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19. **TYPE OF SYSTEM**
    1. The PLC is an IDEC FC6A-C40P1CE system performing configuring, monitoring, reporting of shutdown, pressures, and temperatures to a local 8.4” IDEC HG3G Series HMI touch display. All user configurable variables can be entered into the PLC via the local HMI touch display. The panel is powered by a customer supplied 120vac. throughout this sequence the controller is referred to as PLC.
    2. The PLC is serving the function of both a unit controller (controlling the compressor package) and a site controller (controlling priority valves and SCADA)
20. **SPECIAL PROVISIONS**
    1. The PLC outputs can be forced (latching type function) via the ***PLC/HMI > OUTPUT I/O FORCES*** screen. Once the **MAINTENANCE MODE** is made active any running processes will be sequenced to a NORMAL shutdown state and the unit operating mode will be placed into a **MANUAL** state. The **MAINTENANCE MODE** will automatically be disabled when the timer runs out or by pressing the **MAINTENANCE MODE** **“OFF”** button on the HMI. While in this mode **NO automatic sequencing of the PLC will be available** and a **MAINTENANCE MODE** indicator will be visible in the top section of all HMI screens.
    2. Password protection exists on all set points
    3. The power for all relays is tied into the site ESD loop.
21. **UNIT MODE**
    1. **MANUAL** (HMI based) - The unit is started manually via the local start pushbutton or the HMI start pushbutton while the panel selection switch is in the “RUN” position.
    2. **AUTO** (HMI based) - The unit is started automatically via a call to start from the storage bank while the panel selection switch is in the “RUN” position.
    3. OPERATION SELECTION SWITCH
       1. **RESET** Position (momentary) – Used to reset alarms and fault conditions if they have been resolved.
       2. **OFF** Position (maintained) – No action allowed.
       3. **RUN** Position (maintained) – Required position for manual and automatic operation of the unit.
22. **GENERAL MOTOR CONTROLS**
    1. The Motor have running input feedbacks (**AUX** contacts). If the motor is commanded on (when in **AUTO** sequencing), the relevant motor run fail timer will be started. If the relevant motor running input is not closed before the timer expires, the unit will be shut down on the relevant motor run failure.
23. **PLC I/O FORCING (MAINTENANCE MODE)**
    1. While the unit is in a non-ESD shutdown state, waiting for start permissive from the station, or if it is ready to start, the operator has the ability to manually force on all relevant digital outputs via the ***PLC/HMI SETTINGS > OUTPUT I/O FORCES*** page on the HMI.
    2. When the **MAINTENANCE MODE ‘ON’** touch display button is pressed any active running processes will be sequenced to a **NORMAL** shutdown state and the unit’s operating mode will be placed into a **MANUAL** state. Once the proper state is in effect and the units panel selection switch is in the **RUN** position the latch (**ON**) and unlatch (**OFF**) touch display buttons for the so labeled I/O become functional
    3. When **MAINTENANCE MODE** is enabled the operator has 10 minutes to manually force the outputs. Additional time can be added by pressing the **ADD TIME** button located next to the remaining time countdown.
    4. **MAINTENANCE MODE** may be disabled at any time when the **MAINTENANCE MODE** ‘**OFF’** touch display button is pressed or the timer runs out.
    5. While **MAINTENANCE MODE** is enabled ALL unit shut down conditions are in effect with the exception of low pressure alarms and faults for **ALL** storage banks. Any shutdown will cause **MAINTENANCE MODE** to become inactive and any active forces will be reset.
24. **POWER UP AND READY TO START**

When the Power ON/OFF switch is turned to the ‘ON’ position the PLC will power up. The PLC will scan all inputs and the local HMI will display any alarms or shut downs that may exist. After the operator has corrected all shutdown conditions the PLC will initiate the currently selected fill mode selection. If the selected mode does not immediately require a unit run command the outputs will be driven to the following states.

* ESD Remote loop = Energized (De-energized on ESD activation)
* Unit Fault Indicator = De-Energized (Energized when in fault condition)
* Unit/Station Healthy Status Indicator = Energized (De-energized when not healthy)
* Main Motor Starter = De-Energized
* Inlet valve actuator = De-Energized (Closed)
* ESD / Flow valve = De-Energized (Closed)
* Drain / Load valve = De-Energized (Open)
* High Bank solenoid valve = De-Energized (Closed)
* Mid Bank solenoid valve = De-Energized (Closed)
* Low Bank solenoid valve = De-Energized (Closed)
* Time-Fill solenoid valve = De-Energized (Closed)

1. **START SEQUENCE**
   1. When the PLC is powered up and **AUTO** mode is selected, the PLC will examine the pressures of the **HIGH BANK**, **MID BANK**, **LOW BANK**, and **TIME-FILL**. When any of these pressures fall below the user configurable start pressure set point of that bank, the controller will issue a run command to the units.
   2. When the PLC is powered up and **MANUAL** mode is selected, the local HMI start pushbutton or the start pushbutton located on the main panel is pressed then the controller will issue a run command to that unit.
2. **UNIT RUNNING LOADED**

**8.1** The HMI will display an indicator of the **LOAD VALVE** state and the outputs will be driven to the following states:

* Drain/Load valve actuator = Energized (**Closed**)

1. **CLEARING CYCLE (DRAIN INTERVAL)**
   1. When the unit is running loaded the ‘**INTERVAL’** timer will start. Once the interval timer expires, the Drain / Load valve output will be De-Energized to open the valve and the ‘**DURATION’** timer will start. Once the Duration timer expires, the Drain / Load valve output will be Energized and the Interval timer will re-start.  
      During the clearing duration the low process pressure shutdowns and alarms will be locked out. When the ‘**DURATION’** timer expires the low process pressure shutdowns and alarms will be enabled. This sequence will occur repeatedly when the unit is running.
2. **STORAGE FILLING SEQUENCE (OPTIONAL PRIORITY PANEL)**
   1. Once the PLC has issued a run command, the PLC will energize the corresponding solenoid valve to the bank whose pressure is below its start pressure to begin filling the bank.
   2. The **DEMAND OFFSET** set points for high, mid, and low banks should be of value ranging from smallest offset to largest because storage filling is always **HIGH BANK** first, then the **MID BANK**, and lastly the **LOW BANK**. **DIRECT-FILL**, when enabled, can supersede **HIGH BANK** when a **HOSE IN USE** signal is active. **TIME-FILL**, when enabled, will fill after **LOW BANK**. This will allow the user to better utilize the storage capacity of each bank.  
      1. **DIRECT-FILL (IF ENABLED)**: Once the **DIRECT-FILL** demand has been satisfied, the **HIGH BANK** valve (solenoid/actuator) is energized (**OPEN**)
      2. **HIGH BANK**: Once the **HIGH BANK** demand has been satisfied, the **HIGH BANK** valve (solenoid/actuator) will remain energized (**OPEN**) and the **MID BANK** valve (solenoid/actuator) is energized (**OPEN**).
      3. **MID BANK**: Once the **MID BANK** demand has been satisfied, the **MID BANK** valve (solenoid or actuator) will remain energized (**OPEN**) and the **LOW BANK** valve (solenoid or actuator) is energized (**OPEN**).
      4. **TIME-FILL (IF ENABLED)**: Once the **LOW BANK** demand has been satisfied, the **LOW BANK** valve (solenoid or actuator) will remain energized (**OPEN**) and the **TIME-FILL** valve (solenoid or actuator) is energized (**OPEN**).
   3. Check valves should be installed downstream of the solenoid/actuator valves to prevent the banks from equalizing during the fill process. However, the storage banks will equalize pressures once the low bank is near the temperature compensated stopping pressure.
   4. **PRIORITIZING**
      1. When **DIRECT-FILL** is enabled, **HIGH BANK** is being filled, a **HOSE IN USE** signal is active, and the **DIRECT-FILL** pressure drops below its **FINAL TARGET PRESSURE** minus its **PRIORITY DEADBAND** setting, then the **HIGH BANK** valve (solenoid/actuator) will be de-energized (**CLOSED**) to allow the compressors to fill the **DIRECT-FILL** line.
      2. When the **MID BANK** is being filled, if the **HIGH BANK** pressure drops below its **FINAL TARGET PRESSURE** minus its **PRIORITY DEADBAND** setting, then the **MID BANK** valve (solenoid/actuator) will be de-energized (**CLOSED**) to allow the compressors to fill **HIGH BANK** storage.
      3. When the **LOW BANK** is being filled, if **HIGH BANK** or **MID BANK** pressures drops below their **FINAL TARGET PRESSURE** minus their **PRIORITY DEADBAND** settings, then the **LOW BANK** valve (solenoid/actuator) will be de-energized (**CLOSED**) to allow the compressors to fill the **HIGH BANK** or **MID BANK** as necessary.
      4. **TIME-FILL (IF ENABLED)**: When **HIGH BANK,** **MID BANK,** or **LOW BANK** pressures drops below their **FINAL TARGET PRESSURE** minus their **PRIORITY DEADBAND** settings, the **TIME-FILL** valve (solenoid/actuator) will be de-energized (**CLOSED**) to allow the compressors to fill the **HIGH BANK,** **MID BANK, LOW BANK** as necessary.
   5. **DIRECT FILLING**
      1. While dispensing gas (a **HOSE IN USE** signal is received). If the **DIRECT-FILL** pressure drops below the direct-fill **DEMAND** pressure while the compressor is running loaded, then the site controller de-energizes the **HIGH BANK**, **MID BANK**, **LOW BANK**, and **SLOW-FILL** (if enabled) valves to directly fill the vehicle at the dispenser. Once the dispenser **HOSE IN USE** signal is removed or if the **DIRECT-FILL** pressure exceeds its **FINAL TARGET** pressure, then the site controller will resume filling the storage banks.
   6. **DIRECT-FILL** line pressure falling below its **DEMAND** pressure will not start the compressor.
3. **STOP SEQUENCE**
   1. **NORMAL SHUTDOWN SEQUENCE**
      1. In control mode **MANUAL**, the unit stop will be initiated via the **STOP** touch display pushbutton available on the **STATUS** page dropdown menu for each compressor or their respective **STOP** pushbuttons on the control panel.
      2. In control mode **AUTO**, when the **FINAL TARGET** pressure has been met for all storage banks, the unit **STOP** command will be initiated.
      3. When given the STOP command and once the INLET VALVE, MOTOR, and LOAD timers expire the following conditions will be provided:  
         * ESD Remote loop = Energized (De-energized on ESD activation)
         * Unit Fault Indicator = De-Energized (Energized when in fault condition)
         * Unit/Station Healthy Status Indicator = Energized (Energized when healthy)
         * Main Motor Starter = De-Energized
         * Inlet valve actuator = De-Energized (Closed)
         * ESD / Flow valve = De-Energized (Closed)
         * Drain / Load valve = De-Energized (Open)
         * High Bank solenoid valve = De-Energized (Closed)
         * Mid Bank solenoid valve = De-Energized (Closed)
         * Low Bank solenoid valve = De-Energized (Closed)
         * Time-Fill solenoid valve = De-Energized (Closed)
      4. In **AUTO** mode, once the start/stop cycle is complete a restart delay timer starts (**HMI: COMP SETTINGS > SEQUENCE TIMINGS**). When the restart delay timer expires a **START SEQUENCE** can be initiated.
   2. **FAULT SHUTDOWN SEQUENCE**
      1. If a shutdown condition occurs, the following conditions will be provided:
         * ESD Remote loop = Energized (De-energized on ESD activation)
         * Unit Fault Indicator = Energized (Energized when in fault condition)
         * Unit/Station Healthy Status = De-Energized (Energized when healthy)
         * Main Motor Starter = De-Energized
         * Inlet valve actuator = De-Energized (Closed)
         * ESD / Flow valve = De-Energized (Closed)
         * Drain / Load valve = De-Energized (Open)
         * High Bank solenoid valve = De-Energized (Closed)
         * Mid Bank solenoid valve = De-Energized (Closed)
         * Low Bank solenoid valve = De-Energized (Closed)
         * Time-Fill solenoid valve = De-Energized (Closed)
      2. The HMI will indicate the shutdown condition on the main **STATUS** page and **ALARM DISPLAY** page.
      3. Once the fault shutdown condition has been corrected and the operator has pressed the **RESET** HMI pushbutton from the dropdown menu or selected **RESET** on the faulted compressors panel selection switch, the PLC will advance that compressor to a **STATUS OK** state and will await a new start sequence.
   3. **ESD SHUTDOWN SEQUENCE**
      1. If an ESD condition occurs, the following conditions will be provided:
         * ESD Remote loop = De-Energized (De-energized on ESD activation)
         * Unit Fault Indicator = Energized (Energized when in fault condition)
         * Unit/Station Healthy Status = De-Energized (Energized when healthy)
         * Main Motor Starter = De-Energized
         * Inlet valve actuator = De-Energized (Closed)
         * ESD / Flow valve = De-Energized (Closed)
         * Drain / Load valve = De-Energized (Open)
         * High Bank solenoid valve = De-Energized (Closed)
         * Mid Bank solenoid valve = De-Energized (Closed)
         * Low Bank solenoid valve = De-Energized (Closed)
         * Time-Fill solenoid valve = De-Energized (Closed)
      2. The HMI will indicate the ESD condition on the main **STATUS** page and **ALARMS DISPLAY** page.
      3. Once the ESD condition has been corrected and the operator has pressed the RESET HMI pushbutton from the dropdown menu or selected RESET on either compressors panel selection switch, the PLC will advance that compressor to a STATUS OK state and will await a new start sequence.
4. **DISPENSER VALVE ACTUATION**
   1. When a dispenser handle signal (**HOSE IN USE**) is received, the **FLOW VALVE** will be Energized (**OPEN**) to open the valves. Any time the signal is removed the output will be De-Energized (**CLOSED**).
5. **TEMPERATURE COMPENSATION**
   1. Formula used to derive the temperature compensated **FINAL TARGET** pressures for **DIRECT-FILL** and **TIME-FILL**  
      PT = ((( T – 70) \* 16.6 ) + PS )

