FW MURPHY®
PRODUCTION CONTROLS

Centurion™ C5 Series

M-VIEW® Touch Series

Operations Manual

00-02-1032
2022-08-17
Section 50

Warranty - A limited warranty on materials and workmanship is given with this FW Murphy product.
A copy of the warranty may be viewed or printed by going to http://www.fwmurphy.com/warranty

BEFORE BEGINNING INSTALLATION OF THIS FW MURPHY PRODUCT:

- Please read the following information before operating the Centurion controller. This installation information is intended for Centurion controller only.
- Visually inspect the product for any damage during shipping.
- Before proceeding please visit our website and review our support documentation including Wiring the Murphy Way. www.fwmurphy.com/uploaded/WIR_Murphy_Way.pdf
- Disconnect all power and be sure machine is inoperative before beginning installation.
- Installation is to be done only by a qualified technician of the Responsible Body.
- Observe all Warnings and Cautions at each section in these instructions.
- Device shall be wired in accordance with NEC, CEC or other local code, as applicable.
- Please contact FW Murphy immediately if you have any questions.

For Class I, Division 2:

This equipment is an open-type device and is meant to be installed in an enclosure suitable for the environment such that the equipment is only accessible with the use of a tool.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

Warning – Explosion Hazard – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

Warning – Explosion Hazard – Do not replace batteries unless the area is known to be free of ignitable concentrations.

For AEx/Ex Zone 2:

The equipment shall only be used in an area of pollution degree 2, as defined in IEC 60664-1.

The equipment shall be installed completely within an enclosure that provides a minimum ingress protection of IP 54 in accordance with UL 60079-0 and only accessible by the use of a tool.

Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment. This protection is supplied internal to the equipment. No additional protection is required.

The wire size, torque rating of 12-24 AWG, 0.37-0.44 ft.-lbs. and suitable supply wire temperature rating of 96ºC minimum shall be provided for the input power terminal block.

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Introduction

Product Description

The Centurion configurable controller is a display and controller combination expressly designed to meet the requirements of three specific kinds of applications:

- Screw Compressors
- Reciprocating Compressors
- Pumps

The heart of the Centurion system is the main input/output (I/O) module or controller, which can be mounted on a standard DIN rail. While it is designed to work with any Modbus (Client) compliant HMI (Human Machine Interface) or with no operator interface at all, it is optimally configured and field-configurable using the Centurion Configuration Tool, powerful software developed to configure the controller. Parameters can be modified in the field without special need for laptop or software by utilizing FW Murphy's specially programmed M-VIEW controller display.

The controller is designed to monitor, control, protect and optimize small- to medium-sized gas operated compressors and pumps in the field. Proper operation is maintained by monitoring set points and digital, analog and temperature input points and providing the logic to take corrective and/or proactive steps.

The controller also allows for controlled shutdown and no-flow monitoring as well as auto startup and engine control capabilities.

The controller provides real-time data via communications ports to a connected display and/or supervisory system. This advanced system offers multiple options for remote communications and operation. The industry standard Modbus RTU or Modbus TCP/IP protocol means greater support for a wide variety of communication equipment including radio and satellite communications systems.

Modbus RTU Register Map

Application-specific map is contained in the panel sequence of operation documentation. Contact factory representative to obtain documents if needed or see www.fwmurphy.com for the Centurion C5 Controller Modbus Application Guide and Map.

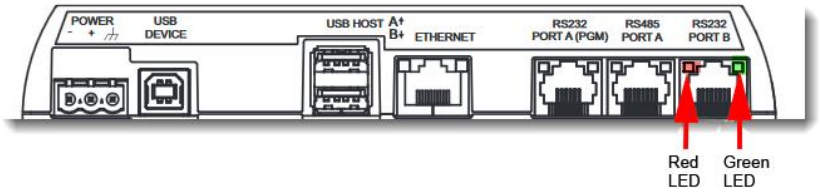
LED Indicators and Blink Codes

M-VIEW Touch Display

M-VIEW Touch Display LED Indicators - Connected to C5 Controller RS232 Port 1

RED LED:
Fast blink (normal) – Display is receiving data from C5
Off - No response from C5

GREEN LED:
Fast blink (normal) - Display is requesting data from the C5
Slow blink - Display requesting data from C5, no responses
Off - Display is not requesting data, not running the application

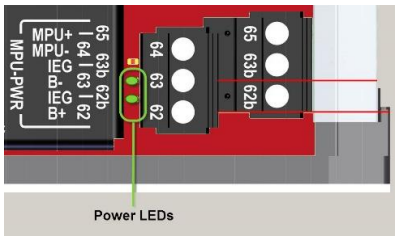


C5 Controller

> **NOTE:** The Expansion modules have the same 2 Power LEDs and COP blink codes as the C5 Controller. They are located next to the power plug on all modules.

