ForeSite® EDGE

(WellPilot)

RPC HMI Manual

Weatherford®

Contents

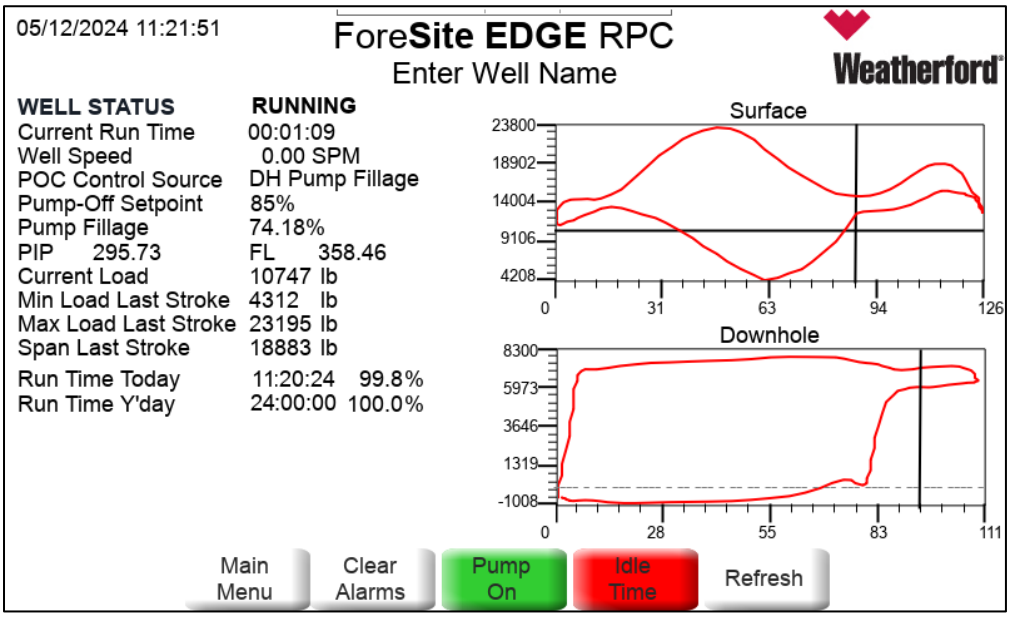
Revision	Description	Date
A	Initial Release	December 2020
B		May 2024
3.11.04	RPOC Firmware Version	Dec 2023
1.09.13	RPOC HMI Firmware Version	March 2024

1.0 Introduction:

Startup UP:

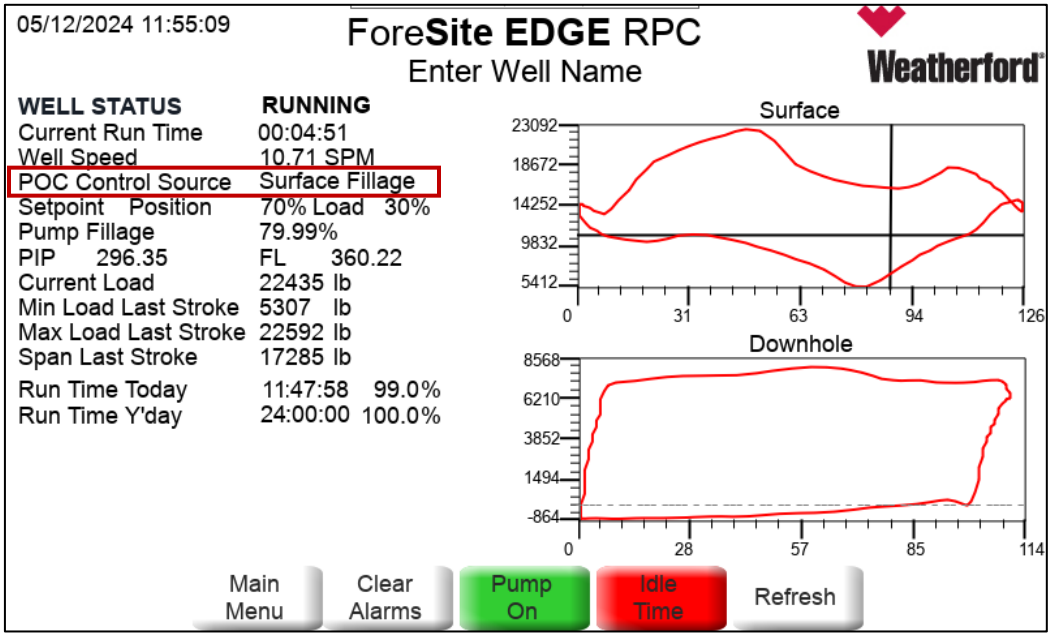
The HMI upon receiving power will undergo a startup sequence in which the base project file and its attributes will be loaded. During this process the “Weatherford” logo will appear followed by the main status screen, when the controller has completely initialized.

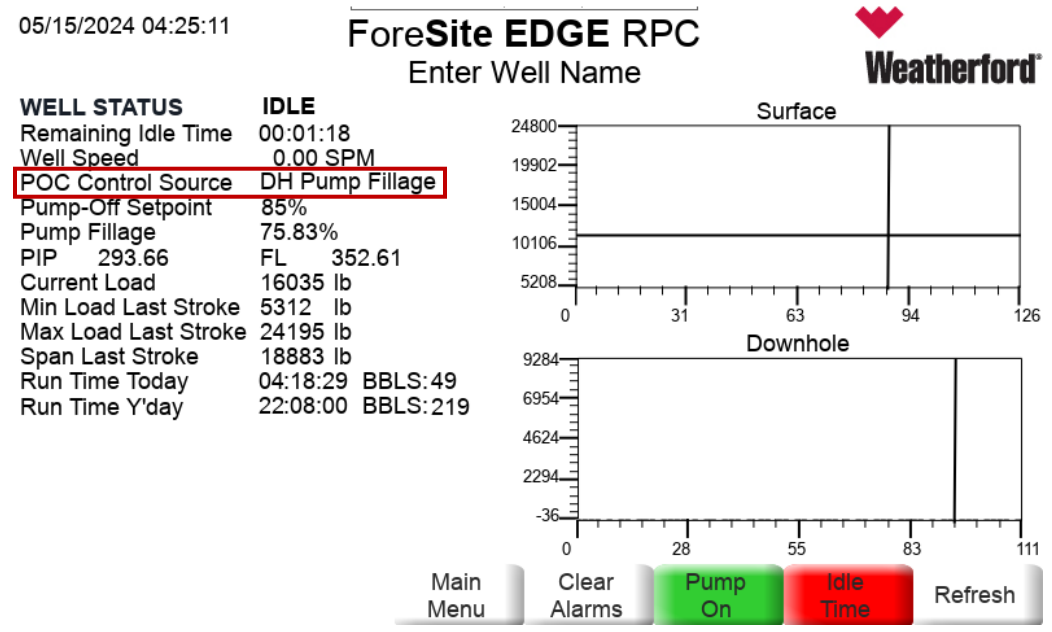
The HMI is intended to function in a similar manner to the EGD and thus the menu layout will be similar.

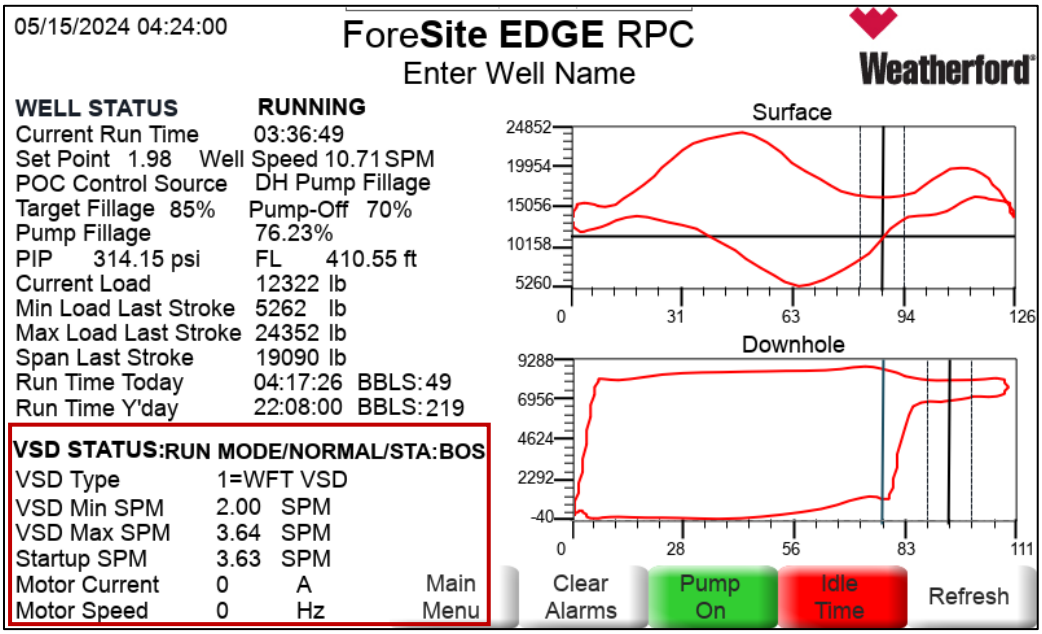


Status Screen:

The status screen is designed to provide the operator with basic information about the wells performance. Three different Status screens are available depending upon your setup choices. If you choose to use the surface pump fillage then the Surface Status Screen will be shown. If you choose to use pump fillage then the Downhole Status Screen will be displayed. If you choose to use the VSD function, then the VSD Status Screen will be displayed. This is an automatic selection of the Status Screen.







RPC Mode	VSD Mode
Well Status	VSD Type
Well Speed	VSD Start Up/Min SPM
POC Control Source	VSD Max SPM
Pump FIllage Setpoint and Calculated Pump Fillage	Motor Current
Current Load and Loads Last Stroke	Motor Speed

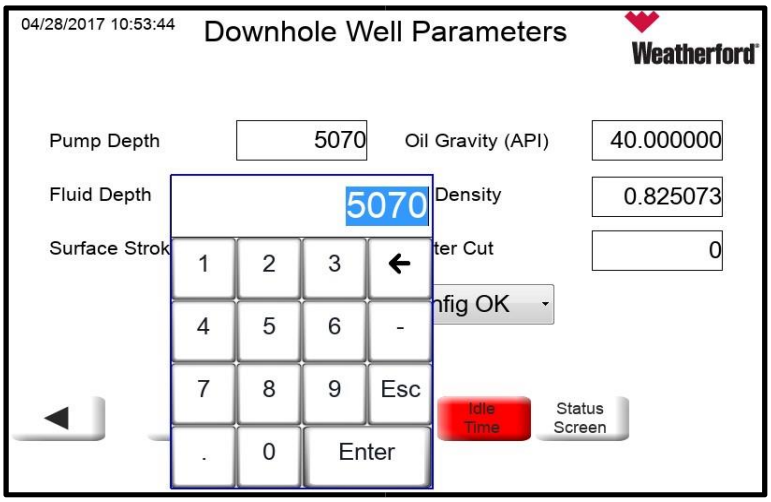
*Note: With the HMI the operator can now also see the Surface and Downhole Dynagraph plots.

2.0 Navigation and Operation:

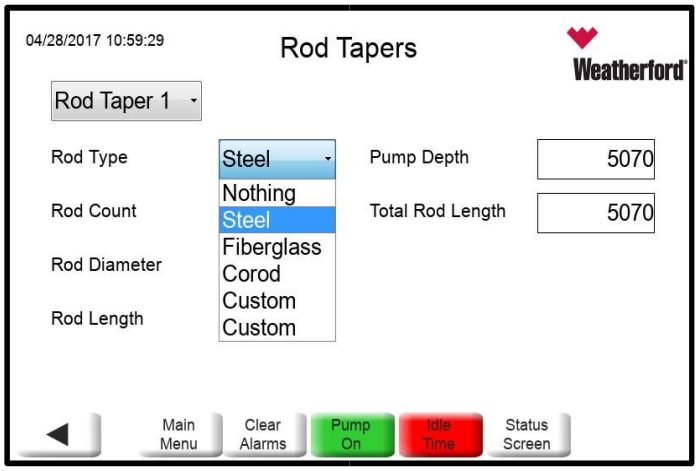
Navigating or executing an operation change within the various screens for the HMI are performed by using the main control keys within the navigation pane at the bottom of each screen.

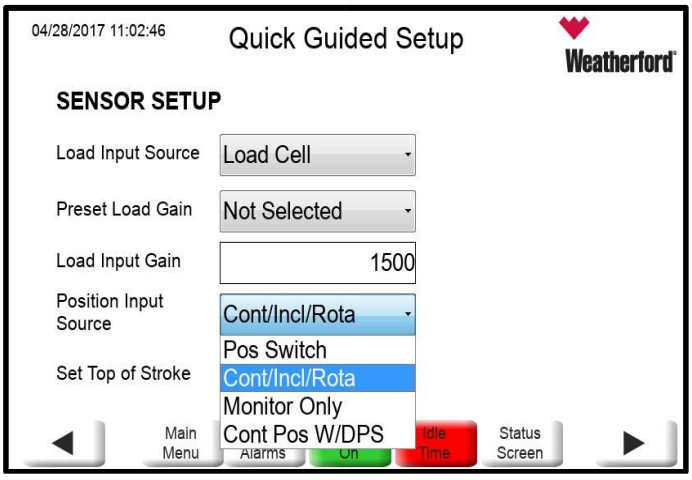
These keys can perform actions such as Starting or Stopping the operation of the pumping system or clearing any alarms that have been resolved and should to be cleared.

A numeric box is now available for entering longer number sequences. The “ENTER” key must be used to update values; while the “ESC” key is used to exit without making changes to the value.



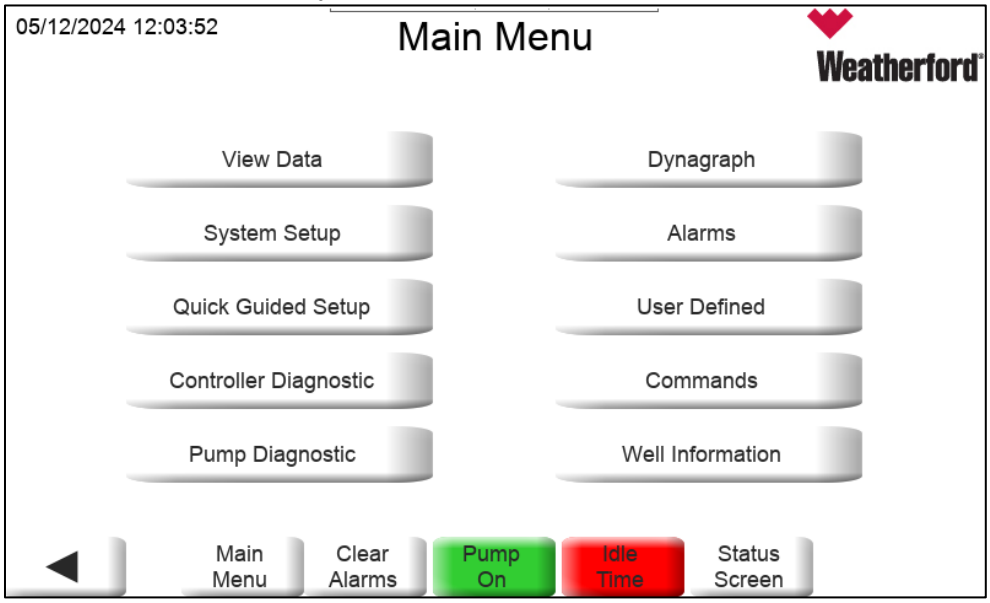
Pre-selections remain available for selections such as “Rod TYPE” or “Position Sensor Type”.



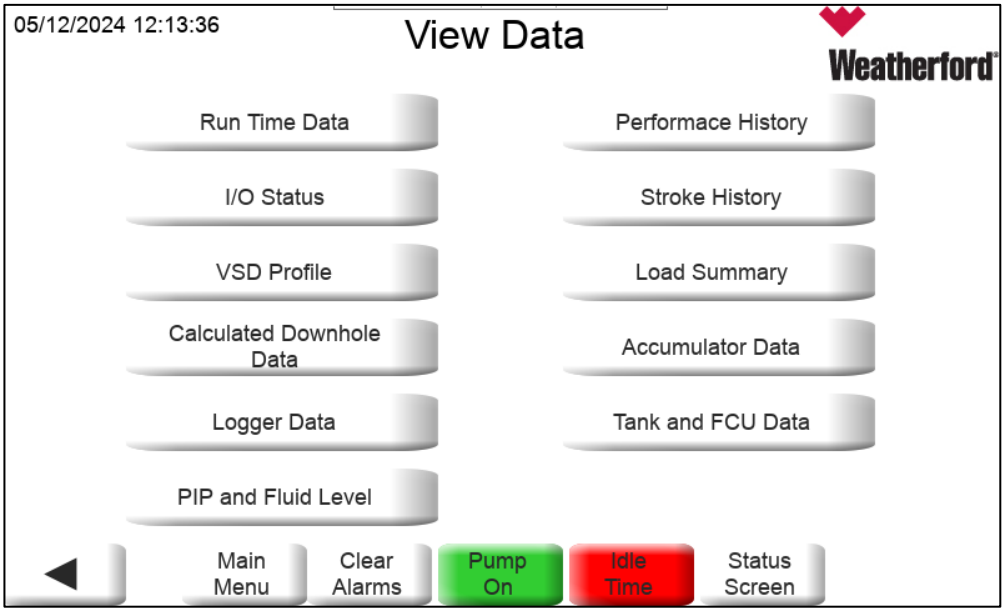


3.0 HMI Menu System:

Main Menu- Is accessed from any screen by pressing the on the “Main Menu” key in the navigation pane at the bottom of any screen and is the root menu for all other menu’s.



View Data Menu-Allows operator to access to informational data related to the wells operating conditions.



VIEW DATA MENU STRUCTURE

3.0 View Data

3.1 Run Time Data

- 3.1.1 List Cycle Run Times
- 3.1.2 List Daily Run Times

3.2 I/O Status

- 3.2.1 Digital I/O
- 3.2.2 Analog I/O
- 3.2.3 RTD and Turbine

3.3 VSD Profile

- 3.3.1 VSD Run Time Status
- 3.3.2 RLC Run Time Status
- 3.3.3 STA Run Time Status
- 3.3.4 VSD Speed Control
- 3.3.5 Yaskawa VSD DI Status
- 3.3.6 VSD Run Status
- 3.3.7 VSD Run Program Status
- 3.3.8 Torque/Current Display
- 3.3.9 Export VSD Fault History to USB

3.4 Calculated Downhole Data

- 3.4.1 Downhole Stroke Length
- 3.4.2 Downhole Min Load
- 3.4.3 Downhole Max Load
- 3.4.4 Downhole Load Span
- 3.4.5 Pump Horsepower
- 3.4.6 Calculated Pump Fillage%
- 3.4.7 Pump Card Area Ratio
- 3.4.8 Pump-Off Stroke Count
- 3.4.9 POC Control Source

3.5 Logger Data

- 3.5.1 Advanced Logger
- 3.5.2 Legacy Logger

3.6 Performance History

(*12 days of: Strokes, Avg SPM, Avg Fill%, PIP (psi), Power kWh, and Regen kWh*)

3.7 Stroke History

3.8 Load Summary

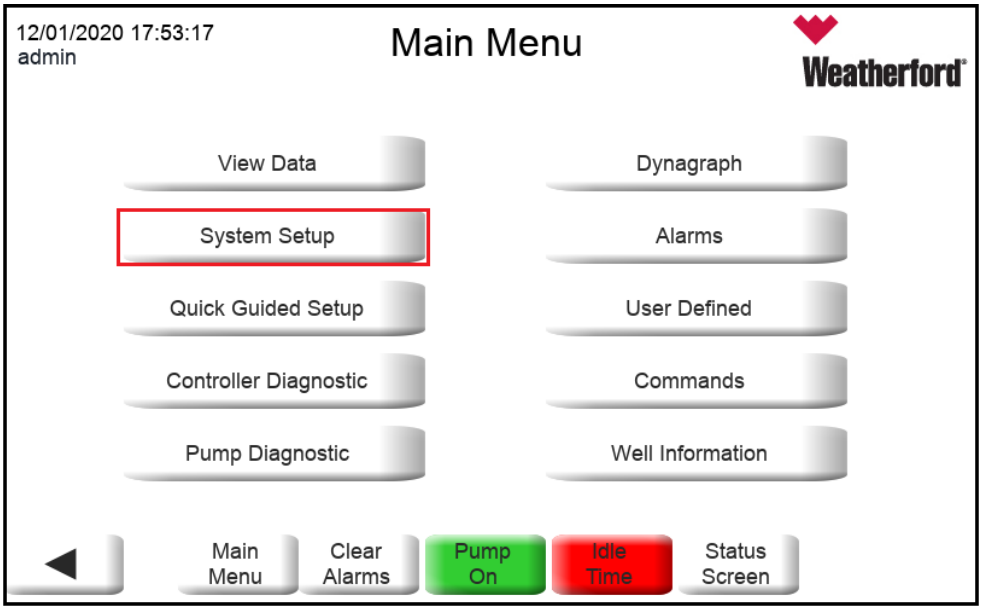
3.9 Accumulator Data

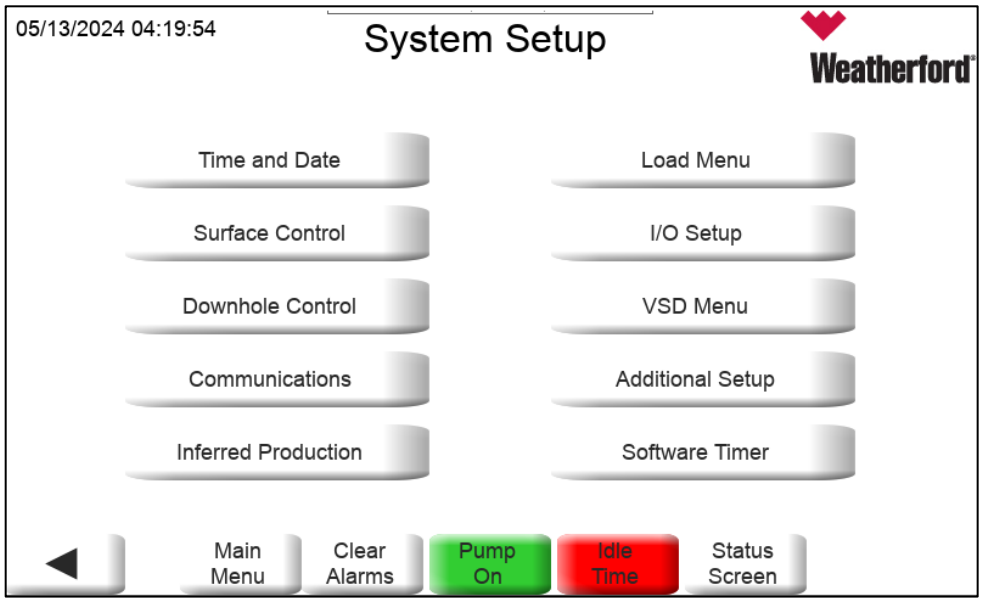
3.10 Tank and FCU Data

- 3.10.1 Tank Data
- 3.10.2 FCU Data

4.0 System Setup:

System Setup-Provides access to more detailed configurations not found in the “Quick Guided Setup” menu.





