MYRIAD DPC/TPC DUPLEX/TRIPLEX PUMP CONTROLLER INSTRUCTION MANUAL

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INTRODUCTION:

The Sigma Myriad TPC (Triplex Pump Controller) is a state of the art microprocessor based, user configurable instrument for the monitoring and control of up to three (3) constant speed or up to three (3) variable speed driven pumps.

The Myriad TPC performs all of the functions found in a full size control panel.

- Displays level in numeric and bargraph forms
- Displays pump run status
- Allows full user selection of all system variables
- Monitors critical alarms (motor overtemperature, etc.)
- Monitors non-critical alarms (seal leak, etc.)
- Monitors hand off auto selection switch position
- Monitors pump (VFD) 'run' feedback
- Provides digital and relay outputs for pump control, level alarm, sensor fail, pump fault
- and seal leak
- Permits user selection of pump sequence, alternation and permitted quantity of pumps to run
- Provides 4/20MA outputs for VFD speed setting and proportional control
- Provides time and date 'stamped' alarm information
- Dual continuous sensor monitor with 'sensor fail' alarm output and auto select of redundant sensor
- Audible and visual alarms
- Allows simulation' of level to exercise pumps or verify operation
- Records "MAX" and "MIN" process values and a graphic trend chart for trouble shooting
- Available in ¼ DIN panel mount or Nema 4X enclosures
- Allows connection of two floats to be used to backup the level sensor(s)

ORDERING INFORMATION:

- DIN Rail Mount/Back Panel   Sigma Myriad-DIN181
- Wall Mount Nema 4X   Sigma Myriad-TPC-N4X

SPECIFICATIONS:

- ANALOG INPUT (2 ea.)
  Analog, 4/20MA, 0-5V, 1-5V, 0-10VDC, isolated with common negative, +-0.1% accuracy.

- DIGITAL INPUTS (21 ea.)
  Digital 10-30V DC

- ANALOG OUTPUT: (4 ea.)
  Analog, with common negative 0-20MA, 4/20MA, 0-5V, 0-10V (voltage output requires a resistor).

- DIGITAL OUTPUTS: (4 ea.)
  Opto isolated, solid state, open collector, 100MA 30VDC max.

- RELAY OUTPUTS: (4 ea.)
  SPDT, Form 'C' 5A Relay

- DISPLAY:
  LCD, 128 X 32 pixel bitmapped graphic display

- LOOP POWER:
  24VDC regulated output, 100MA max.

- 5 USER KEYS:
  Up, Down, Left, Right, Enter

- ACCURACY:
  0.1% of calibrated span

- LOCKOUT:
  User password, user configurable

- INPUT IMPEDANCE:
  Voltage 100K, current 100 OHMS

- POWER:
  120VAC (230VAC available)

- ENVIRONMENTAL:
  Operating, 0-65° C
  Storage, -40° -80° C
  R.H., 0-90% non condensing

- ENCLOSURE:
  ¼ DIN, ABS plastic 96 X 96 X 150MM (main unit) back panel din rail mount aux unit 6" x 4.5" x 2.5"

- FRONT PANEL:
  Gasketed Nema 4X

- ACCESS: (DIN CASE)
  Chassis & boards remove from front of case.

- TERMINAL STRIP:
  (60) Removable for ease of wiring 28 – 16 AWG

- CONNECTIONS:
  Removable screw terminal blocks 28 – 16 AWG wire.

- CONTROL OUTPUTS:
  4 relay outputs, user programmable, SPDT Form 'C' relays 5 AMP.
  4 digital outputs, Opto isolated, open collector.

- OUTPUT ANNUNCIATION:
  On board piezo buzzer

- CPU Activity Monitor

- PROGRAMMING:
  Menu based, all parameters and setpoints are user configurable via menu prompts and user keys. The preconfigured screens and 'pull down' sub menus with English prompts assures rapid setup and commissioning.

- 1 YEAR WARRANTY

- OPTIONS:
  Expansion cards, networking

- MODBUS® RTU RS485:
  Network allows multiple units to be connected together for distributed applications or remote monitoring SCADA applications.

- EXPANSION CARDS:
  Significant expansion is possible via additional control boards and 'MV' networking. Up to 128 units may be interconnected, 4000 feet per node.

FEATURES:

- Microprocessor Based
- Graphic LCD Display
- 5 Function Keys
- Isolated 24VDC Sensor Power
- 4/20MA, 1-5V, 0-5V, 0-10VDC Programmable input
- 2 Analog Input
- 4 Analog Outputs
- 21 Digital Inputs
- 4 Digital Outputs
- 4 Form 'C' Relay Outputs
- Fully User Programmable in English
- 2 Ea. RS485 Ports (Programming and SCADA)
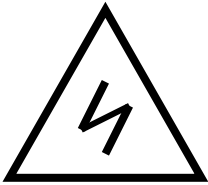- CPU Activity Monitor

WIRING DETAIL

- Inputs, see Dwg # 05-127-1
- Outputs, see Dwg # 05-127-2

All electrical wiring must be in accordance with all local state and national codes that apply.
Do not exceed the rated current of the D.C. power supply (100MA) or the form 'C' relay outputs (5A/240VAC resistive).