PO = PT \* ( 1 + ( F/ 100 ))

If ( PO > C ) then { PFinal = C } else { PFinal = PO }

* + - * Pt = **TARGET** pressure
      * Ps = **FILL TO** pressure
      * PO= Target with **OVERFILL** percentage applied
      * PFinal = **FINAL TARGET** pressure with clipping applied
      * T = Ambient Temperature in degrees Fahrenheit
      * F = Overfill percentage
      * C = Clipping pressure

If FINAL TARGET pressure exceeds CLIPPING pressure then FINAL TARGET shall equal CLIPPING pressure.

* 1. Formula used to derive the temperature compensated **FINAL TARGET** pressures for **HIGH BANK**, **MIDBANK**, and **LOW BANK**.

PT = PS \* ( T + R ) / ( THI + R )

PO = PT \* ( 1 + ( F/ 100 ))

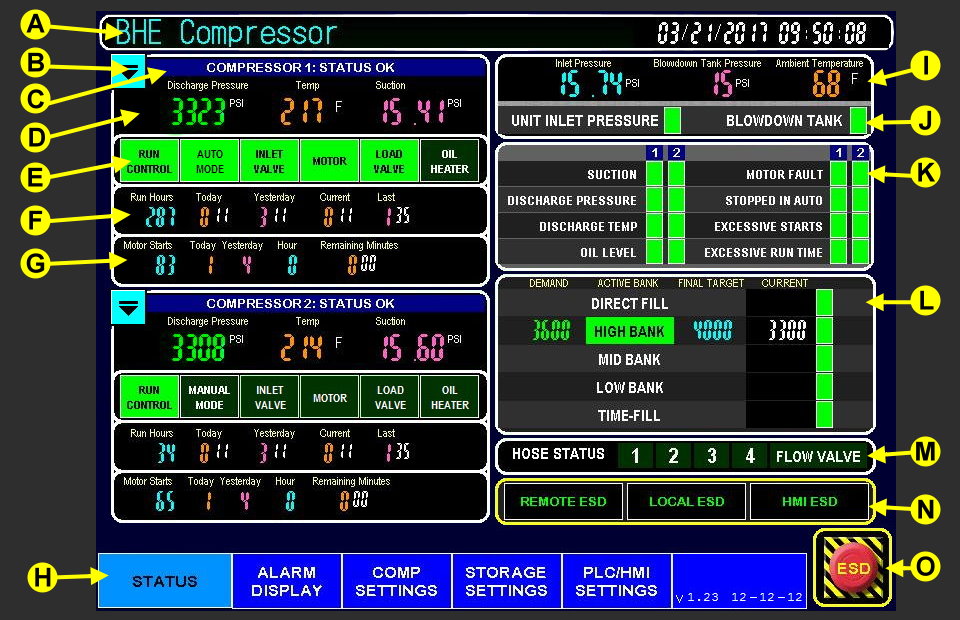
If ( PO > C ) then { PFinal = C } else { PFinal = PO }

* + - * Pt = **TARGET** pressure
      * Ps = **FILL TO** pressure
      * PO= **TARGET** with **OVERFILL** percentage applied
      * PFinal = **FINAL TARGET** pressure with clipping applied
      * T = Ambient Temperature in degrees Fahrenheit
      * THI = Ambient High Temperature in degrees Fahrenheit
      * R = is the value of 460 to convert Degrees Fahrenheit to Rankine
      * F = Overfill percentage
      * C = Clipping pressure

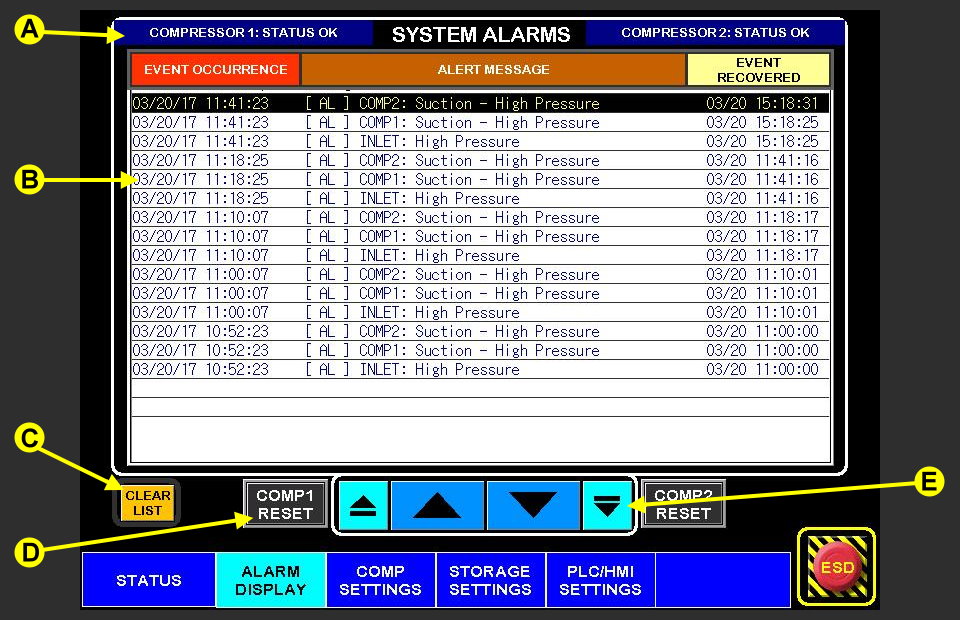
1. **ALARM AND SHUTDOWN FUNCTIONS**AL: Alarm  
   SD: Shutdown  
   IND: Indication (value display only)  
   CTL: Control  
   N/A: Not applicable  
     
   Shutdown/Alarm class descriptions:  
   Class “ESD” - Active at all times.  
   Class “A” - Active at all times.  
   Class “A/S” – Active at all times once a certain condition is met.  
   Class “S” – Active when a certain process condition is met.  
   Class “P” Enable once the unit is RUNNING – Load Control Enabled

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | ANNUNCIATION | DEVICE | TYPE | RANGE | SD/AL/ IND | CLASS | SETPOINT |
| 1 | Remote Shutdown Pressed |  | Discrete | N/A | SD | ESD | N/A |
| 2 | Local Shutdown Pressed |  | Discrete | N/A | SD | ESD | N/A |
| 3 | HMI Shutdown Pressed |  | Discrete | N/A | SD | ESD | N/A |
| 4 | COMP1: Low Oil Level |  | Discrete | N/A | SD | A | N/A |
| 5 | COMP1: Discharge Overpressure Switch |  | Discrete | N/A | SD | S | N/A |
| 6 | COMP1: Motor Overload |  | Discrete | N/A | SD | S | N/A |
| 7 | COMP1: Motor Run Fault |  | Discrete | N/A | SD | S | N/A |
| 8 | COMP1: Excessive Motor Starts |  | Logic | N/A | SD | S | N/A |
| 9 | COMP1: Stopped While in AUTO mode |  | Logic | N/A | SD | P | N/A |
| 10 | COMP1: Excessive Run Time |  | Logic | N/A | SD | P | N/A |
| 11 | COMP2: Low Oil Level |  | Discrete | N/A | SD | A | N/A |
| 12 | COMP2: Discharge Overpressure Switch |  | Discrete | N/A | SD | S | N/A |
| 13 | COMP2: Motor Overload |  | Discrete | N/A | SD | S | N/A |
| 14 | COMP2: Motor Run Fault |  | Discrete | N/A | SD | S | N/A |
| 15 | COMP2: Excessive Motor Starts |  | Logic | N/A | SD | S | N/A |
| 16 | COMP2: Stopped While in AUTO mode |  | Logic | N/A | SD | P | N/A |
| 17 | COMP2: Excessive Run Time |  | Logic | N/A | SD | P | N/A |
| 18 | INLET: Transducer Fault | K-30V100 | 4-20ma | -30in to 100 PSIG | SD | A | N/A |
| 19 | INLET: High Pressure | SD | S | 35 |
| 20 | INLET: Low Pressure | SD | S | 10 |
| 21 | INLET: High Pressure | AL | S | 30 |
| 22 | INLET: Low Pressure | AL | S | 5 |
| 23 | BLOWDOWN: Transducer Fault | K-300 | 4-20ma | 0-300 PSIG | SD | A | N/A |
| 24 | BLOWDOWN: High Pressure | SD | S | 275 |
| 25 | BLOWDOWN: High Pressure | AL | S | 250 |
| 26 | COMP1: Suction - Transducer Fault | K-30V100 | 4-20ma | -30in to 100 PSIG | SD | A | N/A |
| 27 | COMP1: Suction - High Pressure | SD | A/S | 25 |
| 28 | COMP1: Suction - Low Pressure | SD | A/S | -5 |
| 29 | COMP1: Suction - High Pressure | AL | A/S | 20 |
| 30 | COMP1: Suction - Low Pressure | AL | A/S | 0 |
| 31 | COMP2: Suction - Transducer Fault | K-30V100 | 4-20ma | -30in to 100 PSIG | SD | A | N/A |
| 32 | COMP2: Suction - High Pressure | SD | A/S | 25 |
| 33 | COMP2: Suction - Low Pressure | SD | A/S | -5 |
| 34 | COMP2: Suction - High Pressure | AL | A/S | 20 |
| 35 | COMP2: Suction - Low Pressure | AL | A/S | 0 |
| 36 | COMP1: Discharge - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 37 | COMP1: Discharge - High Pressure | SD | A/S | 4400 |
| 38 | COMP1: Discharge - Low Pressure | SD | A/S | 0 |
| 39 | COMP1: Discharge - High Pressure | AL | A/S | 4350 |
| 40 | COMP1: Discharge - Low Pressure | AL | A/S | 0 |
| 41 | COMP2: Discharge - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 42 | COMP2: Discharge - High Pressure | SD | A/S | 4400 |
| 43 | COMP2: Discharge - Low Pressure | SD | A/S | 0 |
| 44 | COMP2: Discharge - High Pressure | AL | A/S | 4350 |
| 45 | COMP2: Discharge - Low Pressure | AL | A/S | 0 |
| 46 | COMP1: Discharge - Thermocouple Fault | K-TYPE | Thermo-couple | -328 to 2372°F | SD | A | N/A |
| 47 | COMP1: Discharge - High Temperature | SD | A/S | 275 |
| 48 | COMP1: Discharge - High Temperature | AL | A/S | 250 |
| 49 | COMP2: Discharge - Thermocouple Fault | K-TYPE | Thermo-couple | -328 to 2372°F | SD | A | N/A |
| 50 | COMP2: Discharge - High Temperature | SD | A/S | 275 |
| 51 | COMP2: Discharge - High Temperature | AL | A/S | 250 |
| 52 | AMBIENT TEMPERATURE: Probe Fault | TGT-TP | 0-10v | 0-1000 °F | AL | A | N/A |
| 53 | AMBIENT TEMPERATURE: High Temperature | AL | A/S | 150 |
| 54 | STORAGE: Direct Fill - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 55 | STORAGE: Direct Fill - High Pressure | SD | A | 4450 |
| 56 | STORAGE: Direct Fill - Low Pressure | SD | A | 0 |
| 57 | STORAGE: Direct Fill - High Pressure | AL | A | 4375 |
| 58 | STORAGE: Direct Fill - Low Pressure | AL | A | 0 |
| 59 | STORAGE: High Bank - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 60 | STORAGE: High Bank - High Pressure | SD | A | 4450 |
| 61 | STORAGE: High Bank - Low Pressure | SD | A | 0 |
| 62 | STORAGE: High Bank - High Pressure | AL | A | 4375 |
| 63 | STORAGE: High Bank - Low Pressure | AL | A | 0 |
| 64 | STORAGE: Mid Bank - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 65 | STORAGE: Mid Bank - High Pressure | SD | A | 4450 |
| 66 | STORAGE: Mid Bank - Low Pressure | SD | A | 0 |
| 67 | STORAGE: Mid Bank - High Pressure | AL | A | 4375 |
| 68 | STORAGE: Mid Bank - Low Pressure | AL | A | 0 |
| 69 | STORAGE: Low Bank - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 70 | STORAGE: Low Bank - High Pressure | SD | A | 4450 |
| 71 | STORAGE: Low Bank - Low Pressure | SD | A | 0 |
| 72 | STORAGE: Low Bank - High Pressure | AL | A | 4375 |
| 73 | STORAGE: Low Bank - Low Pressure | AL | A | 0 |
| 74 | STORAGE: Time Fill - Transducer Fault | K-10000 | 4-20ma | 0-10000 PSIG | SD | A | N/A |
| 75 | STORAGE: Time Fill - High Pressure | SD | A | 4200 |
| 76 | STORAGE: Time Fill - Low Pressure | SD | A | 0 |
| 77 | STORAGE: Time Fill - High Pressure | AL | A | 4100 |
| 78 | STORAGE: Time Fill - Low Pressure | AL | A | 0 |