SYSTEM SETUP MENU STRUCTURE

4.0 System Setup

4.1 Time and Date

4.2 Surface Control Setup

- 4.2.1 Idle Time
- 4.2.2 Pump-Off Pos%
- 4.2.3 Pump-Off Load%
- 4.2.4 Pump-Off Strokes
- 4.2.5 Pump-Off Action
- 4.2.6 Stabilization Delay
- 4.2.7 POC Method
- 4.2.8 POS Sensor Type
- 4.2.9 Load Cell Size/Conn
- 4.2.10 Stroke Length
- 4.2.11 POC Control Source
- 4.2.12 Top of Stroke Setup

4.3 Downhole Setup

- 4.3.1 Downhole Well Parameters
- 4.3.2 Downhole Control Parameters
- 4.3.3 Downhole Calculation Parameters
- 4.3.4 PIP and Fluid Level
- 4.3.5 Rod Tapers
- 4.3.6 Rod Types
- 4.3.7 Rod Stress

Downhole Method & Calc Status

4.4 Communication Setup

- 4.4.1 Port Assignments
- 4.4.2 8500/Modbus Host 1
- 4.4.3 8500/Modbus Host 2
- 4.4.4 8500/Modbus Host 3
- 4.4.5 Modbus Scanner
- 4.4.6 Network configuration

4.5 Inferred Production

4.6 Load Setup Menu

- 4.6.1 Load Violation Setup
- 4.6.2 Load Sensor Setup

4.7 I/O Setup

- 4.7.1 Digital Input
- 4.7.2 Analog Input
- 4.7.3 Analog Output
- 4.7.4 RTD Input
- 4.7.5 Digital Output
- 4.7.6 Analog Input Alarms
- 4.7.7 Analog Output Calibration
- 4.7.8 Rod Rotator

4.8 VSD Menu

- 4.8.1 Variable Speed Drive (VSD) Setup
- 4.8.2 VSD Advanced Setup
- 4.8.3 VSD Minimum Fillage Setup
- 4.8.4 Rod Load Control (RLC)
- 4.8.5 Speed Trim Adjustment (STA)

4.9 Additional Setup

- 4.9.1 Energy Management
- 4.9.2 Data Logger
- 4.9.3 Stop Location
- 4.9.4 Gas Engine Control
- 4.9.5 Accumulators
- 4.9.6 FCU Scanner
- 4.9.7 Tank Scanner
- 4.9.8 Injection

5.0 Software Timer

5.0 Quick Guided Setup:

Quick Guided Setup Menu- Is a basic menu that is primarily used when initially commissioning well.
The Quick Guided Setup Menu is also useful in terms of allowing access to settings that are need regular adjustment.

QUICK GUIDED SETUP MENU STRUCTURE

5.0 Quick Guided Setup

5.1 System Setup Page 1

- Press To Sync HMI Time to RTU
- 5.1.1 Time
- 5.1.2 Date
- 5.1.3 Idle Time
- 5.1.4 Gauge Off Time
- 5.1.5 Pump-Up Delay
- 5.1.6 Power on Restart Delay

5.2 Sensor Setup

- 5.2.1 Load Input Source
- 5.2.2 Preset Load Gain
- 5.2.3 Load Input Gain
- 5.2.4 Position Input Source
- 5.2.5 Set Top of Stroke
- 5.2.6 Units

5.3 Surface Control

- 5.3.1 Pump-Off POS%
- 5.3.2 Pump-Off Load%
- 5.3.3 Pump-Off Strokes
- 5.3.4 POC Method

5.4 Pump Fillage Control

- 5.4.1 VSD Target Fillage
- 5.4.2 Pump-Off Position Fillage [Min Fillage]
- 5.4.3 Pump-Off Strokes [Min Fillage Stroke]
- 5.4.4 Pump-Off Action [Min Fillage Action]
- 5.4.5 Downhole Enable
- 5.4.6 POC Control Source

5.5 Load Violation Setup

5.6 VSD Control

- 5.7.1 SPM Min
- 5.7.2 SPM Max
- 5.7.3 SPM Start-Up
- 5.7.4 VSD Target Fillage
- 5.7.5 Min Fillage Action
- 5.7.6 Min Fillage
- 5.7.7 Min Fillage Strokes
- 5.7.8 Surface Tol%
- 5.7.9 Downhole Tol%
- 5.7.10 Enable

5.8 Rotaflex Control

- 5.8.1 Position Min Input
- 5.8.2 Position Max Input
- 5.8.3 Pump on Settling Time
- 5.8.4 Sensor Failure Action
- 5.8.5 # Cycles to Average
- 5.8.6 Manual Cycle Runtime
- 5.8.7 Weatherford Rotaflex Model
- 5.8.8 STA Enable
- 5.8.9 Trim Speed Diff
- 5.8.10 Max Trans Speed
- 5.8.11 STA Segment Setup

5.9 Well Setup

- 5.8.1 Pump Depth
- 5.8.2 Bore Dia
- 5.8.3 Fluid Depth
- 5.8.4 Surface Stroke
- 5.8.5 Fluid Calc Method
- 5.8.6 Pump Efficiency

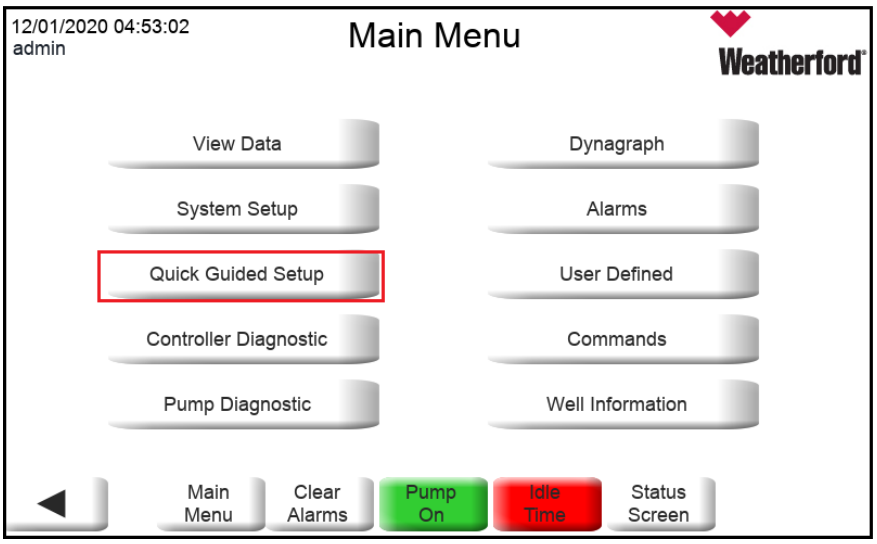
5.9 Rod Tapers

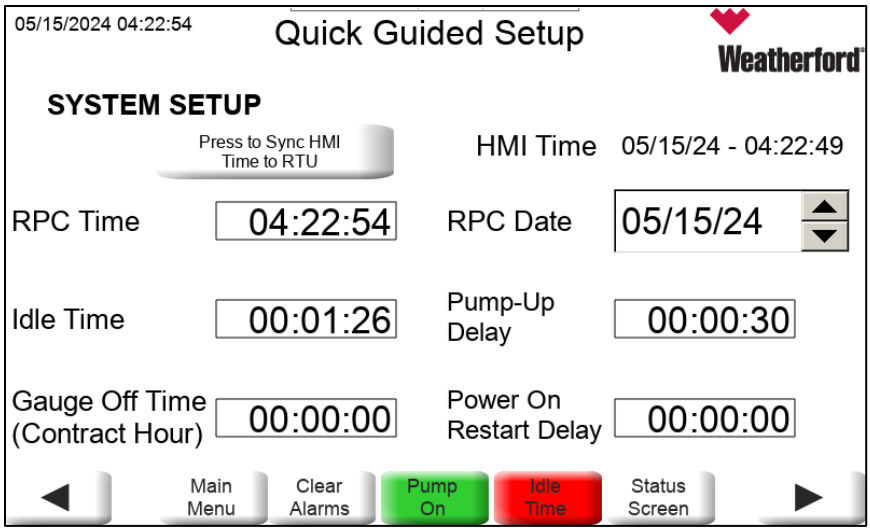
5.10 Pump Intake Pressure (PIP) Setup

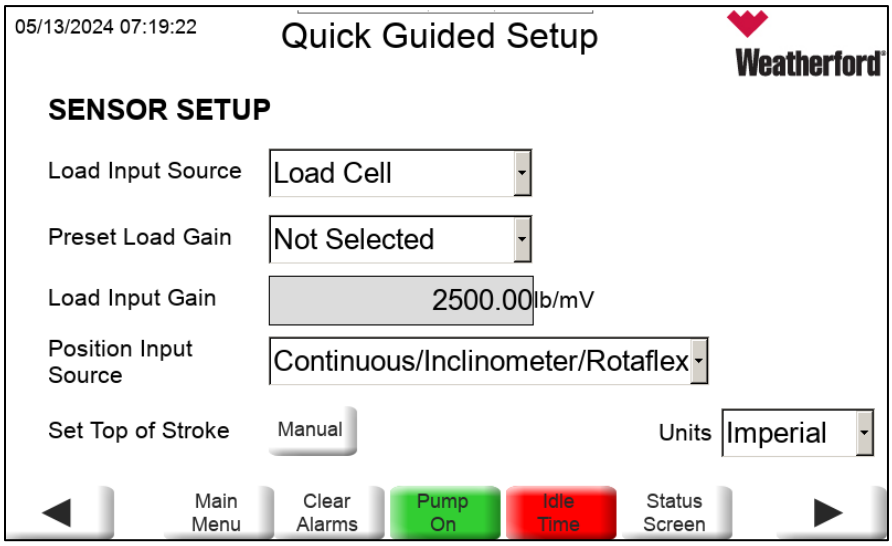
5.11 8500/Modbus Slave

5.12 Modbus Scanner

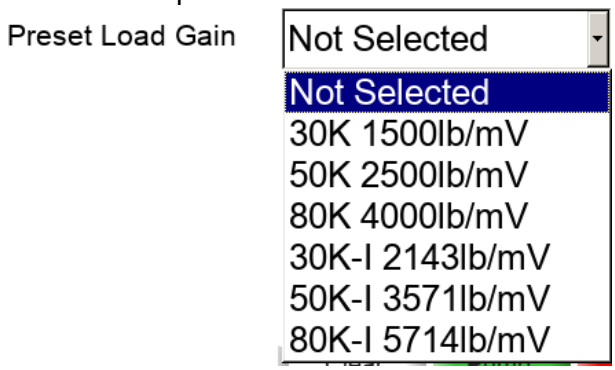
5.13 Save and Restart


12/01/2020 04:53:02
admin
Main Menu
Weatherford
View Data
Dynagraph
System Setup
Alarms
Quick Guided Setup
User Defined
Controller Diagnostic
Commands
Pump Diagnostic
Well Information
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen

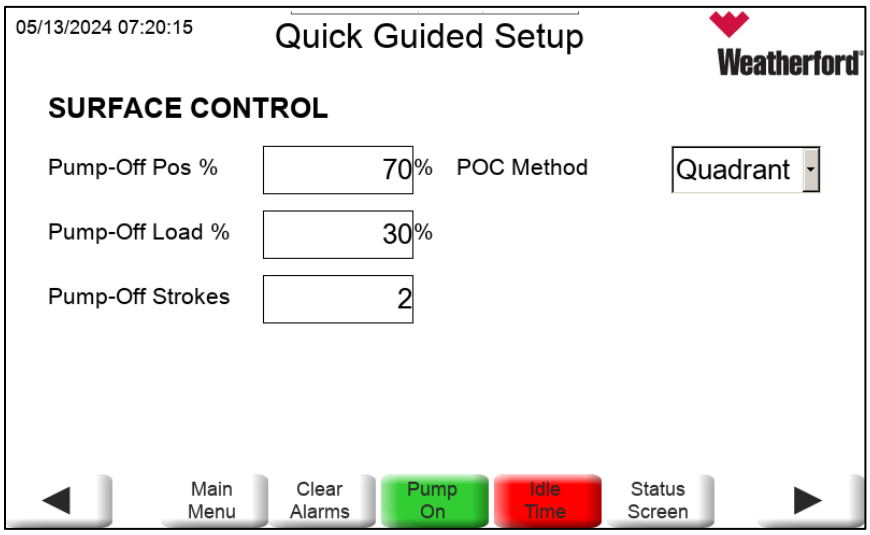

05/15/2024 04:22:54
Quick Guided Setup
Weatherford
SYSTEM SETUP
Press to Sync HMI Time to RTU
HMI Time 05/15/24 - 04:22:49
RPC Time 04:22:54
RPC Date 05/15/24
Idle Time 00:01:26
Pump-Up Delay 00:00:30
Gauge Off Time (Contract Hour) 00:00:00
Power On Restart Delay 00:00:00
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen


05/13/2024 07:19:22
Quick Guided Setup
Weatherford
SENSOR SETUP
Load Input Source Load Cell
Preset Load Gain Not Selected
Load Input Gain 2500.00 lb/mV
Position Input Source Continuous/Inclinometer/Rotaflex
Set Top of Stroke Manual
Units Imperial
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen

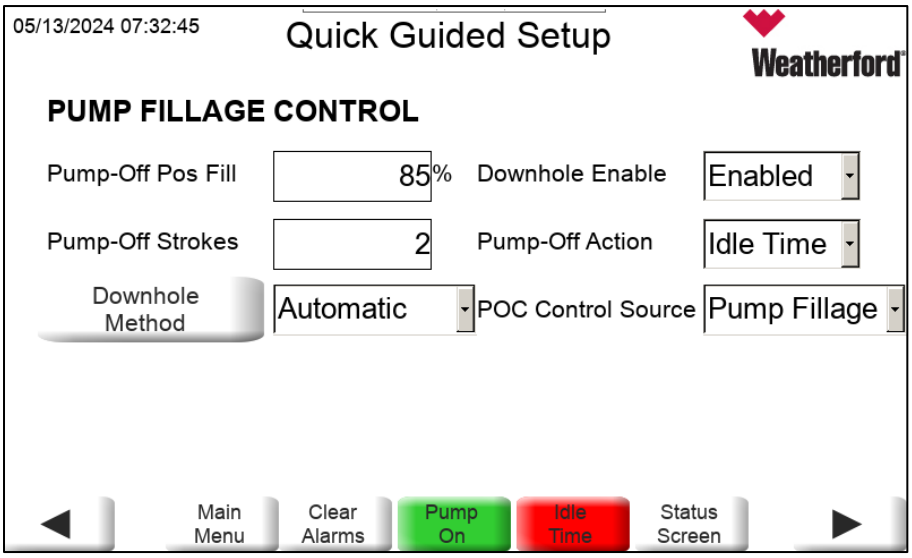
- Load Input Source
  - Load cell – Wired Load cell
  - Strain Gauge
  - Wireless Load cell
- Preset Load Gain – Allows to choose the load cell gain. Selected load cell gain will be displayed under Load Input Gain.



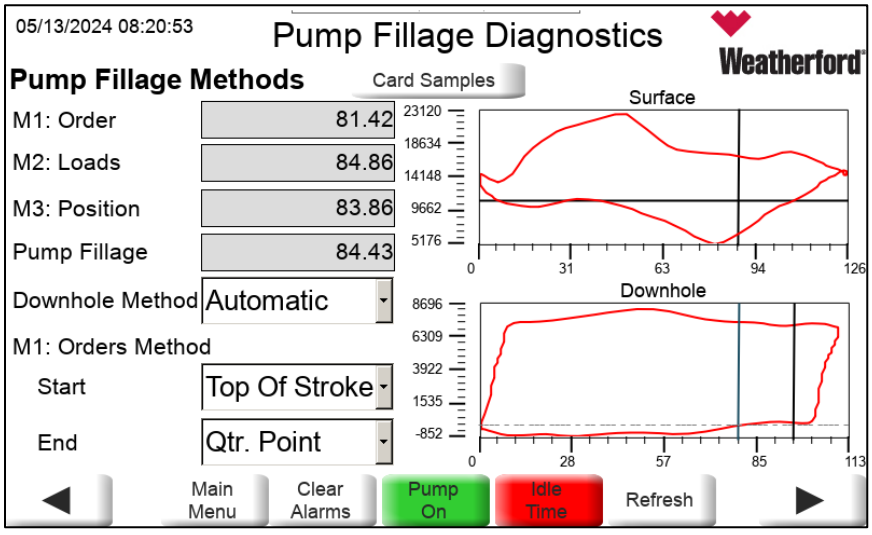
  - Choose 30K-I, 50K-I or 80K -I in case of load cell connected to RPOC through IS barriers.
- Position Input Source – Continuous/Inclinometer/Rotaflex when using inclinometer position sensor or Speed Sentry Aux position kit output on Rotaflex.
- To operate VSD, position input source should be Continuos/Inclinometer/Rotaflex.



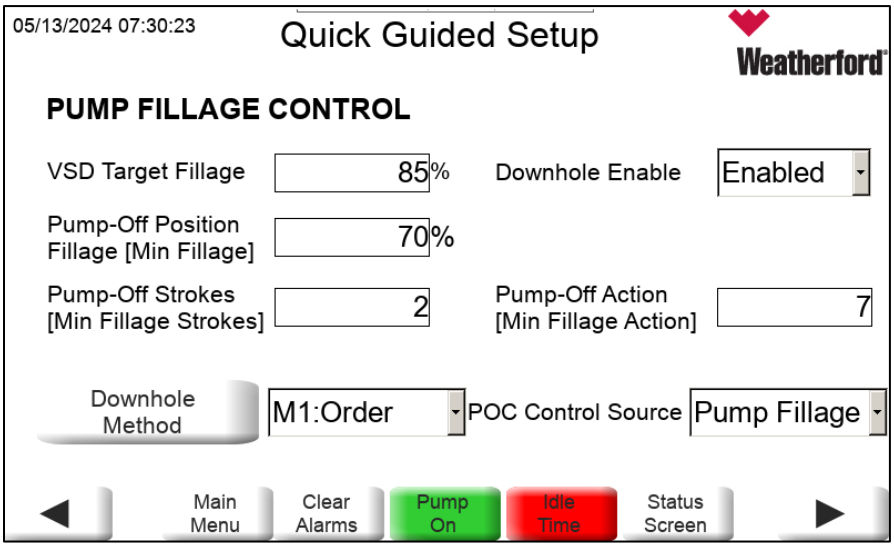
- In case of Surface POC method, choose Quadrant when operating in VSD mode. Well will be controlled in Surface Quadrant pump fillage when downhole control fails.
- Pump Fillage Control page is dynamic and below is the screen layout when VSD Enable flag is disabled.



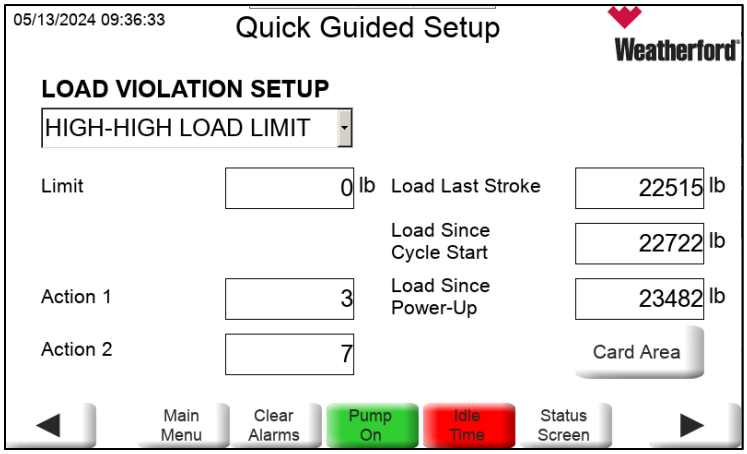
- Source of POC control - Downhole or Surface
  0 = Surface
  1 = Pump Fillage (When DH is enabled)
- Downhole Method button allows user to choose the right pump fillage method.
- Choose “M1:Order” method for downhole cards that show gas interference and downhole friction.
  - Modified Orders Method for severe downhole friction, fluid acceleration and Rotaflex cards with load drop at bottom of stroke running in racetrack mode.
  - To enable Modified orders method.
    - Choose Downhole Method to M1: Order
    - Start: Top stroke
    - End: Qtr. Point

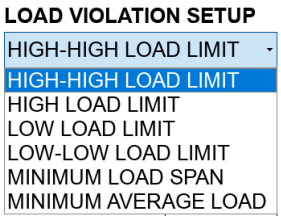


- Pump Fillage Control page changes to below layout when VSD enable flag is enabled by the drive model under VSD CONTROL page.



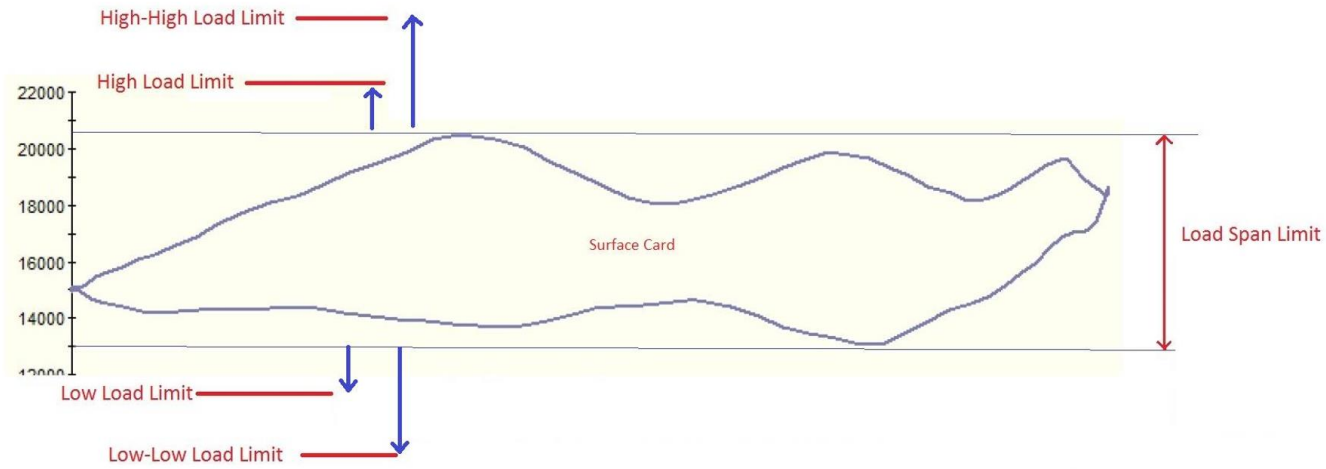
- VSD Target fillage – Well speed controlled between Min SPM and Max SPM based on the target fillage/
- Pump Off Position Fillage – When fillage drops below pump off position for the pump off strokes, well can be stopped on idle time and started back by setting pump-off action to 4 = Idle time.
- Downhole Enable – Allows to enable downhole calculation based on the downhole information entered (well depth and rod string information).
- POC Control Source –
    - Surface Fillage – Control the well pump off from Surface Pump-Off Pos & Pump-Off Load in case of fixed speed or standard operation. Control well speed from surface fillage when VSD is enabled.
    - Pump Fillage – Control the well pump off from Pump-Off Position Fillage in case of fixed speed or standard operation. Control well speed from VSD Target fillage when VSD is enabled.