C5 Power LED Indicators – Power is always two green LEDs

2 Green LEDs:
2 on - Unit is powered normally
1 on - Internal power failure. Needs service
Off - No DC power to unit



C5 Controller (continued)

C5 COP LED Indicators – Controller Operating Properly

Green LED:

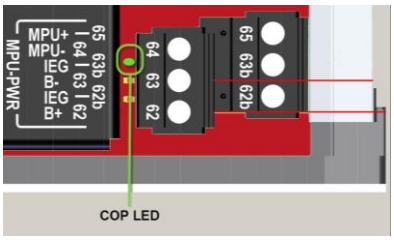
2-Digit Blink Codes - used on date code T4 and newer

Blink codes will be 2 digits separated by pauses with each blink code further separated by a rapid blink event.

Blink codes will be ¼ second ON and ¼ second OFF.

Pauses will be ¾ second OFF.

The separator will be a 2 1/2 seconds pause.



2-Digit Blink Codes		
Blink Code		**Description**
1st Digit	**2nd Digit**	
1	1	Startup Error, contact factory
2	1	Missing configuration file – Configurable 50333921 application running
2	2	Good configuration – Configurable 50333921 application running
2	4	Running with recovery application (firmware load needed, contact factory)
3	1	Missing configuration file, C4-1 Configurable Emulation 50333950 application running
3	2	Good configuration file, C4-1 Configurable Emulation 50333950 application running
4	1	Rockwell Automation IO module firmware running
4	2	MX3 IO module firmware running
4	3	C5 Custom firmware running
Fast Flash (100 mS)		Bootloader Mode, only used for switching applications or module reprogramming via external CAN tools.
Off		Controller not operating

Legacy Blink Codes - used on date code T3 and earlier

Legacy Blink Codes	
Blink Code	**Description**
1-Blink/sec	Good configuration - 50333920 firmware (SR 0.5) or Custom application running
3-Rapid Blinks	Missing configuration file - 50333920 firmware running (SR 0.5)
4-Blinks	Running in Recovery Mode
Fast Flash (100 mS)	Bootloader Mode, only used for switching applications or module reprogramming via external CAN tools.
Off	Controller not operating

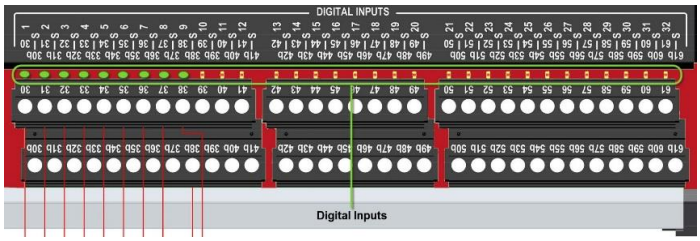
C5 Digital Input LED Indicators – Digital Inputs

Green LED:

On - Input active (DC+ or -)

Off - Input active (open)

Flashing – Wire fault detected, >= SR1.0 only

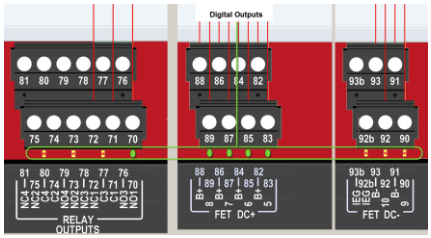


C5 Digital Output LED Indicators – Relay Outputs, FET DC+, FET DC-

Green LED:

On - Output on

Off - Output off



C5 Communication LED Indicators - RS232, RS485, CAN bus

Red LED:

Flash - Unit is transmitting data to device

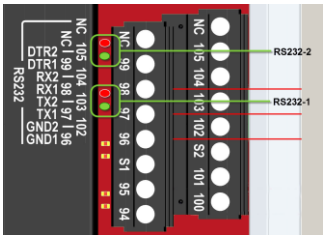
Off - No communication active

Green LED:

