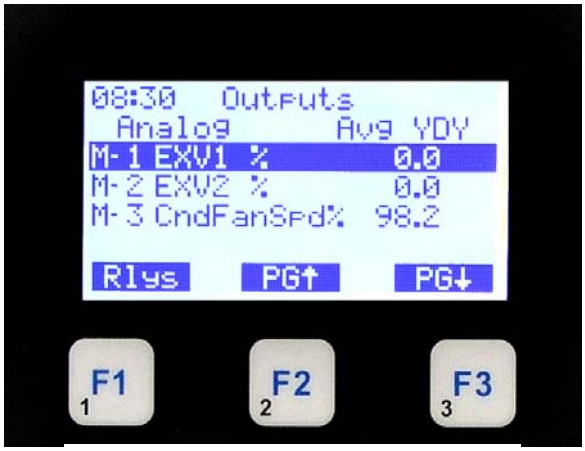


To scroll right Press ►

Analog Outputs Min YDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four relays & minimum value yesterday.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.29. ANALOG OUTPUTS (Avg YDY)

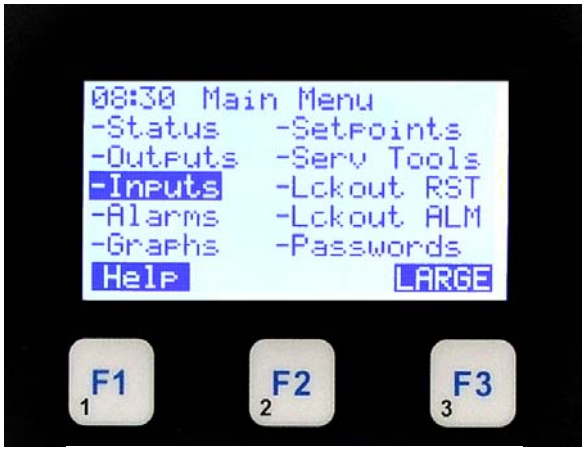


Select Menu & position to Inputs

Analog Outputs Avg YDY

- On the top line shows Outputs.
- The second line shows column headings.
- The third through sixth line shows up to four analog outputs & average yesterday.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional outputs.

4.30. MENU (Inputs)



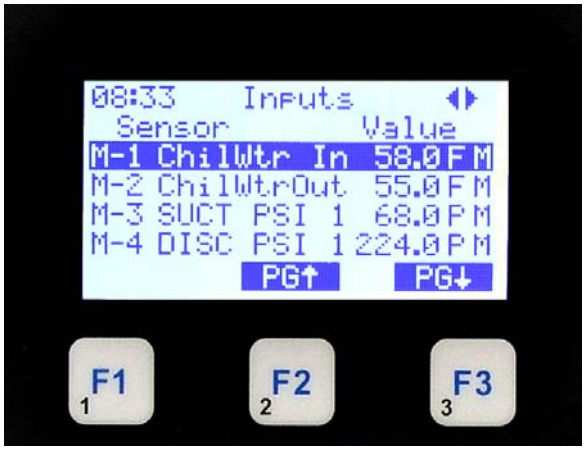
Select 'Inputs' & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Status display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.

To display the current Input Screens press the Enter Key.

4.31. SENSOR INPUTS (Value)

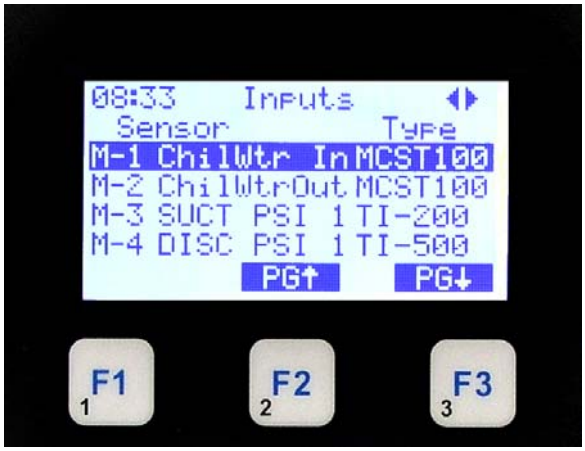


To scroll right Press ►

Sensor Inputs Value

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & their current value.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.32. SENSOR INPUTS (Type)

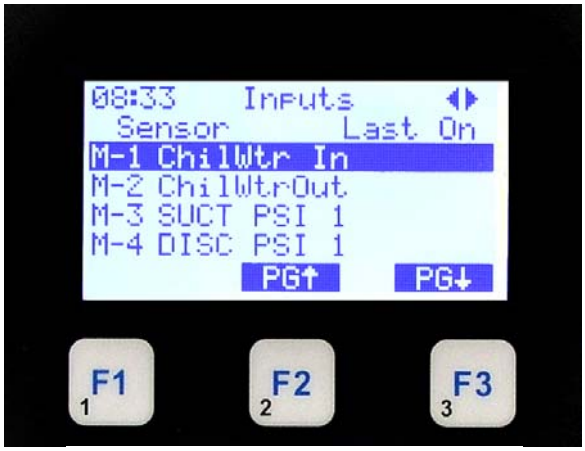


To scroll right Press ►

Sensor Inputs Type

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & the sensor type.
- The bottom line shows function keys with current values.
- Pressing F1 moves you to Relay Outputs.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.33. SENSOR INPUTS (Last on)

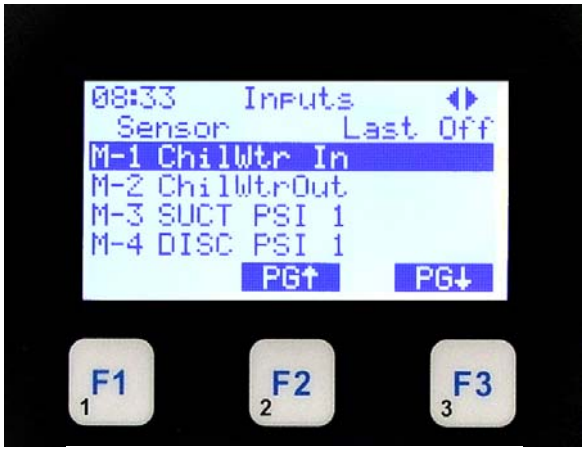


To scroll right Press ►

Sensor Inputs Last On

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & Last On. (If Digital).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.34. SENSOR INPUTS (Last Off)

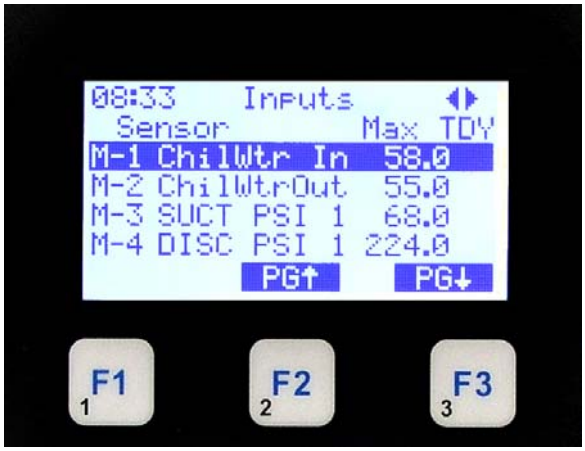


To scroll right Press ►

Sensor Inputs Last Off

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & Last Off. (If Digital).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.35. SENSOR INPUTS (Max TDY)

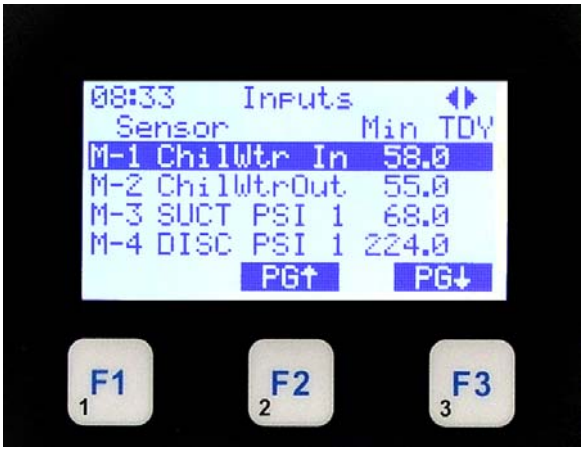


To scroll right Press ►

Sensor Inputs Max TDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & Maximum value today. (If analog).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.36. SENSOR INPUTS (Min TDY)

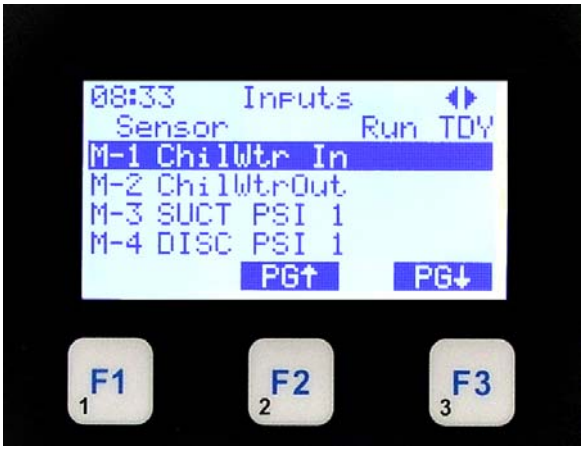


To scroll right Press ►

Sensor Inputs Min TDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor outputs & Minimum today. (If analog)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.37. SENSOR INPUTS (Run TDY)

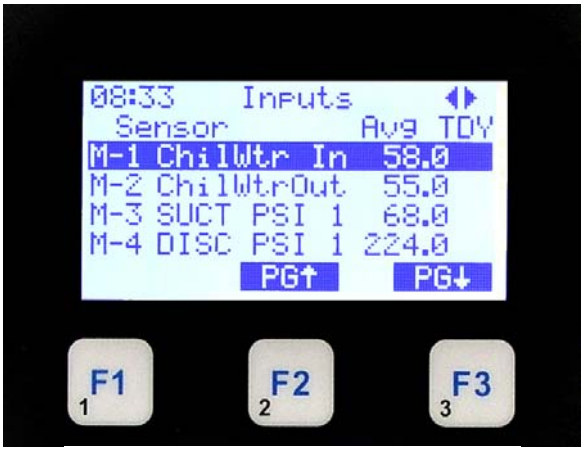


To scroll right Press ►

Sensor Inputs Run TDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & run hours today. (If Digital)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.38. SENSOR INPUTS (AVG TDY)

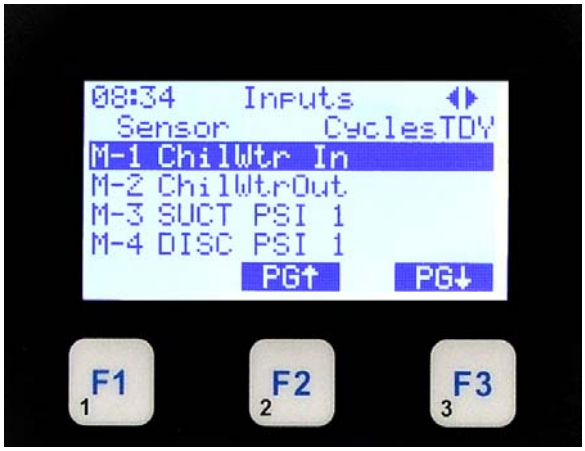


To scroll right Press ►

Sensor Inputs Avg TDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & average today. (If analog).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.39. SENSOR INPUTS (Cycles TDY)

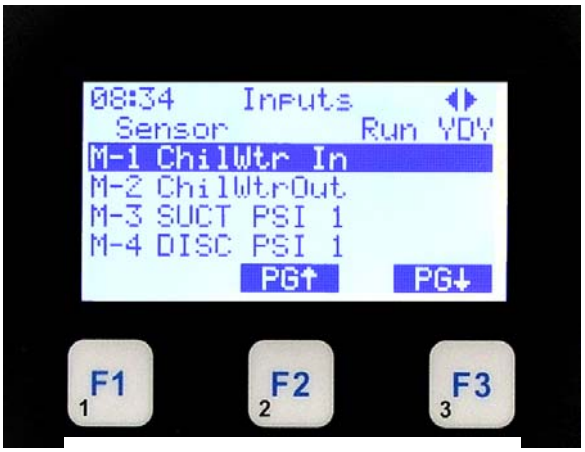


To scroll right Press ►

Sensor Inputs Cycles TDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & cycles today. (If digital).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.40. SENSOR INPUTS (Run YDY)

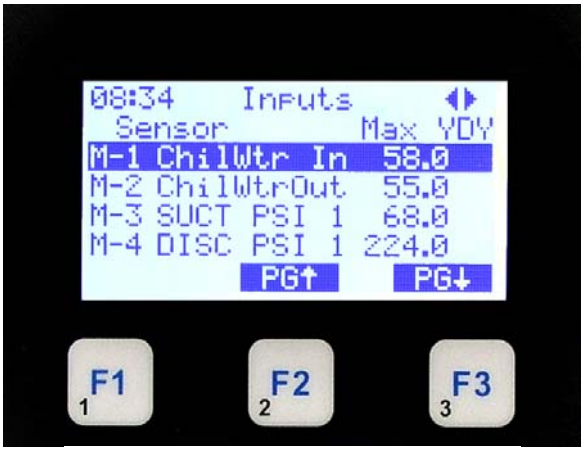


To scroll right Press ►

Sensor Inputs Run YDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & run yesterday. (If digital).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.41. SENSOR INPUTS (Max YDY)

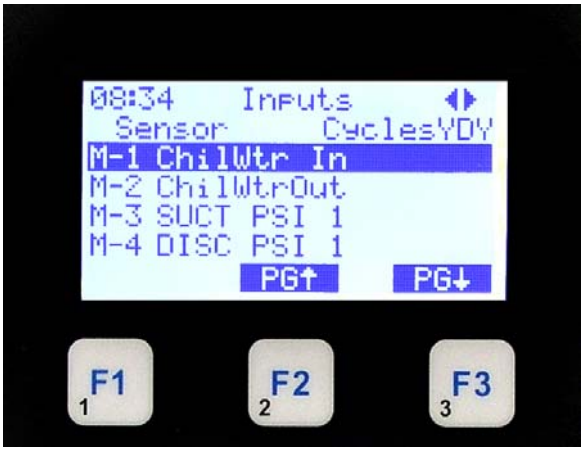


To scroll right Press ►

Sensor Inputs Max YDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & maximum yesterday. (If analog).
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.42. SENSOR INPUTS (Cycles YDY)