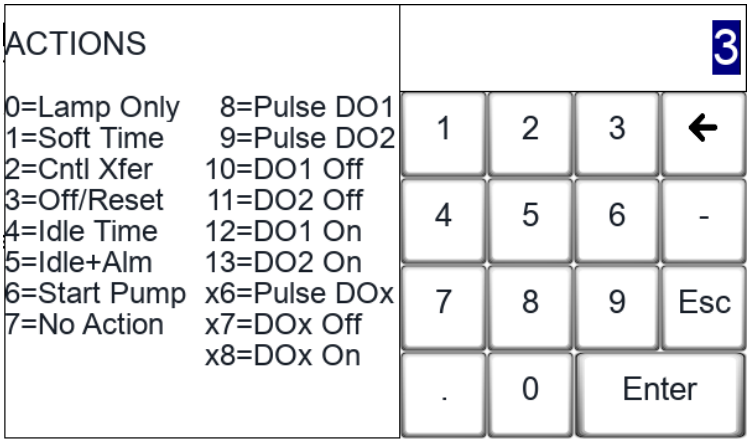


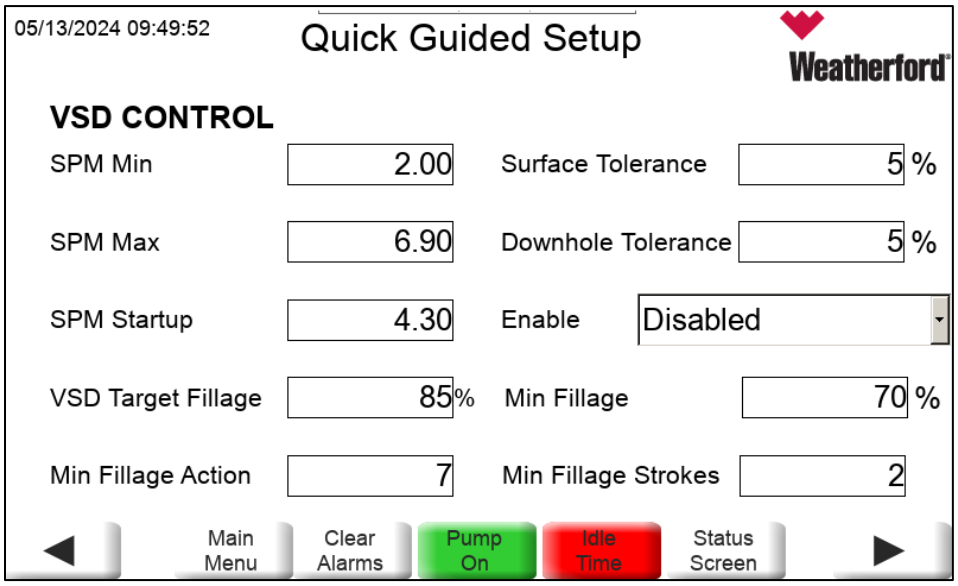


- High-High Load Limit – Well shutdowns on Off/Reset when load value goes above the limit set under High-High Load limit page.
    - Load Last Stroke, Load Since Cycle Start and Load Since Power up shows the peak load captured.

- High Load Limit – Well keeps running with RPOC fault lamp ON when value goes above the limit set under High Load Limit page.
- Low Load Limit - Well keeps running with RPOC fault lamp ON when value goes below the limit set under High Load Limit page.
- Low-Low Load Limit - Well shutdowns on Off/Reset when load value goes below the limit set under High-High Load limit page.
    - Load Last Stroke, Load Since Cycle Start and Load Since Power up shows the minimum load captured.
- Minimum Load Span – Allows to detect malfunctioning downhole pump valves.
- Card Area – Allows to detect delayed travelling valve closure and pump issues.

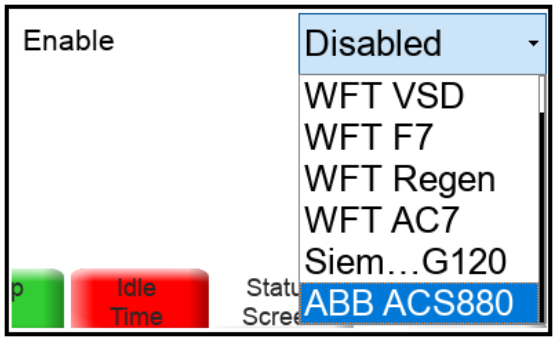


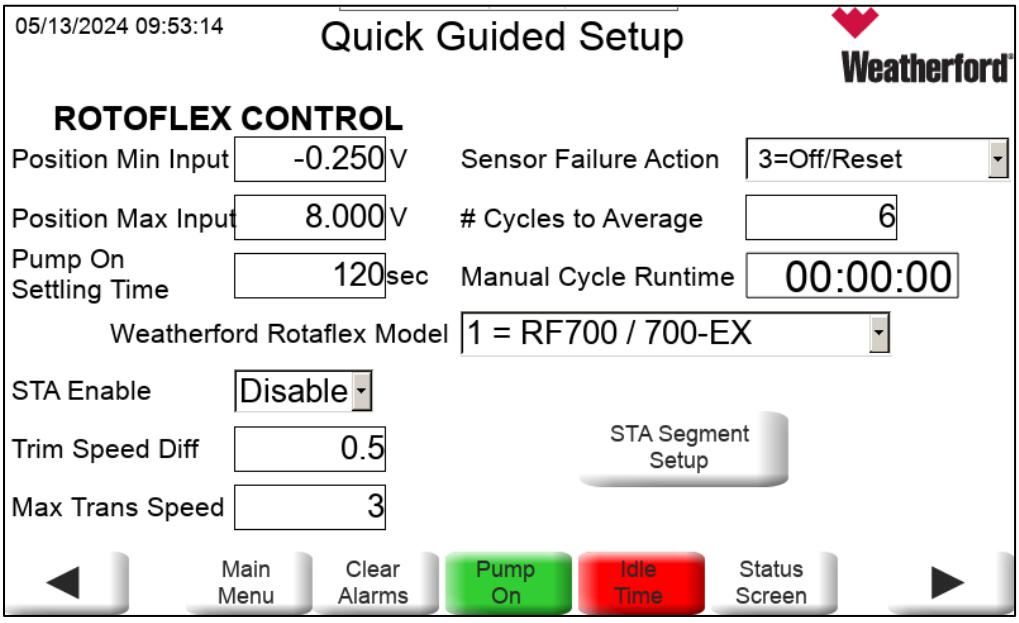




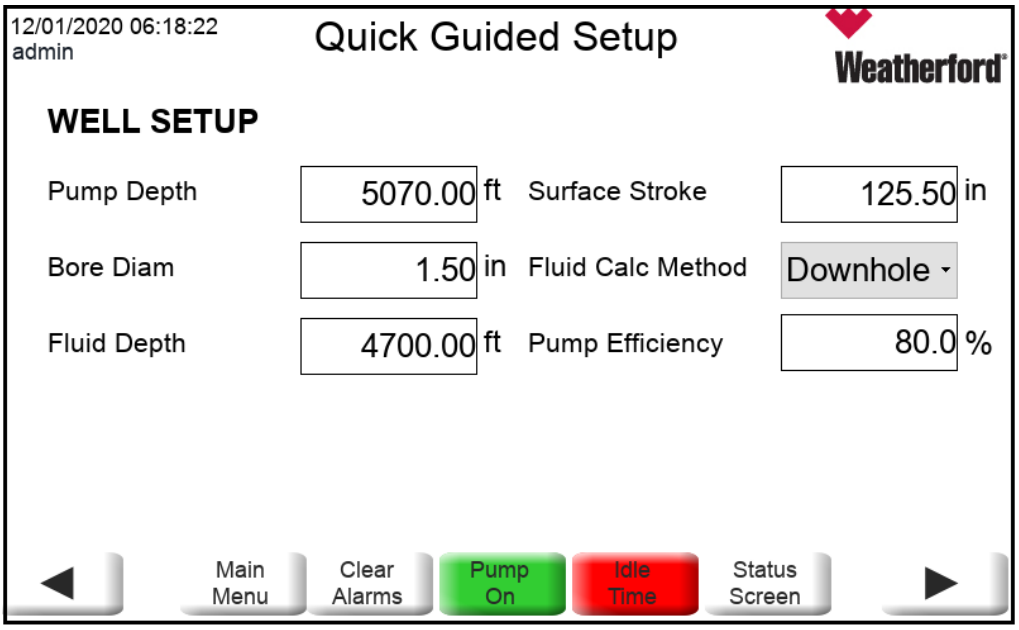
VSD Enable (P1250)

- 0 = Disable
- 1 = WFT VSD
- 2 = WFT F7 VSD
- 3 = WFT RegenVSD (U1000)
- 4 = WFT AC7 RegenVSD
- 5 = Siemens G120
- 6 = ABB ACS880
- 7 = Schneider ATV930
- 8 = Nidec NE300 (Not supported)
- 9 = Toshiba AS3

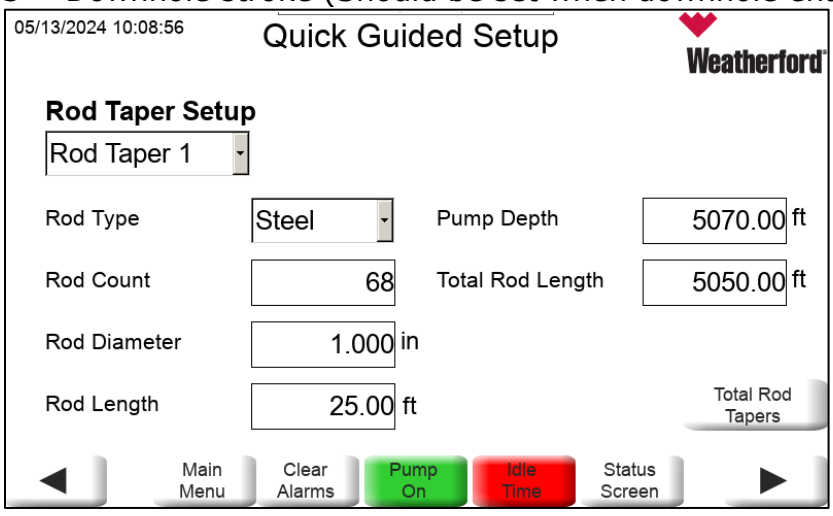


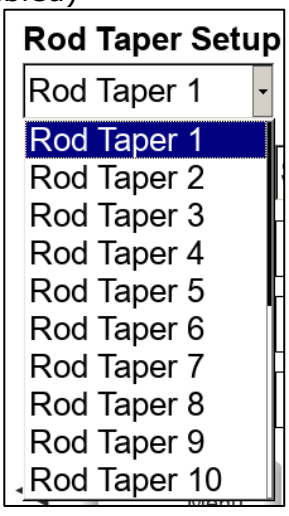


- Rotaflex Control Page is allows to setup the RPOC parameters for operating the unit safely, when installing the RPOC or RPOC integrated VSD with Weatherford Speed Sentry 4.0 and newer versions.
- Position Minimum Input: Set to -0.250 V
- Pump On Settling Time: 120 seconds from default 30 seconds for Beam units.
- Sensor Failure Action: Set to 3 = Off/Reset for load sensor signal failure due to wireless or wired cable issues.
- # Cycles to Averge: 0
- Manual Cycle Runtime: 00:00:00
- Weatherford Rotaflex Model – Choosing the Model from the drop down list will limit the

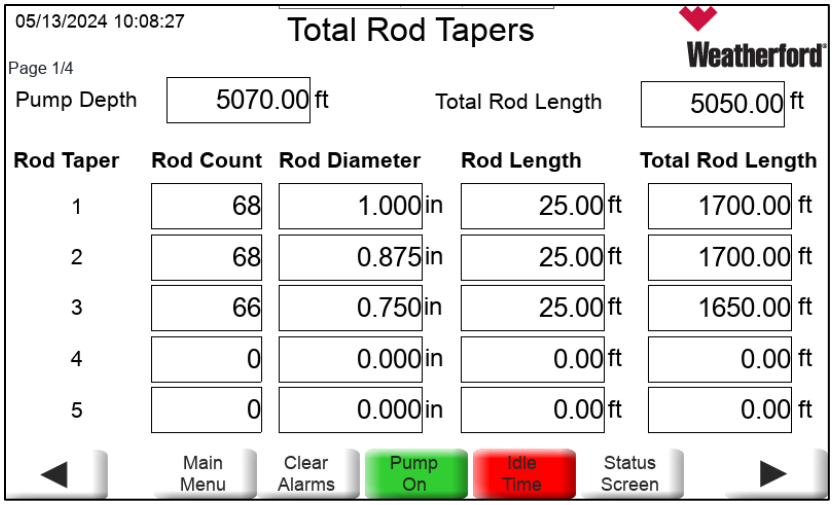


Fluid Stroke Calculation Method
0= Disabled
1 = Short Method (Used in surface control)
2 = Long Method (used in surface control)
3 = Downhole stroke (Should be set when downhole enabled)

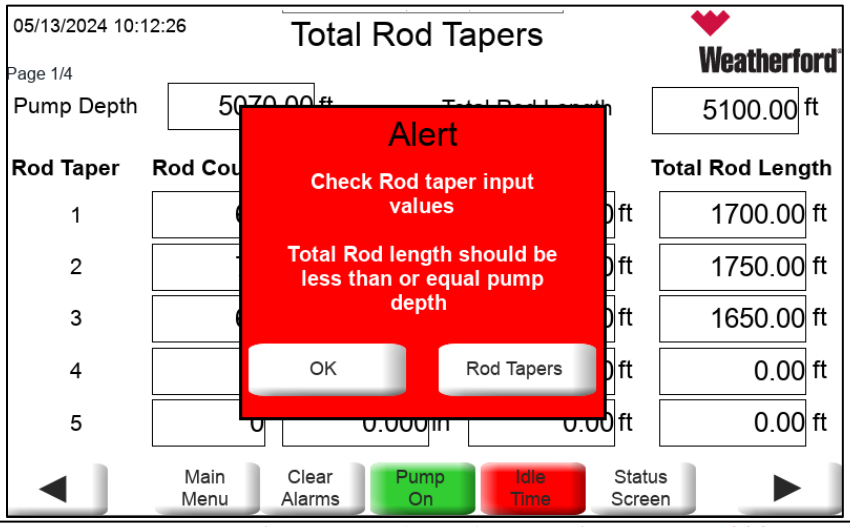


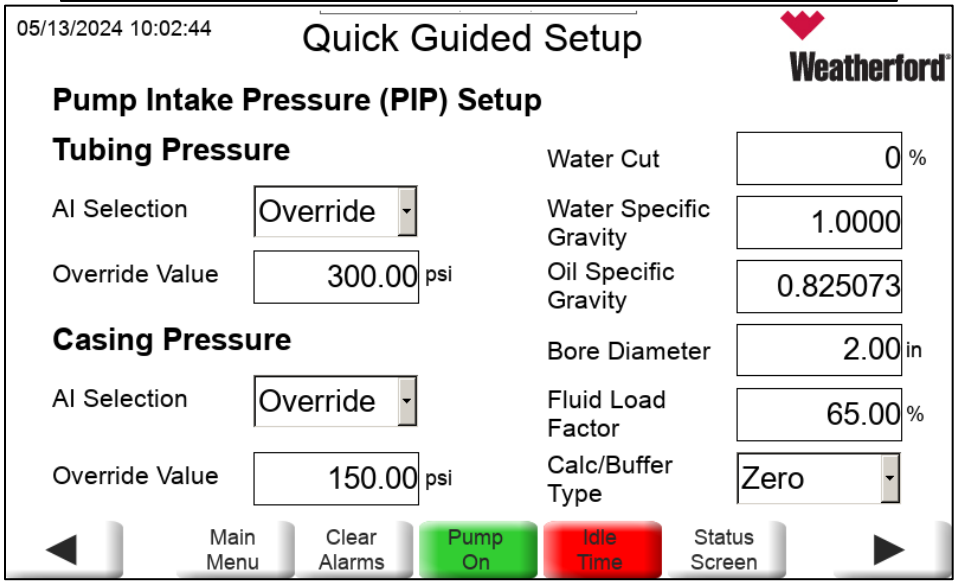


- Total Rod Tapers screen shows the complete list of each rod tapers with count, diameter, length and total Rod Length of each taper.

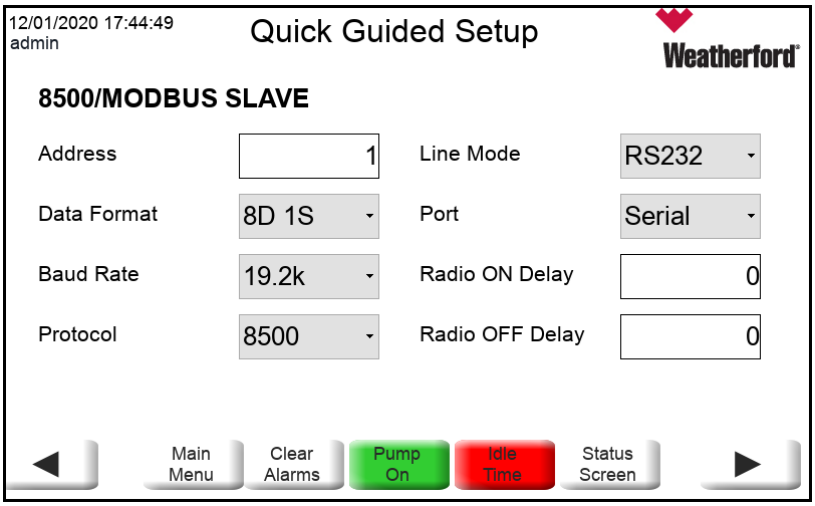


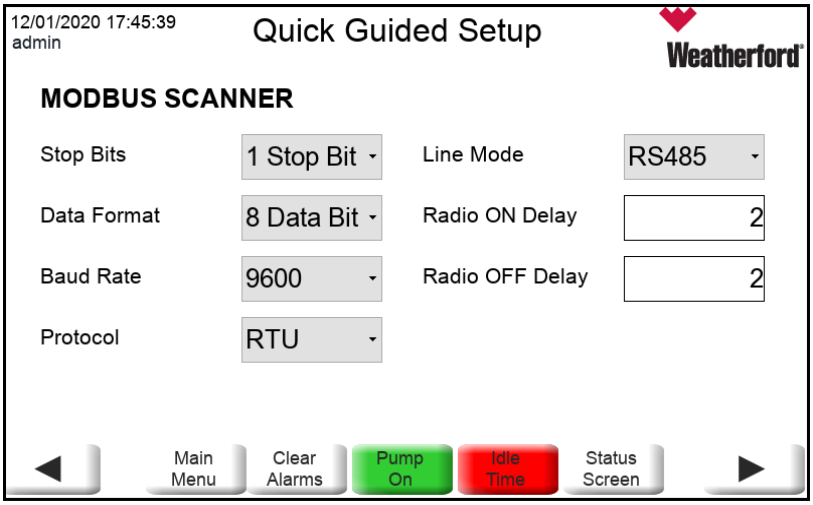
- Alert pop-up will show up when total rod length exceeds the pump depth. Verify each taper inputs with the well design downhole information.

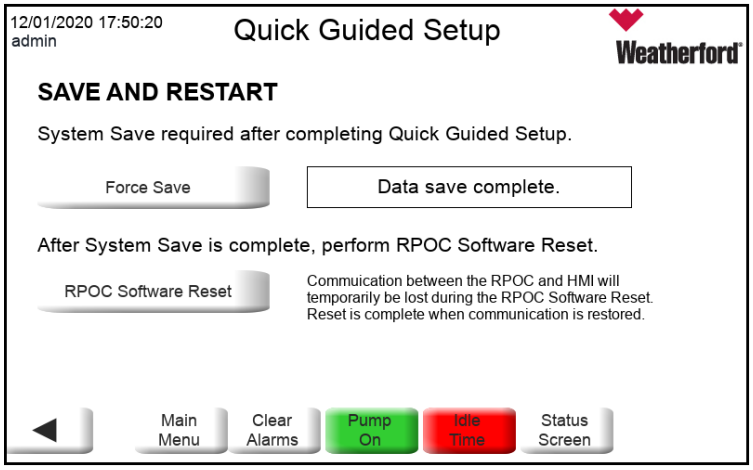




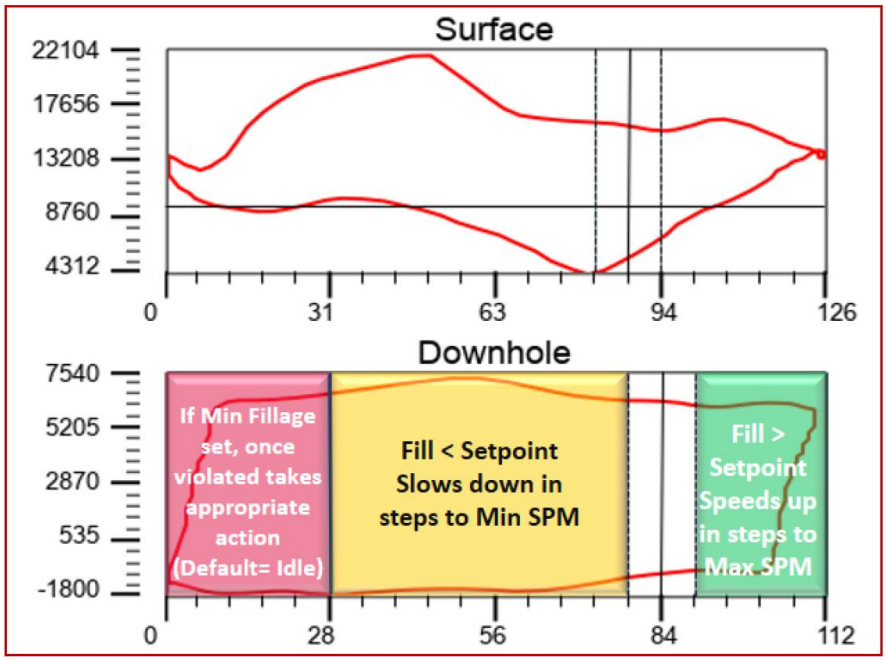
- Tubing pressure and casing pressure transmitters analog points can be reference under AI selection.
    - Example: Tubing pressure is connected to RPOC AI1, set AI selection to AI1.
- If the location doesn't have a transmitter and has a murphy gauge, then set the AI selection to override and under Override value enter the manual gauge value read at field site.
- Fluid Load Factor is a manual input that represents the fluid load taken into PIP calculation considering downhole friction.