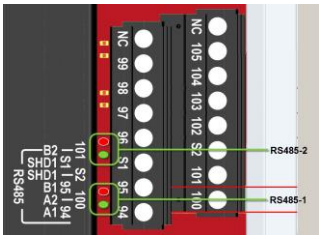
Flash - Unit is receiving data

Off - No communication active

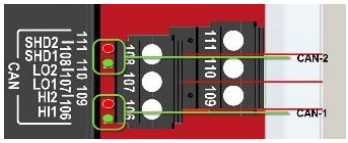
RS232



RS485



CAN bus



C5 Series DIP Switch Configuration

Node Address:

- **DIP1-8:** These switches allow you to assign a unique address to each Centurion that may be in the system using Modbus communication to RS485-2 and RS232-2. This allows the client controller to differentiate between the modules. Addressing is done in binary format, with each switch increasing value by factor of 2. For example, to name the controller address 5, set switch DIP1 and DIP4 to the CLOSED position. Valid settings are from 1 to 239. Addresses 240 thru 255 are for power-up functions only as detailed below.
- **If set to 0:** The RS485-2 and RS232-2 ports will change to 9600 band.

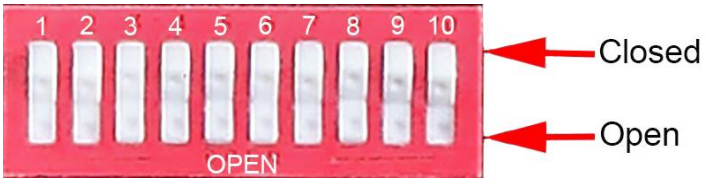
Can Termination:

- **DIP9:** This switch provides a 120Ω termination resistor for the CAN 1 communication chain. CAN must be wired in a daisy chain configuration. Set this switch to CLOSED only when the module is the end of the network. See control panel drawings for designation

- **DIP10:** This switch provides a 120Ω termination resistor for the CAN 2 communication chain. CAN must be wired in a daisy chain configuration. Set this switch to CLOSED only when the module is the end of the network. See control panel drawings for designation

Switch Positions:

Set these switches to the open or closed position for your application.



For T4 Date Code and Newer:

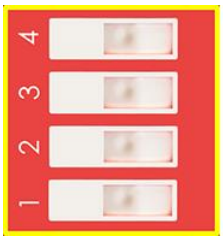
These DIP functions will not work in legacy modules before Date Code T4.

DIP Power-up Functions: There is a special feature for switching module operation mode that is activated by setting specific switch positions at power up. Change will only occur if the following switches are set CLOSED at power up. All other times, these switches behave as address selections.

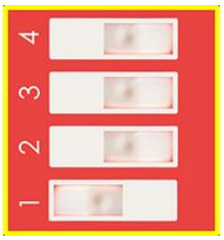
- DIP switches 5-8 CLOSED at power up activates special mode to change the module behavior based on switches 1-4 position.

5-8 CLOSED

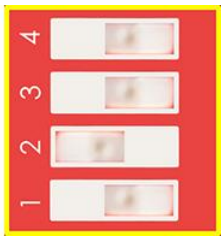
- 1-4 CLOSED: Load factory defaults to non-volatile settings – restores Ethernet address to default values. Default setting is 192.168.0.100 IP, 255.255.255.0 network mask, 0.0.0.0 Gateway.
- 1 OPEN, 2-4 CLOSED: Load Rockwell IO Application.
- 2 OPEN, 1, 3, 4 CLOSED: Load Standard Configurable Controller Application.



1-4 CLOSED



1 OPEN, 2-4 CLOSED



2 OPEN,1, 3, 4 CLOSED

- 3 OPEN, 1, 2, 4 CLOSED: Load C5e Program 50333950 (C4 emulation).
- 1, 2 OPEN, 3, 4 CLOSED: Load Recovery Program. Not normally used. (*Only for USB cable download in the event application is unable to run.)*
- 1, 3 OPEN, 2, 4 CLOSED: Load MX3 program (C5 as I/O Expansion Module).
- 2, 3 OPEN, 1, 4 CLOSED: Set Ethernet port to DHCP mode

3 OPEN, 1, 2, 4 CLOSED

1, 2 OPEN, 3, 4 CLOSED

1, 3 OPEN, 2, 4 CLOSED

2, 3 OPEN, 1, 4 CLOSED

M-VIEW Touch Series Display Features

The display module is a highly integrated operator interface specially programmed to complement and support the Centurion controller. The primary purpose of the display is to:

- view controller operational information
- view/edit controller operational parameters
- send commands to controller, such as stop, edit and reset

State and Mode of the Controller

Depending on the configuration active in the controller, the operation may differ depending on what Mode the controller is currently displaying.