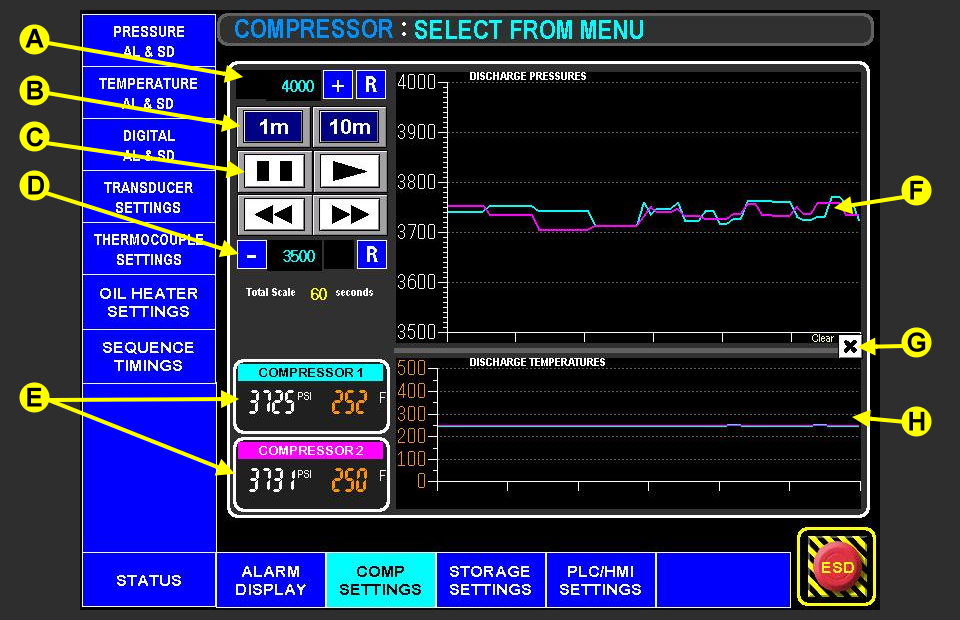
1. **HMI MENUS & CONFIGURABLE PROCESS VARIABLES**
   1. **Main Status Screen: Legend and overview**C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\flashing.jpg Alternating **GREEN** and **RED** indicates a TRANSDUCER FAULT.  
      C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\red.jpg **RED** = SD (High) condition, example OVER PRESSURE.  
      C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\yellow.jpg **YELLOW** = AL (High) condition.  
      C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\green.jpg **GREEN** = OK, normal operating condition.  
      C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\cyan.jpg **CYAN** = AL (Low) condition.  
      C:\Users\Admin\AppData\Local\Microsoft\Windows\INetCache\Content.Word\magenta.jpg **MAGENTA** = SD (Low) condition, example UNDER PRESSURE.  
      (A) Site Name, Defined in the EMAIL section under PLC/HMI SETTINGS.  
      (B) Individual compressors dropdown pushbutton menu allowing for HMI Starting,  
       Stopping, and Manual/Auto Mode unit changes.  
      (C) Individual compressor general health, either STATUS OK or STATUS FAULTED.  
      (D) Individual compressor Dischage pressure, Discharge Temperature, and Suction  
       pressure.  
      (E) Individual compressor operational states of the RUN position switch, Logical  
       Manual/Auto mode, Inlet valve, Motor starter, Load valve, and Crankcase oil heater.  
      (F) Individual compressor total RUN HOURS, for today, for yesterday, for current run, and  
       for the last run.  
      (G) Individual compressor total MOTOR STARTS, today starts, yesterday starts, and dynamic  
       start window for the excessive motor starts within an Hour fault and its remaining timer  
       (This is a logical fault condition to prevent excessive short cycling of the compressor).   
      (H) Menu Categories.  
      (I) Inlet pressure, Blowdown tank pressure, and Ambient temperature.  
      (J) UNIT INLET PRESSURE OK/AL/SD indicator  
       BLOWDOWN TANK pressure OK/AL/SD indicator  
      (K) (Analog) SUCTION 1 & 2 OK/AL/SD indicator  
       (Analog) DISCHARGE PRESSURE 1 & 2 OK/AL/SD indicator  
       (Analog) DISCHARGE TEMPERATURE 1 & 2 OK/AL/SD indicator  
       (Digital) OIL LEVEL 1 & 2 OK/SD indicator  
       (Digital) MOTOR FAULT 1 & 2 OK/SD indicator  
       (Logical) STOPPED IN AUTO 1 & 2 OK/SD indicator  
       (Logical) EXCESSIVE STARTS 1 & 2 indicator  
       (Logical) EXCESSIVE RUN TIME 1 & 2 OK/SD indicator.  
      (L) DEMAND pressure values, ACTIVE BANK(s) indicator , FINAL TARGET pressure(s), and  
       CURRENT BANK pressure(s).  
      (M) HOSE IN USE (1-4) and FLOW VALVE indicators.  
      (N) ESD Condition indicators.  
      (O) HMI ESD pushbutton (Logical).



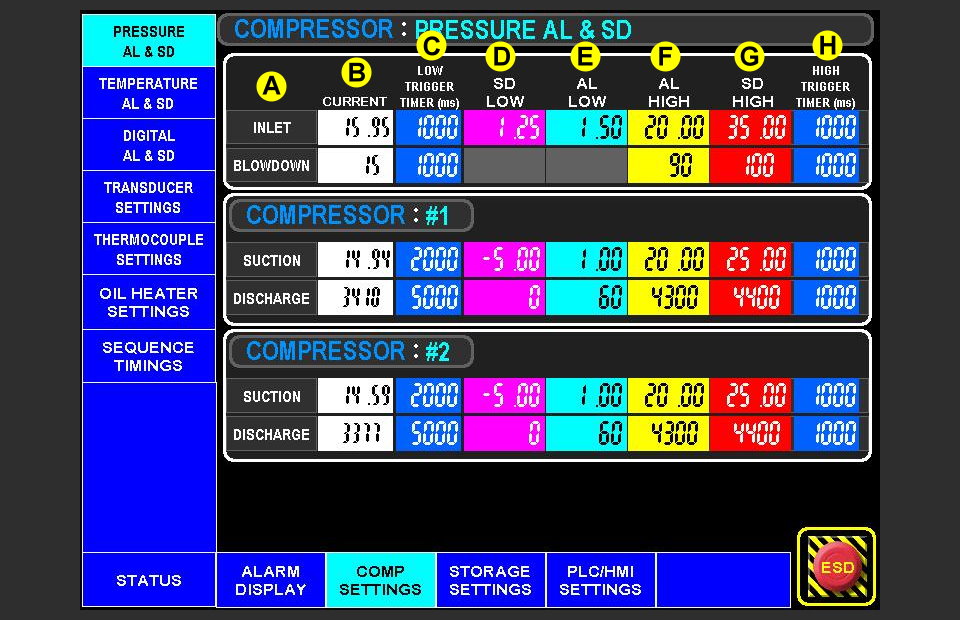
* 1. **Alarm Screen**  
     (A) Individual compressor general health, either STATUS OK or STATUS FAULTED.  
     (B) Event Occurrence: Date and timestamp when the event triggered.  
      Alert Message: [*Type*] *source: affected* Event Recovered: Date and timestamp when the event was recovered or reset.  
     (C) Clears the SYSTEM ALARMS list.  
     (D) COMPRESSOR # reset pushbutton.  
     (E) Page up, scroll up, scroll down, and page down pushbuttons.



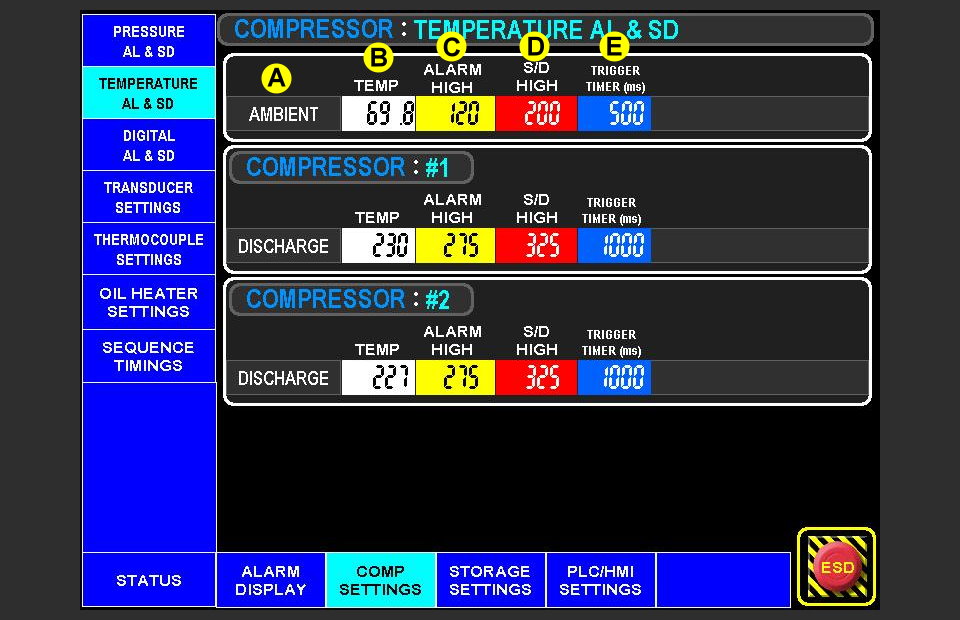
* 1. **Compressor Menu Selection Screen**  
     (A) Upper graph display boundary (5000 maximum). ‘R’ button resets to maximum.  
     (B) Visible data sample duration for both DISCHARGE PRESSURES and DISCHARGE  
      TEMPERATURES each in their respective line colors. When 1 minute is selected each  
      segment is 10 seconds. When 10 minute is selected each segment is approximately  
      100 seconds.  
     (C) PAUSE, PLAY real-time, scroll BACKWARDS and scroll FORWARD (only while paused).  
     (D) Lower graph display boundary (0 minimum). ‘R’ button resets to minimum.  
     (E) Real-time compressor DISCHARGE PRESSURE(s) and DISCHARGE TEMPERATURE(s).  
     (F) DISCHARGE PRESSURES trending graph with user selectable ranges and scale.  
     (G) Clear all trending data pushbutton.  
     (H) DISCHARGE TEMPERATURES trending graph follows user selected durations.