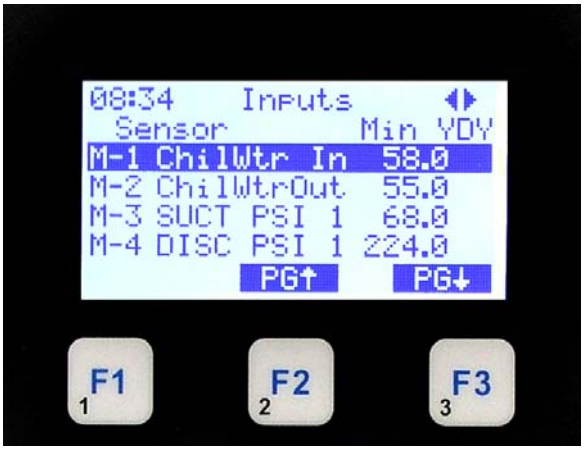


To scroll right Press ►

Sensor Inputs Cycles YDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & cycles yesterday. (If analog)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.43. SENSOR INPUTS (Min YDY)

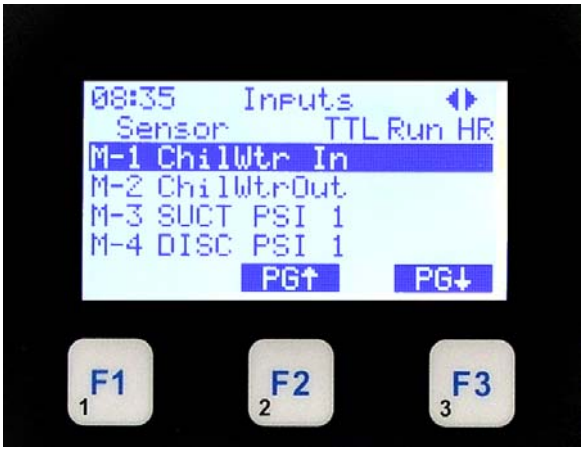


To scroll right Press ►

Sensor Inputs Min YDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & minimum yesterday. (If analog)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.44. SENSOR INPUTS (TTL Run HR)

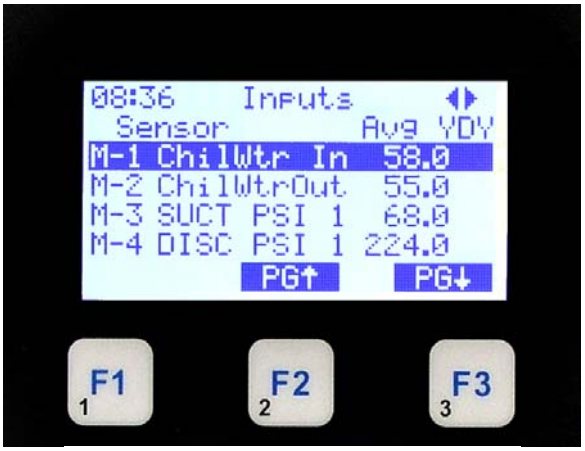


To scroll right Press ►

Sensor Inputs TTL Run HR

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & total run hours. (If digital)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.45. SENSOR INPUTS (Avg YDY)

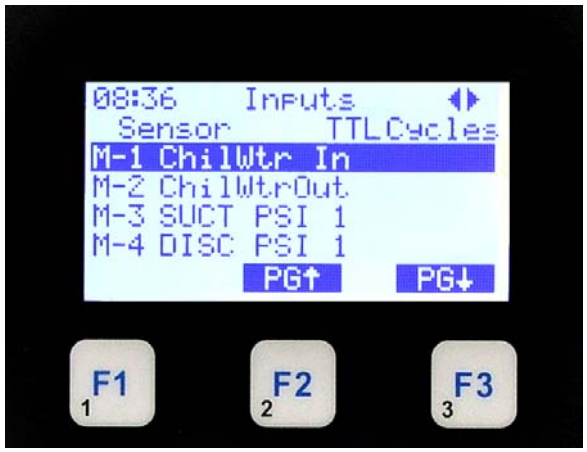


To scroll right Press ►

Sensor Inputs Avg YDY

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & average for yesterday. (If analog)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.46. SENSOR INPUTS (TTL Cycles)

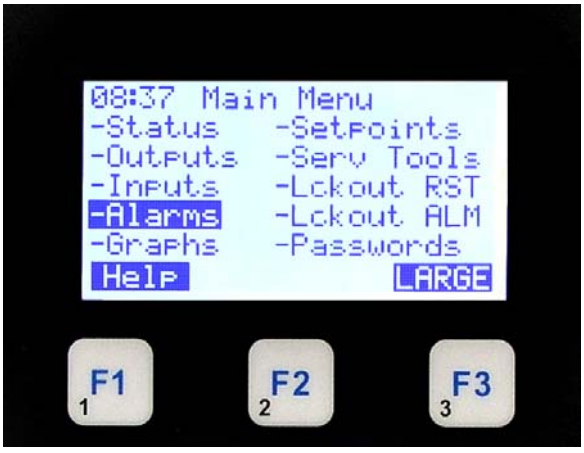


Select Menu & Press ↲

Sensor Inputs TTL Cycles

- On the top line shows Inputs.
- The second line shows column headings.
- The third through sixth line shows up to four sensor inputs & total cycles. (If digital)
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down for additional inputs.

4.47. MENU (Alarms)

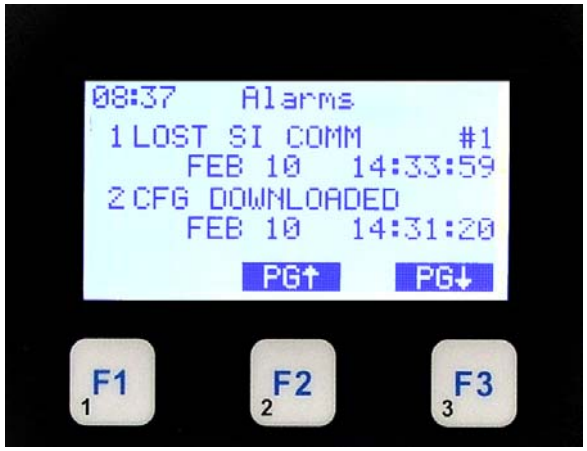


Select Alarms & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Status display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Alarm Screens press the Enter Key.

4.48. ALARMS

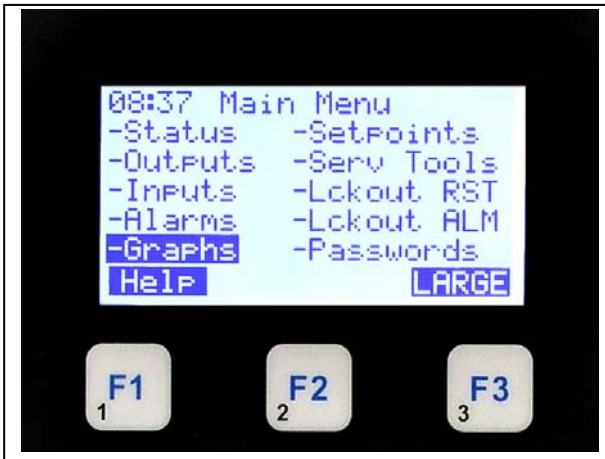


Select Menu & Press ↲

Alarms

- On the top line shows Alarms.
- The second and third line show the information for the first alarm .
- The third and fourth line show the information for the second alarm.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down the additional alarms.

4.49. MENU (Graphs)

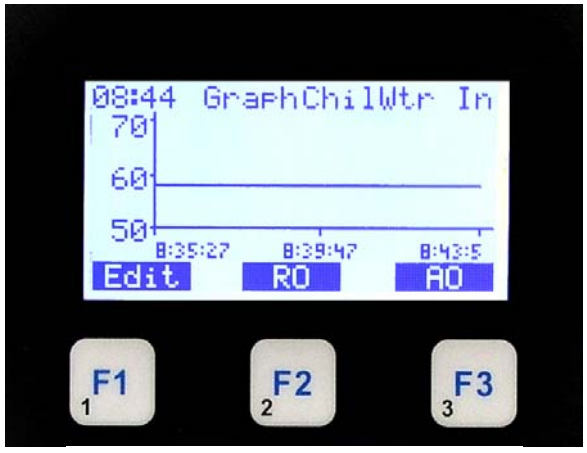


Select Menu & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Status display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Graphs Screens press the Enter Key.

4.50. GRAPHS (Relay or Sensor)

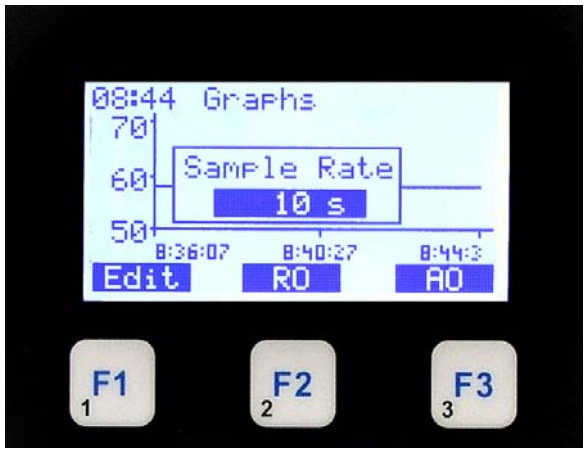


Select Function F1

Graphs Relay or Sensor

- On the top line shows Graph and Sensor being displayed.
- The next lines layout the graph based on the scale required.
- At the bottom of the graph the graph time frame is shown.
- Pressing F1 displays sample time for editing
- Pressing F2 or F3 selects relays or analog outputs for display.

4.51. GRAPHS (Edit)

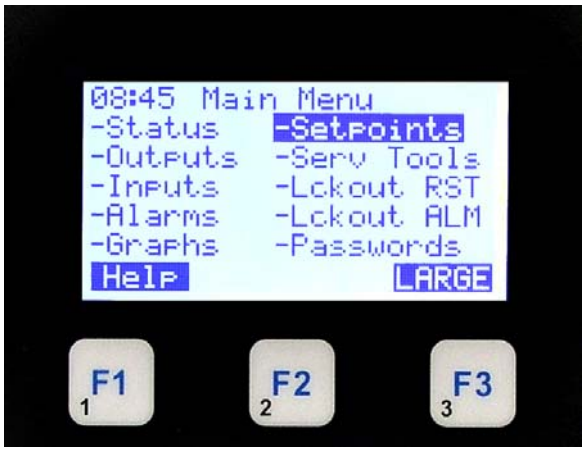


Select Menu & Press ↲

Graphs (Edit)

- The background shows the graph.
- The pop up window shows the current sample rate.
- By pressing ↲ you may change the sample time.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.52. MENU (Setpoints)



Select Menu & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Setpoints display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Setpoints Screens press the Enter Key.

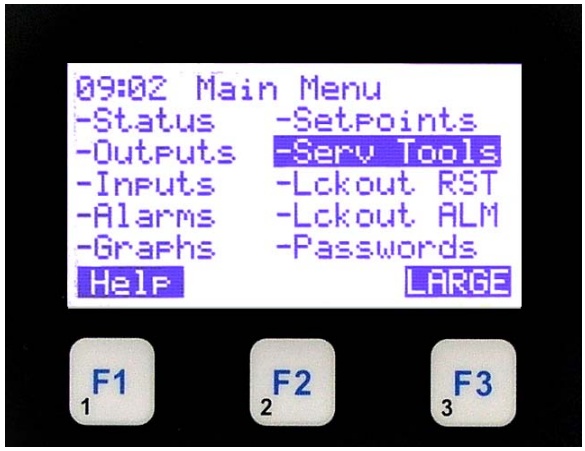
4.53. SETPOINTS (Value)

Select Menu & Press ↲

Setpoints Value

- The top line shows Setpoints & ◄► which allows you to move screen to left or right.
- The second line shows column headings.
- The third through sixth line shows up to four setpoints & their current value.
- Pressing F2 or F3 pages the current screen up or down the current selection
- Setpoints are displayed based on authorization level.

4.54. MENU (Serv Tools)

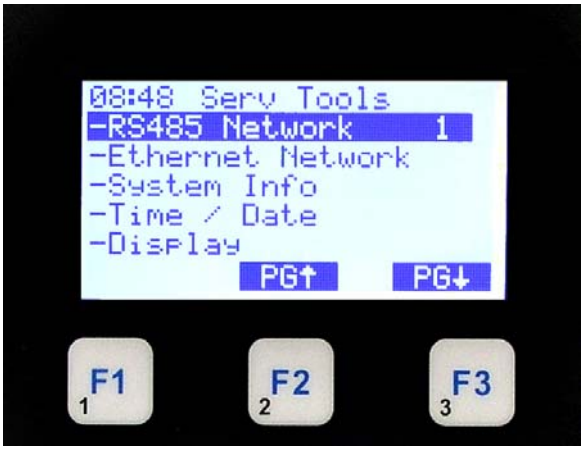


Select Serv Tools & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Serv Tools display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Serv Tools Screens press the Enter Key.

4.55. SERVICE TOOLS (RS485 Network)

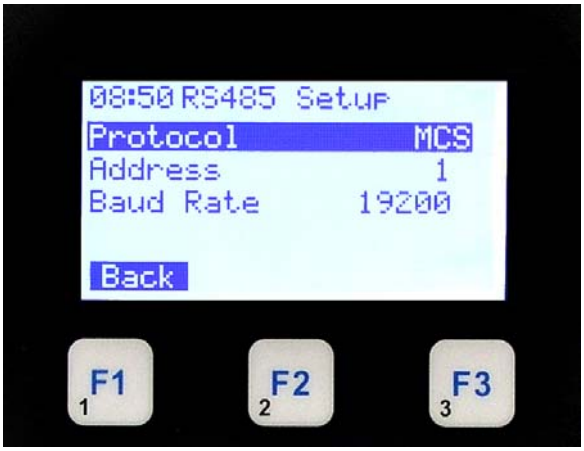


Select RS485 Network & Press ↲

RS485 Network

- The top line shows Service Tools.
- The next 5 lines identify the first five options available under Service Tools.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.56. SERVICE TOOLS (RS485 Setup)

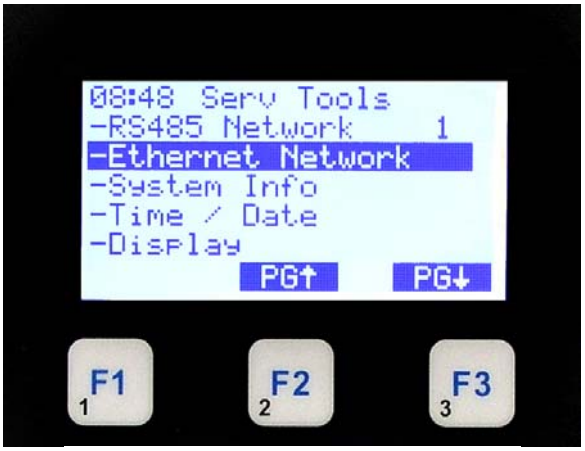


Press F1 (Back)

RS485 Setup

- The top line shows RS485 Setup
- The next 3 lines identify the current protocol, current address & the current baud rate.
- The bottom line shows function keys with current values.
- Pressing F1 takes you back to the previous screen.