CAUTION

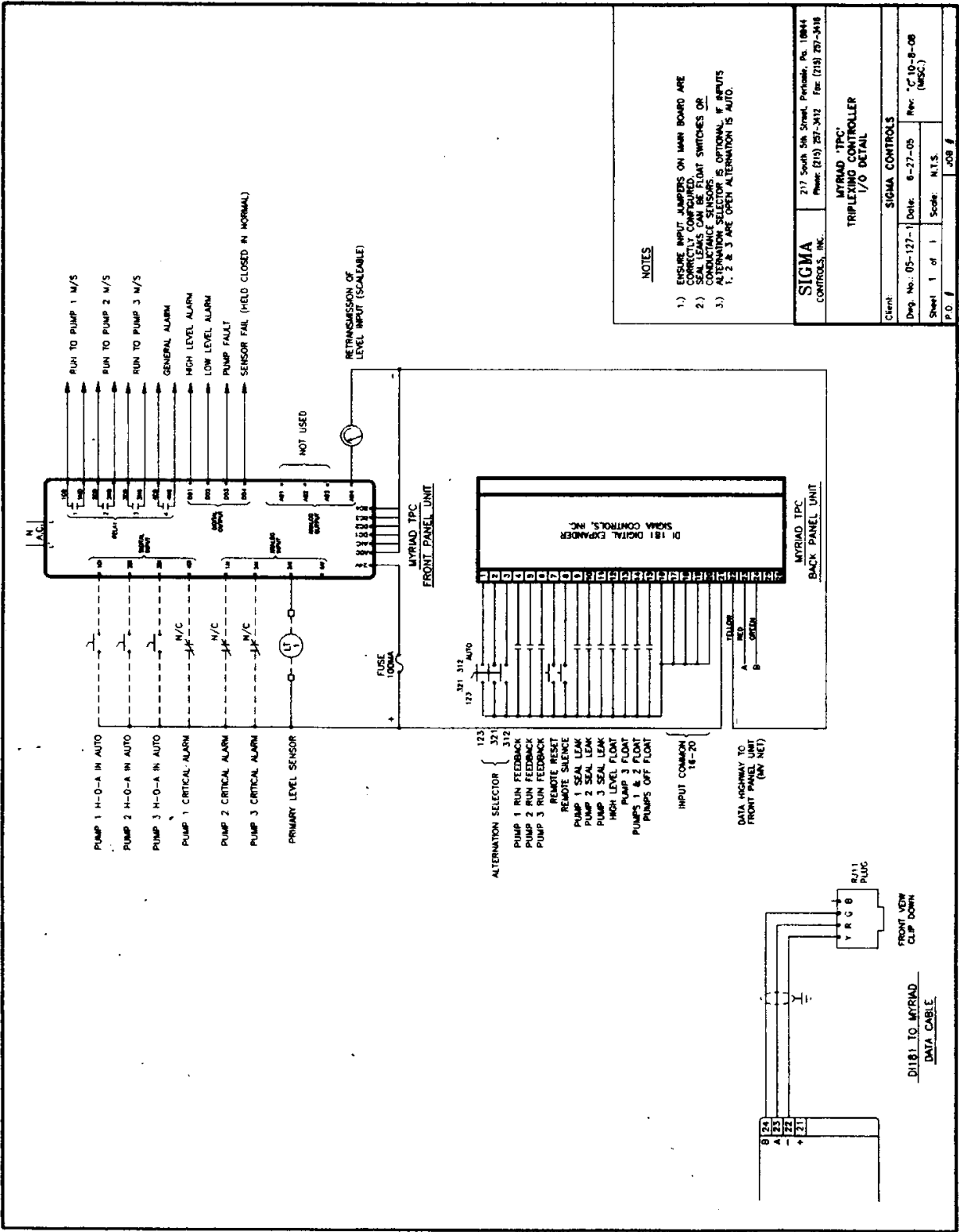**Hazardous voltages are present within the enclosure. Installation or service should only be carried out by trained personnel.**

WARNING

The range selector switches located on the bottom of the circuit board are factory set. If a field change of input type is required see Appendix 'A'. Do not apply an input signal that is not coordinated with range switches or the unit may be damaged.
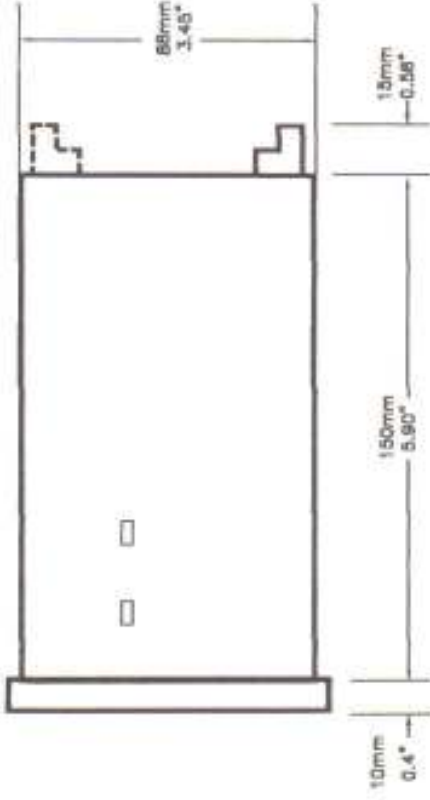
CAUTION

RUN TO PUMP 1 W/S
RUN TO PUMP 2 W/S
RUN TO PUMP 3 W/S
GENERAL ALARM
HIGH LEVEL ALARM
LOW LEVEL ALARM
PUMP FAULT
SENSOR FAIL (HELD CLOSED IN NORMAL)

RETRANSMISSION OF
LEVEL INPUT (SCALEABLE)

NOT USED

MYRIAD TPC
FRONT PANEL UNIT

DI 181 DIGITAL EXPANDER
SIGMA CONTROLS, INC.

MYRIAD TPC
BACK PANEL UNIT

PUMP 1 H-O-A IN AUTO
PUMP 2 H-O-A IN AUTO
PUMP 3 H-O-A IN AUTO
PUMP 1 CRITICAL ALARM
PUMP 2 CRITICAL ALARM
PUMP 3 CRITICAL ALARM
PRIMARY LEVEL SENSOR

N/C
N/C
N/C

FUSE
100MA

ALTERNATION SELECTOR
PUMP 1 RUN FEEDBACK
PUMP 2 RUN FEEDBACK
PUMP 3 RUN FEEDBACK
REMOTE RESET
REMOTE SILENCE
PUMP 1 SEAL LEAK
PUMP 2 SEAL LEAK
PUMP 3 SEAL LEAK
HIGH LEVEL FLOAT
PUMP 3 FLOAT
PUMPS 1 & 2 FLOAT
PUMPS OFF FLOAT
INPUT COMMON 16-20

DATA HIGHWAY TO
FRONT PANEL UNIT
(MV NET)