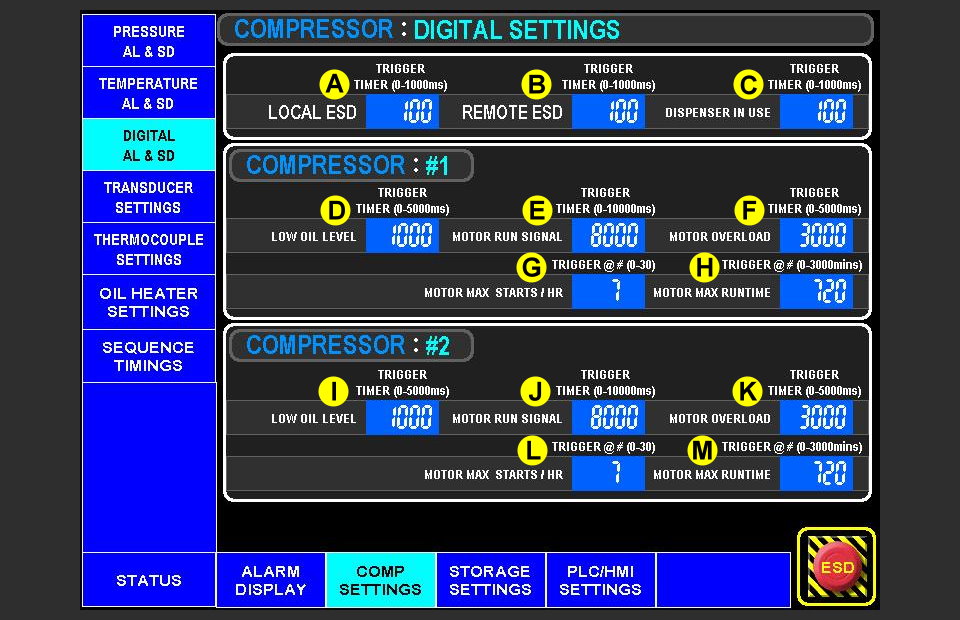
* 1. **Compressor Pressure Alarm and Shutdown Settings**  
     (A) Device name.  
     (B) A reference display of the current pressure as reported by the plc.   
     (C) LOW TRIGGER TIMER setting. This timer starts once a LOW condition is in effect. If in  
      effect for the duration of the timer and the timer expires, then the corresponding LOW  
      condition alarm (AL) or shutdown (SD) is triggered and the UNIT will respond according  
      to the related defined sequence.  
     (D) Pressure condition ‘SD LOW’ threshold that if passed below, will start the LOW TRIGGER  
      TIMER for said shutdown (SD) condition.  
     (E) Pressure condition ‘AL LOW’ threshold that if passed below, will start the LOW TRIGGER  
      TIMER for said alarm (AL) condition.  
     (F) Pressure condition ‘AL HIGH’ threshold that if exceeded, will start the HIGH TRIGGER  
      TIMER for said alarm (AL) condition.  
     (G) Pressure condition ‘SD HIGH’ threshold that if exceeded, will start the HIGH TRIGGER  
      TIMER for said shutdown (SD) condition.  
     (H) HIGH TRIGGER TIMER setting. This timer starts once a HIGH condition is in effect. If in  
      effect for the duration of the timer and the timer expires, then the corresponding HIGH  
      condition alarm (AL) or shutdown (SD) is triggered and the UNIT will respond according  
      to the defined sequence.



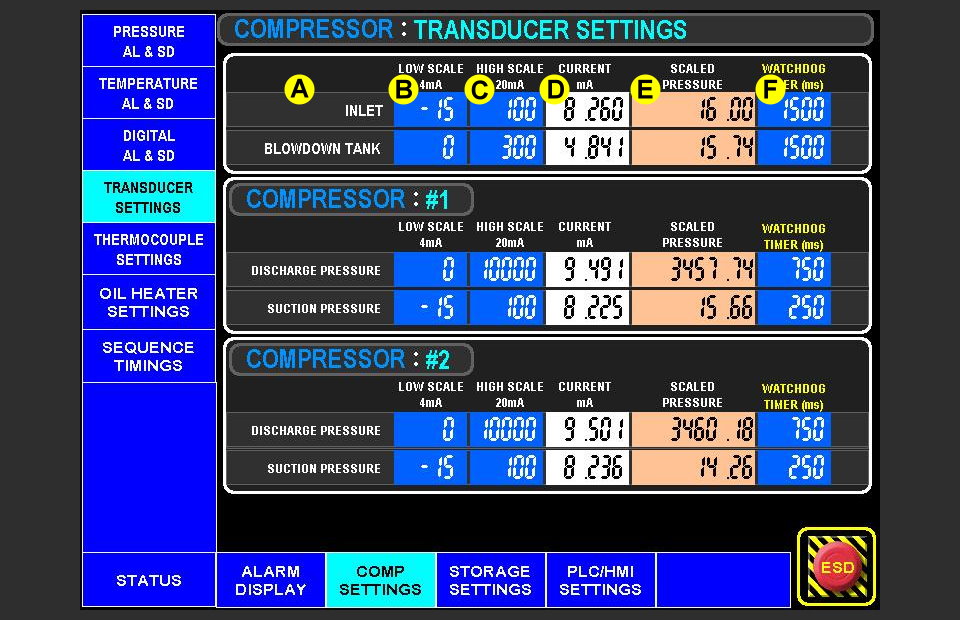
* 1. **Compressor Temperature Alarm and Shutdown Settings**  
       
     (A) Device name.  
     (B) A reference display of the current temperature as reported by the thermocouple.  
     (C) Pressure condition ‘AL HIGH’ threshold that if exceeded, will start the TRIGGER  
      TIMER for said alarm (AL) condition.  
     (D) Pressure condition ‘SD HIGH’ threshold that if exceeded, will start the TRIGGER  
      TIMER for said shutdown (SD) condition.  
     (E) TRIGGER TIMER setting. This timer duration starts once a condition is in effect. If in  
      effect for the duration of the timer and the timer expires, then the corresponding HIGH  
      condition alarm (AL) or shutdown (SD) is triggered and the UNIT will respond  
      according to the defined sequence.



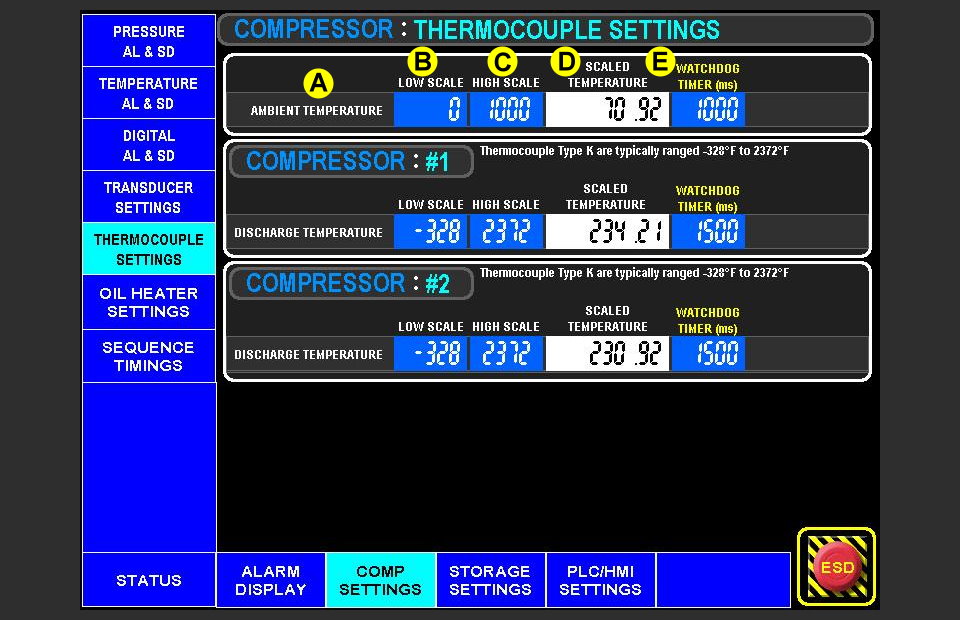
* 1. **Compressor Digital and Logical Shutdown Settings**  
     (A) LOCAL ESD: TRIGGER TIMER setting. This timer duration starts once the condition is in  
      effect. If in effect for the duration of the timer and the timer expires, then the  
      corresponding shutdown (ESD) is triggered and the UNIT will respond according to the  
      defined ESD shutdown sequence.  
     (B) REMOTE ESD: TRIGGER TIMER setting. This timer duration starts once the condition is in  
      effect. If in effect for the duration of the timer and the timer expires, then the  
      corresponding shutdown (ESD) is triggered and the UNIT will respond according to the  
      defined ESD shutdown sequence.  
     (C) DISPENSER IN USE: TRIGGER TIMER setting. This timer duration starts once a ‘HOSE IN  
      USE’ signal is received. If in effect past the duration of the timer , the FLOW VALVE will  
      be Energized (OPEN) to allow flow from storage to the signaling dispenser until ALL  
      ‘HOSE IN USE’ signals have been terminated.  
     (D,I) Compressor #, LOW OIL LEVEL: TRIGGER TIMER setting. This timer duration starts once  
      the condition is in effect. If in effect for the duration of the timer and the timer expires,  
      then the corresponding shutdown (SD) is triggered and the UNIT will respond according  
      to the defined shutdown sequence.  
     (E,J) Compressor #, MOTOR RUN SIGNAL: TRIGGER TIMER setting. This timer duration starts  
      once the motor has been commanded to start. If no MOTOR RUN SIGNAL is returned  
      and the timer expires, then the corresponding shutdown (SD) is triggered and the UNIT  
      will respond according to the defined shutdown sequence.  
     (F,K) Compressor #, MOTOR OVERLOAD: TRIGGER TIMER setting. This timer duration starts  
      once the MOTOR OVERLOAD signal has been lost. If no MOTOR OVERLOAD signal is  
      returned and the duration of the timer expires, then the corresponding shutdown (SD) is  
      triggered and the UNIT will respond according to the defined shutdown sequence.  
     (G,L) Compressor #, MAX STARTS / HR: TRIGGER EVENT setting. Once the motor starts and no  
      MAX STARTS timer is in effect, a 60 minute countdown timer starts. Each start while the  
      timer is active counts toward MAX STARTS. If the MAX STARTS count is exceeded a  
      shutdown condition for the specific compressor is triggered. Once the countdown timer  
      expires the starts counter is reset to zero. This is information is displayed on the main  
      status page in the STARTS section.  
     (H,M) Compressor #, MOTOR MAX RUNTIME: TRIGGER EVENT setting. During a single  
      sequence cycle, if the motor is energized longer than the specified time (defined in  
      minutes) a shutdown event will be triggered for the specific compressor.