4.57. SERVICE TOOLS (Ethernet Network)

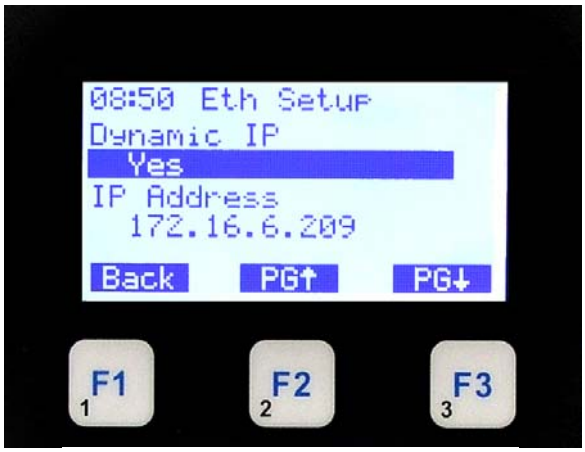


Select Ethernet Network & Press ↲

Ethernet Network

- The top line shows Service Tools.
- The next 5 lines identify the first five options available under Service Tools.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.58. SERVICE TOOLS (Ethernet Setup)



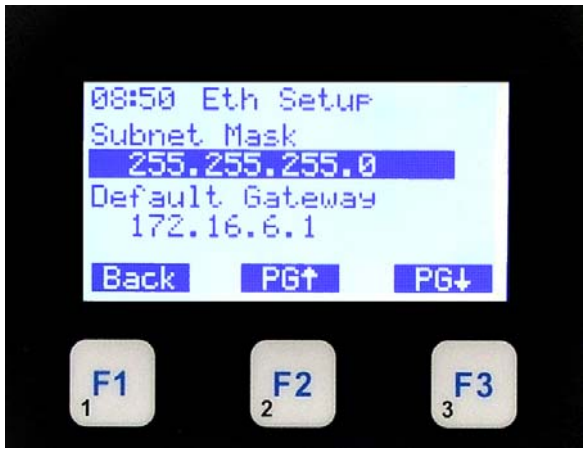
Select F3 to Page Down ↓

Ethernet Setup

- The top line shows Eth Setup.
- The next 4 lines identify the following:

  -Dynamic IP = YES or NO
  -IP Address
- The bottom line shows function keys with current values.
- Pressing F1 backs up to Serv Tools.
- Pressing F2 or F3 pages the current screen up or down.

4.59. SERVICE TOOLS (Subnet Mask)



Select F3 to Page Down ↓

Ethernet Setup Subnet Mask

- The top line shows Eth Setup.
- The next 4 lines identify the Subnet Mask & the Default Gateway.
- Pressing F1 takes you back to the previous screen.
- Pressing F2 or F3 pages the current screen up or down the current selection.

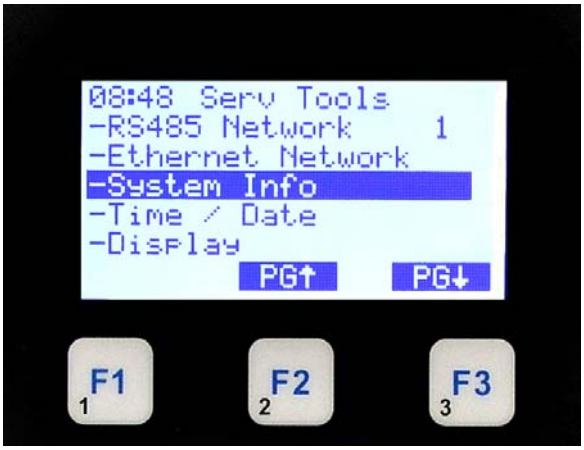
4.60. SERVICE TOOLS (MCS Port)

Select F1 Back

Ethernet Setup MCS Port

- The top line shows Eth Setup.
- The next 4 lines identify the first MCS Port address & then back to the beginning.
- The bottom line shows function keys with current values.
- Pressing F1 takes you back to service tools.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.61. SERVICE TOOLS (System Info)

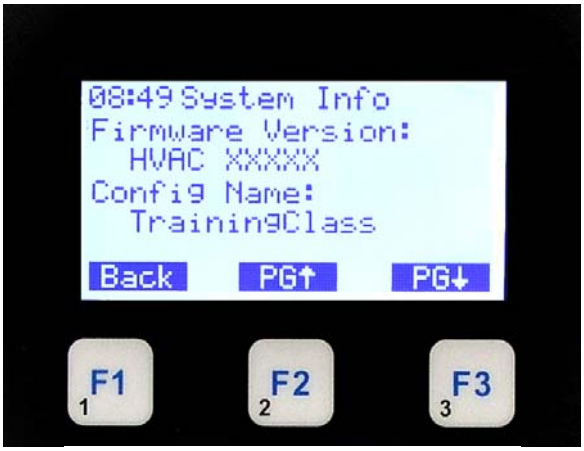


Select System & Press ↲

Service Tools System Info

- The top line shows Service Tools.
- The next 5 lines identify five options available under Service Tools.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.62. SERVICE TOOLS (Firmware & Cfg)

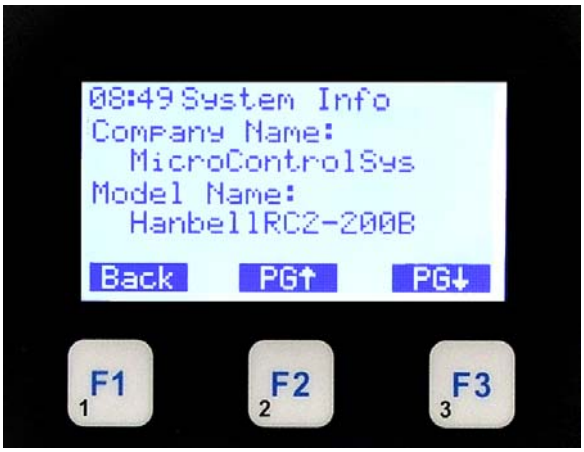


Press F3 PG↓

System Info Firmware & Cfg

- The top line shows System Info.
- The next 4 lines identify the Firmware Version & the Config name.
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.63. SERVICE TOOLS (Company name & Model #)

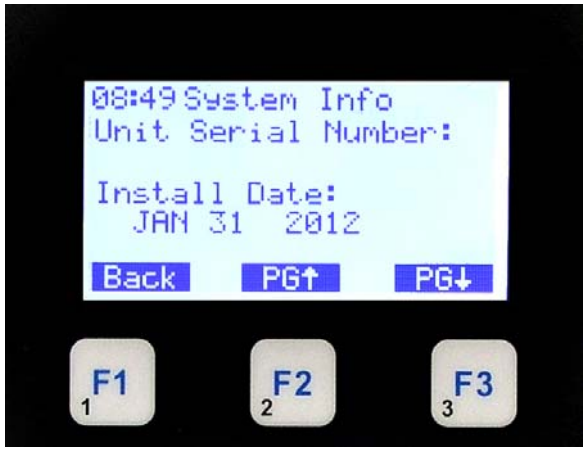


Press F3 PG↓

System Info Company name & model #

- The top line shows System Info.
- The next 2 lines identify the Company name
- The following 2 lines identify the model number..
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.64. SYSTEN INFO (Unit Serial Number & Install Date)

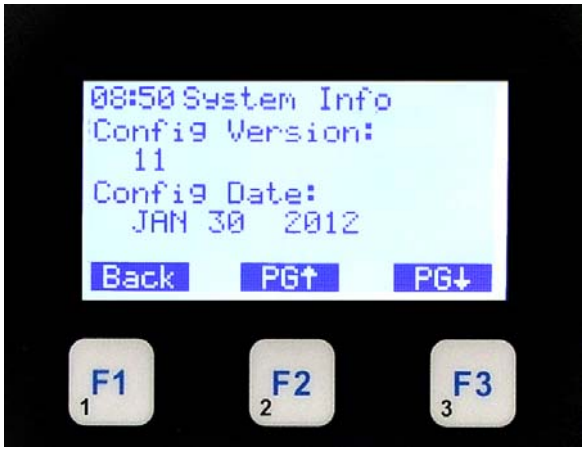


Press F3 PG🡻

System Info Unit serial number & Install Date

- The top line shows System Info.
- The next 2 lines identify the unit serial number.
- The following 2 lines identify the install date.
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info.
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.65. SYSTEM INFO (Config Version & Date)

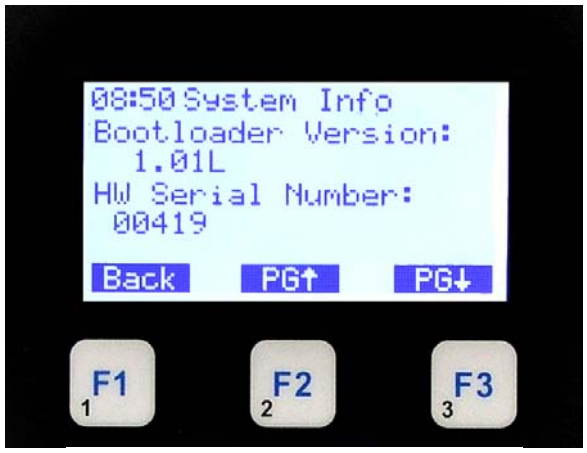


Press F3 PG🡻

System Info Config Version & Date

- The top line shows System Info.
- The next 2 lines identify the Config version
- The following 2 lines identify the Config date..
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.66. SYSTEM INFO (Bootloader & HW Serial Number)

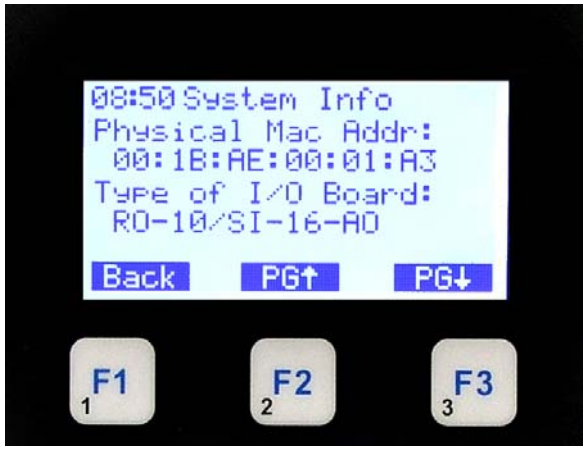


Press F3 PG 🡻

System Info Bootloader & HW Serial Number

- The top line shows System Info.
- The next 2 lines identify the Bootloader version & the following 2 lines identify the hardware serial number.
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.67. SYSTEM INFO (Phy Mac Addr & I/O Types)



Select F1 Back

System Info Physical Mac Address & Type I/O

- The top line shows System Info.
- The next 2 lines identify the Physical MAC address & the following 2 lines identify the type of I/O boards used.
- The bottom line shows function keys with current values.
- Pressing F1, Back function, moves you back to System Info
- Pressing F2 or F3 pages the current screen up or down the current selection.

4.68. SYSTEM INFO (Display)

Select Display & Press ↲

Service Tools Display

- The top line shows Service Tools.
- The next 5 lines identify five options available under Service Tools.
- The bottom line shows function keys with current values.
- Pressing F2 or F3 pages the current screen up or down the current selection.

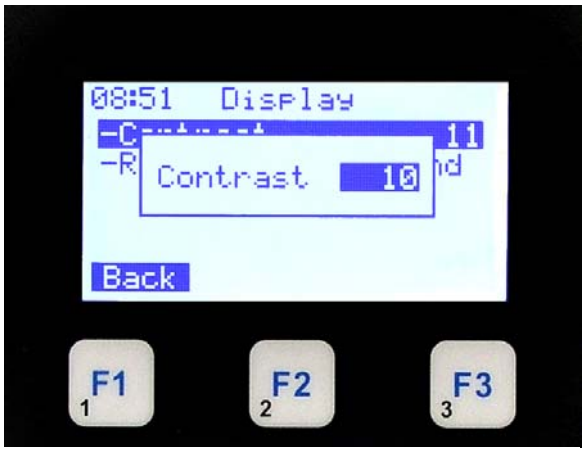
4.69. DISPLAY (Contrast &Reverse Background)

Press ↲ to change contrast

Display Contrast & Reverse Background

- The top line shows Display.
- The next line allows changing the contrast.
- The following line allows reversing the background from light to dark or dark to light.
- Pressing F1 allows you to go back to the Serv Tools menu.

4.70. DISPLAY (Contrast)

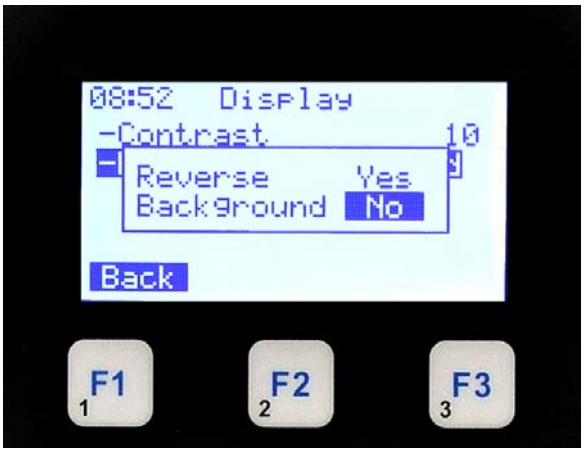


Press ▲ or ▼ to change contrast then ↲

Display Change Contrast

- The top line shows Display.
- Select item to change. (Contrast)
- The pop up box shows current contrast level..
- Use ▲ or ▼ to adjust.
- Press ↲ to change.

4.71. DISPLAY (Reverse Background)



Press ▲ or ▼ to position Yes or No then ↲

Display Reverse Background

- The top line shows Display.
- Select item to change. (Reverse Background)
- The pop up box asks if to want to reverse background.
- Use ▲ or ▼ to select.
- Press ↲ to change.

4.72. DISPLAY (Background Reversed)

Select Menu Key

Display Background Reversed

- The top line shows Display.
- The background is now reversed from light to dark.
- Use F1 (Back) to return to Service Tools sub menu.

4.73. MENU (Lockout Reset)

Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Lckout RST display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Lckout RST press the Enter Key.

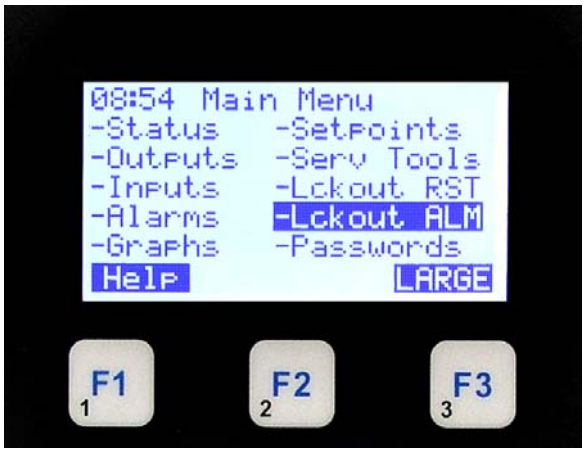
4.74. LOCKOUT RESET (Reset)

Select Menu Key

Lockout Reset

- The top line shows Main Menu.
- The pop up window displays Lockout Reset Yes or NO..
- If there are no current lockouts the response will be No Current Lockouts.
- Using the ▼ or ▲ arrows select your response then press ↲.
- The system is set for a limited number of resets per day to avoid damage.