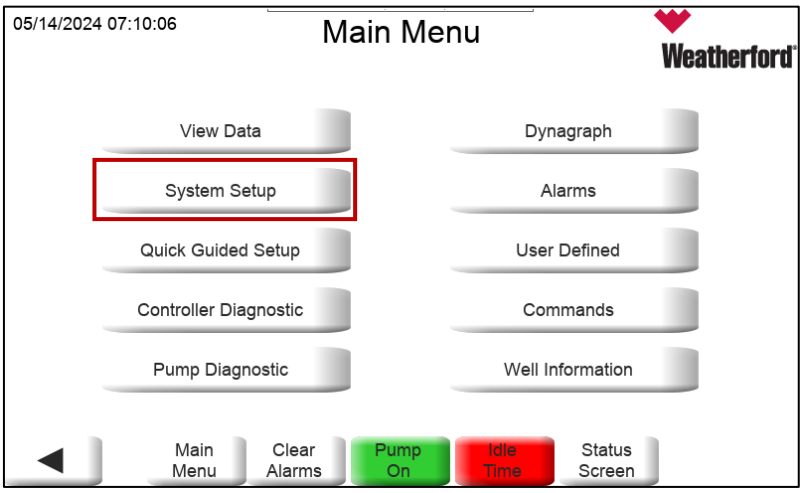


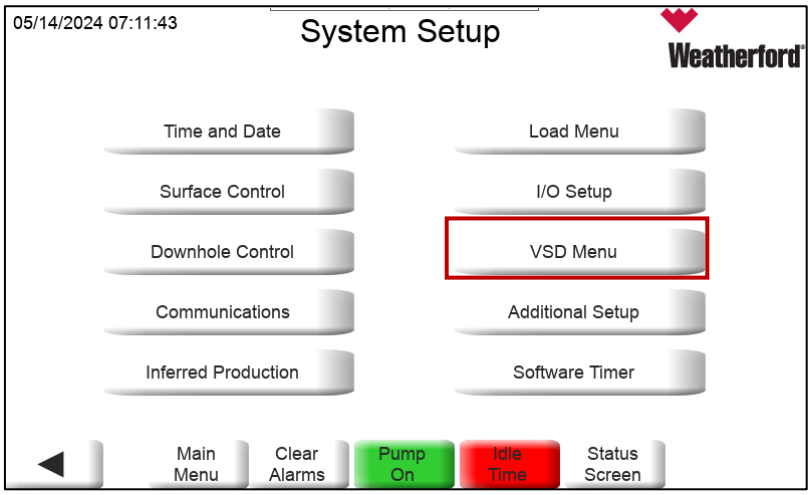


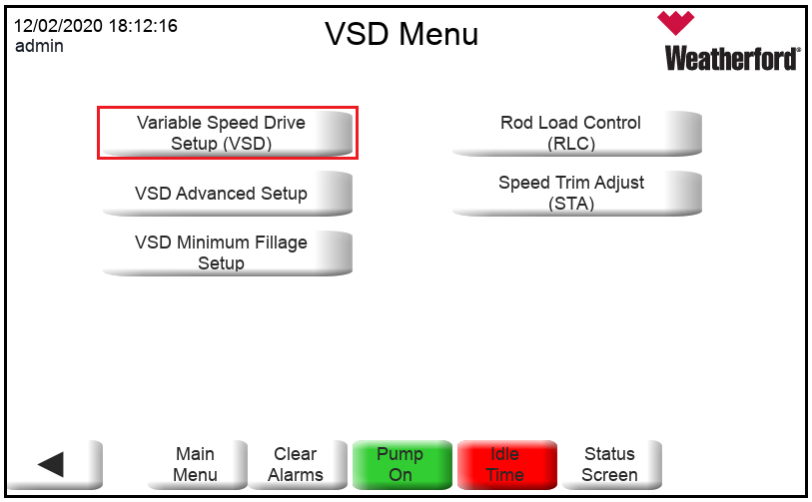


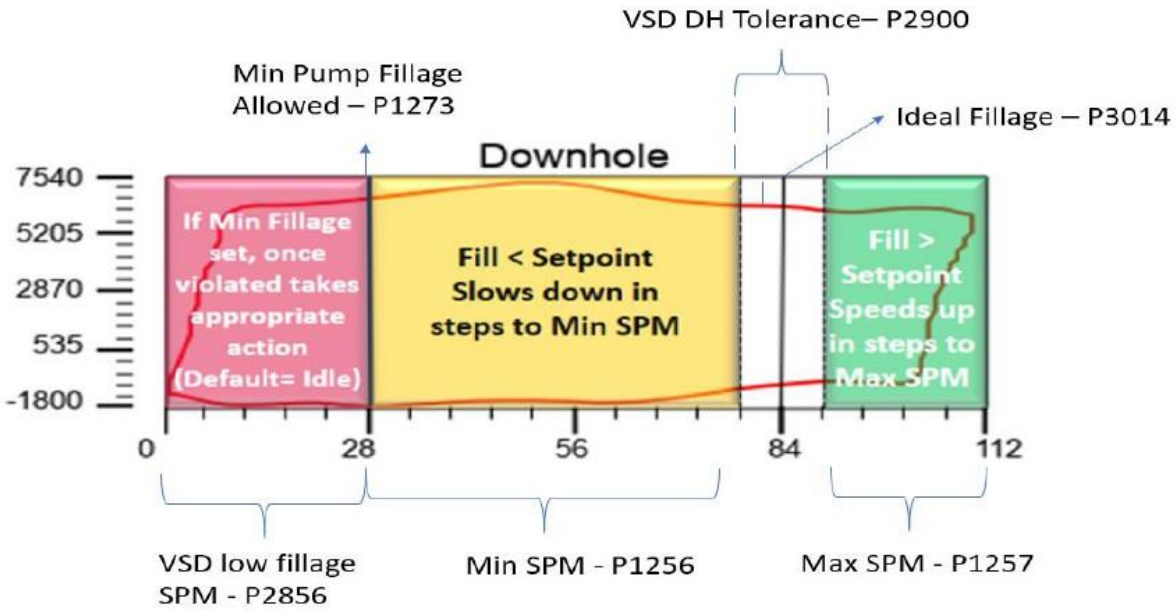
6.0 VSD Setup:


Surface
22104
17656
13208
8760
4312
0
31
63
94
126
Downhole
7540
5205
2870
535
-1800
0
28
56
84
112
If Min Fillage set, once violated takes appropriate action (Default= Idle)
Fill < Setpoint Slows down in steps to Min SPM
Fill > Setpoint Speeds up in steps to Max SPM


05/14/2024 07:10:06
Main Menu
Weatherford
View Data
Dynagraph
System Setup
Alarms
Quick Guided Setup
User Defined
Controller Diagnostic
Commands
Pump Diagnostic
Well Information
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen

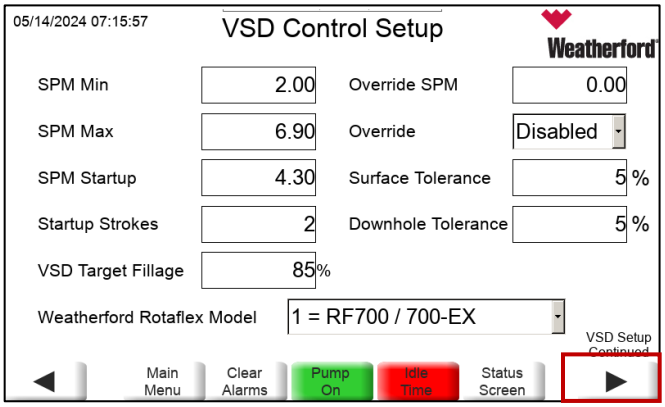

05/14/2024 07:11:43
System Setup
Weatherford
Time and Date
Load Menu
Surface Control
I/O Setup
Downhole Control
VSD Menu
Communications
Additional Setup
Inferred Production
Software Timer
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen

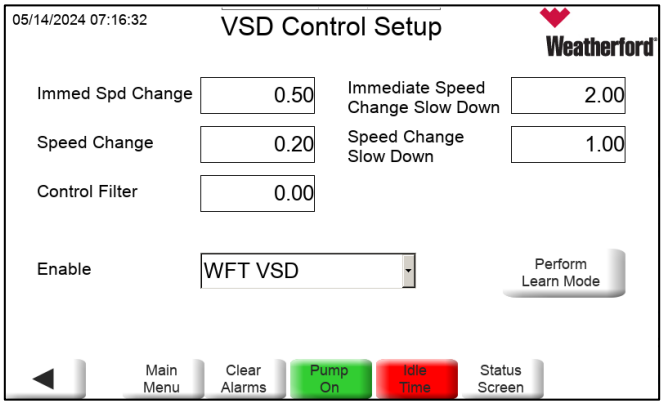




VSD Control Parameters	
Parameter No	Description
30	Control Source; 0= Surface; 1 = Downhole
3152	Downhole Enable; 0 = Disable (Surface Control); 1 = Enabled (Downhole Fillage Control)
3014	VSD Target Fillage/Fillage Setpoint
1256	VSD Min SPM
1257	VSD Max SPM
1252	VSD Surface Tolerance
2900	VSD Downhole Tolerance
1253	Immediate Speed Change
1258	Speed Change
1141	Initial step value slow down
1142	Minimum step value slow down
1263	VSD SPM Override Value
1264	VSD SPM Override Flag

1174	Control Filter
1250	VSD Enable Flag (1 = WFT VSD)
149	Learn Mode
2990	Learn Mode Speed Output %





- (P3014) Ideal Pump Fillage – Variable Frequency drive would speed up or slow down based upon Ideal Pump Fillage Setting and downhole tolerance.

- (P1256) VFD Minimum SPM – This is the minimum SPM at which the pumping unit runs when the fillage drops below ideal pump fillage minus downhole tolerance.

- (P1257) VFD Maximum SPM – This is the maximum SPM at which the pumping units runs when the pump fillage is more than ideal pump fillage plus downhole tolerance setpoint.

- (P1252) VSD Pump Off Position Tolerance – This setting defines the VSD pumpoff tolerance range relative to the Surface Pump Off Position SetPoint.

- (P2900) VSD Downhole Tolerance – This setting defines the VSD pumpoff tolerance range relative to the Ideal Pump Fillage SetPoint.

- (P1253) Immediate Speed Change – This limit sets the allowed speed change on Initial Startup.
- Speed change increase from Min speed, when fillage crosses ideal pump fillage plus downhole tolerance setpoint.
- Speed change decrease from Max Speed, when fillage drops below ideal pump fillage minus downhole tolerance.

- (P1258) Speed change – This limit sets the allowed speed change after Initial Speed Change.

- Initial Step Value down and Minimum Step value slow down allows the user to configure a "dual speed control" mode for the VSD, where separate Initial and Minimum Step values are used for slowing the pump.

- When dual mode is enabled, Initial Speed Change and VSD Speed Increment are used only for speeding up the pump. Setting Initial Step Value slow down to “0” disables dual mode.

- (P1141) Initial Step Value slow down – This limit sets the allowed speed change when slowing down. Value can be >=0.0[SPM] but <=2.0[SPM].

- (P1142) Minimum step value slowdown – This limit sets the minimum allowed speed change after Initial Step Value slow down. Value can be >0.0[SPM] but <=1.0[SPM]

- (P1263) SPM Over-ride Value – When set to non-zero value and SPM over-ride flag is enabled, well speed is controlled from this SPM, irrespective of pump fillage value. Note: Min SPM>= SPM Override Value <= Max SPM

- (P1264) VSD SPM Override flag - This is the SPM Override flag, when set to zero, VSD control operates normally. When set to 1, the VSD control output is defined by SPM Override value, VFD Minimum SPM and VFD Maximum SPM.

- (P1174) VSD Control Filter – This parameter specifies how many strokes will be skipped in VSD mode before changing the speed based on fillage.

- (P1229) Weatherford Rotaflex Model – selecting the Weatherford Rotaflex model will set and limit the Max SPM (1257) to the max cornering SPM when Speed Trim Adjustment/ STA (P1230) is not enabled.
  If STA is enabled under P1230, then based on the model selected under P1229 will limit the max upstroke/downstroke and max transition speed to the selected pumping unit model limits.

Weatherford Rotaflex Model	STA Max Up/Max Down SPM	Max Trans Speed SPM/ Max SPM (Cornering)
RF700 / 700-EX	6.9	5
RF800/ 800-EX	6.24	4.5
RF950 / 950-EX	6.24	4.5
RF1100 / 1100-EX	5.96	4.3
RF1150 / 1150-EX	5.05	3.64
RF1155 / 1155-EX	5.20	3.75
RF1160 / 1160-EX	5.20	3.75

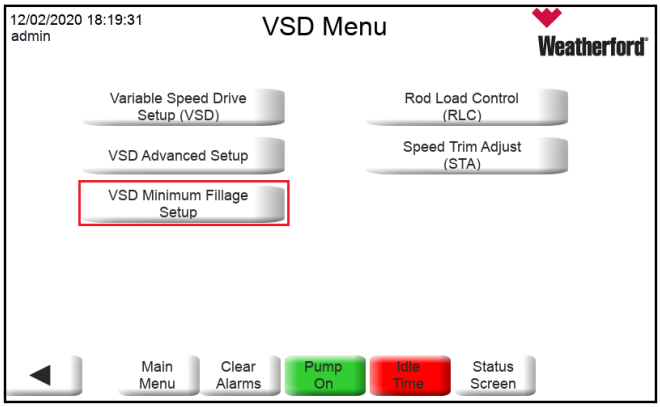
- (P149) Learn Mode – RPOC will initiate learn mode automatically when P1250 is enabled for the first time. Learn mode should be performed on the unit only on below conditions –

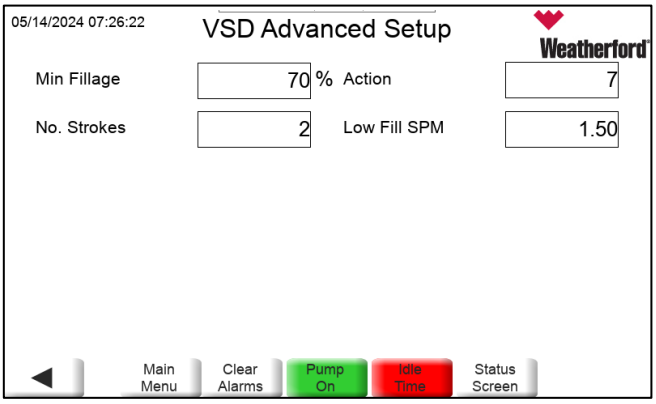
    - Motor sheave changed.
    - Motor swapped.
    - Stroke length changed.
    - Mismatch between the setpoint and status values. Meaning RPOC tells to run at 4 and unit runs at 4.5

  Note: Learn mode should not be performed when the VSD Min/Max setpoints on RPOC are changed, for every time a speed setpoint is changed on the controller.

  When initiated a Learn Mode, RPOC Analog Output is set to 40% (10.4[mA]). For some wells, 40% forces the well to run beyond a safe speed and in this case, this AO % value can be changed in P2990.

6.1 VSD Min Fillage:





VSD Min Fillage (secondary Pump Fillage to stop/start)	
1273	Minimum Pump Fillage
1274	Min Fillage stroke count
1275	Min Fillage action = 4 (Idle time)
20	Idle time
2856	VSD Low/Min Fillage SPM; Works when 1275 = 7 (No Action)

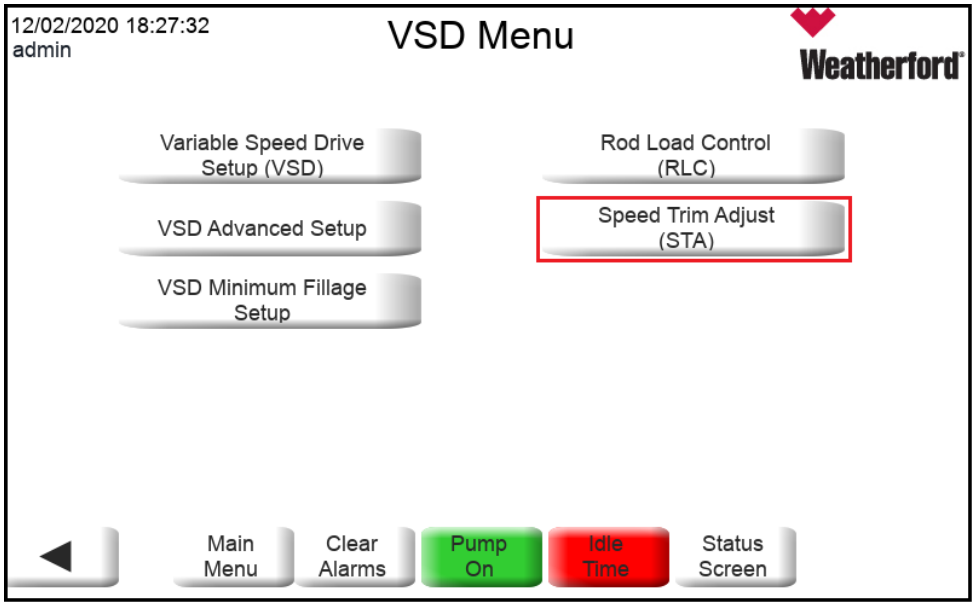
- (P1273) Minimum Pump Fillage Allowed – This is the minimum pump fillage allowed. If the pump fillage is less than the set value, for the number of strokes specified in Minimum Fillage Stroke Count setpoint, controller will take the action set in Minimum Pump Fillage Alarm Action.

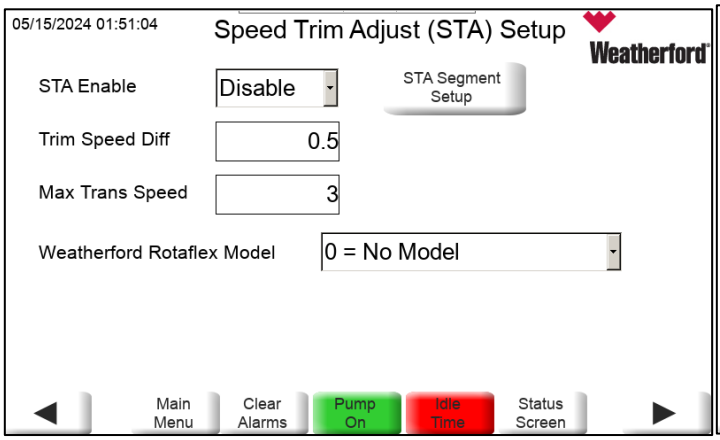
- (P1274) Minimum Fillage Stroke Count – Stroke counts below minimum pump fillage allowed.

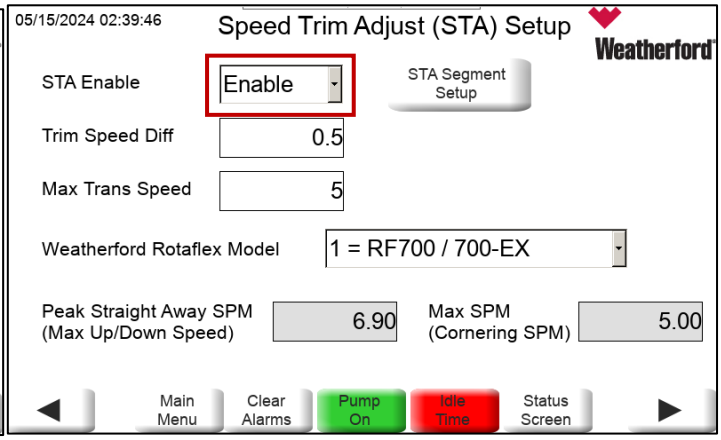
- (P1275) Minimum Pump Fillage Alarm Action – This is the Alarm action taken if the minimum fillage level remains continuously below Minimum Pump fillage allowed for minimum pump fillage stroke counts.

- (P2856) VSD Low Fillage SPM – VSD can be operated at this SPM when pump fillage drops below Minimum Pump fillage allowed for Minimum Pump fillage stroke counts and if Minimum Pump fillage Alarm action is set to 7 = No Action.
  Note: VSD Low fillage SPM can be set lower than VSD Min SPM.
  Minimum Pump fillage allowed should be set only lower than ideal pump fillage minus downhole tolerance.

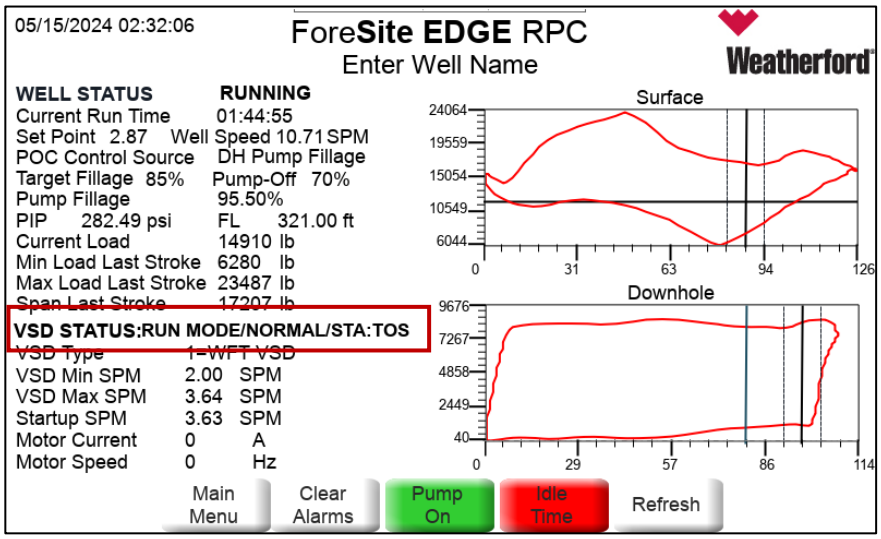
6.2 VSD Speed Trim Adjustment (STA):







- VSD Status shows the polish rod position on each segment during the stroke.



- (P1230) Speed Trim Adjustment (STA) Enabled – To enable or disable Speed Trim Adjust operation, type in the number 0 = Disabled and 1= Enabled.

- (P1231) STA Trim Speed – This is the Strokes per Minute that will be subtracted from the pump speed when the stroke enters the Bottom Stroke or Top of Stroke segment (SPM * 100)

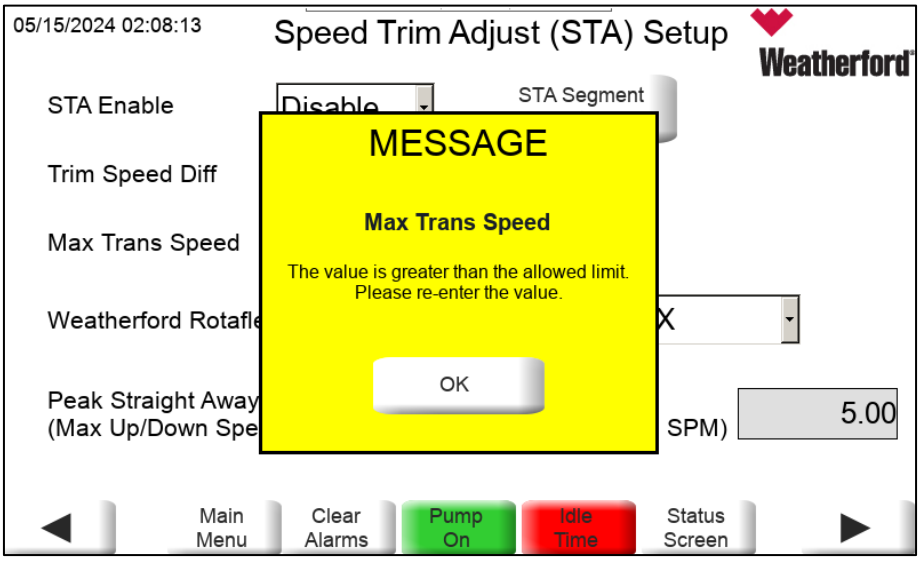
- (P1240) Max Transition Speed in STA Mode – This is the max speed during the transition segments. Unit = 0.1 SPM.

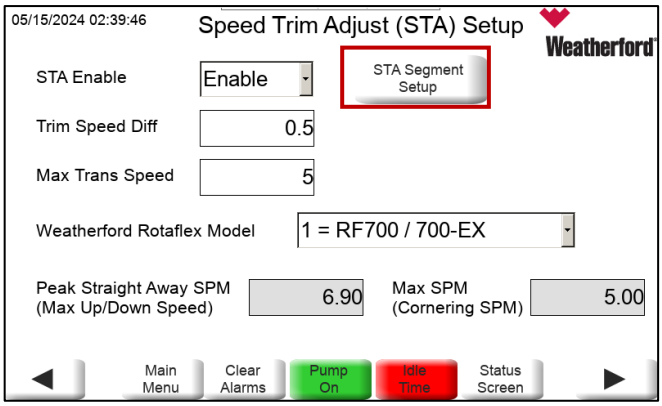
- (P1229) Weatherford Rotaflex Model – selecting the Weatherford Rotaflex model will set and limit the Max SPM (1257) to the max cornering SPM when Speed Trim Adjustment/ STA (P1230) is not enabled.

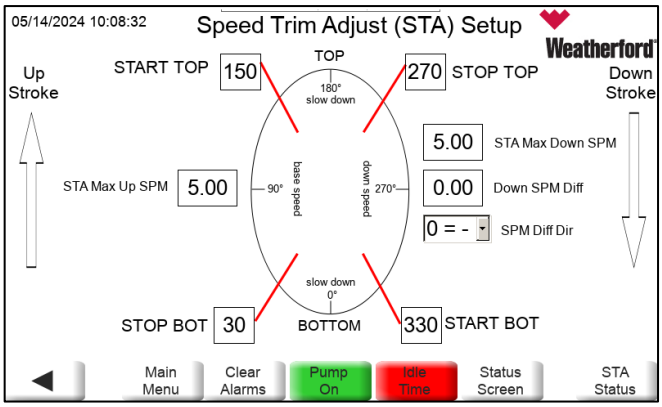
  If STA is enabled under P1230, then based on the model selected under P1229 will limit the max upstroke/downstroke and max transition speed to the selected pumping unit model limits.

Weatherford Rotaflex Model	STA Max Up/Max Down SPM	Max Trans Speed SPM /Max SPM (Cornering)
RF700 / 700-EX	6.9	5
RF800/ 800-EX	6.24	4.5
RF950 / 950-EX	6.24	4.5
RF1100 / 1100-EX	5.96	4.3
RF1150 / 1150-EX	5.05	3.64
RF1155 / 1155-EX	5.20	3.75
RF1160 / 1160-EX	5.20	3.75

- If Max Transition Speed is entered above the Max SPM (Cornering SPM) for the Rotaflex unit model, then below pop-up message appears and limits the Max Transition Speed to Max Cornering SPM value.