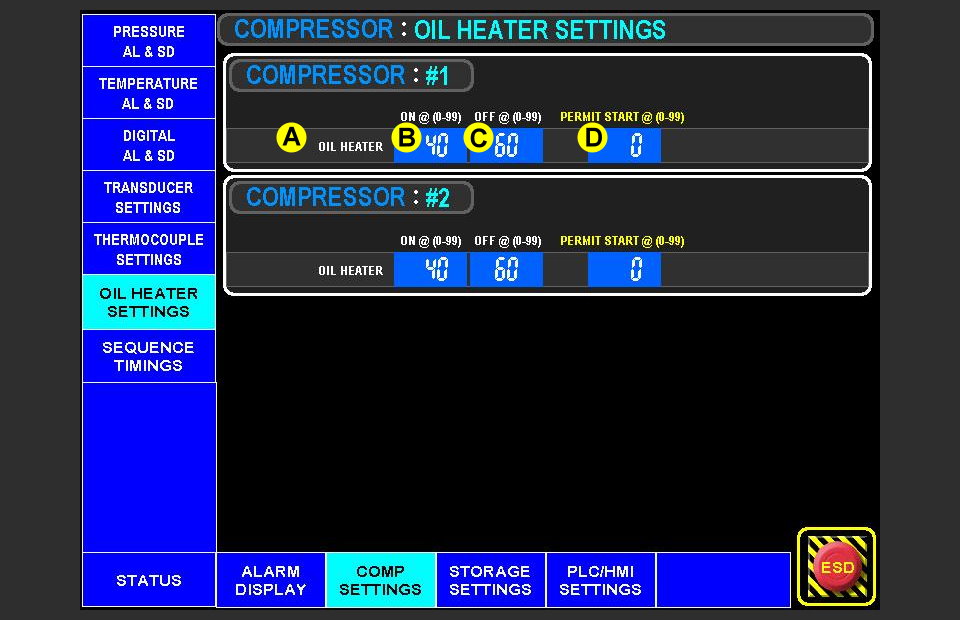
* 1. **Compressor Transducer Settings**  
     (A) Device name.  
     (B) Transducer scale LOW value (4ma)   
     (C) Transducer scale HIGH value (20ma)  
     (D) A reference display of the transducer current as reported by the plc.   
     (E) A reference display of the current scaled pressure.  
     (F) WATCHDOG TIMER setting. This monitors the state of the transducer. This timer starts  
      once the transducer current is < 3.82ma or > 20.36ma (out of bounds low or high). If the  
      timer expires, then the corresponding shutdown (SD) condition is triggered and the  
      UNIT will respond according to the defined sequence.



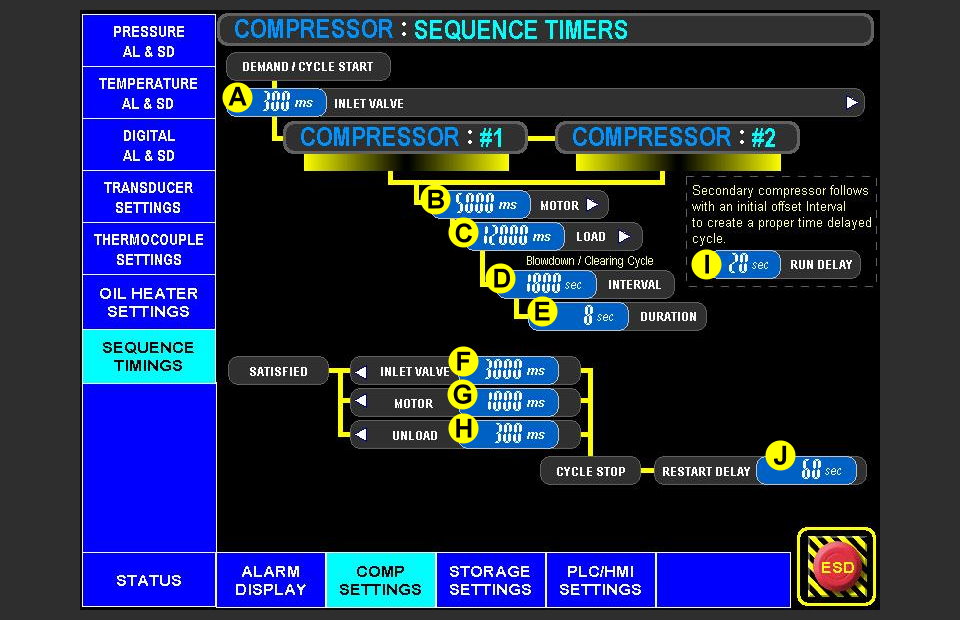
* 1. **Compressor Thermocouple Settings**  
     (A) Device name.  
     (B) Thermocouple scale LOW value.  
     (C) Thermocouple scale HIGH value  
     (D) A reference display of the current scaled temperature in degrees Fahrenheit.  
     (E) WATCHDOG TIMER setting. This monitors the state of the thermocouple. This timer  
      starts once the thermocouple sensor is out of bounds low or high. If the timer expires,  
      then the corresponding shutdown (SD) condition is triggered and the UNIT will respond  
      according to the defined sequence.



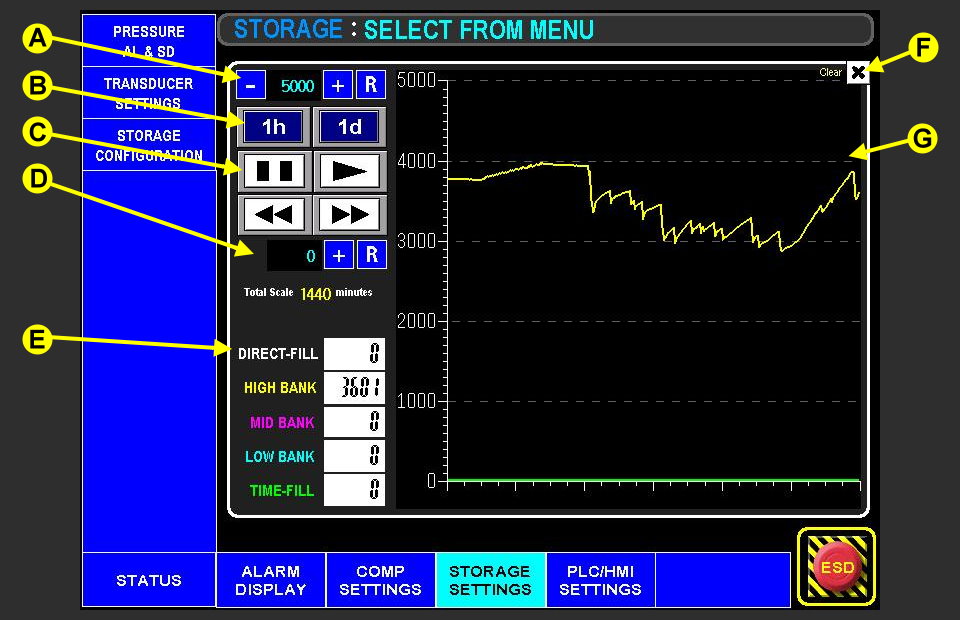
* 1. **Compressor Oil Heater Settings**  
       
     (A) Device name.  
     (B) Low temperature at which to energize the compressors crankcase oil heater.  
     (C) High temperature at which to de-energize the compressors crankcase oil heater.  
     (D) Permit AUTO mode starting when temperature is >= set point ( 0=Disabled).



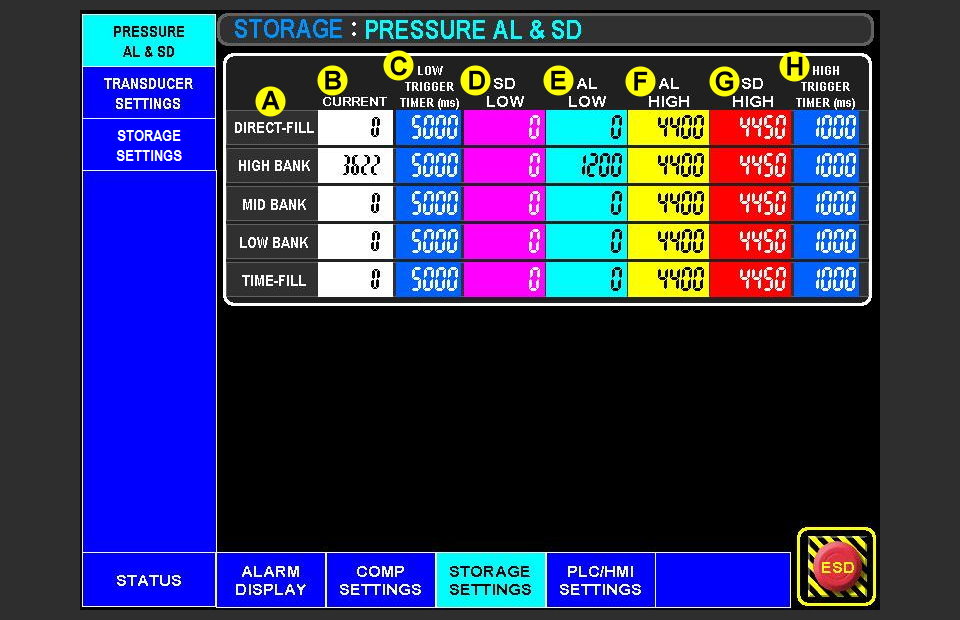
* 1. **Compressor Sequence Timers**  
       
     (A) Once a cycle starts, be it from ‘DEMAND’ or manual ‘START’ pushbutton, the ‘INLET’  
      delay timer is started. When the timer expires the INLET valve is energized (OPEN).  
     (B) Once the ‘INLET’ valve is energized a ‘MOTOR’ delay timer starts. When the timer  
      expires the ‘MOTOR’ run is energized (ON).  
     (C) Once the ‘MOTOR’ run is energized a ‘LOAD’ delay timer starts. When the timer expires  
      the ‘Blowdown/Clearing cycle’ logic is activated.  
     (D) Once the ‘Blowdown/Clearing cycle’ logic is active an ‘INTERVAL’ timer is started.   
     (E) Each time the ‘INTERVAL’ timer is triggered the compressor De-energizes (OPEN) the  
      ‘LOAD’ valve, starts a duration timer, then Re-Energizes (CLOSE) the ‘LOAD’ valve once  
      the timer expires.  
       
     **When all storage is brought to a satisfied state, meaning pressures => Final target pressures, the compressor starts three separate ‘NORMAL’ shutdown timers.**  
      (F) When the INLET VALVE timer expires the inlet valve will be De-Energized  
      (CLOSED).  
      (G) When the MOTOR run timer expires the motor will be De-Energized (OFF).  
      (H) When the UNLOAD timer expires the ‘Blowdown/Clearing cycle’ logic is  
      deactivated and the ‘LOAD’ valve is De-Energized (OPEN).  
       
       
     (I) Once a ‘MOTOR’ is energized for a compressor a delay timer starts. When the timer  
      expires the second compressor is permitted to start.  
     (J) When a ‘NORMAL’ shutdown of a compressor (in AUTO mode) takes place a RESTART  
      timer is established. Once the RESTART timer expires, the compressor is permitted to  
      START.