The Mode can be changed by touching certain icons if the configuration allows for Remote mode.

- Touching Reset or Run/Stop is a Local function and will change the Mode to Local if in Remote Mode.
- Touching the Fn icon before touching Reset or Run/Stop is a Remote function and will change the Mode to Remote if in Local Mode.

The top left of the screen displays the Centurion operating state. Displayed next on the top line are active timers, the run hour meter and the panel starting mode as Local or Remote. The top right displays the system (Centurion) being displayed. This information is key to understanding the status of the controller.

FN Screen

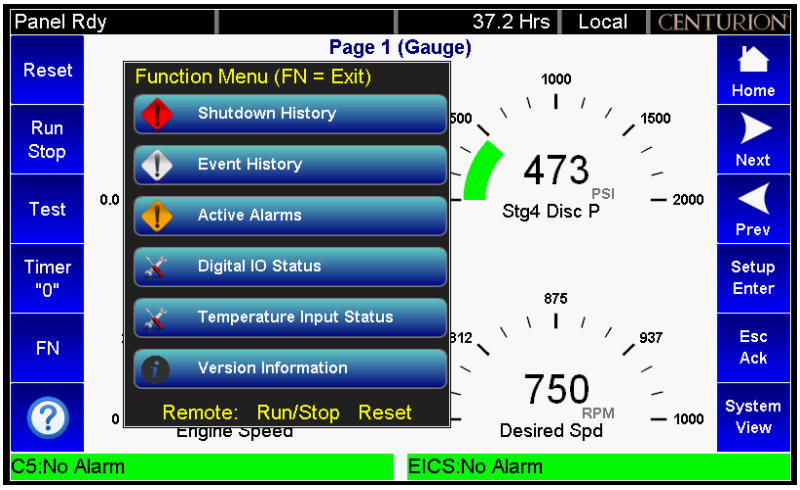
Touch the Function (Fn) icon to display the Function Menu pop-up with available function command screens.

Touch a function command screen from the menu to open it.

The function menu will time out in 5 seconds if a selection is not made.

A prompt to enter a password may appear for some screens to open.

When in Remote Mode: Remote mode commands are available only while the Fn icon is pressed.

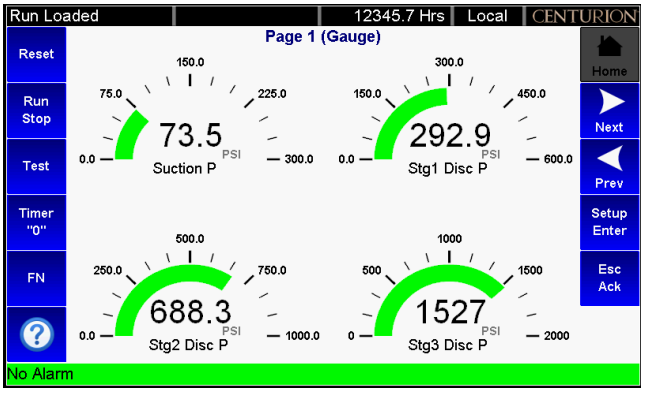


Default Home Screen / Landing Page

Your default Home Screen / Landing Page is determined by the first page configured in the Centurion configuration and may look similar to these examples.

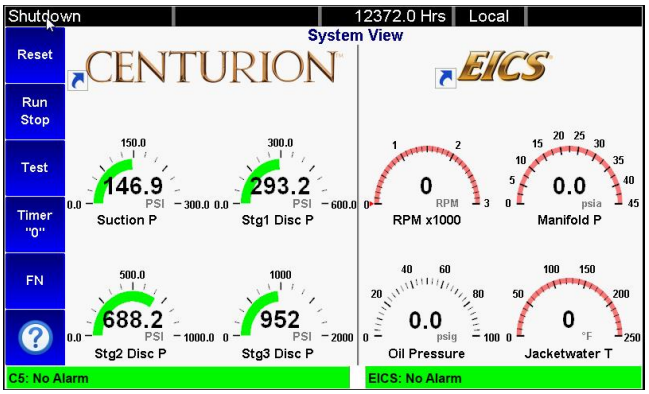
Centurion Home Screen / Landing Page

An example of your default Home Screen / Landing Page if you are running the Centurion.