- (P1232**) START BOT**/BOS Segment Beginning Angle – The Bottom of stroke must begin in the right-side hemisphere and end in the left side hemisphere. It can begin or end at 180 deg. If begin = end = 0. All angles must be <360. The TOS segment cannot overlap the Bottom of Stroke Segment

- (P1233) **STOP BOT**/BOS Segment Ending Angle – The Bottom of stroke must begin in the right-side hemisphere and end in the left side hemisphere. It can begin or end at 180 deg. If begin = end = 0. All angles must be <360. The TOS segment cannot overlap the Bottom of Stroke Segment

- (P1234) **START TOP**/TOS Segment Beginning Angle – The Top of Stroke must begin in the left side hemisphere and end in the right-side hemisphere. It can begin or end at 180 deg. If begin = end = 0 degrees, then the segment if disabled. All angles must be <360 deg. All angles must be <360. Begin = End = non-zero angle is not allowed. The TOS segment cannot overlap the BOS segment.

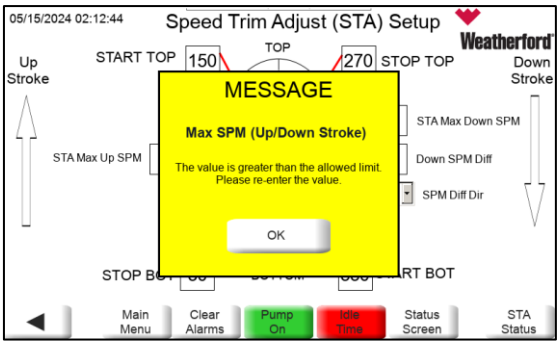
- (P1235) **STOP TOP**/TOS Segment Ending Angle – The Top of Stroke must begin in the left side hemisphere and end in the right-side hemisphere. It can begin or end at 180 deg. If begin = end = 0 degrees, then the segment if disabled. All angles must be <360 deg. All angles must be <360. Begin = End = non-zero angle is not allowed. The TOS segment cannot overlap the BOS segment.

- (P1238) STA Max UP SPM – This is the max speed that the unit will run in the up direction, must be less than or equal VFD Max SPM. Value is limited to Rotaflex model STA Max Up SPM when Rotaflex model enabled.

- (P1239) STA Max DOWN SPM – This is the max speed that the unit will run in the down direction. Must be less than or equal VFD Max SPM. Value is limited to Rotaflex model STA Max Down SPM when Rotaflex model enabled.

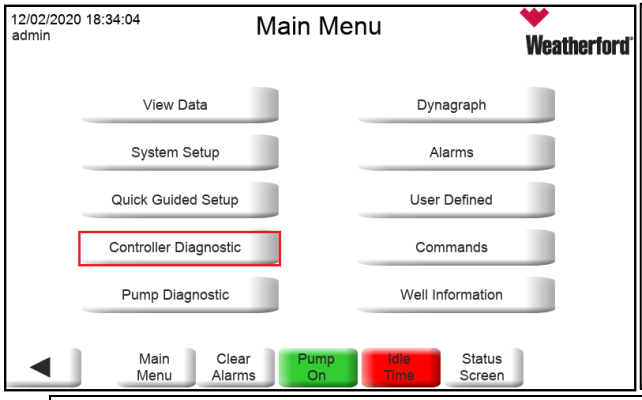
- (P1241) Down Speed Differential – If this is non-zero, the down speed will be set to the base speed plus/minus the differential direction on the downstroke when leaving the TOS Segment.

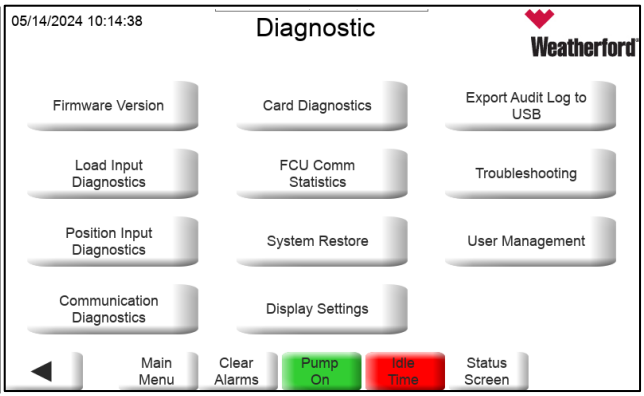
- (P1242) Down Speed Differential Direction – 0 = Minus, 1 = Plus



7.0 Controller Diagnostics:

Controller Diagnostics-Allows access to diagnostic information such as: load sensor, position sensor, communication stats, HMI display settings, settings backup/restore, Firmware version viewing/upgrade, troubleshooting, display settings.



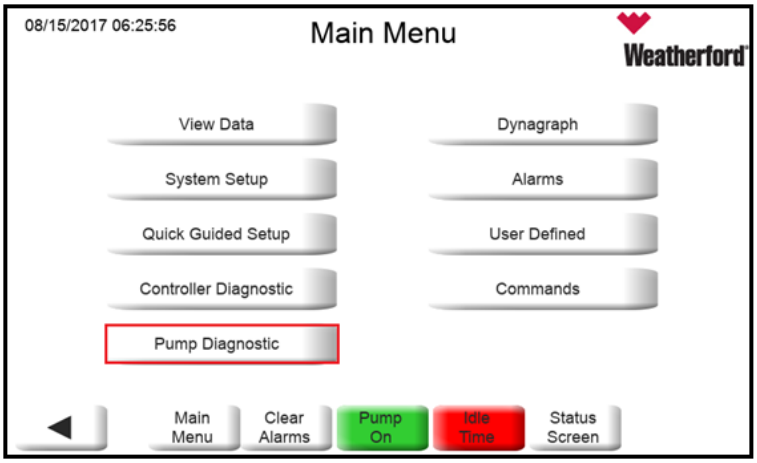


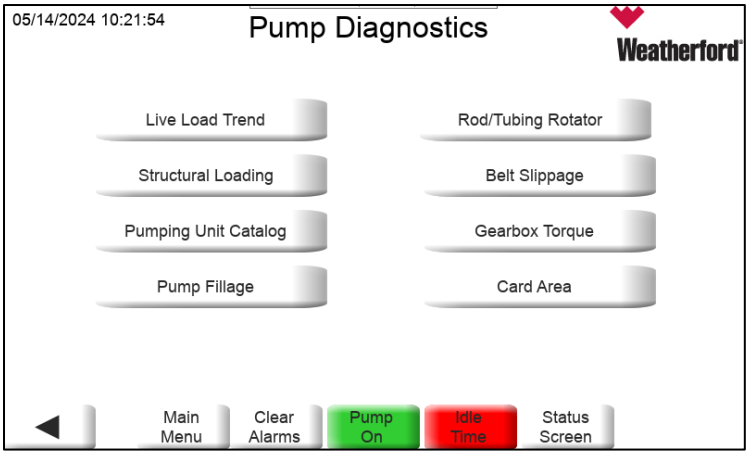
7.0 Controller Diagnostic	
7.1 Firmware Version (*Firmware information and Firmware Upgrade*) **7.2 Load Input Diagnostics** **7.3 Position Input Diagnostics** **7.4 Communication Diagnostics** **7.5 Card Diagnostics** **7.6 FCU Comm. Statistics** **7.7 System Restore** (*includes option to return to quick guided setup menu*) 7.6.1 System Backup to RPOC 7.6.2 System Restore from RPOC 7.6.3 System Backup to SD Card 7.6.4 System Restore from SD Card	**7.7 Display Settings** 7.7.1 HMI Brightness 7.7.2 IP Address 7.7.3 Display (HMI) Version 7.7.4 Display (HMI) Reset **7.8 Export Audit Log to USB** **7.9 Troubleshooting** **7.10 User Management (Note: This feature is available based on the HMI firmware)**

8.0 Pump Diagnostics:

Pump Diagnostics-Currently used to display a trend of current system load and rod rotator configuration/ Historical Data.

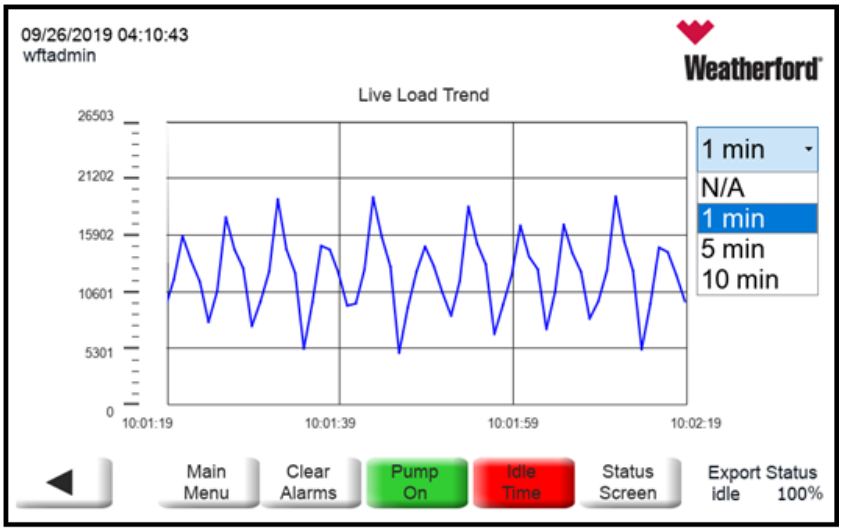
8.0 Pump Diagnostics	
8.1 Live Load Trend (Valve Troubleshoot) **8.2 Rod/Turbing Rotator** 8.2.1 Setup 8.2.2 Historical Data 8.2.3 Current Data **8.3 Structural Loading** **8.4 Pumping Unit Catalog** **8.5 Pump Fillage**	**8.6 Rod/Tubing Rotator** **8.7 Belt Slippage** **8.8 Gearbox Torque** **8.9 Card Area**





8.1 Live Load Trend (Valve Troubleshoot):

Live Load can now be configured by the user for 1min, 5min, or 10min.



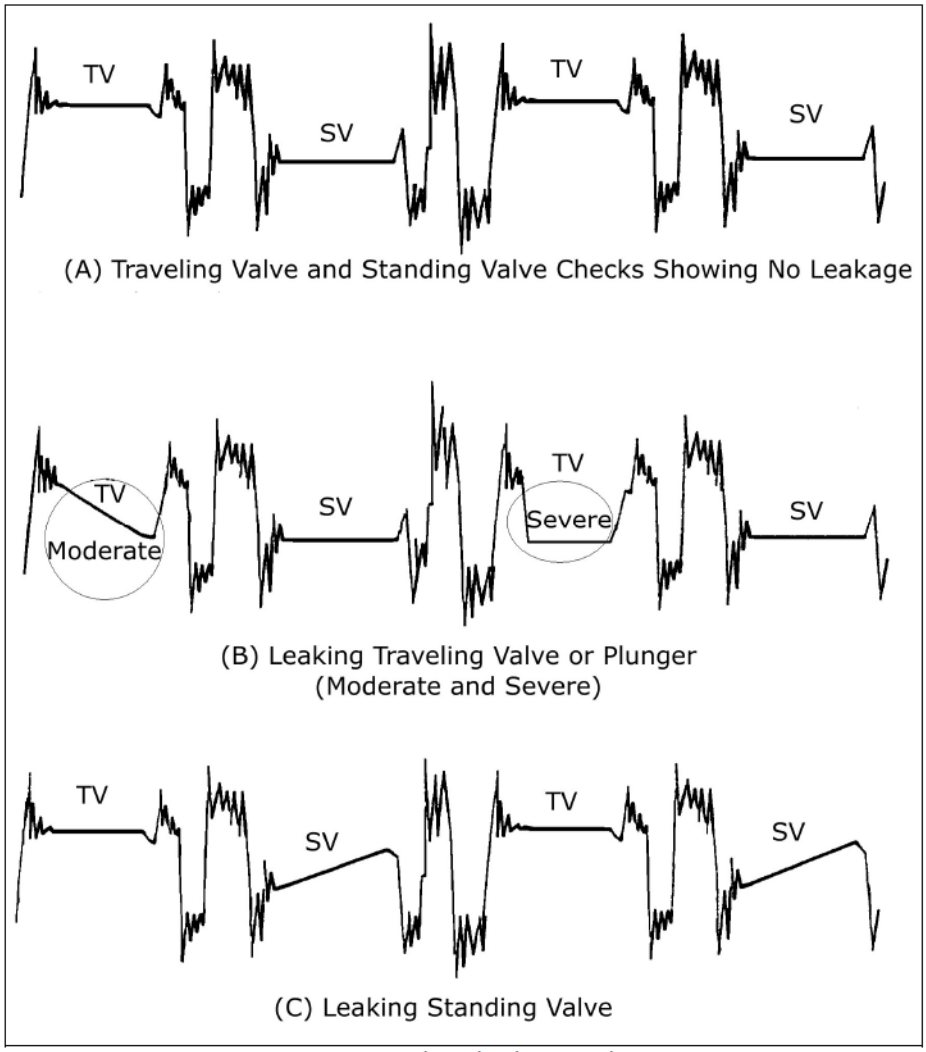
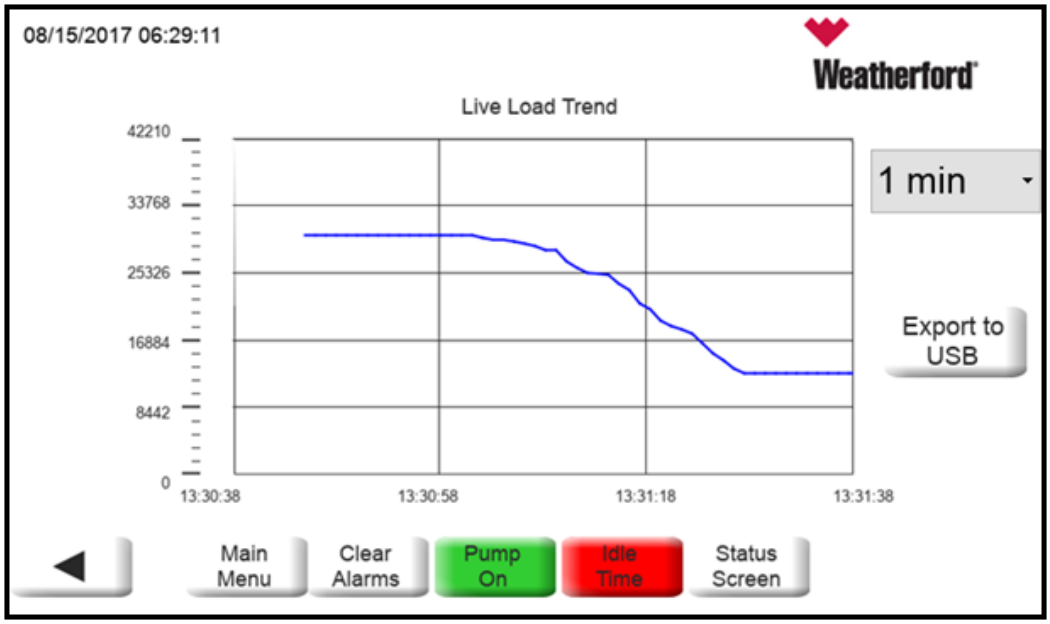
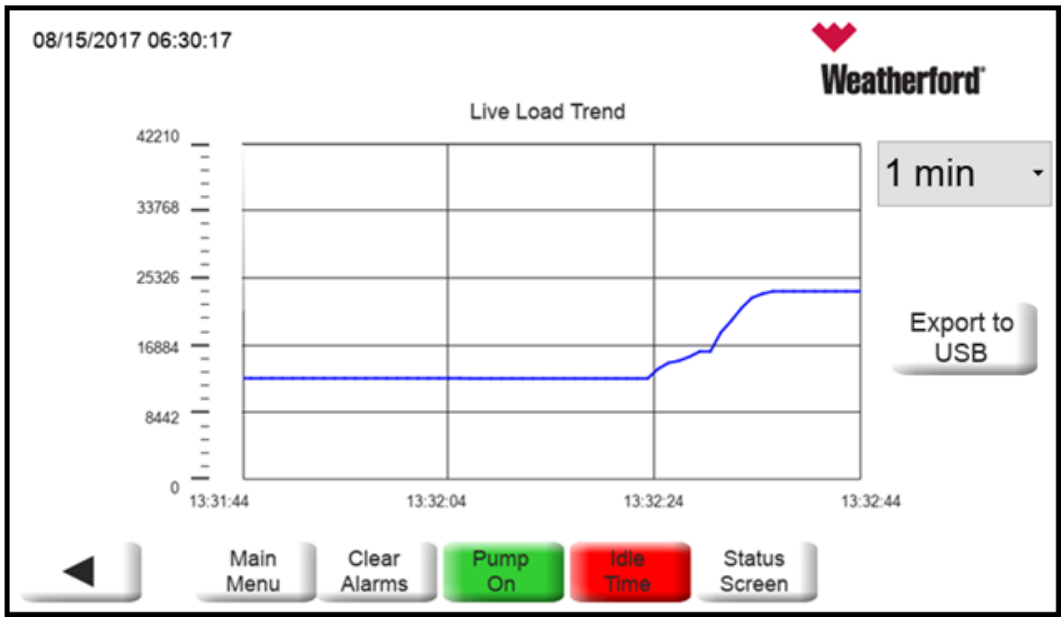


Figure 7: Valve Check Examples

Leaking Travelling Valve Example - **Stop the Pumping unit at Top Of stroke**.
Load drops gradually over time.

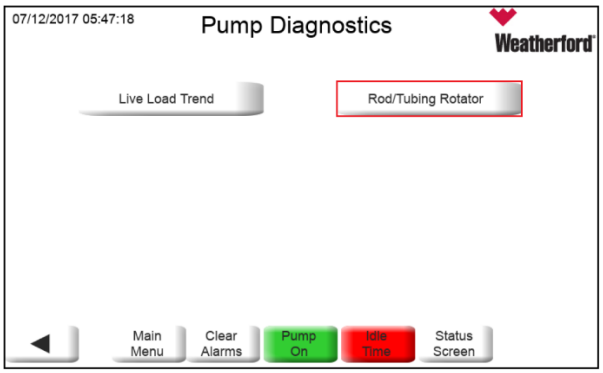


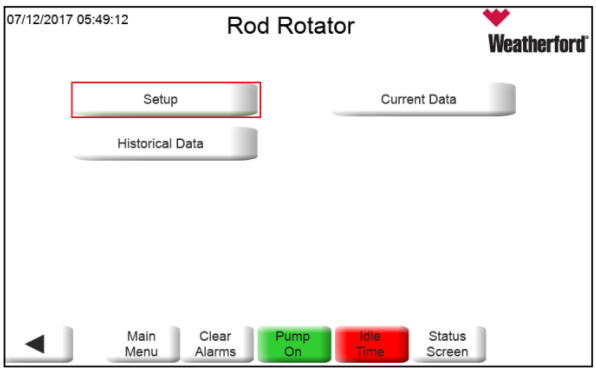
Leaking Standing Valve Example – Stop **the pumping unit at Bottom of Stroke**.
Load increases over time.

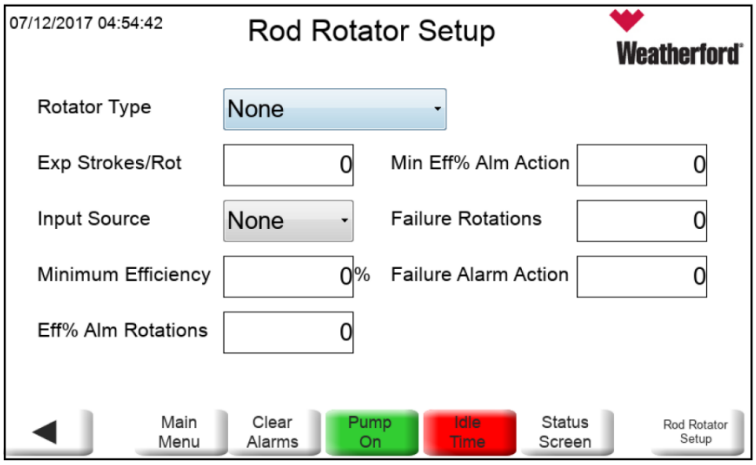


Live Load Export
Live Load graph can be exported from the HMI by inserting a USB drive and pressing Export to USB. The Live Load will be stored in PDF format.

8.2 Rod Rotator:





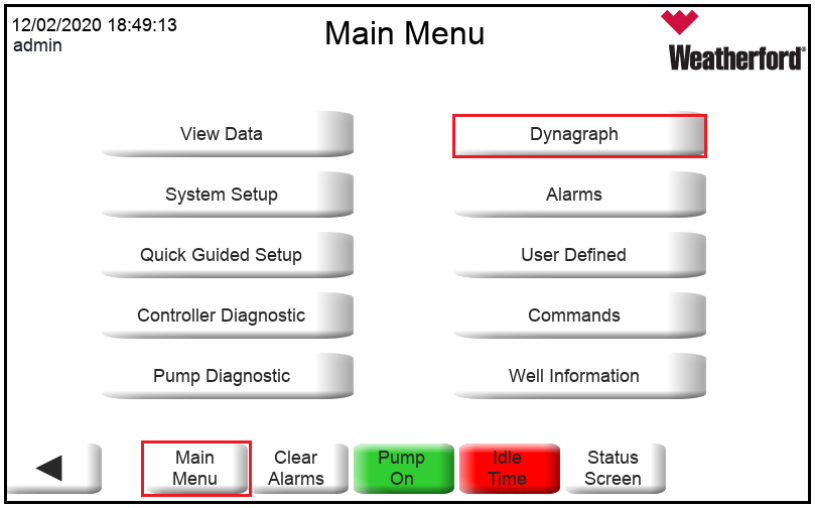


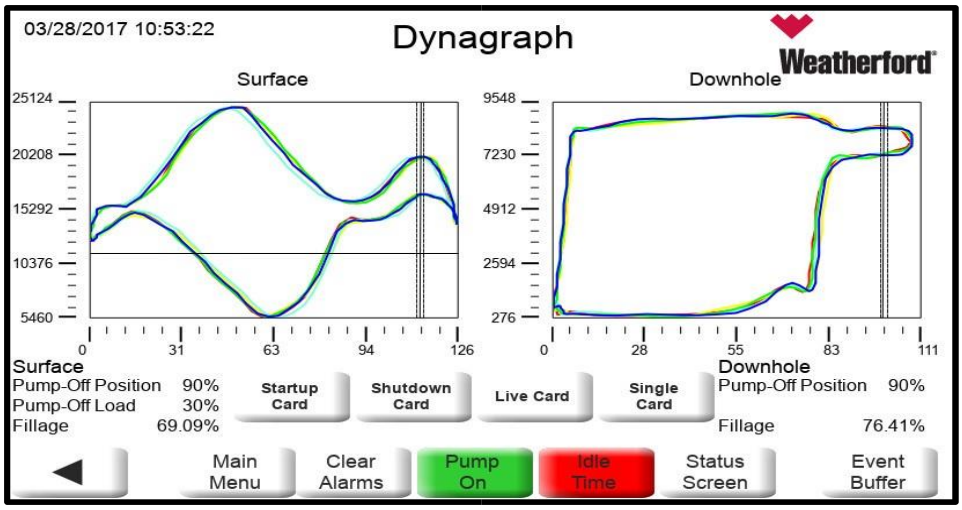
Set the rotator type (P5400) from the following list. Parameter 5401, expected strokes / rotation, will be set automatically. For the custom rod or tubing types enter the expected strokes/rotation manually.

Rotator Type	Strokes / Rotation
Weatherford 13K/30	30 P5401
Weatherford 30K/30	30 will be
Weatherford 40K/80	40 set to the
Weatherford 40K-SG/160	160 strokes/rotation
T-164/28	28 associated with
T-164 SG/43	43 the rotator
T-252/24	24 type
T-302/77	77 ....
T-302 SG/154	154 ....
Custom Rod	Set P5401 with the expected storkes/rotation
Tubing	Set P5401 with the expected storkes/rotation

9.0 Dynagraph:

Dynagraph Plot-Allows access to Dynagraph plots (Start-Up, Shutdown, Live, Single, Surface, and Downhole) and Event Buffer.