123 312
321
AUTO

YELLOW
RED
GREEN
OPTION
A
B

RJ11
PLUG

Y R G B

FRONT VIEW
CLIP DOWN

DI181 TO MYRIAD
DATA CABLE

B 24
A 23
- 22
+ 21

FRONT OF PANEL UNIT

88mm 3.45"

15mm 0.58"

150mm 5.90"

10mm 0.4"

96mm 3.77"

96mm 3.77"

SIDE ELEVATION

FIELD TERMINAL BLOCK

5 1/8

REAR PANEL UNIT

END ELEVATION

TERMINAL BLOCK

DIN RAIL MOUNT

2 3/8
2 9/16
1 13/16
1/8
1 7/8
5 1/4

PROGRAMMING & SETUP

The Myriad TPC utilizes a 'plain English' menu driven setup screens which are intuitive and easily understood.
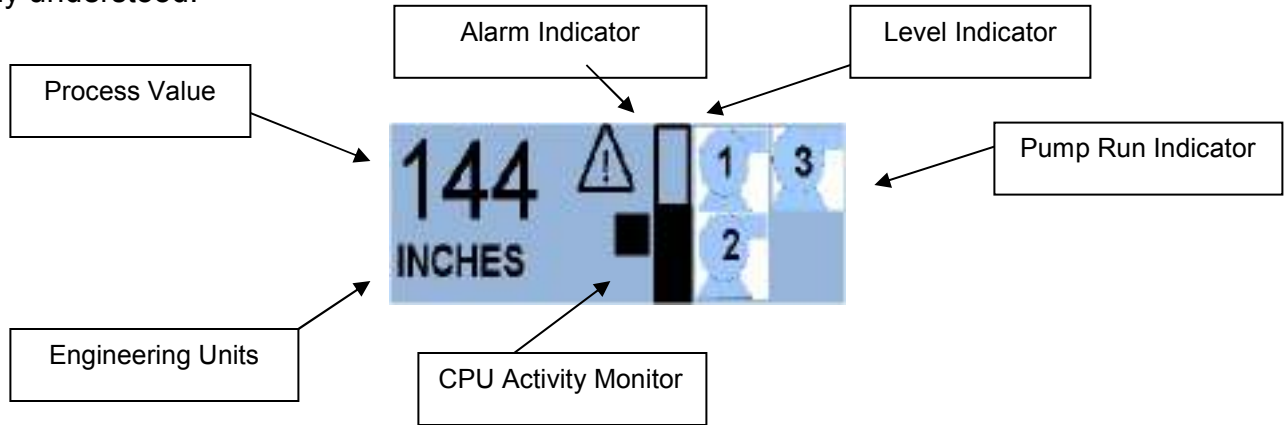
MAIN DISPLAY

NOTE: To 'RETURN' to the main display from any other screen, scroll to 'EXIT' and press 'ENTER'.

From the default screen (Fig. 1), push the 'Enter' button to enter the password protected menus.

Enter the user selected password (factory default is zero) using the ↑ ↓ keys and press 'Enter' to access the first programming menu 'Menu 1'.

NOTE: Programming should begin at 'Menu 2'. 'SCALE' to set the instrument for the correct input signal from 'Menu 1'. Use the → ← buttons to highlight the 'NEXT' item and press enter to access 'Menu 2'.

MENU 2 SCALE

Use the → ← buttons to highlight 'SCALE' and press 'ENTER' .

```
           INPUT TYPE
           4-20 MA
         # OF POINTS 2
     BACK      NEXT      EXIT
```
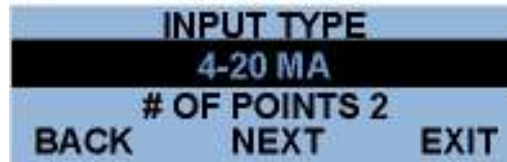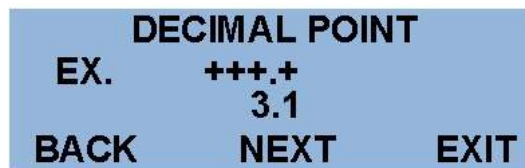
Use the Up/Down arrow buttons to select the desired analog input range. **NOTE: INPUT TYPE MUST BE CO-ORDINATED WITH INPUT SELECTOR SWITCH LOCATED ON THE BOTTOM OF THE CIRCUIT BOARD** (See Appendix 'A')

The 'TPC' does not include linearization of the input signal. The display is linear over the 2 points selected.

DECIMAL POINT SELECTOR SCREEN

```
           DECIMAL POINT
     EX.      +++.+
               3.1
     BACK      NEXT      EXIT
```

The cursor will be positioned over the decimal count window, use the Up/Down ↑↓ arrow buttons to raise or lower the unit number to the left of the decimal point. (The example shown in this window will change with your selection.)

Use the → ← buttons to move the cursor to the number behind the decimal point and the Up/Down ↑↓ buttons to change this selection. Once again the example will change to confirm your selection.

Use the → ← buttons to highlight the 'NEXT' selection and press 'ENTER' to access the Input Scale Screen.

INPUT SCALING TO ENGINEERING UNITS

```
           INPUT SCALE 1
           INPUT  =  4.00
     DISPLAY   =           0.0
     BACK       SAVE      DONE
```
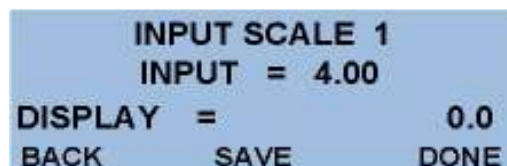
NOTE: This screen sets what the Myriad TPC displays in the main display for the selected input.
The example shown above will display 0.0 units when the input is 4.00 MA.   Both the input and the display at that input can be changed for different requirements.

!

NOTE: Since the TPC accepts two level sensor inputs (one is for a redundant backup), both sensors must be identical in range and output.

A) With the cursor selecting 'INPUT = 4.00' (or the zero value of the selected input) use the ↑ ↓ buttons to change the input value for the required displayed value.