4.75. LOCKOUT ALARM



Select Lckout ALM & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Lckout RST display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Lckout ALM press the Enter Key.

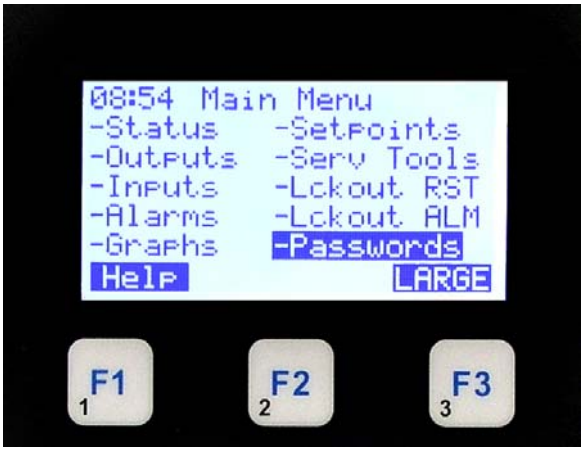
4.76. DISPLAY (Lokout ALM)

Press Menu Key

Lockout Alarm

- The top line shows Lckout ALM.
- The next display will show the 1st alarm which caused a lockout. If there are no lockout alarms this message will be displayed.
- Select next potion

4.77. MENU (Password)



Select Passwords & Press ↲

Pressing the Menu Key

- Results in displaying the 10 available Menu items. The highlight is on the Lckout RST display.
- To select any item use the ▲ ▼ ◄ ► arrow keys to position the highlight and press ↲.
- To understand the options select F1 for help.
- To display the current Lckout ALM press the Enter Key.

4.78. PASSWORDS (Enter Format)

Input Password

Passwords Enter Format

- The top line shows Password.
- The bottom functions show the value of the function keys..
- There are 4 levels of passwords as follows:

  -View -Service

  -Supervisor -Factory
- Enter a 4 character password and press ↲.

4.79. PASSWORDS (After Entering)

After Entering Password Press ↲

After Entering Password

- The top line shows Password.
- The *'s show characters entered.
- Only 1 through 8 numbers are available from the keypad..

4.80. PASSWORDS (Results)

Press Menu Key

Password Results

- The top line shows Password.
- The next line displays the authorization level.
- Press the Menu key to continue..

How to Connect to a Computer with MCS-Connect

Connecting via Ethernet Cable

Equipment Needed:

1. **PC**
2. **Straight Ethernet Cable for a Building Network or Crossover Ethernet Cable for PC to Magnum.**

● For Microsoft Windows 7:

1. At your desktop, left click on **Start** ball.
2. Left click on **Control Panel** button.
3. Double left click on **Network and Sharing Center** icon.
4. Left click **Change Adapter Settings** on the left side of the screen.
5. Right click the connection that you want to change (Local Area Connection) and select **Properties** from the dropdown menu.
6. Under **This connection uses the following items**, left click Internet Protocol Version 4 (TCP/IPv4).
7. Left click on **Properties** tab.
8. Select **Obtain an IP address automatically** if using a Straight ETHERNET Cable for a Building Network. Select **Use the following IP address** if using a Crossover ETHERNET Cable for PC to MCS-MAGNUM:
    a. The first three numbers of the IP address should match exactly what's on the Magnum and the last number must be different.
    b. The subnet mask and the Default Gateway should match the exact values on the magnum.

    Example of Magnum IP Settings
    1. IP Address 192.168.1.254
    2. Default Subnet Mask 255.255.255.0
    3. Default Gateway 192.168.1.1

9. Close all Windows.
10. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** ball on desktop. Left click **MCS-Connect** on Start Menu.
11. Left click on **Setup** tab.
12. Left click on **Options** tab.
13. Under **Network** tab, select the **Available Network Interface**, and select **Local** as the connection type.
14. Left click on **Save** button.
15. Left click on **OK** button.
16. Left click on **Local Ethernet** button to scan for microprocessor when connected.
17. If this does not find the microprocessor, click on disconnect and click IP(Internet). Enter the IP address of the Magnum and click Remote/Connect.

● For Microsoft XP:

1. At your desktop, left click on **Start** button.
2. Left click on **Control Panel** button.
3. Double left click on **Network Connections** icon in Classic view. If you are in Category view, you can switch over to Classic view by left-clicking on **Switch to Classic View** on the left side of the Control Panel window.
4. Right click the connection you want to configure (Local Area Connection) and select **Properties** from the dropdown menu.
5. Left click on **General** tab.

6. Use scroll bar and left click on **Internet Protocol** (TCP/IP).
7. Left click on **Properties** tab.
8. Select **Obtain an IP address automatically** if using a Straight ETHERNET Cable for a Building Network.
   Select **Use the following IP address** if using a Crossover ETHERNET Cable for PC to MCS-MAGNUM:
   a. The first three numbers of the IP address should match exactly what's on the Magnum and the last number must be different.
   b. The subnet mask and the Default Gateway should match the exact values on the magnum.

   Example of Magnum IP Settings
   1. IP Address 192.168.1.254
   2. Default Subnet Mask 255.255.255.0
   3. Default Gateway 192.168.1.1

9. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** button on desktop. Left click **MCS-Connect** on Start Menu.
10. Left click on **Setup** tab.
11. Left click on **Options** tab.
12. Under **Network** tab, select the **Available Network Interface**, and select **Local** as the connection type.
13. Left click on **Save** button.
14. Left click on **OK** button.
15. Left click on **Local-Ethernet** button to scan for microprocessor when connected.
16. If this does not find the microprocessor, click on disconnect and click IP(Internet). Enter the IP address of the Magnum and click Remote/Connect.

Connecting via Null Modem Serial Cable

Equipment Needed:

1. **Computer**
2. **Null Modem Serial Cable**
3. **USB to Serial Converter (If Applicable)**
4. **Latest MCS-Connect program**

Connecting Null Modem Serial Cable directly to Computer:

● For Microsoft XP:

1. At your desktop, left click on **Start** button.
2. Left click on **Control Panel** button.
3. Double left click on **System** icon in Classic view. If you are in Category view, you can switch over to Classic view by left-clicking on **Switch to Classic View** on the left side of the Control Panel window.
4. Left click on **Hardware** tab.
5. Left click on **Device Manager** button.
6. Left click on (+) next to **Ports (COM & LPT)** to drop down Port information.
7. What is **Communications Port (COM #)**? This will be set in **MCS-Connect** program.
8. Close all Windows after determining the **Communications Port (COM #)**.
9. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** button on desktop. Left click **MCS-Connect** on Start Menu.
10. Left click on **Setup** tab.
11. Left click on **Options** tab.
12. Under **Communications** tab, set **LOCAL Comm. COM Port Selection** to the **Communications Port (COM #)** found on computer.
13. Left click on **Save** button.
14. Left click on **OK** button.
15. Left click on **Local-Serial** button to scan for microprocessor when connected.

● For Microsoft Windows 7:

1. At your desktop, left click on **Start** ball.
2. Left click on **Control Panel** button.
3. Double left click on **Hardware and Sound** icon.
4. Left click **Device Manager** under Devices and Printers.
5. Left click on (►) next to **Ports (COM & LPT)** to drop down Port information.
6. What is **Communication Port (COM #)**? This will be set in **MCS-Connect** program.
7. Close all Windows after determining the **Communication Port (COM #)**.
8. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** button on desktop. Left click **MCS-Connect** on Start Menu.
9. Left click on **Setup** tab.
10. Left click on **Options** tab.
11. Under **Communications** tab, set **LOCAL Comm. COM Port Selection** to the **Communication Port (COM #)** found on computer.
12. Left click on **Save** button.
13. Left click on **OK** button.
14. Left click on **Local-Serial** button to scan for microprocessor when connected.

Connecting Null Modem Serial Cable through a USB to Serial Converter to Computer:

The MCS-USB-RS232 sold through Micro Control Systems is the USB to Serial Converter that is proven to work. Other brands of USB converters may or may not work. When connecting a USB converter, you must make sure that the correct driver is installed on your computer. The driver can be found on a CD that is included with the USB to Serial Converter or can be found online.

● For Microsoft XP:

To install driver through CD included with MCS-USB-RS232:

1. Plug in **MCS-USB-RS232** to USB port on your computer.
2. Insert CD into your computer.
3. Download software.
4. Follow prompts.

To install driver found online:

1. Plug in **MCS-USB-RS232** to USB port on your computer.
2. Get connected to internet and go to www.mcscontrols.com.
3. On **Micro Control Systems** website, left click on the **Products** tab.
4. Go to **Controls** tab, left click on **Peripherals** tab.
5. Scroll down to **MCS-USB-RS232**, left click on **Click here to Download and Install the Drivers**.
6. Follow prompts.

To get connected to MCS-Connect:

1. At your desktop, left click on **Start** button.
2. Left click on **Control Panel** button.
3. Double left click on **System** icon in Classic view. If you are in Category view, you can switch over to Classic view by left-clicking on **Switch to Classic View** on the left side of the Control Panel window.
4. Left click on **Hardware** tab.
5. Left click on **Device Manager** button.
6. Left click on (+) next to **Ports (COM & LPT)** to drop down Port information.
7. What is **USB Serial Port (COM #)**? This will be set in **MCS-Connect** program.
8. Close all Windows after determining the **USB Serial Port (COM #)**.
9. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** button on desktop. Left click **MCS-Connect** on Start Menu.
10. Left click on **Setup tab.**
11. Left click on **Options** tab.
12. Under **Communications** tab, set **LOCAL Comm. COM Port Selection** to the **USB Serial Port (COM #)** found on computer.
13. Left click on **Save** button.
14. Left click on **OK** button.
15. Left click on **Local-Serial** button to scan for microprocessor when connected.

● For Microsoft Windows 7:

To install driver through CD included with MCS-USB-RS232:

1. Plug in **MCS-USB-RS232** to USB port on your computer.
2. Insert CD into your computer.
3. Download software.
4. Follow prompts.

To install driver found online:

1. Plug in **MCS-USB-RS232** to USB port on your computer.
2. Get connected to internet and go to www.mcscontrols.com.
3. On **Micro Control Systems** website, left click on the **Products** tab.
4. Go to **Controls** tab, left click on **Peripherals** tab.
5. Scroll down to **MCS-USB-RS232**, left click on **Click here to Download and Install the Drivers**.
6. Follow prompts.

To get connected to MCS-Connect:

1. At your desktop, left click on **Start** ball.
2. Left click on **Control Panel** button.
3. Double left click on **Hardware and Sound** icon.
4. Left click **Device Manager** under Devices and Printers.
5. Left click on (►) next to **Ports (COM & LPT)** to drop down Port information.
6. What is **USB Serial Port (COM #)**? This will be set in **MCS-Connect** program.
7. Close all Windows after determining the **USB Serial Port (COM #)**.
8. Double left click on **MCS-Connect** icon on desktop. If **MCS-Connect** icon isn't on desktop, left click **Start** button on desktop. Left click **MCS-Connect** on Start Menu.
9. Left click on **Setup** tab.
10. Left click on **Options** tab.
11. Under **Communications** tab, set **LOCAL Comm. COM Port Selection** to the **USB Serial Port (COM #)** found on computer.
12. Left click on **Save** button.
13. Left click on **OK** button.
14. Left click on **Local-Serial** button to scan for microprocessor when connected.

Connecting Chiller to the Internet

Introduction

You can readily access multiple MCS -Magnums over the Internet using MCS-Connect. This will require:

1. Internet Static IP
2. Router
3. Internet Connection (Internet modem)
4. Ethernet Cables

Setting Up

1. Program the router with the Internet Static IP . You will get this number from your Information Technology engineer. This is the number you will use over the Internet, with MCS-Connect to access the MCS-Magnum/s.

2. Program the router for DHCP, (Dynamic Host Configuration Protocol) starting at 192.168.1.50. This will allow you to set the router IP at 192.168.1.49 and leave 192.168.1.0 through 192.168.1.48 for MCS-Magnum static IP addresses. If any devices join this server, they will be assigned IP addresses starting with 192.168.1.50 and up.

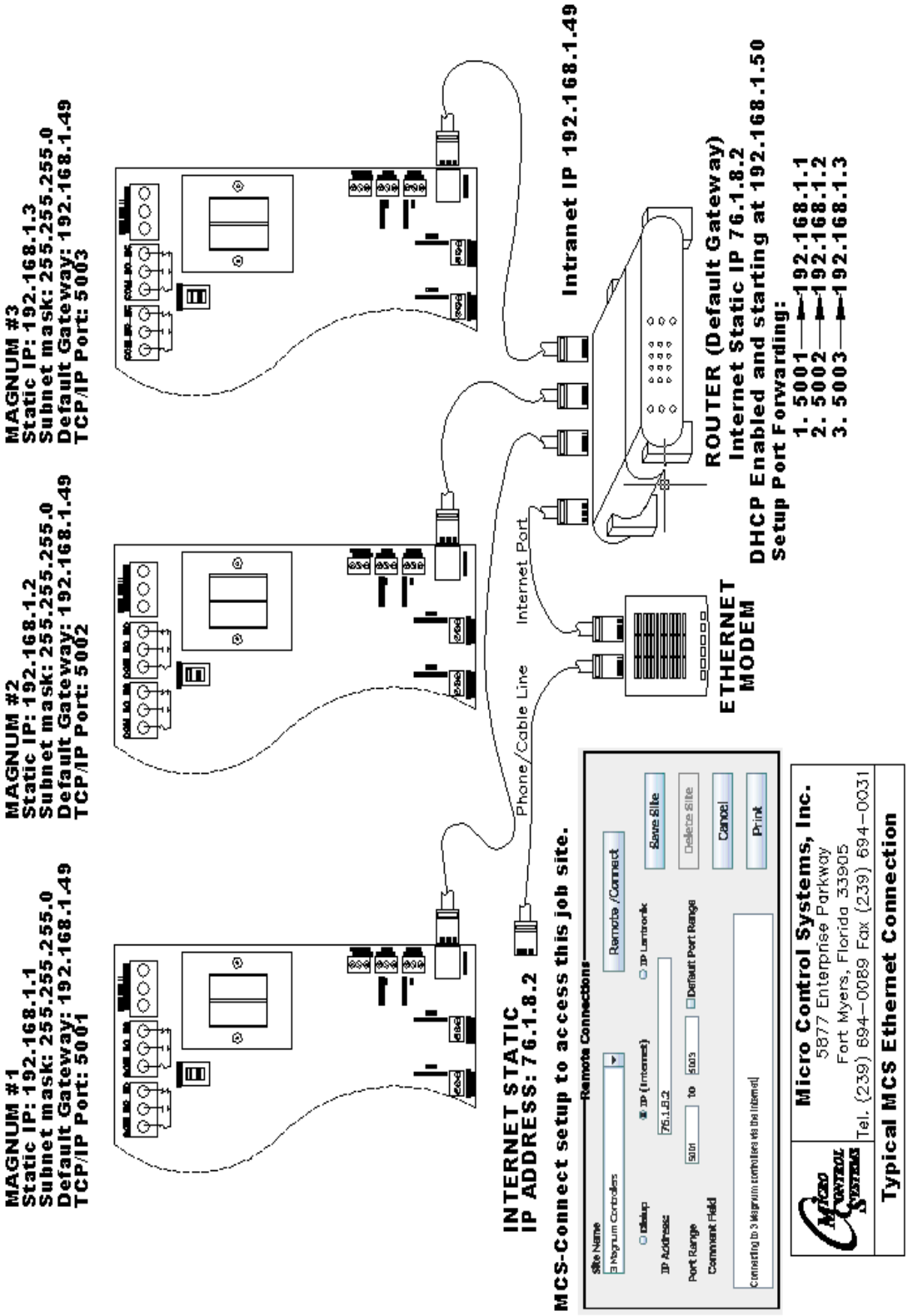
3. Program the router for Port Forwarding. The router is considered the gateway from the Internet to the MCS-Magnum controller. As long as the Default Gateway in the MCS-Magnum matches the router IP, we can now access the MCS-Magnum IP through the Port address.