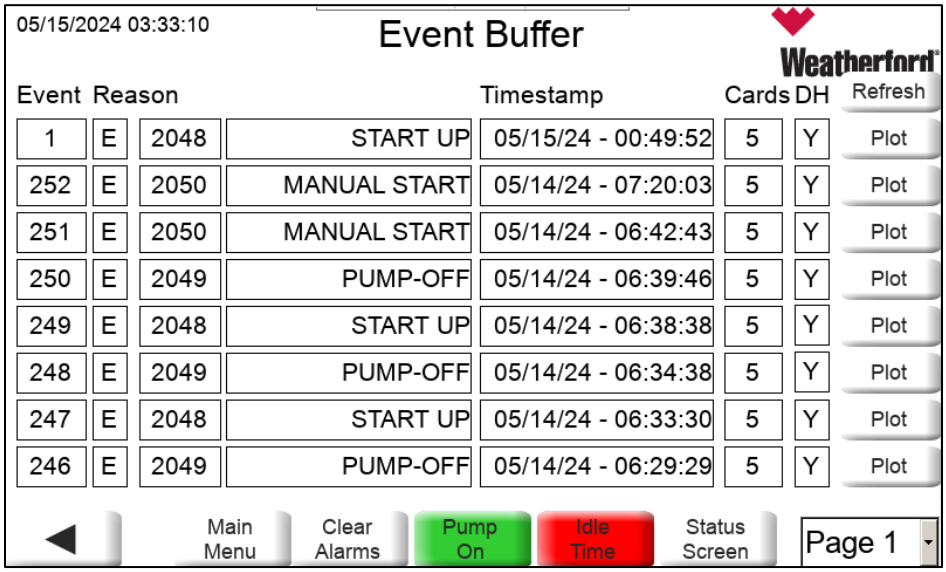




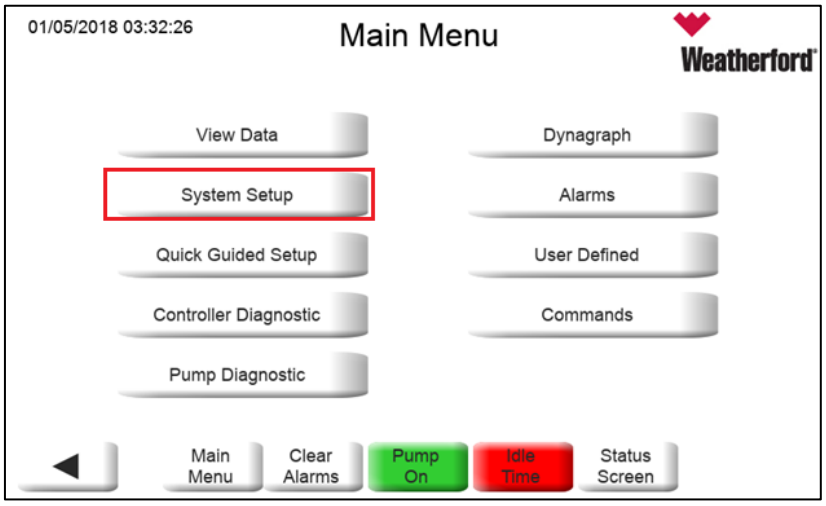
DYNAGRAPH SCREEN STRUCTURE

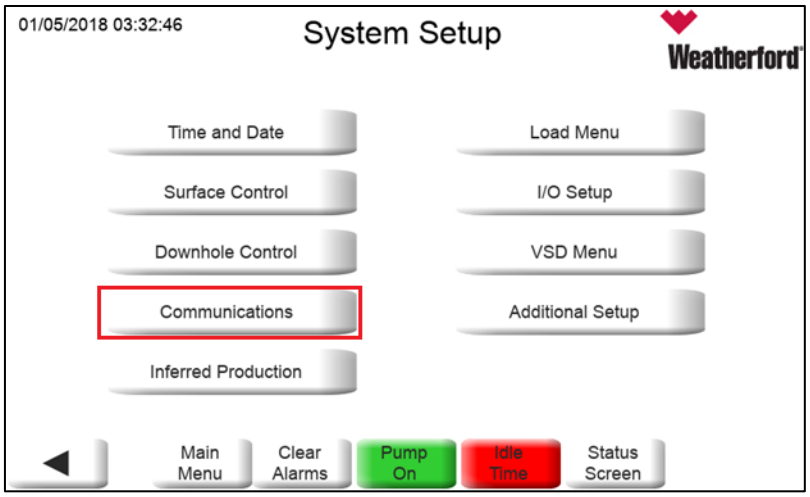
9.0 Dynagraph	
9.1 Start-Up Card **9.2 Shutdown Card** **9.3 Live Card** **9.4 Single Card** **9.5 Event Buffer**	

- Event Buffer – RPOC stores 256 events under event buffer with 5 surface and Downhole cards for each event. Event refers to startup, pump off, RPOC and VSD faults.

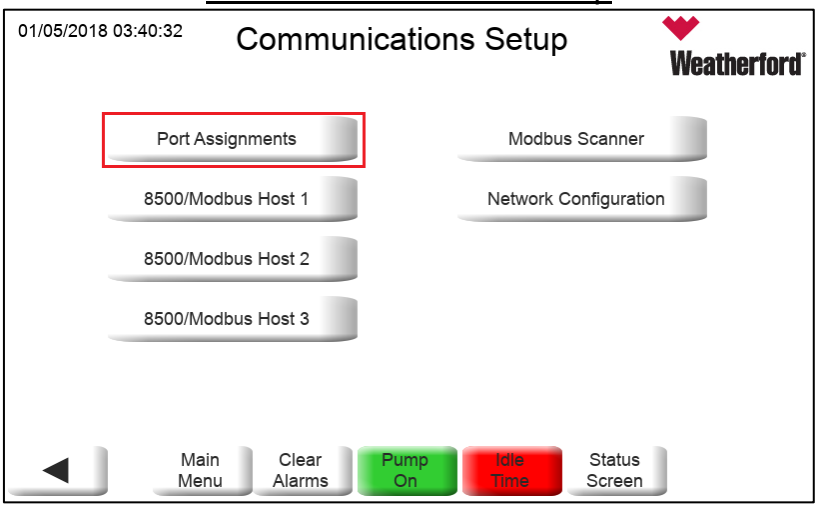


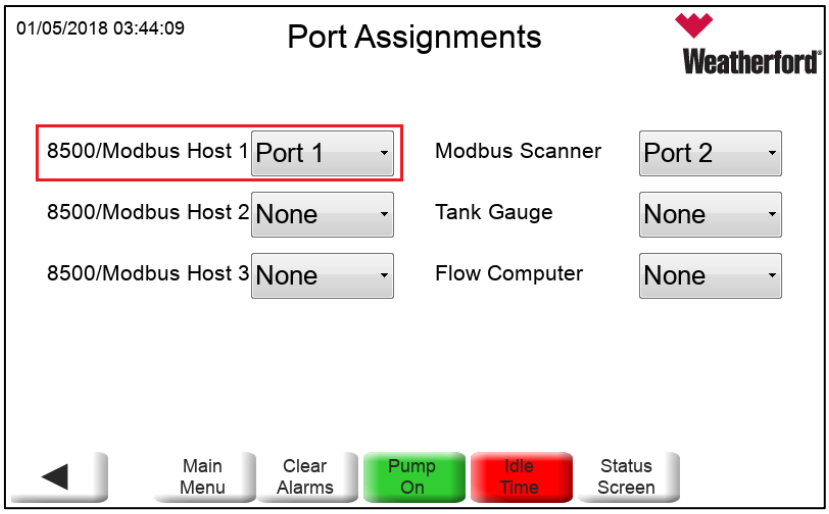
10.0 Communications:

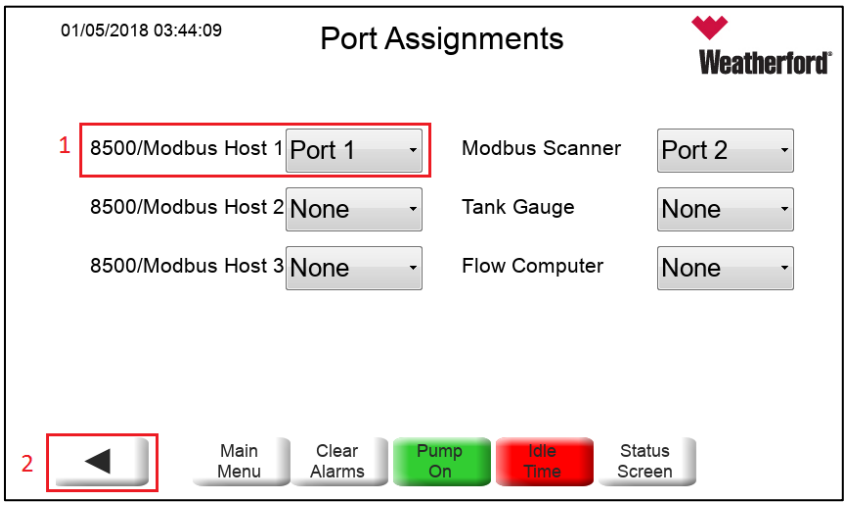


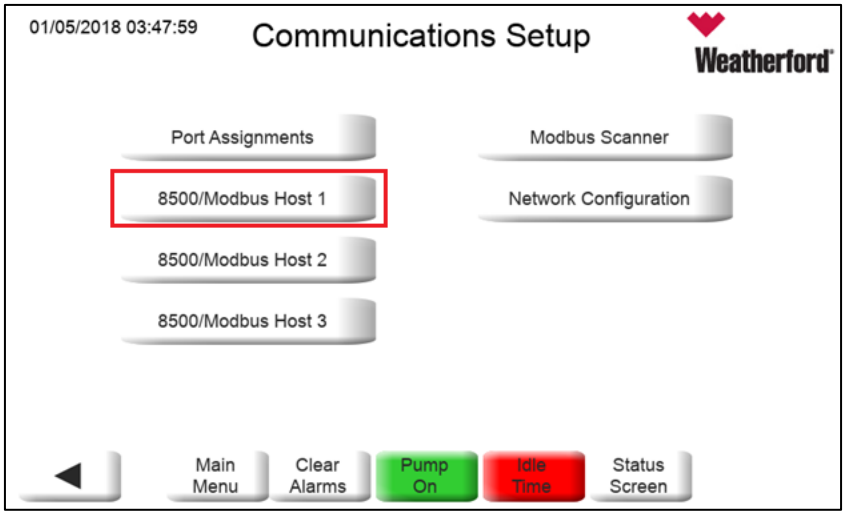


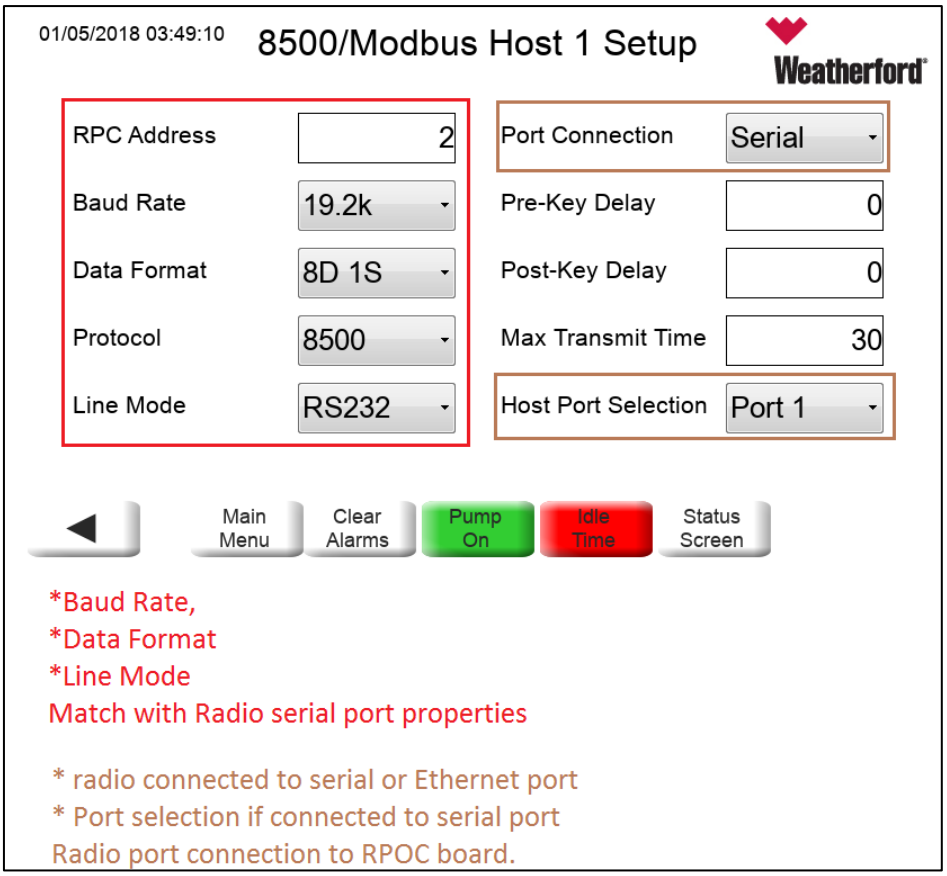
Serial Communication Setup




01/05/2018 03:44:09
Port Assignments
Weatherford
8500/Modbus Host 1
Port 1
Modbus Scanner
Port 2
8500/Modbus Host 2
None
Tank Gauge
None
8500/Modbus Host 3
None
Flow Computer
None
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen

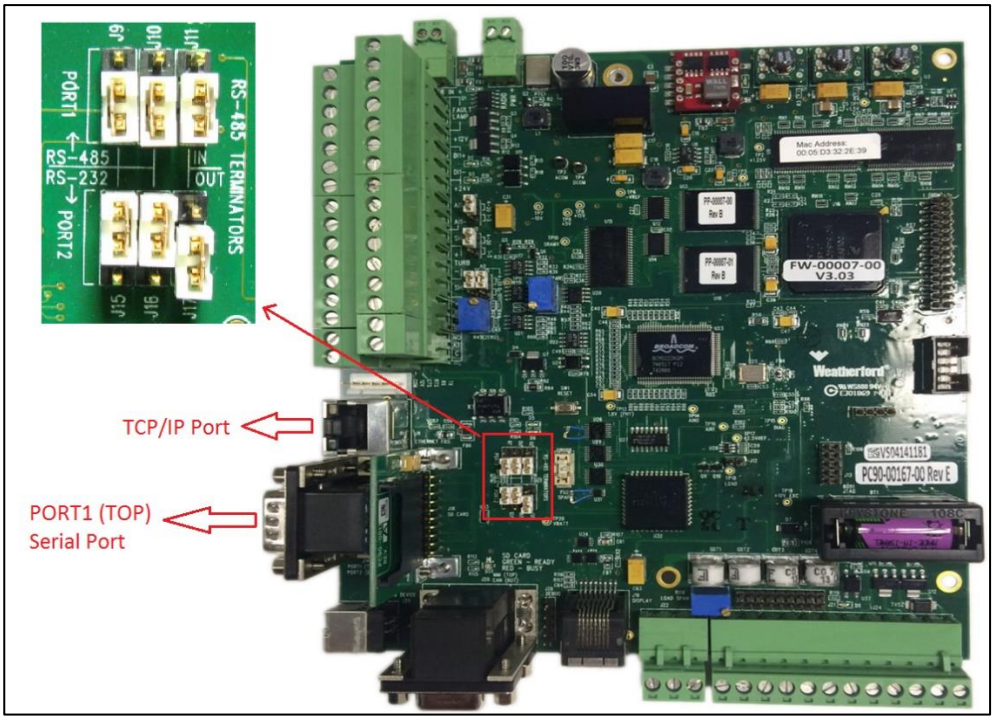

01/05/2018 03:44:09
Port Assignments
Weatherford
1
8500/Modbus Host 1
Port 1
Modbus Scanner
Port 2
8500/Modbus Host 2
None
Tank Gauge
None
8500/Modbus Host 3
None
Flow Computer
None
2
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen


01/05/2018 03:47:59
Communications Setup
Weatherford
Port Assignments
Modbus Scanner
8500/Modbus Host 1
Network Configuration
8500/Modbus Host 2
8500/Modbus Host 3
Main Menu
Clear Alarms
Pump On
Idle Time
Status Screen



By default on RPOC firmware,

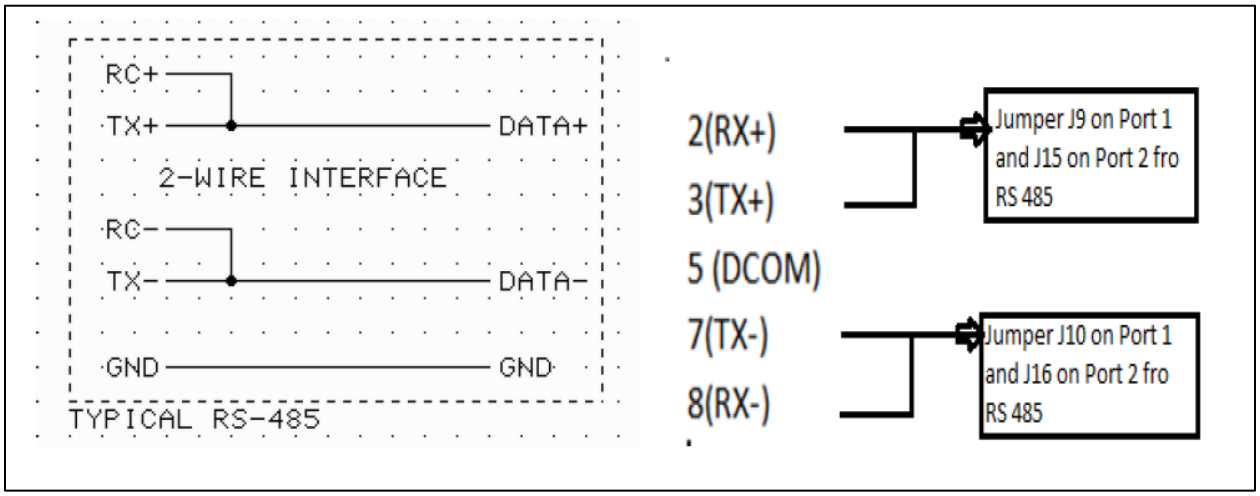
- Port 1(top) is assigned for 8500/ Modbus Host communication. Port 1 jumpers are configured for RS232.
- Port 2(bottom) is assigned for Modbus Scanner Port for scanning the register values from different Yaskawa drives using RS485 (Port 2 Jumpers are configured for RS485)



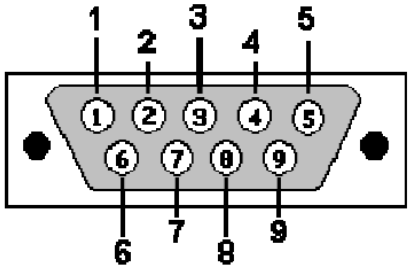
- Port 1 can be configured for RS-485 by moving jumpers J9 and J10 to the top position. J11 is the terminating resistor for Port 1.
- Port 2 can be configured to RS-485 by moving jumpers J15, J16 and J17 to the top position. J17 is the terminating resistor for Port 2.

When a Master device is scanning two or more RPOC devices in a RS485 network, then Terminating resistor should be used on the last RPOC device on the network. Jumper J11 or J17 is moved up to include terminating resistor based on the port scanned.

For the 485 pins 2, 5 and 7 on the DB9 can be used as shown below,



- When the jumpers J9 and J10 are moved up on port 1, then pins 2 and 3 are jumped also, pins 7 and 8 are jumped as shown above in the diagram. So you can use pins 2(+),5(DCOM) and 7(-) on the DB9 for 485 port
- Port 1 to RS-232 is Jumpers J9 & J10 to the bottom position. Port 2 to RS-232 is Jumpers J15 & J16 to the bottom position.
- When the port is configured as RS 232 it is used for communicating with the host system (SCADA) and in this case jumper J11 and J17 are not used.

Pin #	Port 1 & Port 2 RS-485	Port 1 & Port 2 RS-232	
1	N/C*	N/C*	
2	RX+	RxD	
3	TX+	TxD	
4	N/C*	N/C*	
5	Ground	Ground	
6	N/C*	N/C*	
7	TX-	RTS	
8	RX-	CTS	
9	N/C*	N/C*	

DTE and DCE (serial communication)

- DTE and DCE are the two sides of an RS-232 interface. The DB9 pinouts for DTE and DCE are physically different. A modem is an example of a DCE device. A common DTE device is the serial port of a computer.

- **RPOC – Port 1, Port 2 are DTE. MMI port is DCE**
  Wiring a DTE device to a DCE device for communication is easy. The pins are a one-to-one connection, meaning all wires go from pin x to pin x. A **straight through cable** is commonly used for this application.

- For connecting the any serial modem (DCE) to the RPOC (DTE) com Port1 and Port 2 for host communication use a straight serial cable

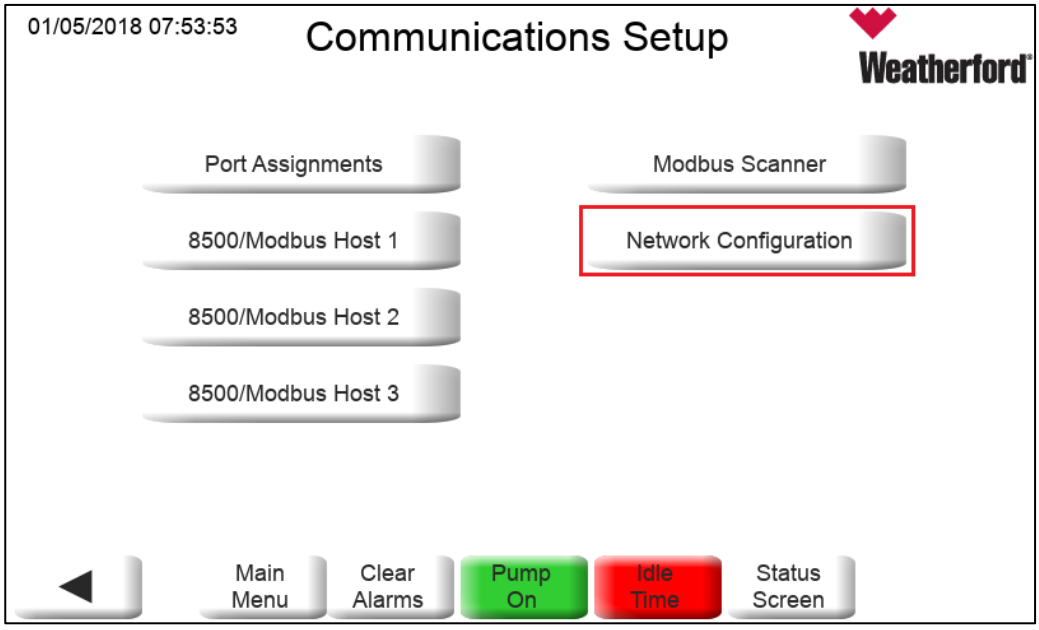
- In contrast, wiring two DTE devices together requires crossing transmit and receive wires. This cable is known as a **null modem** or **crossover cable**.