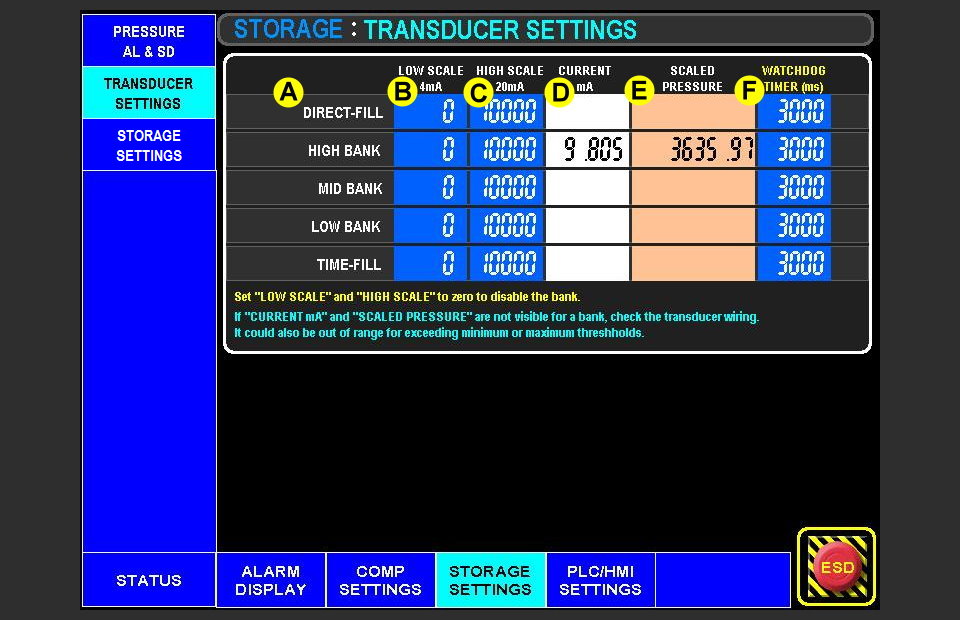
* 1. **Storage Main Selection Menu**  
       
     (A) Upper graph display boundary (5000 maximum). ‘R’ button resets to maximum.  
     (B) Visible data sample duration for STORAGE PRESSURE(s) each in their respective line  
      colors. When 1h is selected each minor segment is 2.5 minutes. When 1d is  
      selected each minor segment is approximately 1 hour.  
     (C) PAUSE, PLAY real-time, scroll BACKWARDS and scroll FORWARD (only while paused).  
     (D) Lower graph display boundary (0 minimum). ‘R’ button resets to minimum.  
     (E) Real-time STORAGE PRESSURE(s).   
     (F) Clear all trending data pushbutton.  
     (G) STORAGE PRESSURE(s) trending graph with user selectable ranges and scale.



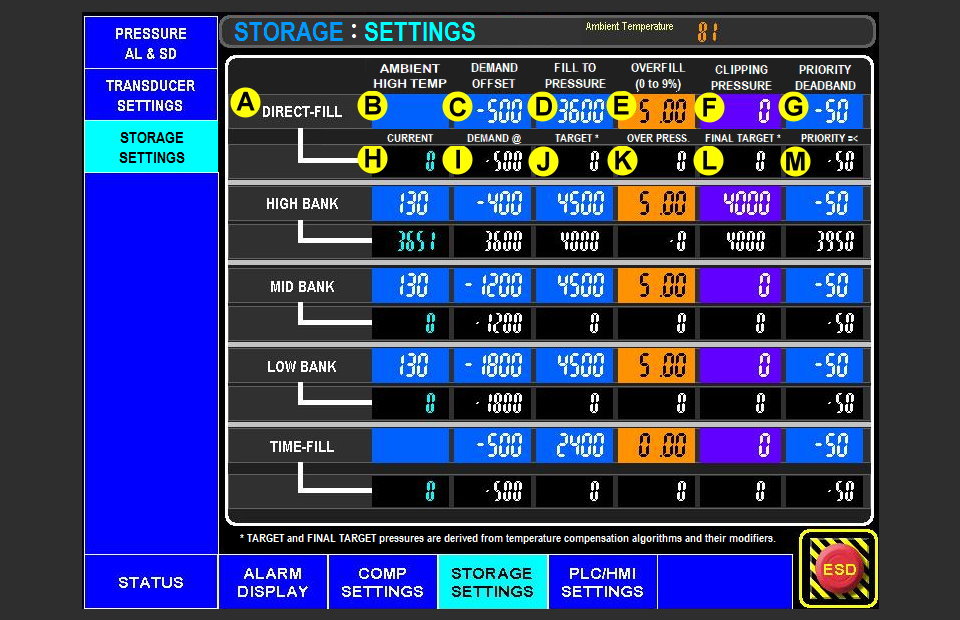
* 1. **Storage Pressure Alarm and Shutdown Settings**  
     (A) Device name.  
     (B) A reference display of the current pressure as reported by the plc.   
     (C) LOW TRIGGER TIMER setting. This timer starts once a LOW condition is in effect. If in  
      effect for the duration of the timer and the timer expires, then the corresponding LOW  
      condition alarm (AL) or shutdown (SD) is triggered and the UNIT will respond according  
      to the related defined sequence.  
     (D) Pressure condition ‘SD LOW’ threshold that if passed below, will start the LOW TRIGGER  
      TIMER for said shutdown (SD) condition.  
     (E) Pressure condition ‘AL LOW’ threshold that if passed below, will start the LOW TRIGGER  
      TIMER for said alarm (AL) condition.  
     (F) Pressure condition ‘AL HIGH’ threshold that if exceeded, will start the HIGH TRIGGER  
      TIMER for said alarm (AL) condition.  
     (G) Pressure condition ‘SD HIGH’ threshold that if exceeded, will start the HIGH TRIGGER  
      TIMER for said shutdown (SD) condition.  
     (H) HIGH TRIGGER TIMER setting. This timer starts once a HIGH condition is in effect. If in  
      effect for the duration of the timer and the timer expires, then the corresponding HIGH  
      condition alarm (AL) or shutdown (SD) is triggered and the UNIT will respond according  
      to the defined sequence.



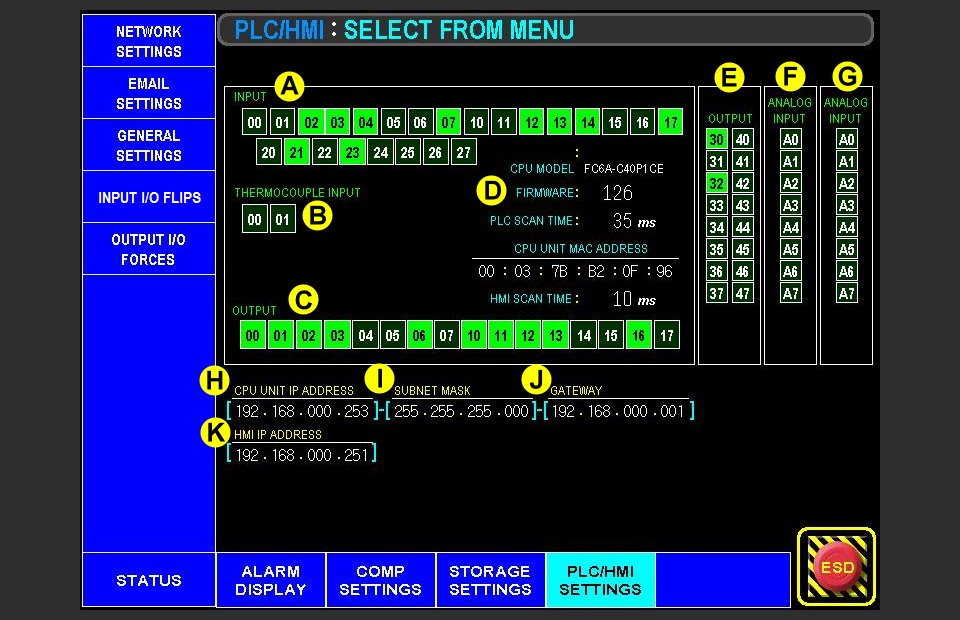
* 1. **Storage Transducer Settings**  
     (A) Device name.  
     (B) Transducer scale LOW value (4ma)   
     (C) Transducer scale HIGH value (20ma)  
     (D) A reference display of the transducer current as reported by the plc.   
     (E) A reference display of the current scaled pressure.  
     (F) WATCHDOG TIMER setting. This monitors the state of the transducer. This timer starts  
      once the transducer current is < 3.82ma or > 20.36ma (out of bounds low or high). If the  
      timer expires, then the corresponding shutdown (SD) condition is triggered and the  
      UNIT will respond according to the defined sequence.



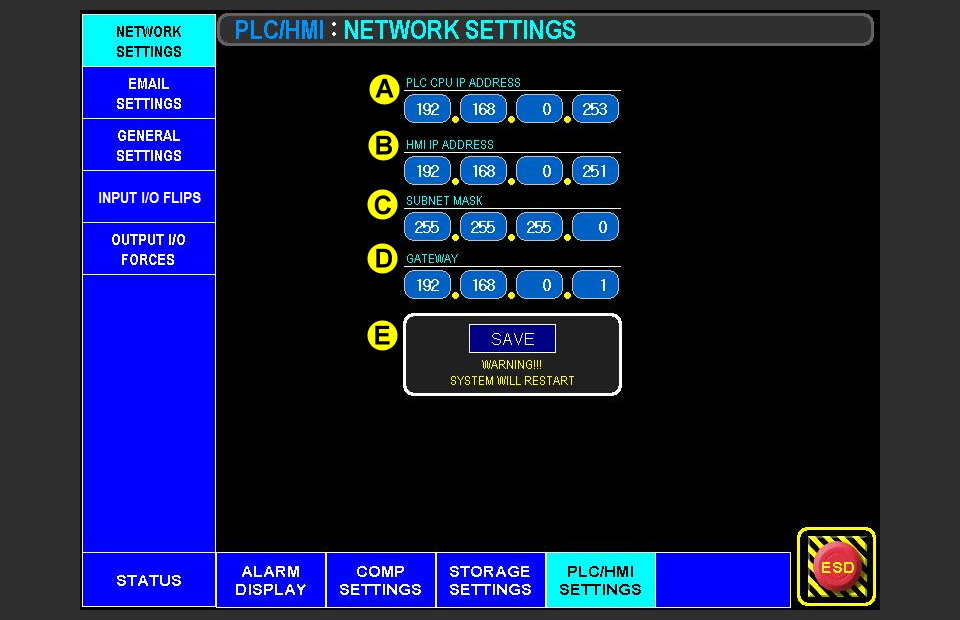
* 1. **Storage Settings**  
     (A) Storage bank name.  
     (B) **Ambient High Temperature**: Applies to High, Mid, and Low banks. The ambient  
      temperature in which the ‘Fill to pressure’ setting is achieved.  
     (C) **Demand Offset**: Offset from ‘TARGET’ pressure to determine a demand state.  
     (D) **Fill to Pressure**: For High, Mid, and Low banks see temperature compensation in  
      section 13.2. For Direct-fill and Time-fill see temperature compensation in section 13.1  
     (E) **Overfill %**: Percentage of ‘TARGET’ pressure to ‘OVER-FILL’.  
     (F) **Clipping Pressure**: No pressure target pressure shall rise above this setting regardless of  
      temperature compensation.  
     (G) **Priority Deadband**: Offset to decide at what pressure a bank is given priority/re-  
      prioritization.  
     (H) A reference display of the current scaled pressure.  
     (I) **Demand @**: The pressure in which ‘DEMAND’ calls for a UNIT start.  
     (J) **Target**: See section 13 Temperature Compensation.  
     (K) **Over Pressure**: The amount of pressure added to ‘TARGET’ pressure to formulate ‘FINAL  
      TARGET’ pressure. ‘CLIPPING’ pressure will reduce this amount if it causes ‘FINAL  
      TARGET’ pressure to exceed ‘CLIPPING’ pressure.  
       
       
     (L) **Final Target**: Pressure in which the banks ‘DEMAND’ is considered ‘SATISFIED’.  
     (M) **Priority =<**: When the bank is equal to or less than this pressure, it is in consideration for  
      prioritization following the guidelines set forth in section 10.4.