   Example: 5001=192.168.1.1
   5002=192.168.1.2
   5003=192.168.1.3

4. Program the MCS-Magnum IP address and Port address.

   Example: MCS-Magnum#1=Port 5001(192.168.1.1)
   MCS-Magnum#2=Port 5002(192.168.1.2)
   MCS-Magnum#3=Port 5003(192.168.1.3)

5. Open up the MCS-Connect program and go to the Remote Connections. Click on IP(Internet) and input a Site Name, IP Address, and Port Range and click on Save Site. Next, click on Remote/Connect and select the tab of the unit you want to see.


MAGNUM #1
Static IP: 192.168.1.1
Subnet mask: 255.255.255.0
Default Gateway: 192.168.1.49
TCP/IP Port: 5001
MAGNUM #2
Static IP: 192.168.1.2
Subnet mask: 255.255.255.0
Default Gateway: 192.168.1.49
TCP/IP Port: 5002
MAGNUM #3
Static IP: 192.168.1.3
Subnet mask: 255.255.255.0
Default Gateway: 192.168.1.49
TCP/IP Port: 5003
INTERNET STATIC
IP ADDRESS: 76.1.8.2
Phone/Cable Line
Internet Port
Intranet IP 192.168.1.49
ETHERNET
MODEM
ROUTER (Default Gateway)
Internet Static IP 76.1.8.2
DHCP Enabled and starting at 192.168.1.50
Setup Port Forwarding:
1. 5001 192.168.1.1
2. 5002 192.168.1.2
3. 5003 192.168.1.3
MCS-Connect setup to access this job site.
Micro Control Systems, Inc.
5877 Enterprise Parkway
Fort Myers, Florida 33905
Tel. (239) 694-0089 Fax (239) 694-0031
Typical MCS Ethernet Connection

Transmitting Config File with MCS-Connect

1. If you are connected utilizing a Null Modem Serial Cable

1. Connect to the MCS-MAGNUM by attaching a null modem serial cable (DB9 Male to DB9 Female) to the port on the front of the MCS-MAGNUM-KEYPAD.
2. On your computer start MCS-Connect.
3. Select Local Serial as method of connection. This will bring up the MCS-MAGNUM scanning screen.
4. Select the MCS-MAGNUM you would like to connect to and click the respective tab. Wait for the tables to load.
5. Click the 

button and enter the correct authorization code (must be service level or higher). This will enable the 

button.
6. Click the 

button and navigate to the configuration file you wish to transmit in the file-chooser that pops up. (Be sure the file type is .cfg)
7. Open the configuration file and wait until it has finished transmitting.
8. You may need to rescan to find the MCS-MAGNUM after the file has been loaded.

2. If you are connected utilizing a Crossover Ethernet Cable

1. Connect to the MCS-MAGNUM through the Ethernet port on the MCS-MAGNUM or through an Ethernet switch already connected to the MCS-MAGNUM. Note your computer must be on the same network as the MCS-MAGNUM. (See app note 79).
2. On your computer start MCS-Connect
3. Select Local Ethernet as method of connection. This will bring up the MCS-MAGNUM scanning screen.
4. Select the MCS-MAGNUM you would like to connect to and click the respective tab. Wait for the tables to load.
5. Click the 

button and enter the correct authorization code (must be service level or higher). This will enable the 

button.
6. Click the 

button and navigate to the configuration file you wish to transmit in the file-chooser that pops up. (Be sure the file type is .cfg)
7. Open the configuration file and wait until it has finished transmitting.
8. You may need to rescan to find the MCS-MAGNUM after the file has been loaded.

Basic Start-up Procedure

MCS START UP

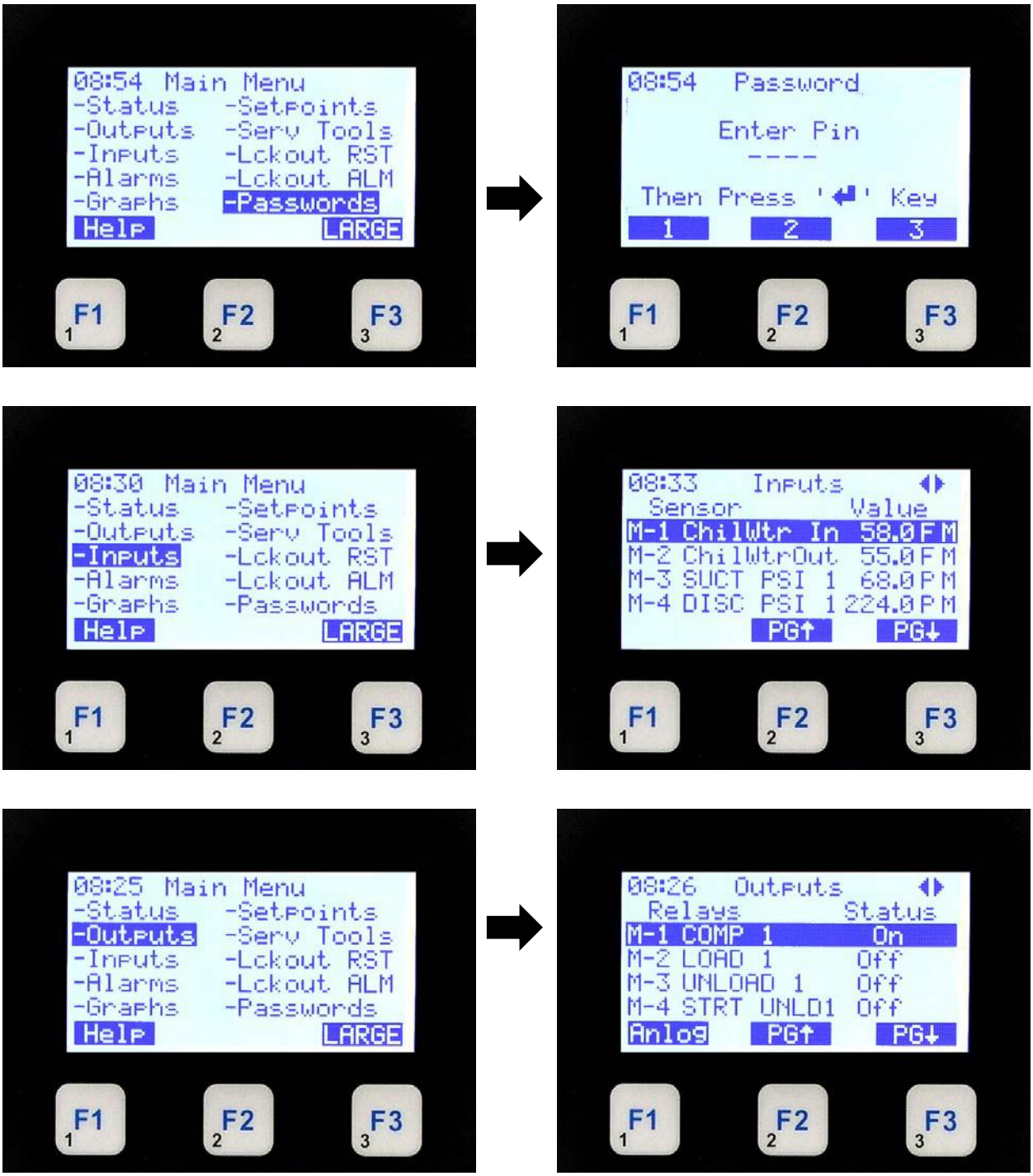
1. Equipment Installation Inspection

- ☐ Inspect incoming voltage matches nameplate voltage, and chiller disconnect per national and local codes.
- ☐ Ensure chiller has power supplied for 24 hours and the disconnect switch is ON.
- ☐ Inspect installation of equipment mounting, piping, and wiring for completion.
- ☐ Inspect chiller location is **free from overhangs and at least 3 feet from any wall or fence**.
- ☐ Inspect chiller fluid level is full and free of air.
- ☐ Check glycol freeze point and log into chart.
- ☐ Tighten all Schrader valve cores and liquid line solenoid bodies.
- ☐ Open receiver ball valves to release the refrigerant into the system and tighten packing nut (If applicable).
- ☐ Leak check the refrigerant circuit with an electronic leak detector.
- ☐ Tighten all electrical connections in the control panel, microprocessor and other controls.

******The Chiller can be started via Keypad or Laptop. If using Laptop, call Drake******

2. Chiller Operation (Via Keypad)

1. Refer to the Magnum chiller manuals for Sequence of Operation and Magnum Keypad display.



2. Go to the Main Menu ---go to **Passwords**---tab and enter **2112** for Supervisor level access
3. Go to the Inputs menu ---use ‘F3’ to page down to **‘Run/Stop’** (usually M-15)---set to ‘**MANOFF’**
4. Use the down arrow to page down to **‘Emg/Stop’** (usually M-16)---set to ‘**MANOFF’**

5. Go to the Main Menu ---go to **Lckout RST**---hit return to perform a 'lockout reset'

6. Inspect pump overload settings and this should match the SFA rating on the pump labels (IF Applicable). Confirm am
7. Go to the Main Menu ---go to **Outputs** --- Test all components (aside from the compressor(s)). Follow steps a) to d) below.
    a) Turn the pump(s) to '**MANON'**. Confirm the phase and proper rotation, Zip-Tie use is recommended. The motor fan should be turning clock-wise when looking from the back.
    b) To test individual components, arrow down to the components to highlight. Change the status from OFF to '**MANON'** in order to manually turn the component on (Liq Sol, Cond Fans etc.).
    c) Ensure that the components (e.g. Liquid Line Solenoid Valve) are powered and operating correctly.
    d) Reset components back to **'AUTO'** and repeat steps a) to c) for all components (except the compressor(s))
8. Once complete, ensure the liquid line solenoid 1 (LLS 1), compressor 1 (COMP 1), condenser fan motor 1 (COND 1), pumps and all other outputs for CIRCUIT #1 are set to '**AUTO**'.
9. **For 2 or more circuits ensure that COMP 2 (3, 4, 5 etc.) is set to 'MANOFF'**
10. Go to the Inputs menu ---use 'F3' to page down to **'Run/Stop'** (usually M-15)--- set to '**MANON'**
11. Any questions at this point call Drake Tech Support 215-638-5515
12. Compressor #1 should start in 60 seconds.
13. **Check compressor rotation (for 3-Phase)**, condenser fan operation, chiller pressures and temperatures and allow unit to run.
14. Fill in the Log Sheet
15. For dual compressor chillers (if applicable).
    a) Once complete testing of circuit #1 disable the Run/Stop by using the same procedure as before to set the Run/Stop input to '**MANOFF'**

b) Wait for circuit #1 to pump-down and turn off
c) **From the Outputs set COMP 1 to 'MANOFF'**
d) Ensure the liquid line solenoid 2 (LLS 2), compressor 2 (COMP 2), condenser fan motor 2 (COND 2), pumps and all other outputs for CIRCUIT #2 are set to **'AUTO'**
e) Enable the Run/Stop by using the same procedure as before to set the Run/Stop input to '**MANON'**
f) Compressor #2 should start in 60 seconds
g) Repeat for more compressors

16. Complete Log Sheet.
17. Confirm to **'Run/Stop'** is set to '**MANON'** and **'Emg/Stop'** is set to **'MANOFF'**
18. Confirm everything else is in **'AUTO'** when done with the unit.