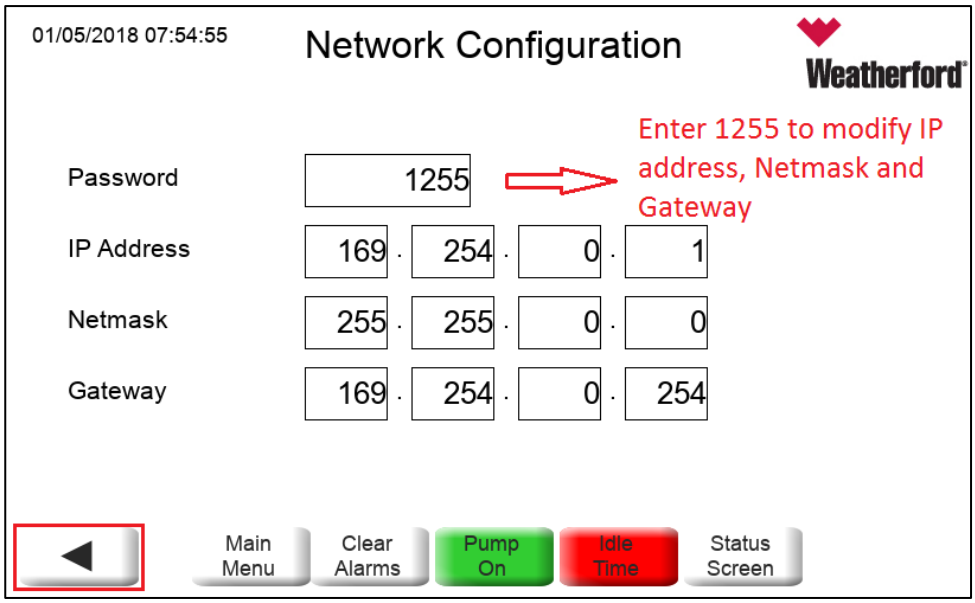
- For connecting a laptop com port (DTE) to RPOC Port 1 and Port 2 (DTE) for any communication we should use a null modem along with a straight serial cable or a cross over cable. Also a null modem is used between two DCE.

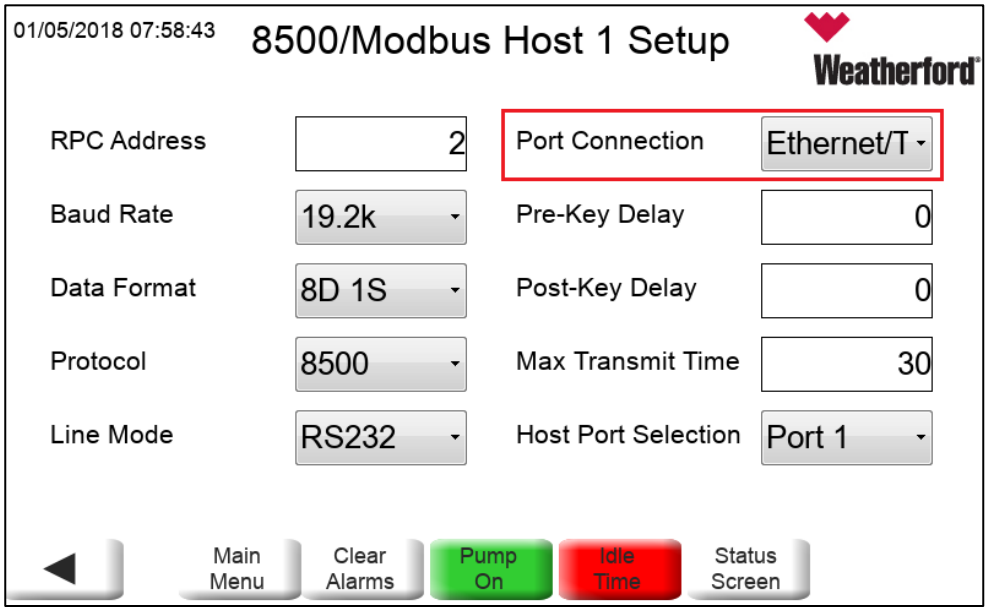
Table below shows the cable to be used for serial communications

	RPOC		
	Port 1 (DTE)	**Port 2 (DTE)**	**MMI (DCE)**
Laptop (DTE)	Null Modem or cross over cable	Null Modem or cross over cable	Straight through cable
Serial Modem (DCE)	Straight through cable	Straight through cable	Null Modem or cross over cable

Ethernet Communication Setup





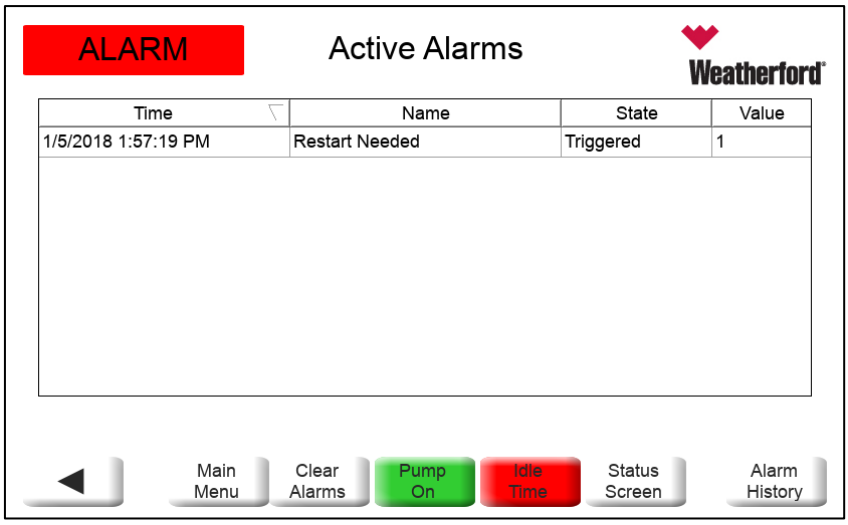


For Ethernet communication the main properties to be checked for communication are

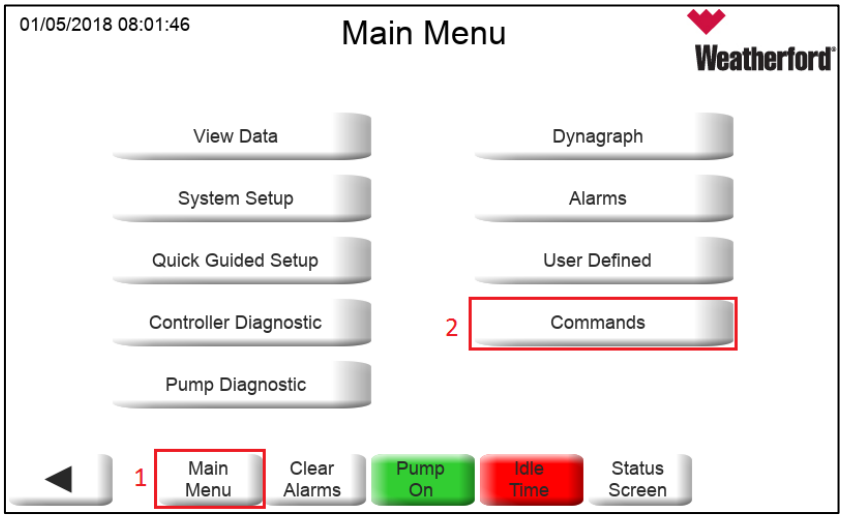
- Unit address
- Port connection
- Protocol
- Network configuration (Ethernet IP, Netmask and Gateway)

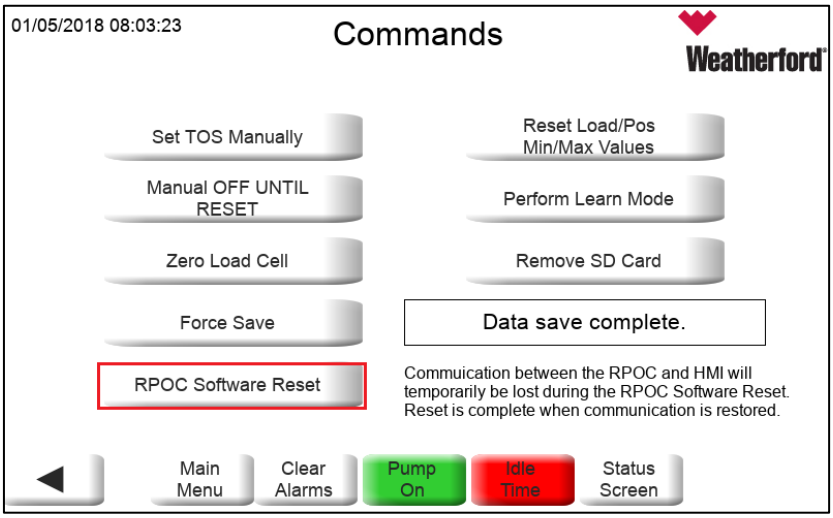
Note: RPOC will automatically pop up an alarm asking for Restart needed on below conditions

- Port assignments are changed
- Port connections are changed
- Protocol changed

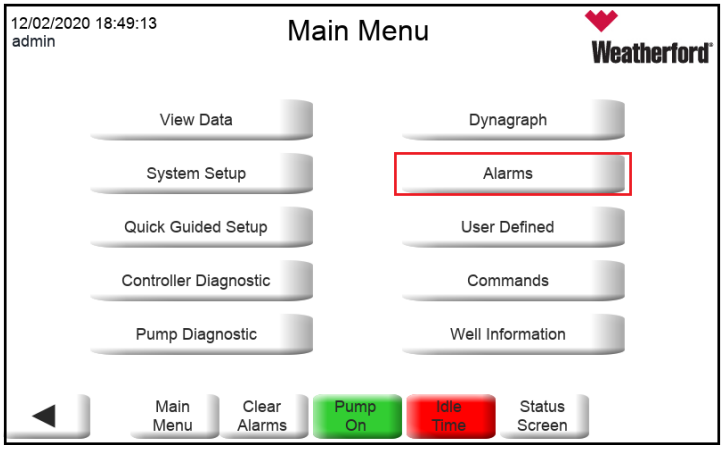


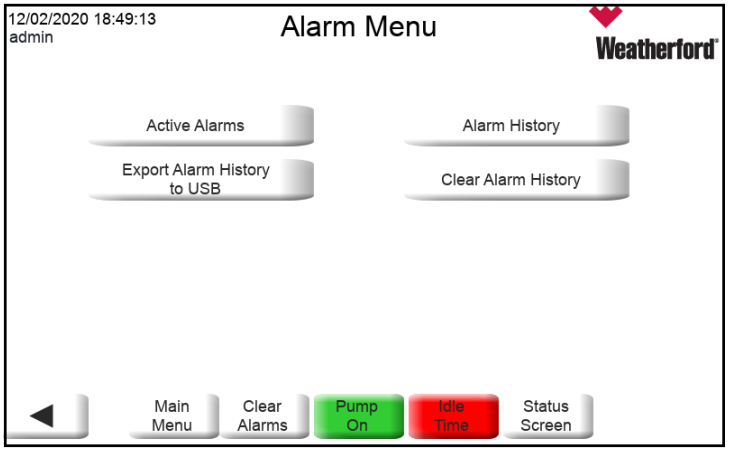
To perform software restart –



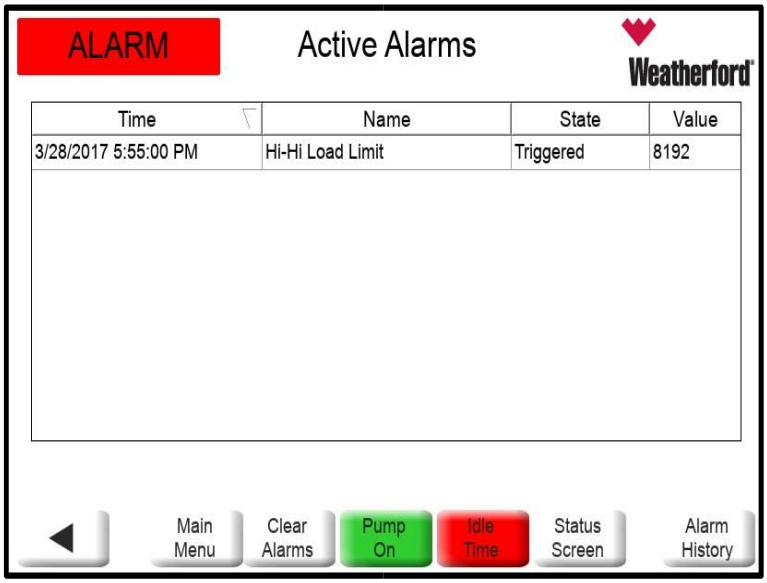


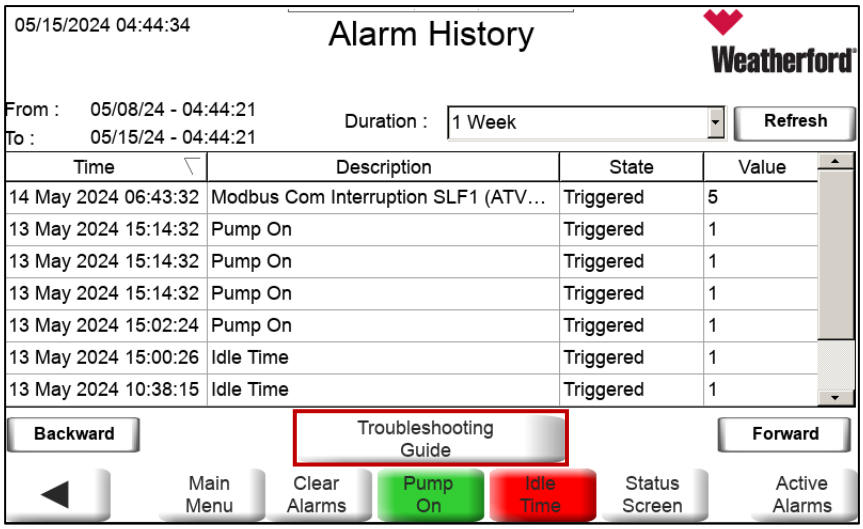
11.0 Alarms:



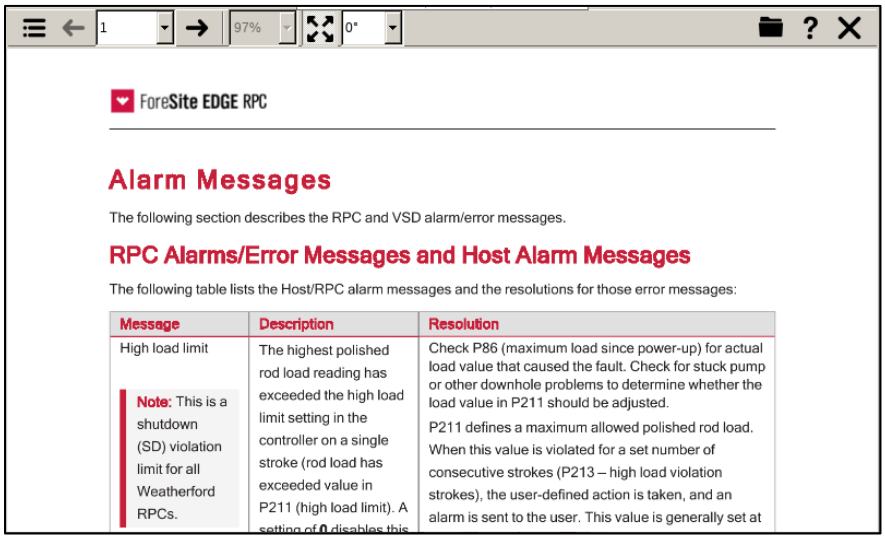


- Alarms Menu- Main location for all alarms stored in controller.





- Troubleshooting Guide will list the alarm message, description and troubleshooting steps.



12.0 Parameter Groups:

Parameter Group	Range	Parameter Group	Range
A/D (Analog/Digital) Operations	450 – 458	Logger Freeze Buffer, Hourly	900 – 923
Accumulator 1 Setup	6510 – 6528	Logger Parameters	890 – 899
Accumulator 1 Status	6535 – 6543	Low Load Span, Well Off/On Timer	226 – 228
Accumulator 2 Setup	6545 – 6563	Modbus Device Status	1300 – 1458
Accumulator 2 Status	6570 – 6578	Modbus Scanner 1	1500 – 1589
Accumulator 3 Setup	6580 – 6598	Modbus Scanner 2	1600 – 1689
Accumulator 3 Status	6605 – 6613	Modbus Scanner Communication Properties	1190 – 1208
Accumulator 4 Setup	6615 – 6633	Modbus Scanner Database	1700 – 2299
Accumulator 4 Status	6640 – 6648	Modbus Scanners/Devices	1300 – 1458
AI1 Status & Setup	280 – 300	Motor Moisture Restart Protection	38 – 39
AI2 Status & Setup	310 – 329	Password Setup	500 – 501
AI3 Status & Setup	330 – 349	Peak Energy Hours Control	50 – 53
AI4 Status & Setup	700 – 719	POC Sensor Failure Action	200
AI5 Status & Setup	720 – 739	Position, Load Display Control	370 – 376
AI6 Status & Setup	740 – 759	Position Data, Actual	619
AI7 Status & Setup	760 – 779	Position Sensor, Setup	270 – 273
AI8 Status & Setup	780 – 799	Position Sensors, Data, & Control	128 – 135
AI as DI Actions	249 – 254	Position Switch Information	144 – 149
AI Channel 1 Status	160 – 168	Position Switch Setup	6 – 14
AI, DI Accumulators	193 – 199	Power Fail Multiplier	220 – 221
Air Balance Control	40 – 46	POC Load & Position Settings	20 – 26
AO Parameters	1180 – 1189	Pump Intake Pressure (PIP) – Last 24 Hours	3700 – 3723
Auto Self-Tracking/Load (Strain Gauge)	63 – 69	Pump Intake Pressure (PIP) – Last 60 Days	3724 – 3784
Auxiliary I/O Configuration	496 – 497	Radio Transmission Data	621 – 624
Card Collection	510 – 514	Reset to Defaults	472 – 473
Communications	601 – 653	Rod Load Control	1290 – 1294
Continuous Position Sensor Data	102 – 114		1470 – 1488
	270 – 273	Rod Rotator Setup	5400 – 5411
Control Failure	260 – 263	Rod Rotator Status	5415 – 5425
Control Override	27 – 33		5461 – 5522
Controller Configuration	492 – 494	Rod Stress	8101 – 8120
Controller Status, Fatal Error	389 – 397	Runtime Counter, Days, & Hours	398 – 399
Cycle Interval Filter Control	125 – 127	Runtime Segments	968 – 999
Cycle Runtime History	400 – 419	Scratch Pad	120 – 124
Daily Logger Freeze Buffer	930 – 959	Sensor Fail Action (Load or Position)	200 – 203
Daily Production	3420 – 3539	Setup & Initialization	1 – 5
Daily Runtime	670 – 699	Setup & Initialization, Time & Date	1 – 5

Parameter Group	Range	Parameter Group	Range
	3300 – 3419		15 – 19
Daily Runtime History	420 – 427		15
DI Actions	560 – 575	Software Timer	204 – 209
DI Status & Accumulators	180 – 199	Speed Trim Adjust	1230 – 1247
Display Rates	508 – 514		1154 – 1167
DO Action Ticks	590 – 599		1460 – 1469
DOs on Timer	580 – 587	Startup Control	54 – 56
Dynagraph Card Setup	614 – 618	Status	520 – 526
Error Bit Values & Descriptions	527 – 537	Stop Location	6670 – 6674
Error Bit Values & Descriptions, Accumulated	541 – 547		6682
Event Records Management	355 – 366	System Backup and Restore	465 – 470
Firmware, CMCS Compatibility	490 – 494	Tank 1 Setup	4020 – 4042
Firmware Version	478 – 479	Tank 1 Status	4043 – 4145
Firmware Version ID	549 – 556	Tank 2 Setup	4150 – 4172
Fluid Level – Last 24 Hours	5700 – 5723	Tank 2 Status	4173 – 4275
Fluid Level – Last 60 Days	5724 – 5784	Tank 3 Setup	4280 – 4302
Fluid Pump Stroke Calculation	800 – 810	Tank 3 Status	4303 – 4405
	841 – 849	Tank 4 Setup	4410 – 4432
Fluid Pump Stroke Displacement Totals	811 – 840	Tank 4 Status	4433 – 4535
Gauge Times	429 – 449	Tank 5 Setup	4540 – 4562
Gearbox Torque	2964	Tank 5 Status	4563 – 4665
	8200 – 8212	Tank 6 Setup	4670 – 4692
	8213 – 8224	Tank 6 Status	4693 – 4795
Hi Speed DI Accumulator on DIO1	578 – 579	Time & Date Setup	15 – 19
Host Alarms	1000 – 1016	Total Stroke Count – Last 24 Hours	5864 – 5892
Immediate Pump-Off	230 – 231	Total Stroke Count – Last 60 Days	5800 – 5831
Lamp Test/Software Reset	350 – 352	Traveling & Standing Valves	1020 – 1033
Load & Position Sensor Setup for POC	34 – 37	User Defined Display	870 – 881
Load Limits & Limit Violation Action	208 – 219	Variable Speed Control (VSD)	1250 – 1275
Load Parameters	70 – 114	VSD	1170 – 1179
Load Span, Low For Trash	115 – 117	Weekend Start Times & Mode Sequence	850 – 862
Load Span, Low Limit & Violation Action	222 – 225	Well Cycle (Stroke) Monitoring & Control	136 – 143
Logger Freeze Buffer, Daily	930 – 959	Worst Pump Control State	540

VSD Control Parameters		Load violation Shutdown limits	
Parameter No	Description	**Parameter No**	**Description**
30	Control Source; 0= Surface; 1 = Downhole	218	High High Load Limit
3152	Downhole Enable; 0 = Disable (Surface Control); 1 = Enabled (Downhole Fillage Control)	219	High high Load action 1
3014	VSD Target Fillage/Fillage Setpoint	660	High high Load action 2
1256	VSD Min SPM	211	High Load Limit
1257	VSD Max SPM	214	High Load action 1
1252	VSD Surface Tolerance	661	High Load action 2
2900	VSD Downhole Tolerance	210	Low Load Limit
1253	Immediate Speed Change	216	Low load action 1
1258	Speed Change	662	Low load action 2
1141	Initial step value slow down	208	Low Low Load limit
1142	Minimum step value slow down	209	Low Low load action 1
1263	VSD SPM Override Value	663	Low Low load action 2
1264	VSD SPM Override Flag	223	Low load span limit
1174	Control Filter	225	Low Load span action 1
		664	Low Load span action 2
VSD Min Fillage (secondary Pump Fillage to stop/start)			
1273	Minimum Pump Fillage		
1274	Min Fillage stroke count	**Inferred Fluid Production**	
1275	Min Fillage action = 4 (Idle time)	30	Control Source; 0= Surface; 1 = Downhole
20	Idle time	3152	Downhole Enable; 0 = Disable (Surface Control); 1 = Enabled (Downhole Fillage Control)
2856	VSD Low/Min Fillage SPM; Works when 1275 = 7 (No Action)	3002	Surface Stroke Length (in *100)
		805	Production calculation Method (6= Downhole)
VSD STA (Speed Trim Adjustment) - Rotaflex Operation		807	Pump bore diameter (in*100)
1230	Speed Trim Adjustment (STA) Enable	810	Pump Efficiency (%*10)
1231	STA Trim Speed		
1232	STA BOT Start Angle		
1233	STA BOT Stop Angle	**PIP(Pump Intake Pressure) Setup**	
1234	STA TOP Start Angle	3171	Tubing Pressure; Enter value when no Transmitter connected to RPC in P3172
1235	STA TOP Stop Angle		
1238	STA Max Up Speed	3172	Tubing -AI(1-8); 0= No Transmitter, 1 = AI1,8 = AI8
1239	STA Max Down Speed	3173	

1240	STA Max Transition Speed		Casing Pressure; Enter value when no Transmitter connected in P3172
1241	STA Down Speed Difference	3174	Casing -AI(1-8);0= No Transmitter, 1 = AI1,8 = AI8
1242	Down Speed Differential Direction	3175	Pump Intake Pressure
		3176	Fluid Level
Downhole Control Setup		3177	Toggle-Zero(0)/Negative(1)
3000	Pump depth	3178	Fluid Load Factor%
3001	Fluid depth		
3002	Surface stroke(in x 100)		
3003	Oil API gravity		
3004	Oil specific gravity		
3005	Water specific gravity		
3006	Water cut		
3007	D/H Damping factor		
3014	D/H Pump-off Position % (Fixed Speed POC)		
3015	D/H strokes for pumpoff (Fixed Speed POC)		
3016	D/H strokes for failure		
3017	D/H fallback method		
3018	D/H strokes for recovery		
3019	D/H failure Action		
Rod Taper Setup			
3020	Rod type 1 density		
3021	Rod type 1 elasticity		
3022	Rod type 1 propagation		
3023	Rod type 1 service factor		
3024	Rod type 1 tensile strength		
3025	Rod type 2 density		
3026	Rod type 2 elasticity		
3027	Rod type 2 propagation		
3028	Rod type 2 service factor		
3029	Rod type 2 tensile strength		
3030	Rod type 3 density		
3031	Rod type 3 elasticity		
3032	Rod type 3 propagation		
3033	Rod type 3 service factor		
3034	Rod type 3 tensile strength		
3035	Rod type 4 density		
3036	Rod type 4 elasticity		
3037	Rod type 4 propagation		
3038	Rod type 4 service factor		
3039	Rod type 4 tensile strength		
3040	Rod type 5 density		
3041	Rod type 5 elasticity		