B) Use the → ← buttons to move the cursor to the 'display' value and the Up/Down buttons to change the desired display for the previously selected input. Once complete, scroll to 'SAVE', press 'ENTER' to access 'INPUT SCALE 2' screen.

```
        INPUT SCALE 2
        INPUT  =  20.00
DISPLAY  =              100.0
BACK          SAVE         DONE
```

Follow the steps outlined above to set the values of 'input' and 'display' for input Scale 2.

When complete with scale 2, scroll the cursor to the 'SAVE' position and press 'ENTER'. Press 'DONE' and press 'ENTER' to move to the "ENGINEERING UNITS" selection screen.

ENGINEERING UNITS SELECTION:

When 'Scale Menu' is complete the 'INPUT TEXT" menu is the last menu in the scaling process.

```
        INPUT TEXT
      FEET OF WATER

BACK          NEXT         EXIT
```

This screen allows the selection of several engineering units. With the cursor on the default value as shown, press the Up/Down buttons to select between

'FEET OF WATER'
'PSI'
'GALLONS'
'LITERS'
'UNITS'
'INCHES'

Use the ↑ ↓ keys to select the desired engineering units then with the → ← keys, highlight 'NEXT' and press 'ENTER' to access the "display filter" screen.

DISPLAY FILTER SCREEN

```
        DISPLAY FILTER
   < 0 = FAST     10 = SLOW>
              0
   BACK          NEXT         EXIT
```

Use the ↑ ↓ keys to change the amount of filtering applied to the input signal. 'O' is no filter and '10' is high filter.

⚠ **Too much filtering will dampen process responses.**

Scroll to 'NEXT' and press 'ENTER' to return to the Menu 2.

ANALOG OUTPUT (AOUT)

Use the → ← keys to highlight the 'AOUT' item and press 'ENTER' to access the analog output signal settings.

NOTE: There are four analog outputs on the TPC, as follows: AOUTPUT 1 and AOUTPUT 2 are speed vs. level setpoints, which are only utilized on variable speed drive applications. This screen allows the user to program the speed of the drive at a selected level. Both level and drive speed are selectable.

LEAD SPEED SCALE 1

```
          LEAD  SCALE  1
LEVEL          =  30
SPEED          =  50.0%
BACK           SAVE          DONE
```

The 'level' value will be highlighted, use the ↑ ↓ keys to change the level point at which the speed of the drive (selected in the next block) is requested. In the example above, the drive will be at 50% speed when the level is 30 inches and only the lead pump is called to run.

Scroll to 'SAVE' and press 'ENTER' for speed scale 2.

LEAD SPEED SCALE 2

```
          LEAD  SCALE  2
LEVEL          =  100
SPEED          =  90.0%
BACK           SAVE          DONE
```

Select a value of drive speed and level as described above and scroll to 'DONE' to save the values selected and move to lag speed scale 1 screen.

As described above, select an output value versus display value for analog output 4. When complete use → ← to select 'SAVE' and press 'ENTER'.

## LAG SPEED SCALE 1

```
          LAG  SCALE  1
LEVEL          =  40
SPEED          =  55.0%
BACK           SAVE          DONE
```

The 'level' value will be highlighted, use the ↑ ↓ keys to change the level point at which the speed of the drive (selected in the next block) is requested. In the example above, the drive will be at 55% speed when the level is 40 inches and the lead and lag pumps are called to run.

Scroll to 'SAVE' and press 'ENTER' for speed scale 2.

LAG SPEED SCALE 2
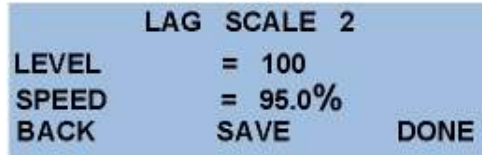
```
          LAG  SCALE  2
LEVEL       =  100
SPEED       =  95.0%
BACK        SAVE        DONE
```

Select a value of drive speed and level as described above and scroll to 'DONE' to save the values selected and move to lag 2 speed screen and lag 3 speed screen.

As described above, select an output value versus display value for analog output 4. When complete use → ← to select 'SAVE' and press 'ENTER'.

From menu 2 use the → ← keys to select 'SETUP' and press enter to access the setup menu.

SETUP

NOTE: The 'SETUP' menu allows access to the following items:

1) Pump elapsed timer 1
2) Pump elapsed timer 2
3) Pump elapsed timer 3
4) Trend screen time base
5) Password
6) Time
7) Month
8) Date
9) Day
10) Alarm Horn on/off

ELAPSED TIMERS

An elapsed timer is provided to allow the operator to monitor the run times of the four pumps.

```
          SETUP
     ELAPSED TIMER 1
          678345
BACK       NEXT        EXIT
```

To reset the #1 timer use the ↑ ↓ keys to change the saved value to zero. Select 'NEXT' and press enter to access elapsed timer 2.   Follow the procedure above to reset this timer to zero. Reset other timers in the same way.

Use the → ← keys to highlight 'NEXT' and press the enter key to move to the trend screen speed screen.

TREND SPEED SCREEN

```
            SETUP
         TREND SPEED
            FULL
  BACK        NEXT        EXIT
```

NOTE: The trend screen is provided as a diagnostic tool. This trend graphic will display the process value over the time duration selected. The duration of the trend is selectable between 2 minutes, 2 hours, 12 hours and full speed. The trend is non-retentive and will overwrite previous data.

Use the ↑ ↓ keys to select the desired time base and scroll to 'NEXT' and press 'ENTER' to move to the 'Change Password' screen.

'CHANGE PASSWORD SCREEN'

```
            SETUP
      CHANGE PASSWORD
              0
  BACK        NEXT        EXIT
```
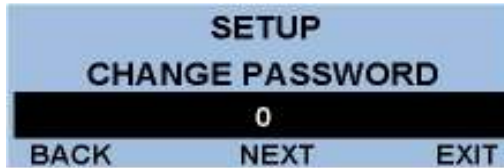
⚠ **Once the password has been changed make sure a record of the new password is retained. Access to the programming menus requires a correct password.**

Use the ↑ ↓ keys to enter a number up to 9999, select 'NEXT' and press 'ENTER' to enter the 'change clock' menu.