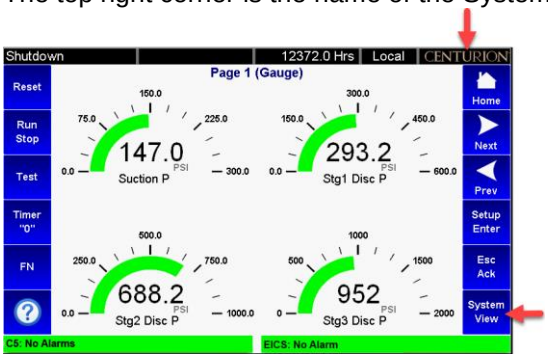
System View Home Screen / Landing Page

An example of your default Home Screen / Landing Page if you are running the Centurion and EICS.

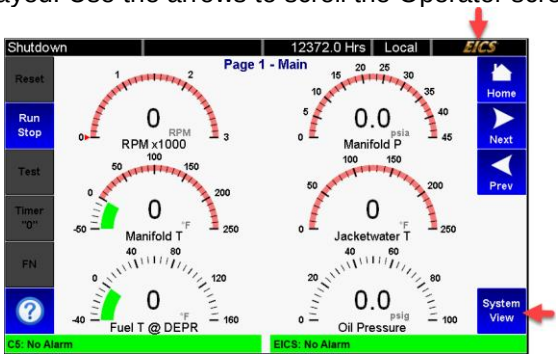


Touch the Centurion screen and open the Centurion full screen view, or touch the EICS screen to open the EICS full screen view. To go back, touch the System View icon.

The top right corner is the name of the System being displayed. Use the arrows to scroll the Operator screens.



Centurion Screen with System View as Home Screen / Landing Page



EICS Screen with System View as Home Screen / Landing Page

Navigation

The Best Way to Navigate

Press the information  icon and review the tutorial of the Home Screen / Landing Page. We recommend you use this icon to view information on all available screens.

Reset	Reset any active timers and alarms/faults.
Run Stop	Initiate or cancel a start sequence.
Test	Enter Test mode and start the test timers. Not applicable in shut-down mode.
Timer "0"	Zero displayed timer (global timers, state timers, etc.).
FN	Enter the Function mode pop-up menu with additional available functions. Automatically cancels upon moving to the next mode or within 5 seconds if no choice is made from the menu.
	Information icon helps explain the screens at point of use.
Home	Takes you to the Home Screen / Landing Page.
Next	Scroll right for the next page.
Prev	Scroll left for the previous page.
Setup Enter	Setup is the page you need to edit or view the set-up details. Enter is used to enter a page or to save.
Esc Ack	Acknowledges all active messages and alarms displayed in the Active Alarm screen. Exit set-up mode. Exit edit mode without saving changes to the current configuration.
System View	Used to split the Home Screen / Landing Page when running two FW Murphy systems.

Passwords

Passwords and Security Access

Some settings are password protected, including the setup screens.

Where to log ON and OFF

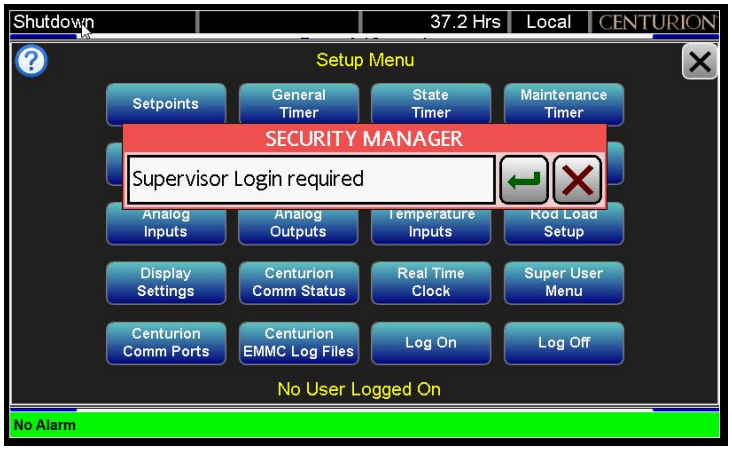
A pop-up message for login is displayed when security access is required and you may log in from that pop-up.

To log in anytime, touch the Setup Enter icon to open the Setup Menu and touch the Log On icon. You may log in from that pop-up.

Always remember to touch the Log Off icon to deactivate your security access before you leave the premises. Touch the Setup Enter icon to open the Setup Menu and touch the Log Off icon.