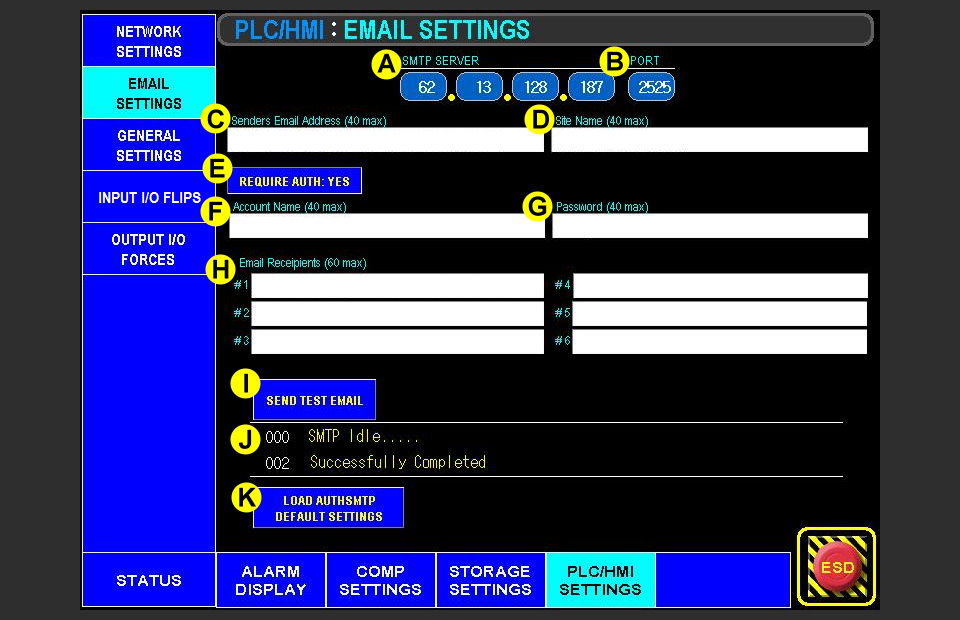
* 1. **PLC / HMI Main Selection Menu**  
     (A) Input Status.  
     (B) Thermocouple fault status.  
     (C) Output Status.  
     (D) PLC / HMI CPU Information.  
     (E) Module Output Status.  
     (F,G) Analog fault status.  
     (H) PLC IP address, (I) PLC Subnet mask, (J) PLC gateway IP.  
     (K) HMI IP address.



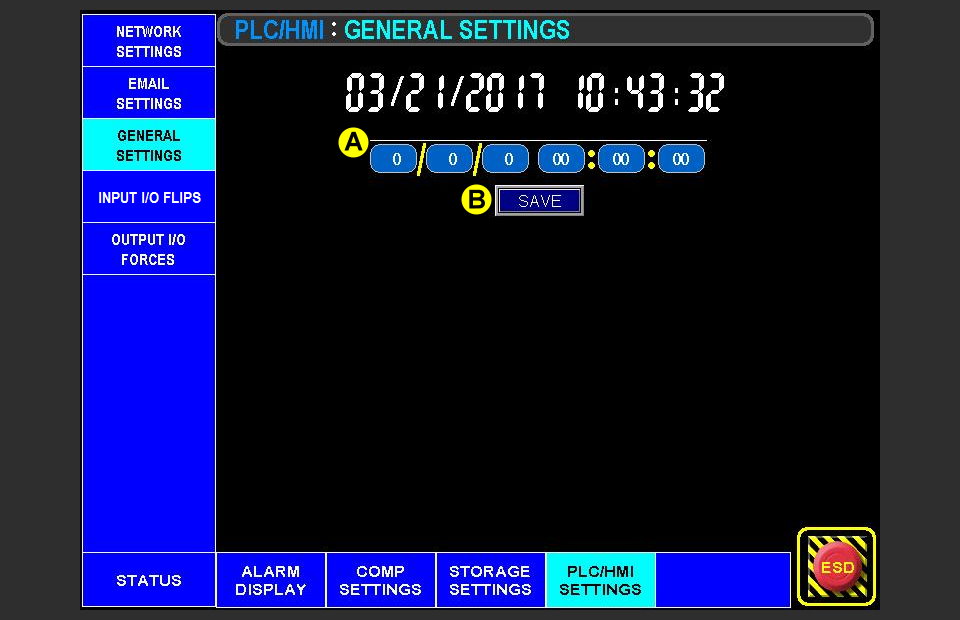
* 1. **PLC / HMI Network Settings**  
     (A) PLC CPU IP address.  
     (B) HMI Touch Display IP address.  
     (C) Subnet mask for both, (D) Gateway address for both.  
     (E) Commit changes and restart the PLC and HMI.



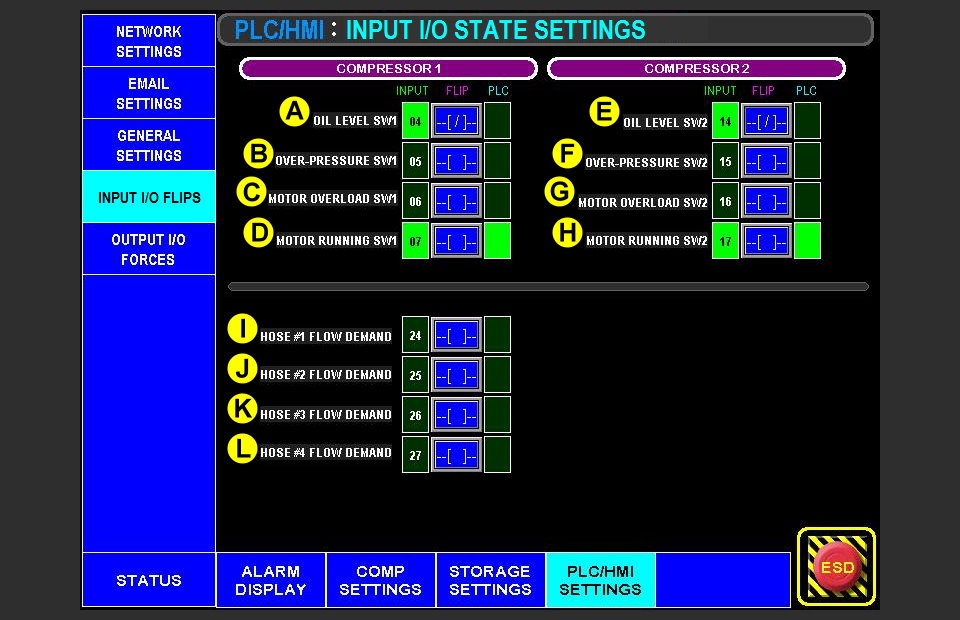
* 1. **PLC/HMI Email Settings**  
     (A) SMTP Servers IP address.  
     (B) SMTP Servers port number.  
     (C) Senders Email Address. Must be a fully qualified email address.  
     (D) Site Name, this is displayed in the ‘From’ field in the email as well a displayed on the  
      main status page.  
     (E) Setting for if the SMTP server requires TLS/SSL.  
     (F) Email account login name.  
     (G) Email account password.  
     (H) Email recipients list, only 1 per.  
     (I) Once configured this will allow you to send out a test email to the recipients list.   
     (J) Test email sending status and error code if failure.  
     (K) Preloaded Authsmtp service defaults.



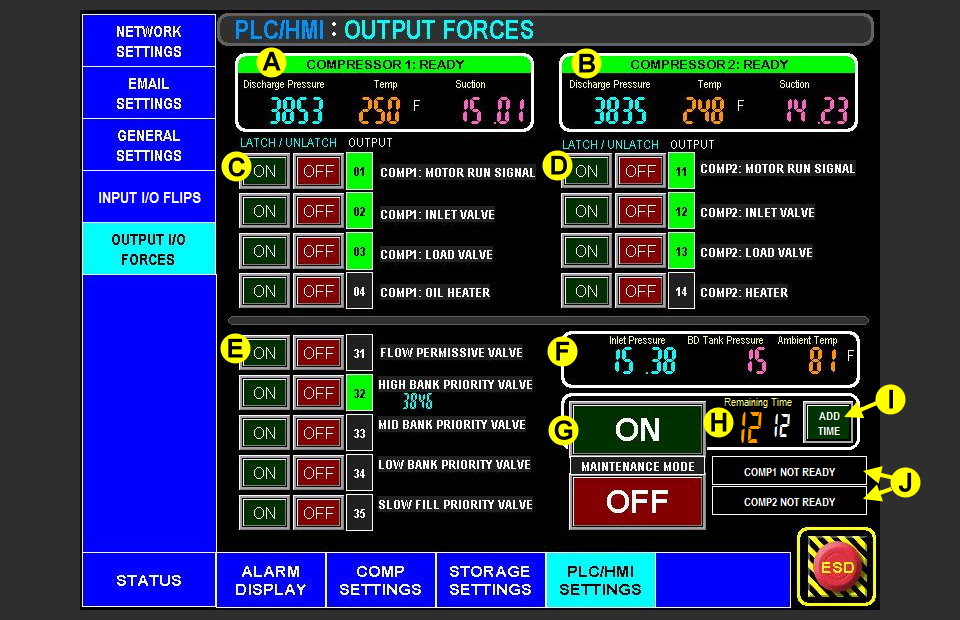
* 1. **PLC/HMI General Settings**  
     (A) HMI Date and Time setting: MM/DD/YYYY HH:MM:SS  
     (B) Commit changes



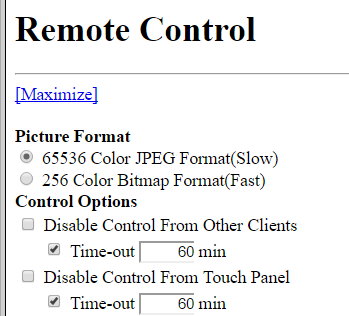
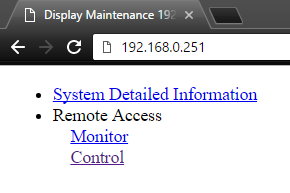
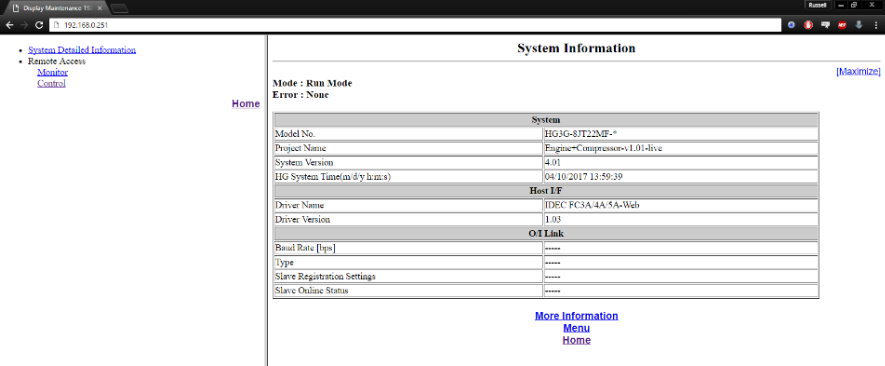
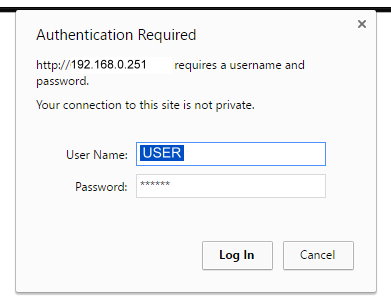
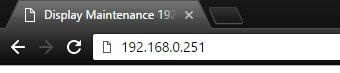
* 1. **PLC/HMI Input IO State Settings**  
     (A) OIL LEVEL SW1.  
     (B) OVER-PRESSURE SW1 (Optional Pressure Switch).  
     (C) MOTOR OVERLOAD SW1 (Contactor Overload AUX contacts).  
     (D) MOTOR RUNNING SW1 (Contactor AUX contacts or Soft Starter dry contacts).  
     (E) OIL LEVEL SW2.  
     (F) OVER-PRESSURE SW2 (Optional Pressure Switch).  
     (G) MOTOR OVERLOAD SW2 (Contactor Overload AUX contacts).  
     (H) MOTOR RUNNING SW2 (Contactor AUX contacts or Soft Starter dry contacts).  
     (I,J,K,L) ‘HOSE IN USE’ Signals (Flow demand).