CHANGE CLOCK, MONTH, DATE AND DAY SCREENS

```
            SETUP
        CHANGE CLOCK
            02:23 A
  BACK        NEXT        EXIT
```
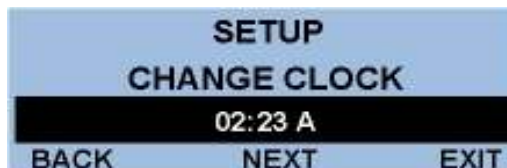
As described previously use the ↑ ↓ keys to set the screen to the current time. Scroll to 'NEXT' and press 'ENTER' to move to the change month screen.

The 'change month' screen, 'change date' screen and 'change day' screen are all adjusted as above. After changing the 'DAY' screen, scroll to 'NEXT' and press 'ENTER' to select the 'Alarm Horn' screen.

NOTE: DAYLIGHT SAVINGS CHANGES ARE AUTOMATIC.

ALARM HORN SCREEN

```
          SETUP
       ALARM HORN
             ON
  BACK      NEXT      EXIT
```

NOTE: Selecting the alarm horn to 'OFF' will disable the internal piezo alarm from sounding when an alarm condition occurs.

When the desired selection is made, scroll to 'NEXT' and press 'ENTER' to return to 'MENU 2'. In Menu 2 select 'NEXT' and 'ENTER' to select Menu 1.

MENU 1

```
          MENU 1
   SETTINGS        SIM
   ALARMS          ALT
   BACK    NEXT    EXIT
```

From Menu 1 select 'Settings' and press 'ENTER' to access the 'LEAD PUMP ON' setpoint.

LEAD PUMP ON

```
         SETTINGS
        LEAD ON AT
  80                LEV
  BACK     NEXT     EXIT
```
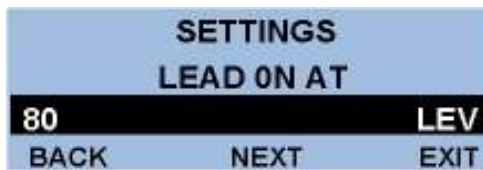
NOTE: This parameter determines at what level the 'lead' pump turns on. Using the ↑ ↓ keys select a level point to turn on the lead pump. Scroll to 'NEXT' and press 'ENTER' to access the: --

LEAD PUMP OFF SCREEN

```
         SETTINGS
        LEAD OFF AT
  30                LEV
  BACK     NEXT     EXIT
```

Following the procedure above select a level value at which the lead pump turns off. Use 'NEXT' with the exit button to access the: --

LAG PUMP ON SCREEN

```
        SETTINGS
        LAG 0N AT
 100                      LEV
 BACK         NEXT        EXIT
```

Select a value, which turns on the lag pump. Use 'NEXT' and 'EXIT' to access the: --

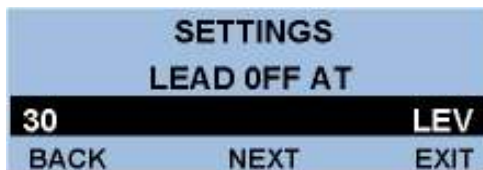## LAG PUMP OFF SCREEN

```
        SETTINGS
        LAG OFF AT
 40                       LEV
 BACK         NEXT        EXIT
```

And once again select a level value, which turns off the lag pump. Select 'NEXT' and press 'EXIT' to advance to the Lag 2 setting.

PUMP ON DELAY SCREEN

```
        SETTINGS
      PUMP ON DELAY
 1                        SEC
 BACK         NEXT        EXIT
```

This screen allows an operator selected delay before a pump is operated after its 'ON' setpoint has been reached. Sometimes this delay is required to overcome process disturbances such as pressure or wave action.

Change the 'ON' delay as required and select 'NEXT' and press 'ENTER' to advance to the:--
PUMP OFF DELAY SCREEN

```
        SETTINGS
      PUMP OFF DELAY
 1                        SEC
 BACK         NEXT        EXIT
```

Change pump off delay as described above and select 'NEXT' and press 'ENTER' to advance to the:--

LEVEL ALARM SCREENS

The next screens are as follows:

> Low Level Alarm Set Point
> Low Level Alarm Reset Point
> High Level Alarm Set Point
> High Level Alarm Reset Point
> Alarm Timer

Adjust and advance through the alarm settings as described previously, the 'alarm timer' provides an adjustable time delay for alarm notification after the alarm setpoint has been reached in order to prevent nuisance alarms.

After the 'alarm timer' has been set return to Menu 1 and select 'ALT', press 'ENTER' to access the alternative menu.

'ALTERNATION'

From Menu 1 select 'ALT' and press ENTER to select the Lead/Lag order screen.

LEAD/LAG ORDER SCREEN

```
        LEAD / LAG ORDER
LEAD     1              LAG 1    2
2 LAG    3
BACK           NEXT        HELP
```

The example shows the #1 pump as the 'Lead' and #2 as the 'Lag', #3 pump as the second 'Lag' and #4 pump as the third 'Lag'. The starting position of any pump may be changed in this screen by positioning the cursor with the → ← buttons and selecting the desired pump sequence. **NOTE:** If alternation is enabled, the pump sequence will change based on time or pump cycle. If alternation is selected to be 'off' then pump sequence will be 'fixed' per the selected 'pump order'.

```
      SELECT PUMPS IN
      ORDER, PUT UNUSED
      LAST, ONE OF EACH
         (IE: 1, 3, 2, 4)
```

The help screen can be selected from the Lead/Lag Order screen or it may appear if an incorrect pump order was entered. This screen explains that pump numbers should be entered in the order in which they come on. If there are unused pumps, enter them as coming on last. You must enter each pump once.

ROTATE PUMPS SCREEN

```
        PUMPS TO ALT
     ROTATE   3  PUMPS
        <IE: 2 = DUPLEX>
   BACK        NEXT        EXIT
```

This screen is provided to allow the operator to limit the maximum number of pumps to be alternated. In the example shown the cursor is over the programmable number of pumps allowed to be in the alternation cycle, i.e. 3 pumps (Triplex).

Use the ↑ ↓ keys to select a time of day to alternate. Select 'NEXT' and press 'ENTER' to return to Menu 1.