Log Sheet (Motors, Elements, etc.)								
ID Information	Amp Readings				Voltage Readings			
Motor/Element Name	**L1**	**L2**	**L3**	***NP**	**L1-L2**	**L1-L3**	**L2-L3**	***NP**
Compressor 1								
Compressor 2								
Condenser Fan 1								
Condenser Fan 2								
Condenser Fan 3								
Condenser Fan 4								
Recirc. Pump								
System Pump								
Receiver Heater 1								
Receiver Heater 2								
Liquid Solenoid 1								
Liquid Solenoid 2								
*NP=Name Plate								
Glycol Freeze Point :								

Troubleshooting

Troubleshooting Quick Reference

(A more detailed troubleshooting guide is available on our website: *www.MCScontrols.com*)

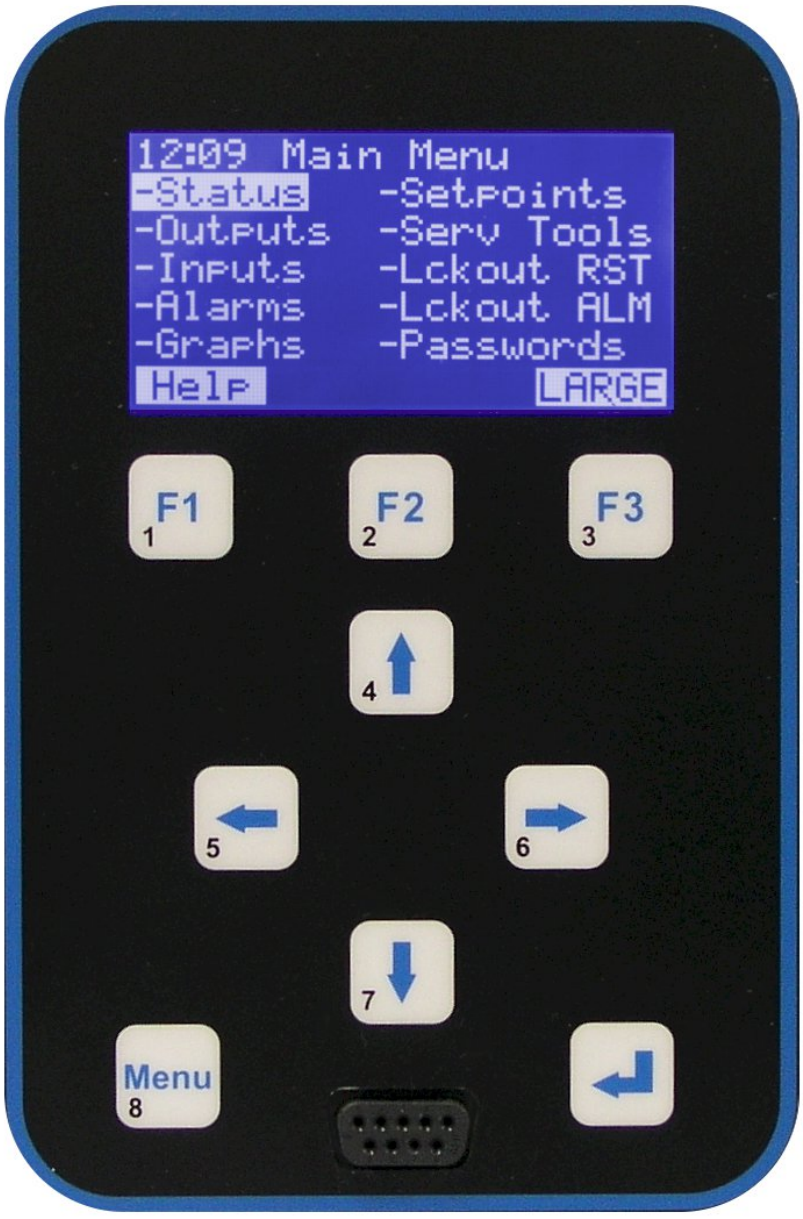
PROBLEM	POTENTIAL SOLUTION
No Sensor + 5 vdc or sensor +5 vdc output is less than 4.90 vdc.	Indicates a possible shorted input sensor ■ Remove all sensor terminal blocks. ■ Wait about 30 to 60 seconds. If + 5 vdc returns, replace one sensor wire at a time until the + 5 vdc is lost again. This will be the shorted sensor.
A Sensor Input reads -99.9	This indicates an open Sensor Input signal or 5 VDC problem. ■ Check sensor wiring for missing wire or poor connection. ■ Check for faulty sensor. ■ Check + 5 vdc on Sensor Input to ground. If less than 5 VDC is on the sensor 5 VDC terminal block, the problem is with probably a shorted sensor. (A poly fuse protects the board) ■ Remove all Sensor Input terminals. ■ Wait about 1 minute or until 5 VDC restored at Sensor Input. ■ Connect terminals 1 at time until short reappears and fix bad sensor.
A Sensor Input reads +999.9	This indicates a shorted Sensor Input signal. ■ Check sensor wiring for +5VDC shorted to signal etc. ■ Check for faulty sensor.
A pressure sensor is reading more than 1 psi off (The temperature and humidity sensors do not require calibration.)	This indicates the transducer Sensor Input needs to be calibrated through the offset capability in the software. (Transducers by design need to be calibrated based on construction and altitude.) ■ You must use the MCS-Connect with a valid Authorization code to change sensor offsets ■ See MCS-Connect Interactive section for instructions. (Change SI Status, Manual Value and / or offset.)
Invalid reading on one Sensor Input.	This indicates an input problem with 1 sensor. ■ Verify jumper settings correct for that SI.
Lost I/O	Indicates communications problem. ■ Verify RS485 LED blinking. ■ Verify termination jumper J6 only on at Magnum and last I/O. ■ Verify Magnum and I/O address's set correctly. ■ Verify wiring from Magnum to each I/O correct. ■ Check fuses/120 VAC on I/O units
MCS-Connect cannot make changes	This indicates you are not at a proper authorization level. Follow steps below for proper authorization ■ From either the SITE INFO or STATUS screen in MCS-Connect, click the 'View Only' button at the top of the screen, or click on the 'Passwords' menu option on the lower right of your Keypad/LCD display. ■ Follow prompts and enter a valid 4-digit authorization number. ■ The authorization level is displayed at the top of the display and is reflected by the color of the Authorization button. **Red = View Only** **Light Blue = User level** **Purple = Service level** **Dark Blue = Supervisor level** **Green = Factory level**
Invalid authorization	This indicates an invalid authorization number. Follow steps below for proper authorization ■ Press Service Diagnostics key until the authorization option appears ■ Press the Enter key ■ From the "Display Status" press keys corresponding to your authorization number. ■ Press Enter

PROBLEM	POTENTIAL SOLUTION
SI from AMPS board 10 A low.	This indicates a problem with this SI only. ■ Jumper setting on this SI in wrong position. ■ Incorrect sensor type used.
INVALID CONFIG VER	Indicates layout of CFG wrong. ■ CFG layout for different version than software
INVALID CONFIG TYPE	Indicates CFG incompatible with software.
INVALID CONFIG CHECKSUM	Indicates Checksum invalid ■ Reload a valid CFG
Sensor input believed invalid (Under Sensor Diagnostic Sub Menu)	■ Verify Berg jumpers using Quick Reference Sheets ■ Check board version number ■ Check wiring of sensor
Communications to MCS-485-GATEWAY from MCS-Connect not working.	■ Verify red LED on the gate way is blinking. This indicates that MCS-Connect is talking to the gateway. ■ Verify that the two wire shielded cable is properly wired from the RS-485 connector to the gateway. ■ Verify red LED (Located just to the left of the RS-485 connector on the Magnum board is blinking. This indicates that the Magnum is responding to the gateway. ■ If both of these LED are blinking, check the address of the Magnum and any other Magnums that are on the network. Each must have a unique address. This address can be changed from the Magnum. Proper authorization is required. Enter the UNIT INFORMATION screen by pressing the SERVICE DIAGNOSTIC key and scrolling to this item. Press the enter key and scroll to the NETWORK ADDRESS screen. Change address if needed. ■ Verify + 12 vdc to MCS-485-GATEWAY
INVALID CONFIG	Indicates Checksum invalid ■ Either set to factory defaults on reset settings.

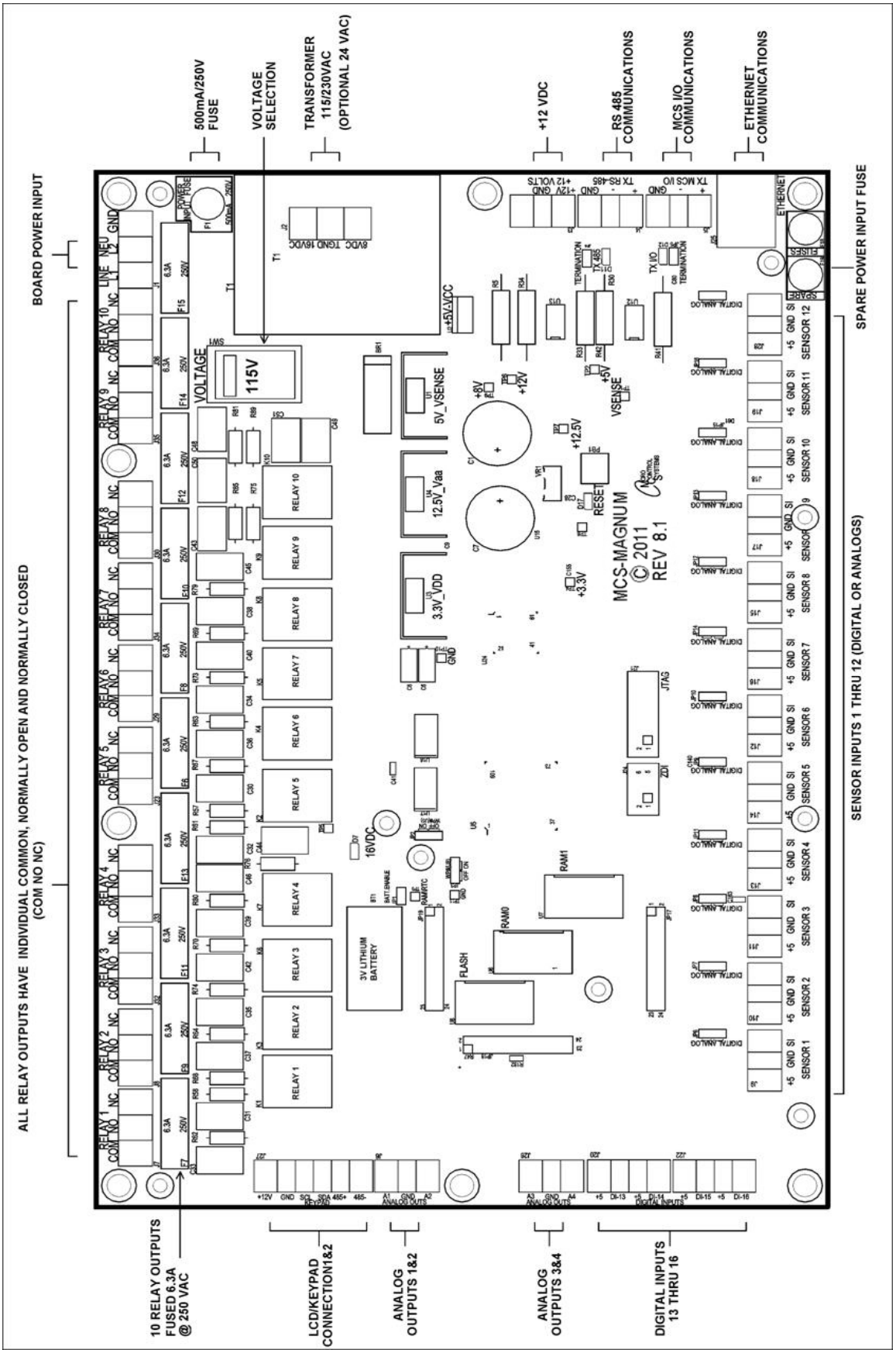
9. Hardware Quick References

9.1. Magnum Keypad Display

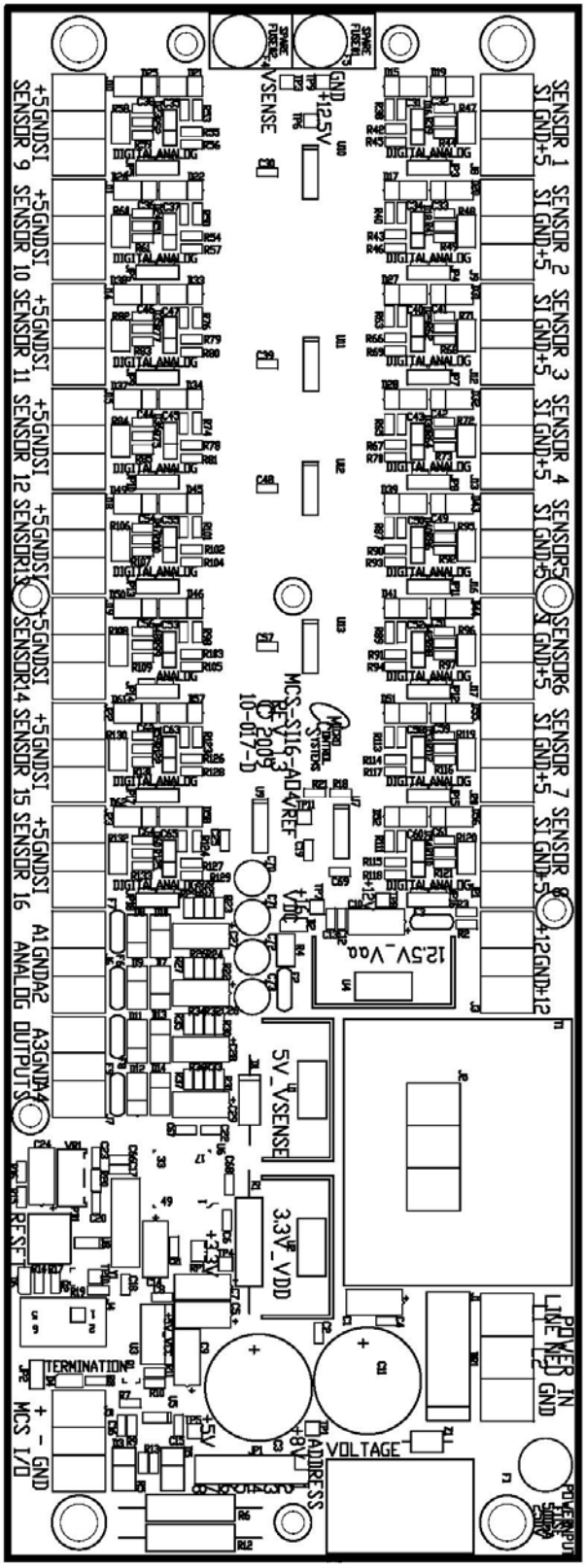
- No authorization is required to view information.
- Pressing the 'MENU' key will display the information below.
- Using the ←, ↑, →, and ↓ buttons will change the selection to the item you want.
- Press the ↵ (Enter) key to select the highlighted item.
- The bottom line of the display defines the functions of F1 –F3.
- To enter the authorization code, refer to the small numbers on the bottom left corner of the keys (1 - 8).
- The RS-232 port is located at the bottom of the keypad.
- To use MCS-Connect you must use a null modem cable.