* 1. **PLC/HMI Output IO Forces**  
     (A) Compressor 1 Status, Discharge Pressure, Discharge Temperature, and Suction Pressure.  
     (B) Compressor 2 Status, Discharge Pressure, Discharge Temperature, and Suction Pressure.  
       
     Sections (C, D, and E) are only active if (G) MAINTENANCE MODE is ‘ON’ and (H) REMAINING TIME is greater than zero.  
       
     (C) Compressor 1 LATCH/UNLATCH pushbuttons for MOTOR RUN SIGNAL, INLET VALVE,  
      LOAD VALVE, and OIL HEATER.  
     (D) Compressor 2 LATCH/UNLATCH pushbuttons for MOTOR RUN SIGNAL, INLET VALVE,  
      LOAD VALVE, and OIL HEATER.  
     (E) Storage LATCH/UNLATCH pushbuttons for FLOW VALVE, HIGH BANK VALVE, MID BANK  
      VALVE, LOW BANK VALVE, and SLOW FILL VALVE.  
     (F) UNIT Inlet pressure, BLOWDOWN tank pressure, and AMBIENT TEMPERATURE.  
     (G) Enable (ON) MAINTENANCE MODE or Disable (OFF) MAINTENANCE MODE.  
     (H) Remaining Time until MAINTENANCE MODE is automatically disabled (OFF).  
     (I) Add 10 minutes to the remaining time (max 60 minutes).  
       
       
       
     (J) Compressor state to permit MAINTENANCE MODE  
      (1) Panel selector switch must be in the ‘RUN’ position.  
      (2) Operational mode must be in ‘MANUAL’ mode.  
       
      ***Note: ALL SHUTDOWNS except LOW STORAGE PRESSURES are in effect.  
      There is NO sequencing while in MAINTENANCE MODE proceeding  
      with extreme caution is advised.  
        
      Unsafe use can cause damage to equipment and/or operator.***



1. **WEB VIEWER ACCESS**Using a web browser connect to <http://192.168.0.251> (this is the factory default)  
     
   You will be prompted for login information.  
     
   Enter USER for user name and 4321 for the password. Then click ‘Log In’  
     
     
   Once fully loaded you should see the default System Information Screen.  
     
     
   To just monitor the UNIT Select ‘Monitor’ to fully control the UNIT Select ‘Control’  
     
     
   Once the ‘REMOTE CONTROL’ panel is loaded you can select ‘Maximize’ to open the HMI in a standalone tab or screen (It is recommended that you bookmark this page for easy access).  
     
     
   You can select a ‘Picture Format’ to optimize your latency with the HMI. ‘65536 Color’ will look much better but load slowly on a poor or slow connection.  
     
   Control options allow you disable control from other connections and Disable the ‘LOCAL’ touch panel input for the designated time-out.



1. **IO PLC Reference**
   1. **OUTPUT IO List**

|  |  |
| --- | --- |
| **PLC OUTPUT CHANNEL** | **DESCRIPTION** |
| Q00 | COMPRESSOR 1: SHUTDOWN STATE STATUS (OK=ON, FAULTED=OFF) |
| Q01 | COMPRESSOR 1: MOTOR RUN SIGNAL |
| Q02 | COMPRESSOR 1: INLET VALVE |
| Q03 | COMPRESSOR 1: BLOWDOWN/LOAD VALVE |
| Q04 | COMPRESSOR 1: OIL HEATER |
| Q05 | COMPRESSOR 1: RED LED INDICATOR |
| Q06 | COMPRESSOR 1: GREEN LED INDICATOR |
| Q07 | Unused |
| Q10 | COMPRESSOR 2: SHUTDOWN STATE STATUS (OK=ON, FAULTED=OFF) |
| Q11 | COMPRESSOR 2: MOTOR STARTER |
| Q12 | COMPRESSOR 2: INLET VALVE |
| Q13 | COMPRESSOR 2: BLOWDOWN/LOAD VALVE |
| Q14 | COMPRESSOR 2: OIL HEATER |
| Q15 | COMPRESSOR 2: RED LED INDICATOR |
| Q16 | COMPRESSOR 2: GREEN LED INDICATOR |
| Q17 | Unused |
| **OUTPUT MODULE CHANNEL** | **DESCRIPTION** |
| Q0 | GLOBAL: ESD LOOP PERMISSIVE (ZERO VOLTAGE COMPLIANCY) |
| Q1 | GLOBAL: FLOW PERMISSIVE VALVE |
| Q2 | GLOBAL: HIGH BANK STORAGE VALVE |
| Q3 | GLOBAL: MID BANK STORAGE VALVE |
| Q4 | GLOBAL: LOW BANK STORAGE VALVE |
| Q5 | GLOBAL: SLOW FILL STORAGE VALVE |

**17.2.** **INPUT IO List**

|  |  |
| --- | --- |
| **PLC INPUT CHANNEL** | **DESCRIPTION** |
| I00 | COMPRESSOR 1: SELECTOR SWITCH ‘RESET’ |
| I01 | COMPRESSOR 1: START PUSHBUTTON |
| I02 | COMPRESSOR 1: STOP PUSHBUTTON |
| I03 | COMPRESSOR 1: SELECTOR SWITCH ‘RUN’ |
| I04 | COMPRESSOR 1: OIL LEVEL FLOAT SWITCH |
| I05 | COMPRESSOR 1: OVERPRESSURE SWITCH |
| I06 | COMPRESSOR 1: MOTOR OVERLOAD SWITCH |
| I07 | COMPRESSOR 1: MOTOR RUN STATUS SWITCH |
| I10 | COMPRESSOR 2: SELECTOR SWITCH ‘RESET’ |
| I11 | COMPRESSOR 2: START PUSHBUTTON |
| I12 | COMPRESSOR 2: STOP PUSHBUTTON |
| I13 | COMPRESSOR 2: SELECTOR SWITCH ‘RUN’ |
| I14 | COMPRESSOR 2: OIL LEVEL FLOAT SWITCH |
| I15 | COMPRESSOR 2: OVERPRESSURE SWITCH |
| I16 | COMPRESSOR 2: MOTOR OVERLOAD SWITCH |
| I17 | COMPRESSOR 2: MOTOR RUN STATUS SWITCH |
| I20 | Unused |
| I21 | GLOBAL: REMOTE EMERGENCY SHUTDOWN (FROM RELAY) |
| I22 | GLOBAL: EXTERNAL EMERGENCY SHUTDOWN (FROM RELAY) |
| I23 | GLOBAL: LOCAL EMERGENCY SHUTDOWN PUSHBUTTON |
| I24 | GLOBAL: HANDLE IN USE (1) |
| I25 | GLOBAL: HANDLE IN USE (2) |
| I26 | GLOBAL: HANDLE IN USE (3) |
| 27 | GLOBAL: HANDLE IN USE (4) |
|  |  |

**17.3.** **ANALOG IO List**

|  |  |
| --- | --- |
| **ANALOG MODULE 1 CHANNEL** | **DESCRIPTION** |
| A00 | TRANSDUCER – GLOBAL: INLET PRESSURE |
| A01 | TRANSDUCER – GLOBAL: BLOWDOWN TANK PRESSURE |
| A02 | TRANSDUCER – COMPRESSOR 1: SUCTION PRESSURE |
| A03 | TRANSDUCER – COMPRESSOR 2: SUCTION PRESSURE |
| A04 | TRANSDUCER – COMPRESSOR 1: DISCHARGE PRESSURE |
| A05 | TRANSDUCER – COMPRESSOR 2: DISCHARGE PRESSURE |
| A06 | Unused |
| A07 | GLOBAL: AMBIENT TEMPERATURE PROBE |
|  |  |
| **ANALOG MODULE 2**  **CHANNEL** | **DESCRIPTION** |
| A00 (A10) | TRANSDUCER – GLOBAL: DIRECT-FILL |
| A01 (A11) | TRANSDUCER - GLOBAL: HIGH-BANK |
| A02 (A12) | TRANSDUCER - GLOBAL: MID-BANK |
| A03 (A13) | TRANSDUCER - GLOBAL: LOW-BANK |
| A04 (A14) | TRANSDUCER - GLOBAL: TIME-FILL |
| A05 (A15) | Unused |
| A06 (A16) | Unused |
| A07 (A17) | Unused |
|  |  |
| **THEROCOUPLE ANALOG MODULE 1** | **DESCRIPTION** |
| TC00 | THERMOCOUPLE – COMPRESSOR 1: DISCHARGE TEMPERATURE |
| TC01 | THERMOCOUPLE – COMPRESSOR 2: DISCHARGE TEMPERATURE |
|  |  |

TECHNICIANS NOTES:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | ANNUNCIATION | DEVICE | TYPE | RANGE | FACTORY | SETPOINT |
|  |  |  | 4-20ma |  |  |  |
| SD | INLET: High Pressure | 35 |  |
| SD | INLET: Low Pressure | 10 |  |
| AL | INLET: High Pressure | 30 |  |
| AL | INLET: Low Pressure | 5 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | BLOWDOWN: High Pressure | 275 |  |
| AL | BLOWDOWN: High Pressure | 250 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | COMP1: Suction - High Pressure | 25 |  |
| SD | COMP1: Suction - Low Pressure | -5 |  |
| AL | COMP1: Suction - High Pressure | 20 |  |
| AL | COMP1: Suction - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | COMP2: Suction - High Pressure | 25 |  |
| SD | COMP2: Suction - Low Pressure | -5 |  |
| AL | COMP2: Suction - High Pressure | 20 |  |
| AL | COMP2: Suction - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | COMP1: Discharge - High Pressure | 4400 |  |
| SD | COMP1: Discharge - Low Pressure | 0 |  |
| AL | COMP1: Discharge - High Pressure | 4350 |  |
| AL | COMP1: Discharge - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | COMP2: Discharge - High Pressure | 4400 |  |
| SD | COMP2: Discharge - Low Pressure | 0 |  |
| AL | COMP2: Discharge - High Pressure | 4350 |  |
| AL | COMP2: Discharge - Low Pressure | 0 |  |
|  |  | K-TYPE | Thermo-couple | -328 to 2372°F |  |  |
| SD | COMP1: Discharge - High Temperature | 275 |  |
| AL | COMP1: Discharge - High Temperature | 250 |  |
|  |  | K-TYPE | Thermo-couple | -328 to 2372°F |  |  |
| SD | COMP2: Discharge - High Temperature | 275 |  |
| AL | COMP2: Discharge - High Temperature | 250 |  |
|  |  | TGT-TP | 0-10v | 0-1000 °F |  |  |
| AL | AMBIENT TEMPERATURE: High Temperature | 150 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | STORAGE: Direct Fill - High Pressure | 4450 |  |
| SD | STORAGE: Direct Fill - Low Pressure | 0 |  |
| AL | STORAGE: Direct Fill - High Pressure | 4375 |  |
| AL | STORAGE: Direct Fill - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | STORAGE: High Bank - High Pressure | 4450 |  |
| SD | STORAGE: High Bank - Low Pressure | 0 |  |
| AL | STORAGE: High Bank - High Pressure | 4375 |  |
| AL | STORAGE: High Bank - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | STORAGE: Mid Bank - High Pressure | 4450 |  |
| SD | STORAGE: Mid Bank - Low Pressure | 0 |  |
| AL | STORAGE: Mid Bank - High Pressure | 4375 |  |
| AL | STORAGE: Mid Bank - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | STORAGE: Low Bank - High Pressure | 4450 |  |
| SD | STORAGE: Low Bank - Low Pressure | 0 |  |
| AL | STORAGE: Low Bank - High Pressure | 4375 |  |
| AL | STORAGE: Low Bank - Low Pressure | 0 |  |
|  |  |  | 4-20ma |  |  |  |
| SD | STORAGE: Time Fill - High Pressure | 4200 |  |
| SD | STORAGE: Time Fill - Low Pressure | 0 |  |
| AL | STORAGE: Time Fill - High Pressure | 4100 |  |
| AL | STORAGE: Time Fill - Low Pressure | 0 |  |

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