MAXIMUM PUMPS ALLOWED SCREEN

```
          MAX # OF PUMPS
          ALLOWED TO RUN
                3
    BACK         NEXT         EXIT
```

This screen allows the operator to select the maximum number of pumps that are allowed to run regardless of level conditions. Select the maximum number of pumps with the ↑ ↓ buttons.

ALTERNATION SCREEN

```
            ALTERNATION
               DAILY
              02:23 A
    BACK         NEXT         EXIT
```

NOTE: Three options are available for alternating the pump lead position:--

        A) 'ALT OFF' no alternation of lead/lag pump.
        B) 'WHEN PUMPS STOP' pumps alternate when a pump has completed a pump
           cycle.
        C) 'DAILY' allows for alternation of the pumps in systems, which run continuously.
        Selecting 'DAILY' brings up a new selection, which is the time of day at which the
        pumps will alternate their position in the sequence even if they are operating.

From 'Menu 1' select 'ALARMS' and press 'ENTER' to view the current alarm status.
ALARMS

```
          CURRENT ALARMS
             LOW LEVEL
               ACTIVE
    BACK         RESET        EXIT
```
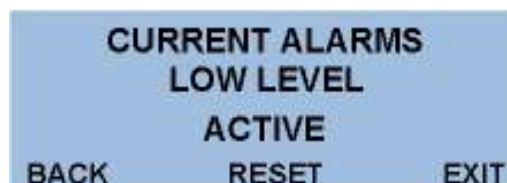
NOTE: In this menu item, all alarm screens will be shown in an automatically 'SCROLLING' fashion. The following alarm status will appear on the screen:

> P1 Failed to Run
> P2 Failed to Run
> P3 Failed to Run
> P1 Critical Alarm
> P2 Critical Alarm
> P3 Critical Alarm
> Seal Leak Alarm
> High Level Alarm
> Low Level Alarm
> Main Sensor Failure
> 2nd Sensor Failure
> System Shutdown

Any alarm that is currently active will be indicated on its screen by the lower display changing from 'NOT ACTIVE' to 'ACTIVE'. Any 'ACTIVE' alarm must be reset by selecting 'RESET' with the → ← arrows and pressing 'ENTER' **after the causal condition has been removed.**

NOTE: The RESET function can be utilized from the PASSWORD screen, The ALARM screen, digital input # 7 on the expansion (DI 181) board or by pressing the ↑ ↓ buttons simultaneously.

NOTE: While in the main display any alarm condition which occurs during normal operation will cause a time and date 'stamped' message to pop-up over the main display screen indicating the specific alarm condition. The on board horn will sound. To clear the screen and stop the horn, press any key.

On the main display a ⚠ will flash indicating that an alarm condition still exists. This indicator will be removed after the alarm has been cleared as described above. The 'RESET' selection appears on the 'ALARMS' and the 'ENTER PASSWORD' screens.

OPERATIONAL INFORMATION

Several items of operational information are provided for operator review of system status. These items may be accessed from the 'VIEW' screen, which appears at the bottom of the 'PASSWORD' entry screen.

```
        ENTER PASSWORD
              0

VIEW          RESET        EXIT
```

From the main menu press 'ENTER' key to access the 'ENTER PASSWORD' screen. Use the → ← keys to scroll to the 'VIEW' position and press 'ENTER'.

## NOTE: IT IS NOT NECESSARY TO ENTER A PASSWORD TO ENTER THIS SCREEN.

VIEW MENU

```
          VIEW MENU
TREND                PEAK
ALARMS               ETMS
  VIEW      NEXT      EXIT
```
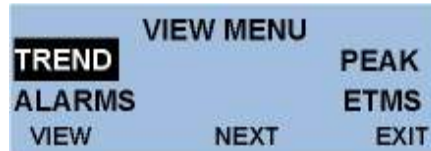
'TREND' will be highlighted, press 'ENTER' to view the recorded trend of the process value for the time selected previously during the setup procedure (2 min., 2 hrs,12 hrs, or full speed).

```
        12 HOURS
```

After viewing the process trend press 'ENTER' to return to the 'VIEW' menu. Select 'PEAK' with the → ← keys and press 'ENTER'

```
      PEAK AND VALLEY
        HI   100.0
        LO  -25.0
  BACK      CLR       EXIT
```
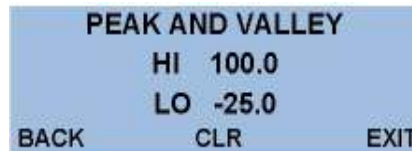
This screen records the highest and lowest process values that have occurred since the last 'CLR' (clear). To reset these values to the current value of the process, scroll to 'CLR' and press 'ENTER'. The cursor will automatically move to the 'BACK' position, press 'ENTER' to return to the 'VIEW' menu. Select 'ALARMS' and press enter to view the current alarm status and use 'RESET' as described previously to clear any active alarms. Select 'BACK' and press 'ENTER' to return to the 'VIEW' menu. Select 'ETMS' and press 'ENTER' to view the recorded elapsed times for each pump.

```
       ELAPSED TIMERS
P1        678345       HOURS

P2        234456       HOURS
  BACK      NEXT       EXIT
```

NOTE: Elapsed times are resettable in the 'SETUP' mode and will 'ROLLOVER' to zero after 1,000,000 hours if not reset.
Select 'NEXT' and press 'ENTER' to view pump 3 & 4 elapsed times.
**MAINTENANCE AND TROUBLE SHOOTING**

MAINTENANCE:

The Myriad TPC is a digital solid-state device, which requires no periodic maintenance.

Occasional physical checks of the unit should be carried out for physical and mechanical security of mounting, terminal blocks, and electrical wiring.

TROUBLE SHOOTING:

▪ UNIT 'LOCKS UP' –   Recycle power to the unit by removing AC power, waiting 10 seconds and reconnecting power.
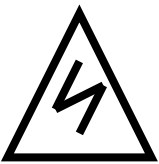
WARNING

NOTE: This should be done by using the user provided circuit breaker or fuse, not by removing the power wires at the terminal block. Serious injury or death can occur if contact is made with the incoming ac power.