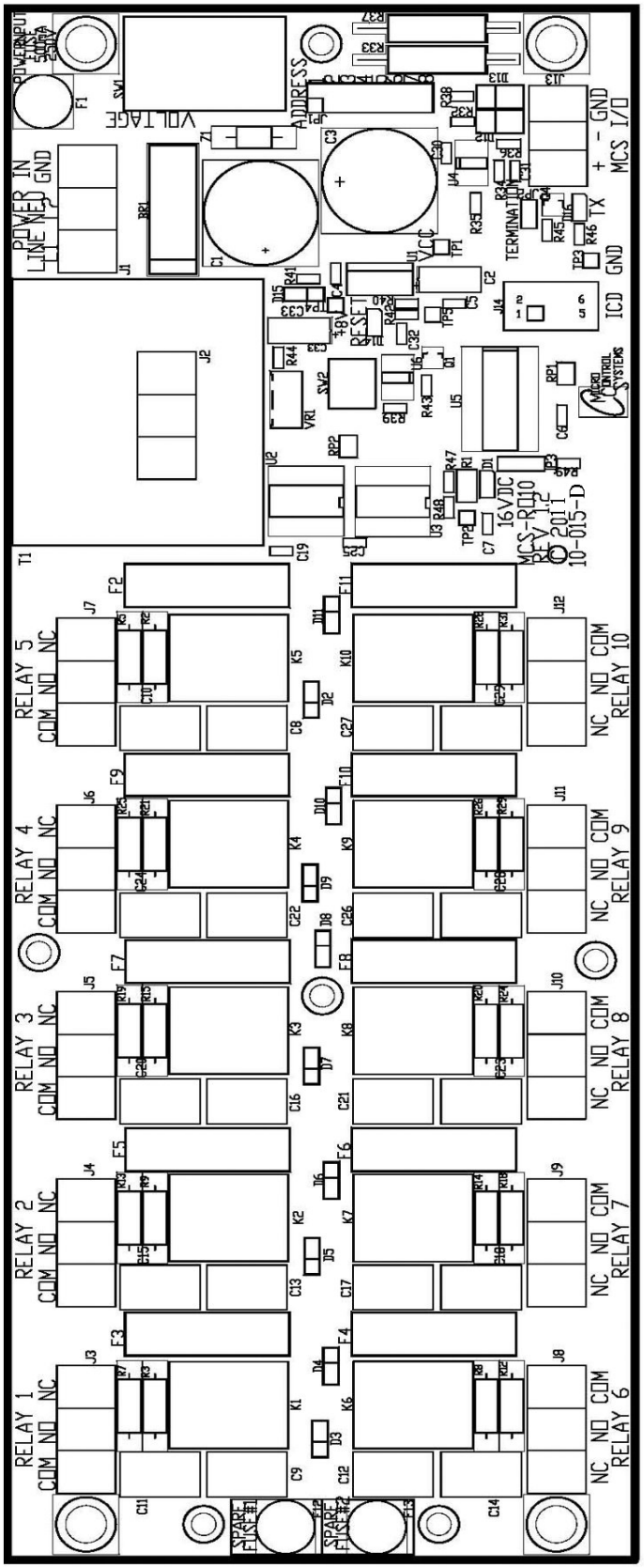
9.2. MCS-Magnum Revision 8.1



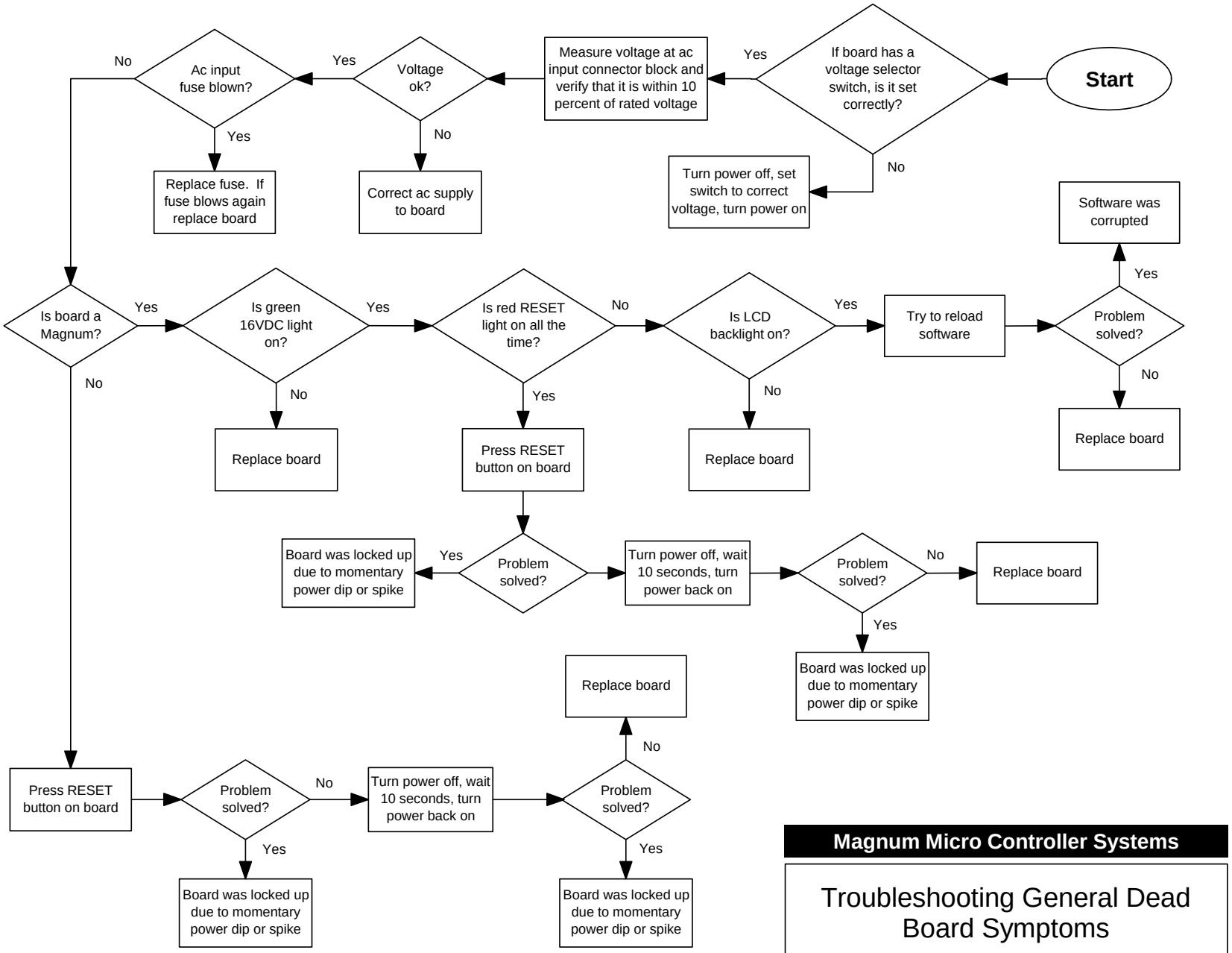
9.3. MCS-SI16-AO4



9.4. MCS-RO10

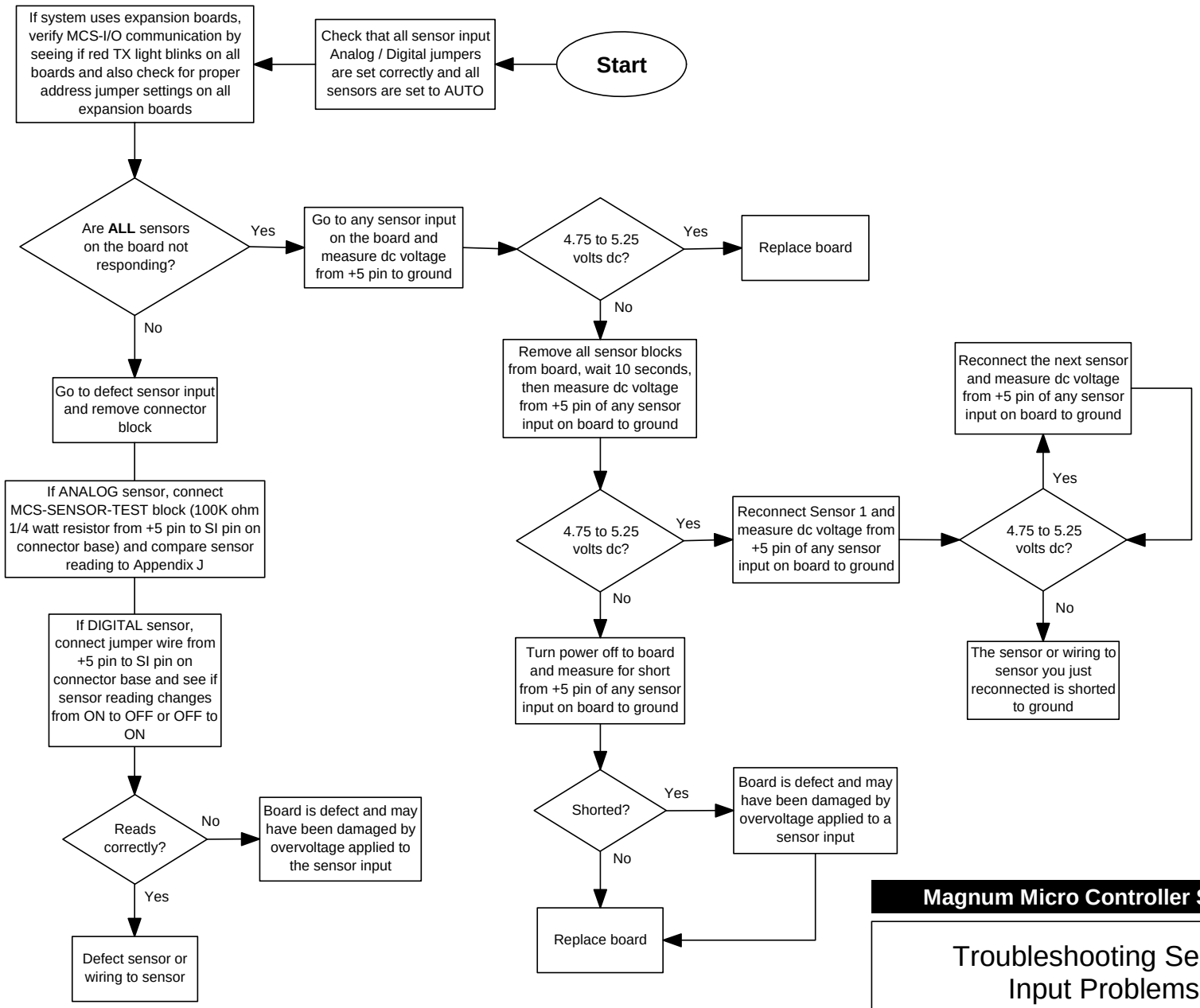

POWER IN
LINE
NEU
GND
J1
VOLTAGE
ADDRESS
MCS I/O
+ - GND
TX
ICD
GND
RESET
16VDC
MCS-RO10
REV 1.2
10-015-D
RELAY 5
COM NO NC
NC NO COM
RELAY 10
RELAY 4
COM NO NC
NC NO COM
RELAY 9
RELAY 3
COM NO NC
NC NO COM
RELAY 8
RELAY 2
COM NO NC
NC NO COM
RELAY 7
RELAY 1
COM NO NC
NC NO COM
RELAY 6
SPARE FUSE #1
SPARE FUSE #2