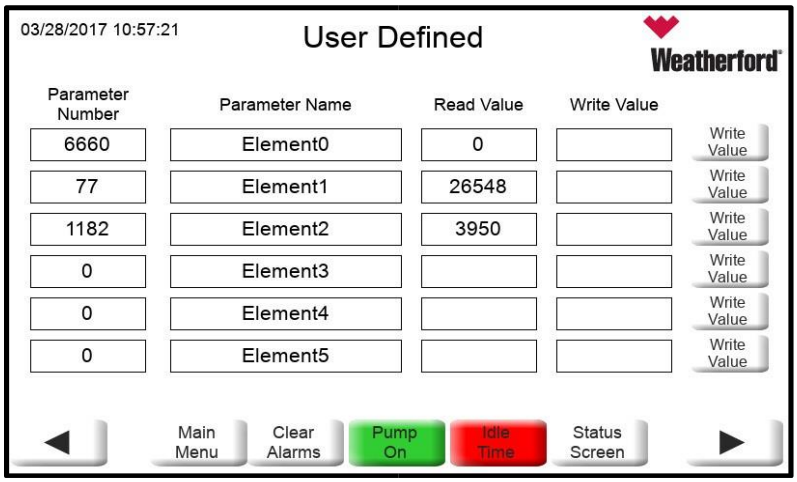
Rod Taper Setup			
3042	Rod type 5 propagation		
3043	Rod type 5 service factor		
3044	Rod type 5 tensile strength		
3045	Taper 1 rod type	0 = Nothing, 1 = Steel, 2 = Fiberglass, 3 = Corod, 4 = Custom	
3046	Taper 1 rod count		
3047	Taper 1 rod diameter (inches)		
3048	Taper 1 rod length (feet)		
3050	Taper 2 rod type	0 = Nothing, 1 = Steel, 2 = Fiberglass, 3 = Corod, 4 = Custom	
3051	Taper 2 rod count		
3052	Taper 2 rod diameter (inches)		
3053	Taper 2 rod length (feet)		
3055	Taper 3 rod type	0 = Nothing, 1 = Steel, 2 = Fiberglass, 3 = Corod, 4 = Custom	
3056	Taper 3 rod count		
3057	Taper 3 rod diameter (inches)		
3058	Taper 3 rod length (feet)		
3060	Taper 4 rod type	0 = Nothing, 1 = Steel, 2 = Fiberglass, 3 = Corod, 4 = Custom	
3061	Taper 4 rod count		
3062	Taper 4 rod diameter (inches)		
3063	Taper 4 rod length (feet)		
3065	Taper 5 rod type	0 = Nothing, 1 = Steel, 2 = Fiberglass, 3 = Corod, 4 = Custom	
3066	Taper 5 rod count		
3067	Taper 5 rod diameter (inches)		
3068	Taper 5 rod length (feet)		

Strokes Per Minute (SPM Values)		Well Status		Rod Stress Calculated Values	
141	Last Stroke Well Speed	20	Idle time/Downtime	8101	Taper 1 Max Stress
142	Filtered/Avg Well speed over last 10 strokes	30	POC Control Source (Downhole)	8102	Taper 1 Min Stress
5900	Avg SPM Today	55	Time to IDLE at Startup	8103	Taper 1 Max Allowable
5901	Avg SPM Yesterday	419	Present Pump Off Time (Well In Idle time status)	8104	Taper 1 Max Percentage
5800	Stroke Count Today	400	Current Cycle Runtime/Pump run time [0]	8105	Taper 2 Max Stress
5801	Stroke count yesterday	421	Runtime yesterday (HH:MM:SS)	8106	Taper 2 Min Stress
Load Values		P526	8323 = Well is Running without any fault/alarm	8107	Taper 2 Max Allowable
79	Min load last stroke	P526	8192 = Well is in idle state. Will restart after idle time expires	8108	Taper 2 Max Percentage
80	Max load last stroke		Well In Fault State	8109	Taper 3 Max Stress
87	Span over last stroke	P1766	U1000/Regen VSD Fault	8110	Taper 3 Min Stress
274	MinLoad Today	P1780	A1000/AC7 VSD Fault	8111	Taper 3 Max Allowable
275	MinLoad Yesterday	**Well In Fault State on not**		8112	Taper 3 Max Percentage
276	MinLoad 2 days Back		Drive Fault/RPC Fault	8113	Taper 4 Max Stress
277	MaxLoad Today	register	P 1766/P526	8114	Taper 4 Min Stress
278	MaxLoad Yesterday	Fault	!=0/0	8115	Taper 4 Max Allowable
279	MaxLoad 2 Days Back	Fault	0/3	8116	Taper 4 Max Percentage
419	Present Pump off time	No fault	0/0	8117	Taper 5 Max Stress
430	Today undisturbed cycles	**Downhole Status**		8118	Taper 5 Min Stress
431	Yesterday undisturbed cycles	3001	fluid depth from surface	8119	Taper 5 Max Allowable
Inferred Production		3014	D/H Pump-off Position %		
810	Pump Efficiency	3149	D/H fillage (% x 100)	8120	Taper 5 Max Percentage
811	Current Inferred Production	3145	D/H stroke len.(in x 100)		
812	Yesterday Inferred Production	3146	D/H Min load last stroke	**GearBox Torque**	
History		3147	D/H Max load last stroke	8213	Min torque-Upstroke
3300 - 3419	Daily Runtime (120 Days)	3148	D/H load span last stroke	8214	Max torque-UpStroke
3420 - 3539	Daily Production (120 Days)	3152	D/H enabled	8215	Min torque-DownStroke
3540 - 3659	Cycle Runtime/Pump Runtime (120)	3154	Pump fillage - method 1	8216	Max torque-DownStroke
3700 - 3723	Pump Intake Pressure (24 Hours)	3155	Pump fillage - method 2	8217	Max torque-Stroke
3724 - 3784	Pump Intake Pressure (60 Days)	3156	Pump fillage - method 3	8218	Min torque-Stroke
5700 - 5723	Fluid Level (24 Hours)	3175	Pump Intake Pressure (PIP)	8219	Min torque-UpStroke%
5724 - 5784	Fluid Level (60 Days)	3176	Fluid Level	8220	Max torque-UpStroke%

History					
5801 - 5831; 5864 - 5892	Stroke Count (60 Days)	8022	Polish Rod HorsePower	8221	Min torque-DownStroke%
5976 - 5999	Stroke Count (24 Hours)	8100	Pump HorsePower	8222	Max torque-DownStroke%
5832 - 5843	Average Pump Fillage (Today - 11Days)	**Card Area Status**		8223	Min torque-Stroke%
5900 - 5911	Average SPM (Today - 11Days)	1035	Min surf. area last cycle	8224	Max torque-Stroke%
5932 - 5943	Power Consumed (Today - 11Days)	1036	Max surf. area last cycle		
5964 - 5975	Regen Power (Today - 11Days)	1037	Min surf. area since pwr up		
		1038	Max surf. area since pwr up		
		1040	d/h card area last stroke		
		1041	Min d/h area last cycle		
		1042	Max d/h area last cycle		
		1043	Min d/h area since pwr up		
		1044	Max d/h area since pwr up		

13.0 User Defined:

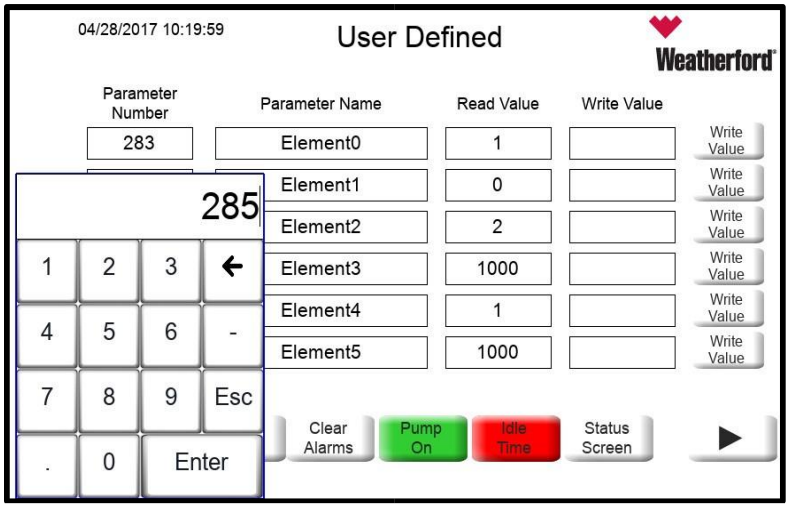
User Defined Menu- Allows the operator to configure 12 parameters to be viewed whenever the screen is opened.



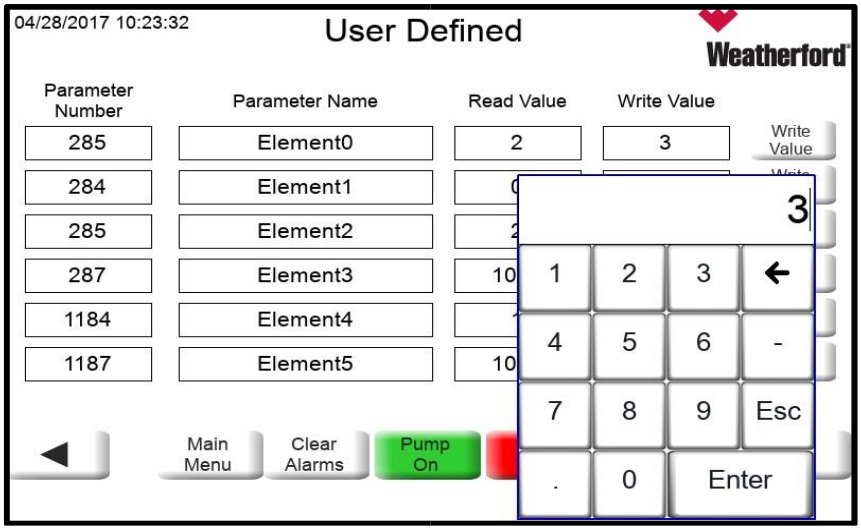
The user defined screen can also be used to access parameter system of controller. Access is obtained as shown the below example:

Example: Adjusting parameter 285 “AI-1 EGU Label”

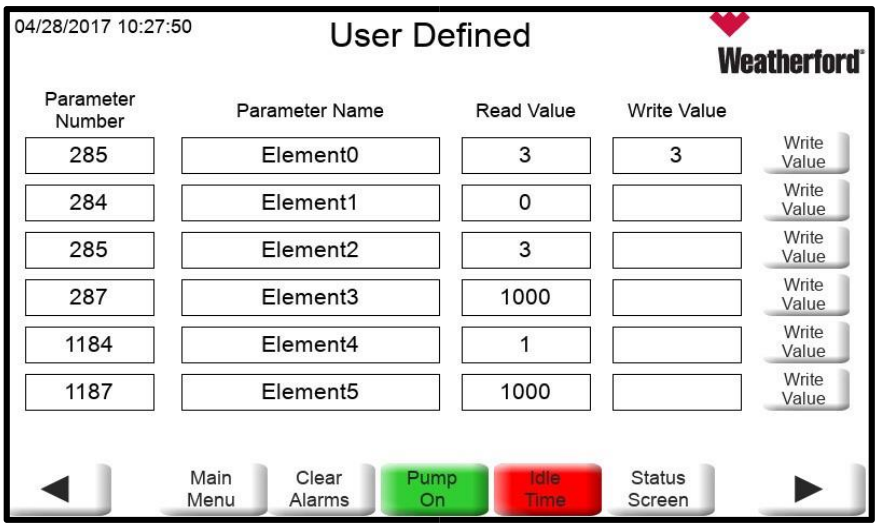
Step 1-Enter the number of the parameter in the “Parameter Number” box, followed by “ENTER”.



Step 2-Enter the number of the desired new value in the “Write Value” box, followed by “ENTER”.

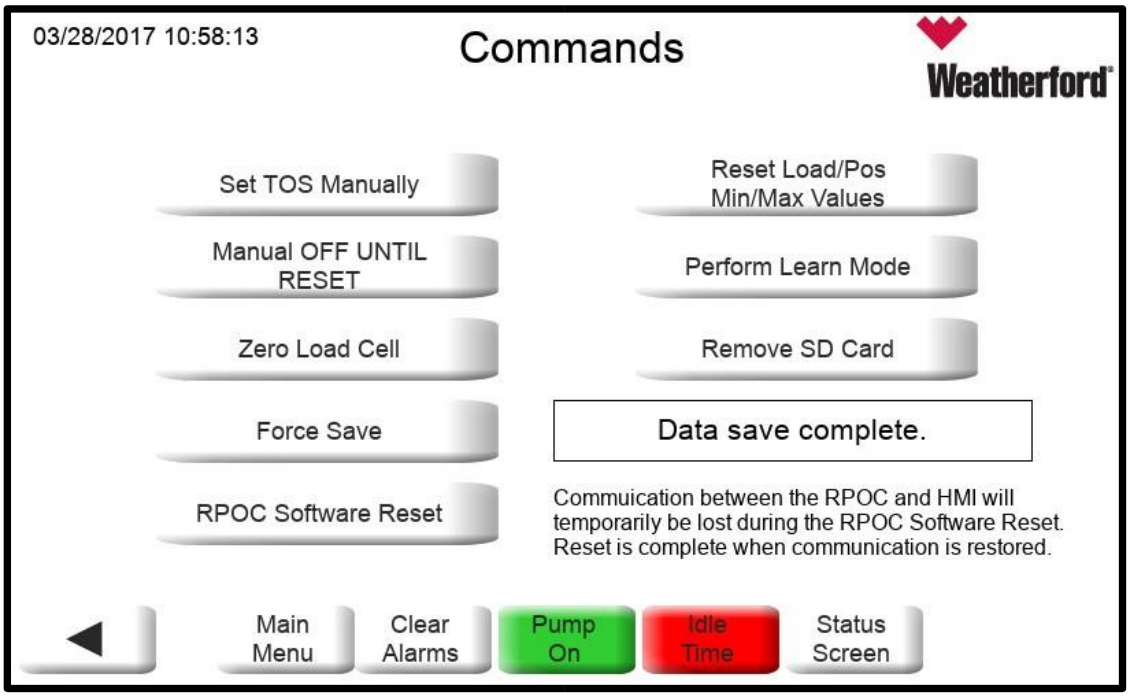


Step 3-Select the “Write Value” option to modify parameter.



14.0 Commands:

Commands Menu-Contains 8 non-configurable controller commands, which are used often during normal operation of the controller.

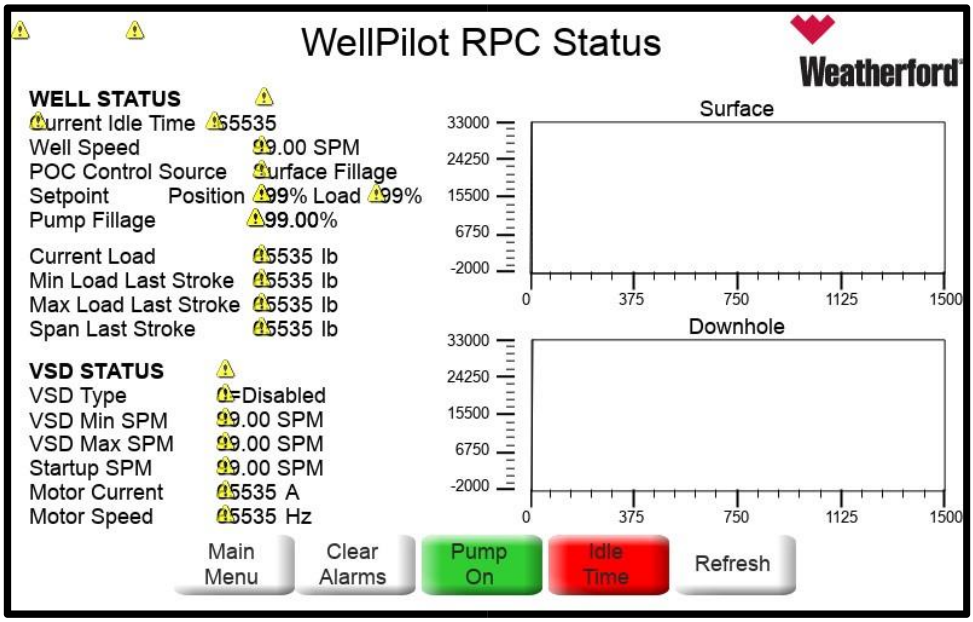


COMMANDS SCREEN STRUCTURE

14.0 Commands	
14.1 Set TOS Manually **14.2 Manual OFF Until Reset** **14.3 Zero Load Cell** **14.4 Force Save** **14.5 RPOC Software Reset** **14.6 Reset Load/Position Min/Max Values** **14.7 Perform Learn Mode** **14.8 Remove SD Card**	

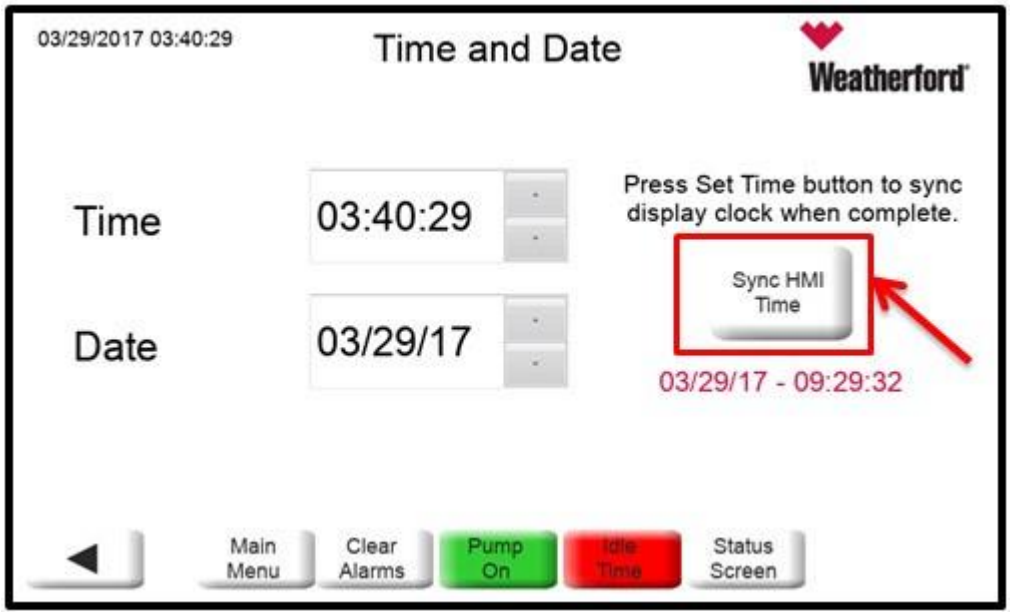
15.0 Troubleshooting:

	Issue	Reason	Solution
1	Yellow Caution Triangles On Main Status Screen	Communication between the HMI and the RPC board has not been has been lost or was never established.	-Ensure that RPC is operating on HMI F.W. 3.06.XX. and above. -Reset RPC back to factory defaults to ensure that default communication settings are being used.



	Issue	Reason	Solution
2	Screen displaying “J-MOBILE”	HMI is missing RPC program and must be loaded.	-Contact Weatherford support representative for program or further instructions.

	Issue	Reason	Solution
3	Controller Time and HMI Time Do Not Match	HMI time was never synchronized with controller time.	-Locate Time and Date menu within the System Setup menu and execute “Sync HMI Time” option.

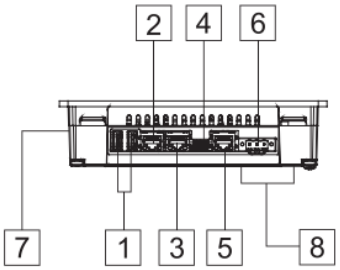


	Issue	Reason	Solution
4	Blank Screen	Insufficient power is being supplied to HMI or Component Failure.	-Ensure that sufficient power is connected and has been tested/ verified. -Contact Weatherford support representative for further instructions.

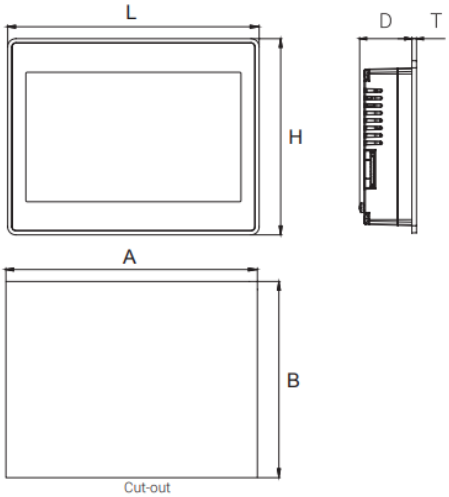
16.0 Specifications:

System Resources	
Display - Colors	7" TFT 16:9 LED - 16M
Resolution	800x480, WVGA
Brightness	500 Cd/m² typ.
Dimming	to 0%
Touchscreen	True Glass Projected Capacitive, Multitouch
CPU	ARM Cortex-A9 dual core 800 MHz
Operating System	Linux RT
Flash	4 GB
RAM	1 GB
Real Time Clock, RTC Back-up, Buzzer	Yes
Interface	
Ethernet port	3 (port 0 - 10/100/1000, port 1 - 10/100, port 2 - 10/100)
USB port	2 (Host V2.0, max. 500 mA)
Serial port	1 (RS-232, RS-485, RS-422, software configurable) Max 3 serial ports using plug-in modules.
SD card	Yes
Expansion	2 slot for plug in modules
Ratings	
Power supply	24 Vdc (10 to 32 Vdc)
Current Consumption	0.7 A at 24 Vdc (max.)
Input Protection	Electronic
Battery	Rechargeable Lithium battery, not user-replaceable
Environment Conditions	
Operating Temp	-20° to +60 °C (vertical installation) Plug-in modules and USB devices may limit max temperature to +50 °C
Storage Temp	-20°C to +70°C
Operating / Storage Humidity	5-85% RH, non condensing
Protection Class	IP66 (front), IP20 (rear) Type: 12, 4X
Dimensions and Weights	
Faceplate LxH	187x147 mm (7.36x5.79")
Cutout AxB	176x136 mm (6.93x5.35")
Depth D+T	47+8 mm (1.85+0.31")
Weight	1.5 Kg
Approvals	
CE	Emission EN 61000-6-4, Immunity EN 61000-6-2 for installation in industrial environments
UL	cULus: UL61010-1 / UL61010-2-201
UL	cULus: Class 1 Div 2
IECEx	Zone 2/22: Ex nA IIC T5 Gc, Ex tc IIIC T95°C Dc
ATEX	Zone 2/22: II 3 G Ex nA IIC T5 Gc, II 3 D Ex tc IIIC T95°C Dc
DNV-GL	Yes
LR	Yes
EU RO MR	Yes
RCM	Yes

***Note: Operates on nominal 12Vdc. Also, tested at -40°C.**



1 USB ports 1 and 2
2 Ethernet port 2 (10/100 Mb)
3 Ethernet port 1 (10/100 Mb)
4 Serial port
5 Ethernet port 0 (10/100/1000 Mb)
6 Power supply
7 SD Card slot
8 2 Expansion slots for plugin modules



***Note: Operates on nominal 12Vdc.**