▪ LCD display goes dim or contrast is poor. Remove power from the unit, release the 2 rear mounting screws and slide the unit forward in its case approximately 1 inch.   On the left side of the circuit board is an adjustable potentiometer. With a small screwdriver adjust this "pot" to allow alter the contrast to the desired amount. Return the unit to its normal position and secure the rear screws.

▪ DISPLAY REMAINS AT ZERO OR SHOWS NO CHANGE -- If the display remains at zero or shows no change but the process is changing, check for D.C. voltage on the loop. With 2 wire (4/20MA) instruments check with a D.C. voltmeter at the level instrument, by disconnecting the level instrument from its 2 wires and measuring across these 2 wires with a D.C. voltmeter for the presence of 24VDC.

If D.C. voltage is present, reconnect the negative wire of the supply and insert a milliampmeter between the positive wires. The loop should provide a signal between 4 and 20 MA. If no current is present or Y current exceeds 20MA consult the level instrument supplier.

If D.C. voltage is not present check the user supplied power supply or if using the Myriad supply measure across terminals 24VDC and A/C. If no 24VDC is present consult factory. If 24VDC is present check field wiring between the Myriad and the field device and recheck 'SCALE' functions to insure correct setup.

▪ Unit appears to be functioning but does not bring on pumps or alarms. From 'MENU 2' scroll to 'DIAG' and press enter:--

DIAGNOSTIC SCREENS

INPUTS

'Raw' Analog In

Pump Run Feedback

'In Auto' Switches

```
IN      A2000PMP     123
AUTO 123            CRIT 123
SL█ SD█ RX█    ERR█
TPC       NEXT        V1.0
```

Seal leak input

Shutdown input

Network Data Receive

Network data received

Software Revision Level
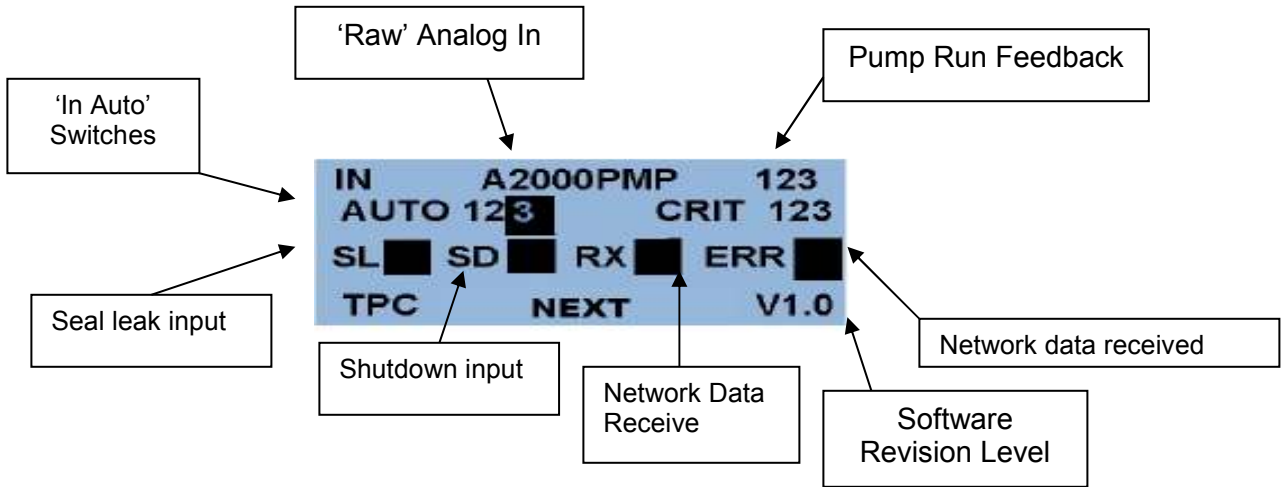
Select 'NEXT' and press 'ENTER' to view the output screen.

OUTPUTS

Analog output common for all 4 outputs

Pump run relays

Network data buffer full

Alarm levels

```
OUT     A2000PMP     123
HI█ LO█         FAIL 123
SL█ SD█    TX█    BF█
X FAIL 12 GAL 12     EXIT
```

Seal leak alarm

Network data transmit

Primary transducer fail

Shutdown output

General Alarm 2

Secondary transducer fail

General Alarm 1
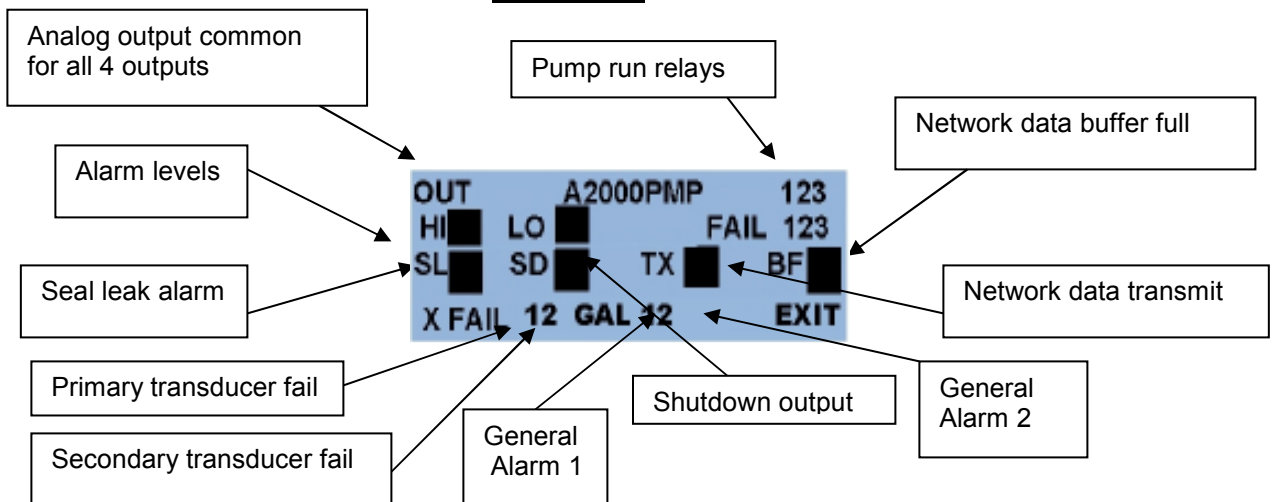
The diagnostic screens provide information about the current status of inputs and outputs and provide valuable information to aid in trouble shooting.