Detailed Troubleshooting



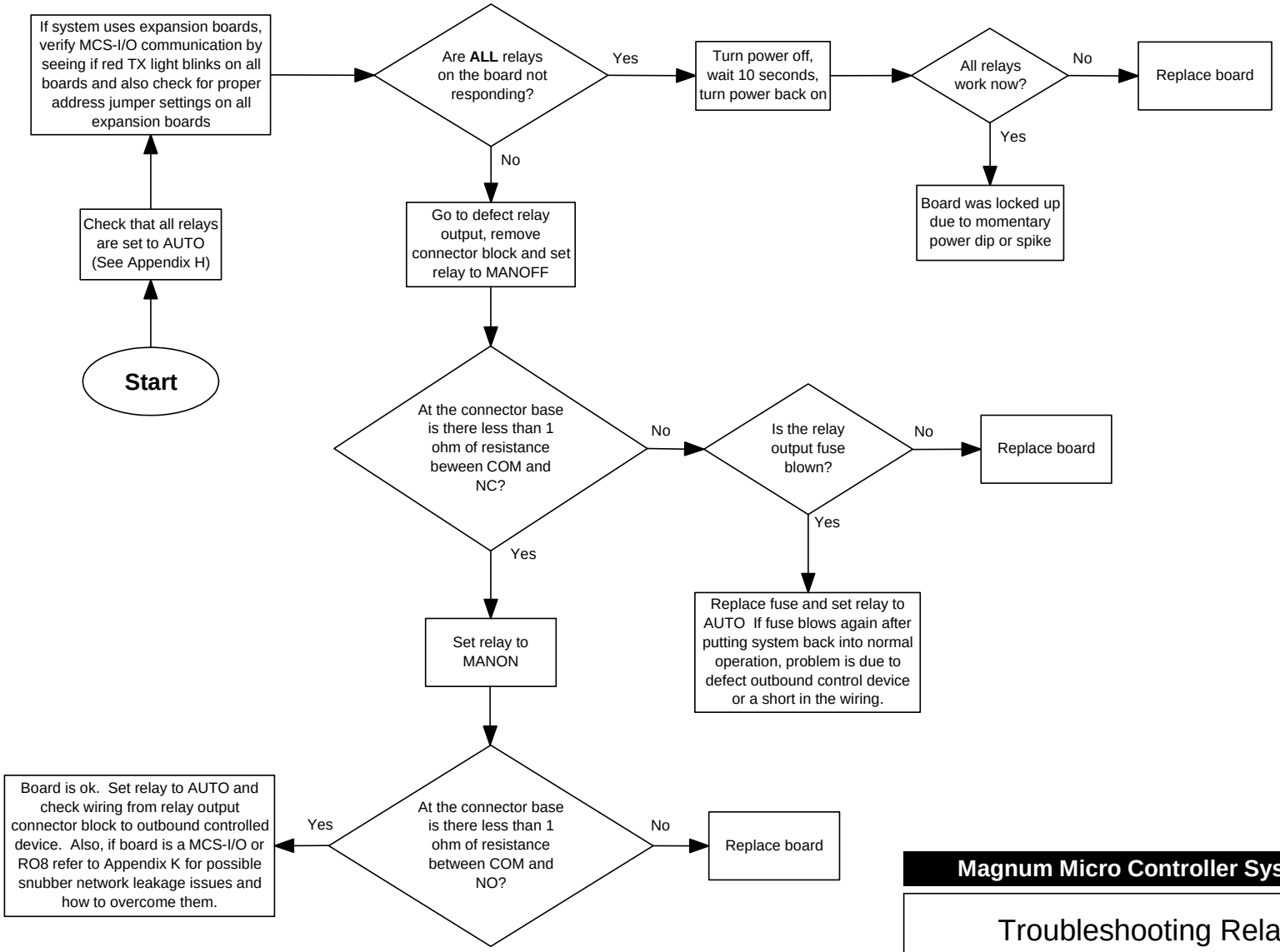
Magnum Micro Controller Systems

Troubleshooting General Dead Board Symptoms



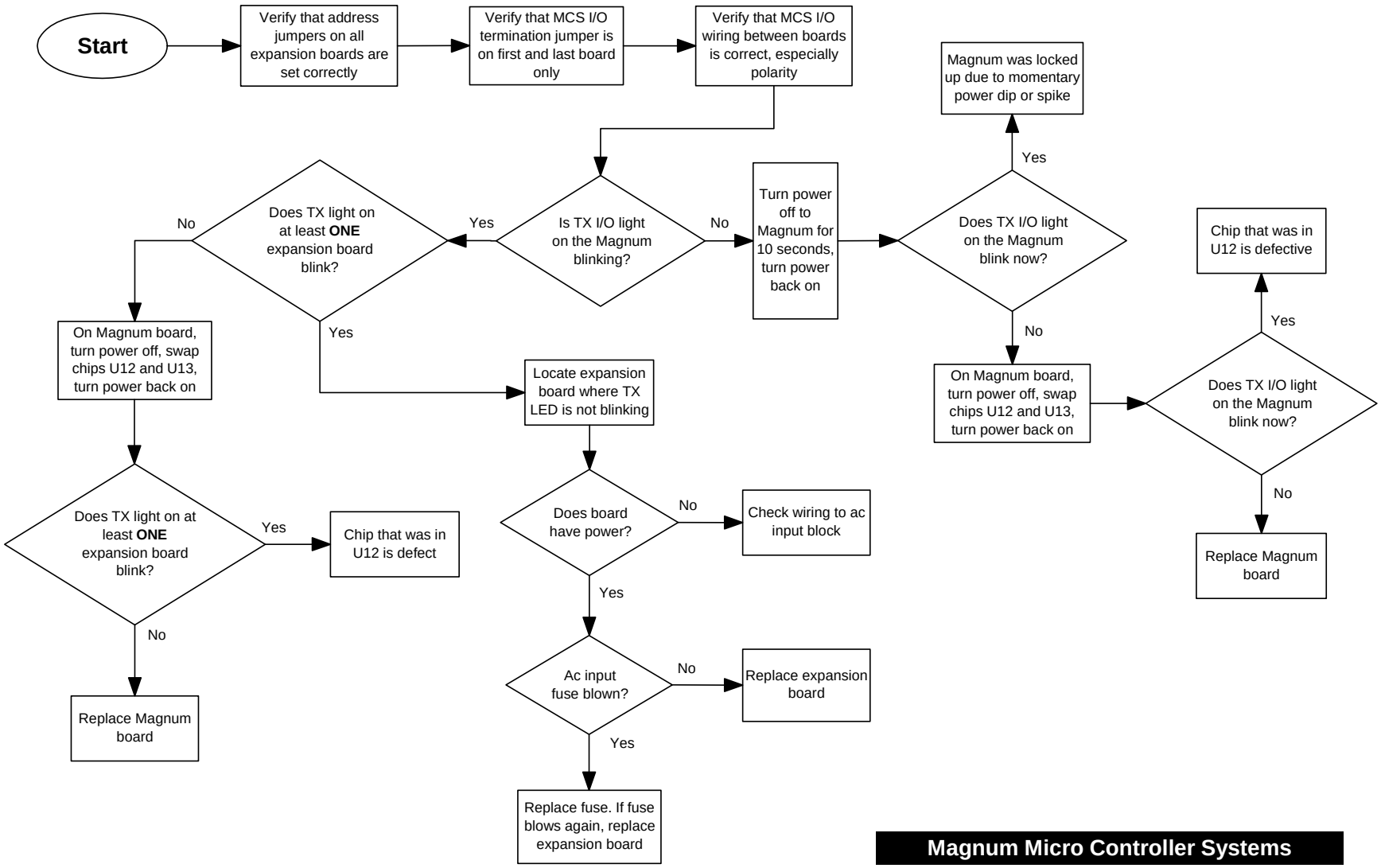
Magnum Micro Controller Systems

Troubleshooting Sensor Input Problems



Magnum Micro Controller Systems

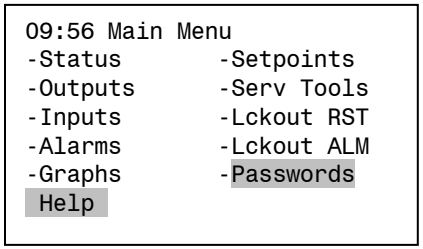
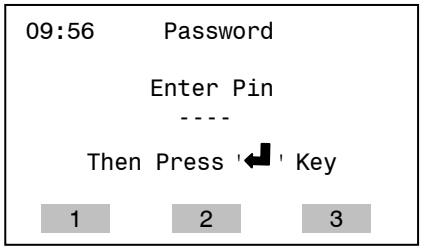
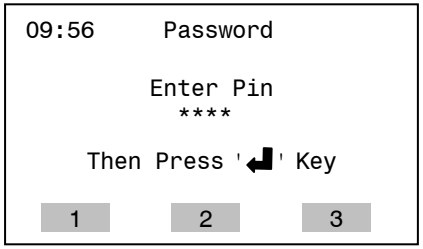
Troubleshooting Relay Output Problems



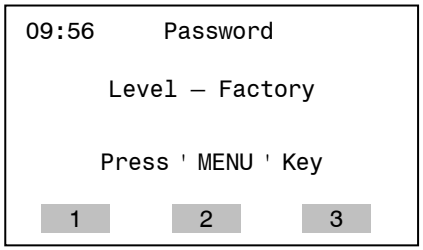
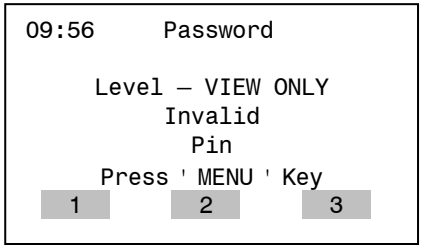
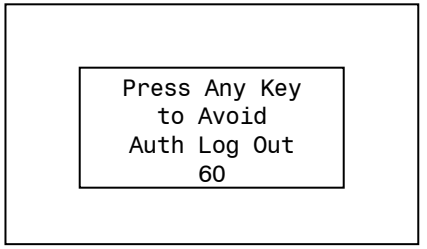
Magnum Micro Controller Systems

Troubleshooting Lost I/O Communication Problems

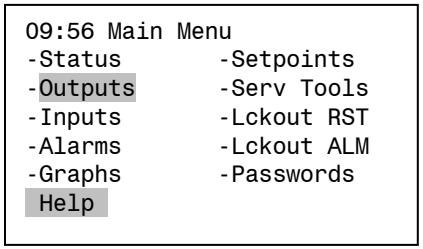
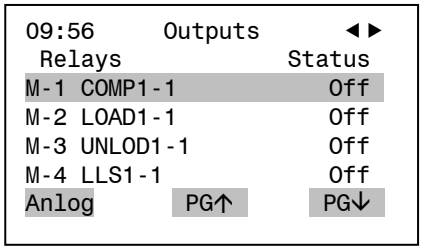
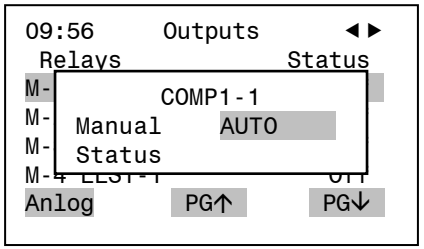
Appendix G
Entering Authorization Codes to Log In and Out of a Magnum

First, at the Main Menu use the arrow keys to navigate to **Passwords**:	
Next, press the Enter key. You will see the following:	
Now enter the proper four-digit authorization code. Each **-** is changed to a ***** as numbers are entered. After you have keyed in the numbers, press the Enter key.	

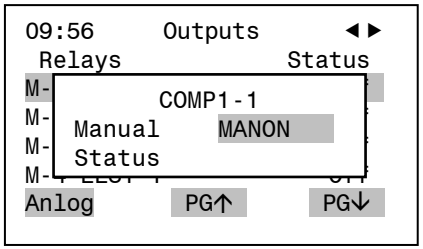
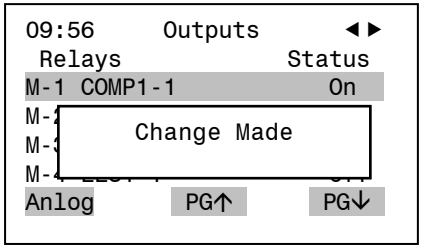
Appendix G (continued)
Entering Authorization Codes to Log In and Out of a Magnum

The Magnum will tell you if it accepted your code and the level of authorization. For example, if you entered a valid factory authorization code you will see the following:	
If you entered an invalid authorization code you will see the following:	
Once you are logged in you can log out immediately by simply entering any invalid authorization code. If you are logged in and no keys are pressed for more than 15 minutes the Magnum will automatically log you out, warning you shortly before with how many seconds remaining as shown here:	

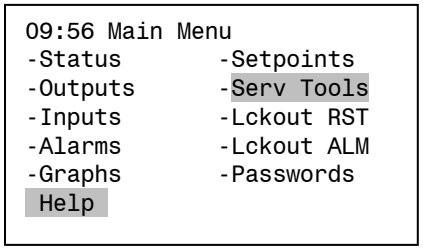
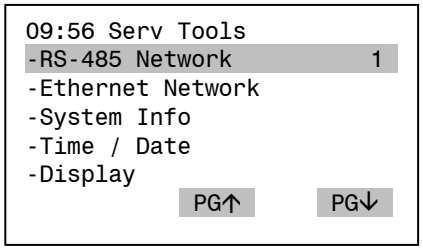
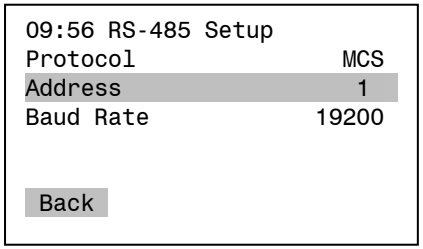
Appendix H
Manually Turning On and Off a Magnum, MCS-I/O or RO8 Relay Output

Note: If a relay is in a Lockout state you cannot manually turn it on or off. First, after logging into the Magnum with your authorization code (see Appendix G), use the arrow keys to navigate to **Outputs**:	
Next, use the up and down arrow keys to highlight the relay you want to turn on or off:	
Now press the Enter key. You should see something similar to the following:	

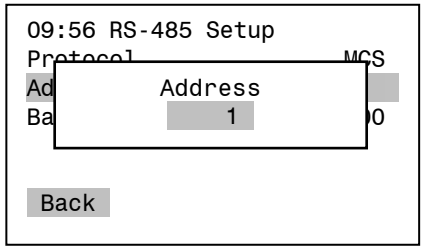
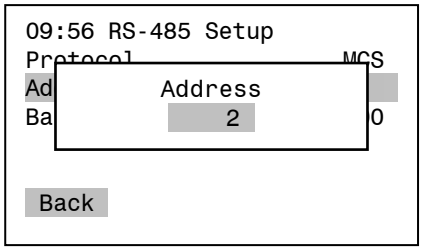
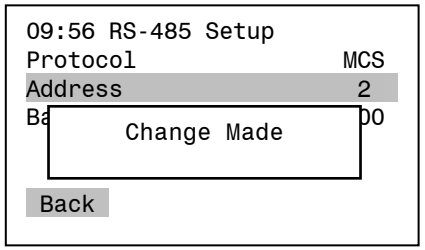
Appendix H (continued)
Manually Turning On and Off a Magnum, MCS-I/O or RO8 Relay Output

Use the up and down arrow keys to cycle through the three modes for the relay output: **AUTO**, **MANON** or **MANOFF** Stop when you reach the one you want:	
Finally, press the Enter key to make the change. In our example the relay output is now manually turned on as shown here: ***Remember to return the relay output to AUTO mode when you are done!***	

Appendix I
Determining and Changing the Network Address of a Magnum

First, at the Main Menu use the arrow keys to navigate to **Serv Tools**:	
Next, press the Enter key. You will see the following:	
Use the up and down arrow keys to highlight **Address**:	

Appendix I (continued)
Determining and Changing the Network Address of a Magnum

Now press the Enter key. You should see something similar to the following:	
Use the up and down arrow keys to select the Address number:	
Finally, press the Enter key to make the change. In our example the RS-485 network address has been changed from 1 to 2:	

Appendix J
Analog Sensor Input Reference Table

To troubleshoot analog sensor input problems and determine where the problem is, simply remove the sensor input connector block of the input you want to test and plug in a MCS-SENSOR-TEST block. If you do not have a MCS-SENSOR-TEST block you can connect a 100K ohm 1% ¼ watt resistor between the +5 and S1 pins of the suspect sensor input on the board with the original sensor connector block removed.

After you have done this, compare the reading displayed by the Magnum with the table of the most common sensor types on the right. If the reading is close to what is found in the table for that particular sensor type you can safely assume that the board is functioning normally and that the problem lies with the sensor itself of the wiring from the sensor to the board.

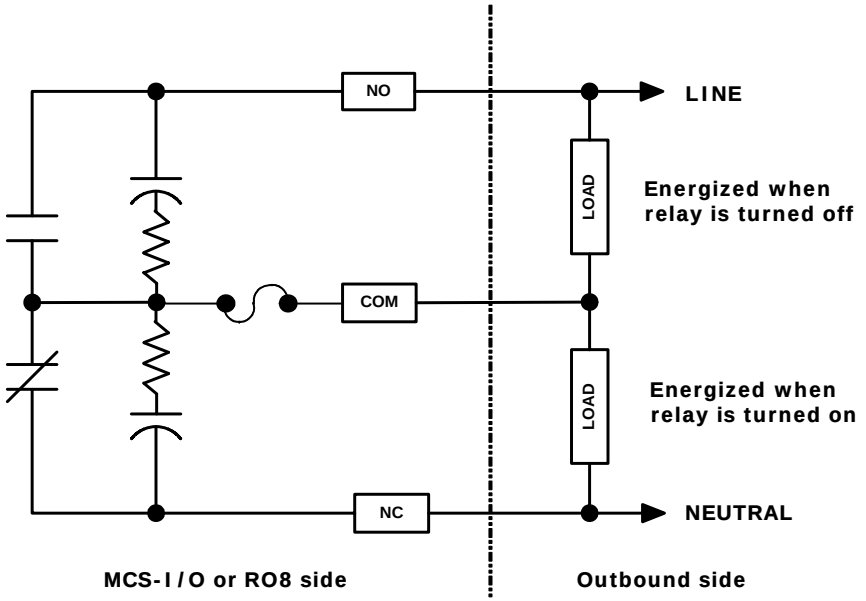
Sensor Type	Reading
CT100	57.0A
CT250	143.0A
CT500	287.0A
HUMD	54.0%
T100	77.0F
Ti150A	75.0P
Ti200	100.0P
Ti500	250.0P
Ti667A	334.0P

Appendix K
Resolving MCS-I/O and RO8 Snubber Network Leakage Issues

Each relay output on a MCS-I/O and RO8 board is protected by the use of on-board snubber networks. These networks consist of a resistor and capacitor in series connected from the common side of each relay to the normally open and normally closed sides. Its purpose is to suppress or “snub” the electrical arc that is produced when relay contacts open and close. Electrical arcs can shorten the useful life of a relay and can also cause the electronics on the controller board to malfunction.

In some cases the use of these snubber networks can cause an outbound device, such as a relay, to stay on even when the controlling relay on the MCS-I/O or RO8 board is turned off. This can occur in situations where the outbound device requires very little ac current to keep it on once it is energized. Because snubber networks normally pass a small amount of current when the circuit it is protecting is switched off, enough current may pass through these networks to keep the outbound relay on, even though the controlling relay is turned off.

An easy solution to this problem is to rewire the relay output as shown in the diagram to the right. As you can see, wiring the circuit in this way causes the outbound device to have the same voltage potential on both sides when it is not energized.



END OF DOCUMENT