The screens show the status of the 'RAW' analog input and output values. These raw values are approximately the input and output range in the selected input value; as shown, the input is 20.00 MA and the output is 20.00 MA. These values can provide help in determining if the Myriad TPC is receiving the correct analog input.

NOTES ON ALARMS

General alarm output 'sweeps' all alarms into a common SPDT dry contact output.

PUMP ALARMS

(1) Pump fail, after a pump has been 'called' to run a digital input (normally from the auxiliary contact on the respective motor starter) is 'fed back' to the controller at 1DI and 2DI. If the controller fails to see this input it assumes the motor starter has failed to energize the starter and it energizes the 'Pump Failed to Run' alarm, removes this pump from the sequence and brings on the next available pump.

(2) Critical alarm, the critical alarm inputs 3DI and 4DI or normally closed inputs usually from the pump motor thermostat. If the controller 'sees' either of these inputs go open, then the "critical alarm" is brought up on the screen and the respective pump is shut down. The next pump is brought on.
NOTE: If these inputs are not used they should be 'jumpered'.

(3) Seal leak, both seal leak inputs are connected to a single digital input 3AI. When either of these are closed the non-critical alarm is activated. The pumps are not shut down.

(4) H.O.A. selectors, are monitored for their position at 1AI and 2AI. If an HOA is not in the 'Auto' position that pump will not be permitted to run.

(5) The system shutdown alarm will 'kill' the pumps when activated.

NETWORK DATA

The main board talks over a data highway to the aux board, remote sensor and backup controller. RX is data received by the main board. TX is data transmitted, ERR is any bad data received. BF is when the data buffer is full.

APPENDIX 'A'

SWITCH SELECTION OF ANALOG INPUT RANGES   (Factory default 4/20MA).

The range dip switches are located on the bottom of the main circuit board. Disconnect power, remove two rear screws, remove terminal strips and slide the entire unit out of its case. Turn the unit upside down to locate the range dip switches.

SW1	SW2	INPUT 4	DESCRIPTION
0	0		Ain1 range = 5V
0	1		Ain1 range = 10V
1	0		Ain1 range = 20mA
1	1		Not Used

SW3	SW4	DESCRIPTION
0	0	AIn2 range = 5V
0	1	AIn2 range = 10V
1	0	AIn2 range = 20mA
1	1	Not Used

SW5	SW6	DESCRIPTION
0	0	AIn3 range = 5V
0	1	AIn3 range = 10V
1	0	AIn3 range = 20mA
1	1	Not Used

SW7	SW8	DESCRIPTION
0	0	Ain4 range = 5V
0	1	Ain4 range = 10V
1	0	Ain4 range = 20mA
1	1	Not Used

→ ON

1	■	
2	■	
3		■
4		■
5	■	
6	■	
7		■
8		■
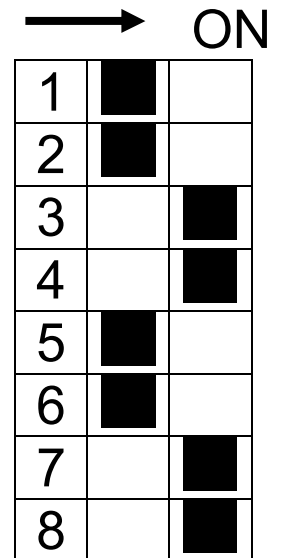
EXAMPLE ONLY

CAUTION, ENSURE THAT DIP SWITCHES ARE CORRECTLY SET FOR INPUT RANGE REQUIRED.

SIGMA MYRIAD TPC PROGRAMMING RECORD SHEET

Model Number: _____   **Serial Number:** _____

Vers: _____

Password: _____

- **Scale:**

  Input Type   _____
  \# Input Points   _____
  Decimal Point   _____

  Input Scale 1:

  Input =   _____
  Display =   _____

  Input Scale 2:

  Input =   _____
  Display =   _____
  Engineering Units   _____
  Display Filter #   _____

- **Settings:**

  Lead on at   _____
  Lead off at   _____
  Lag on at   _____
  Lag off at   _____
  Pump on Delay   _____
  Pump off Delay   _____

- **Alarms:**
  Low level alarm set _____
  Low level alarm reset _____
  High level alarm set _____
  High level alarm reset _____
  Alarm Timer _____
Alternation: _____

- **(VFD) Speed Scale 1:**

  Level =   _____
  Speed =   _____

  (VFD) Speed Scale 2:

  Level =   _____
  Speed =   _____

- **Analog Output 4 Scale 1:**

  Display =   _____
  Output =   _____

- **Analog Output 4 Scale 2:**

  Display =   _____
  Output =   _____

- **Setup:**

  _____Trend Speed_____

Sigma Controls, Inc.
PROCESS CONTROLS AND INSTRUMENTATION
217 S. Fifth Street, Perkasie, PA 18944
PH: 215-257-3412   FAX: 215-257-3416

WARRANTY

All Sigma Controls, Inc. products are warranted to be free from defective materials and workmanship for one (1) year from date of shipment. Sigma reserves the right to repair or replace at its option any product found to be defective. In no event shall Sigma Controls, Inc. be liable for any consequential, incidental, or special damages and the limit of its liability shall not exceed the purchase price of the supplied equipment.

RETURN FOR REPAIR POLICY (WARRANTY/NON-WARRANTY REPAIR)

Return status can be determined upon factory inspection of returned equipment.
A completed Return Authorization form must accompany all items returned for repair.
Repairs will be evaluated as quickly as possible. Cost for non-warranty repairs will be provided before repairs are initiated and repairs will be completed only after approval by customer.

217 S. 5th Street, Perkasie, PA 18944   215-257-3412