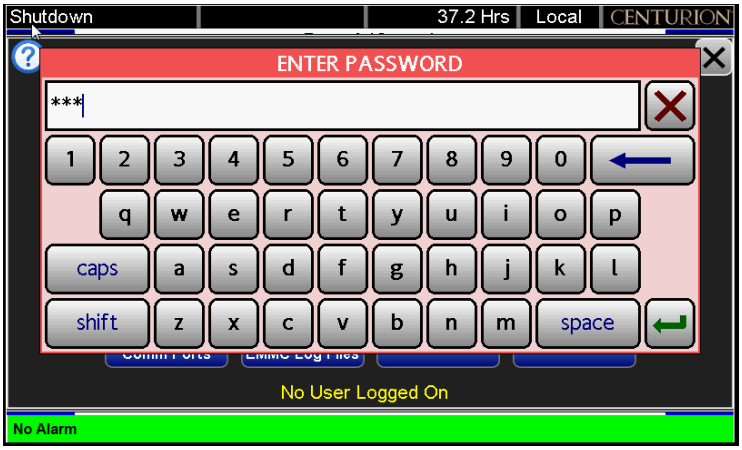
How to log ON

On the Security Manager pop-up, touch the green arrow to enter the password page.

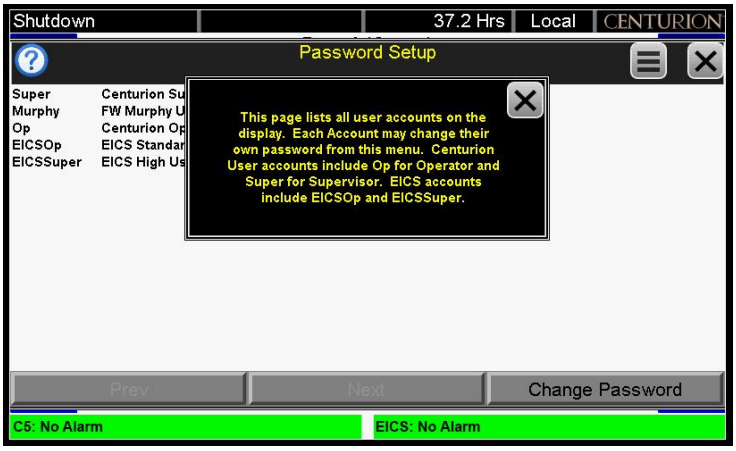


On the Enter Username pop-up, enter super for supervisor access or op for operator access.

On the Enter Password pop-up, enter the password. Default passwords are 164 for operator or 133 for super.



Once you have entered using the default password, we recommend you change passwords for better security. See Display Settings for further details on how to set the passwords.

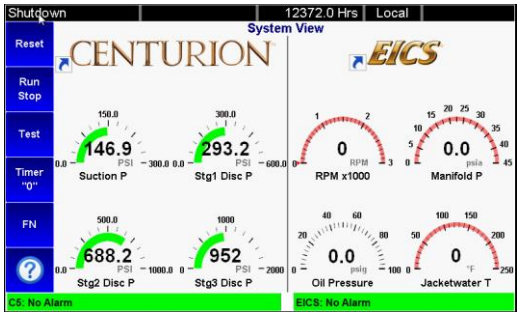


Before Starting the Equipment for the First Time

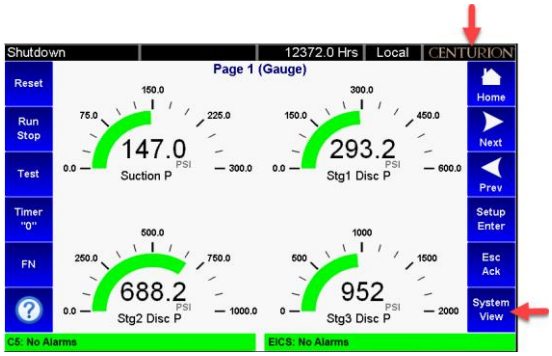
Setup with M-VIEW Touch Series Display

Read and follow steps in order listed.

1. Locate the system drawing inside the panel and verify its drawing number matches the sticker on the lower front panel.
2. Locate the legend of the drawing and find the configuration description in the list. Record this description.
3. Power up the M-VIEW Touch display.
    a. Allow time for the display to boot up and land on the Home Screen / Landing Page, approximately 15 seconds.
    b. If you are running System View as your Home Screen / Landing Page, touch the screen on the Centurion side to view it full screen with active icons.

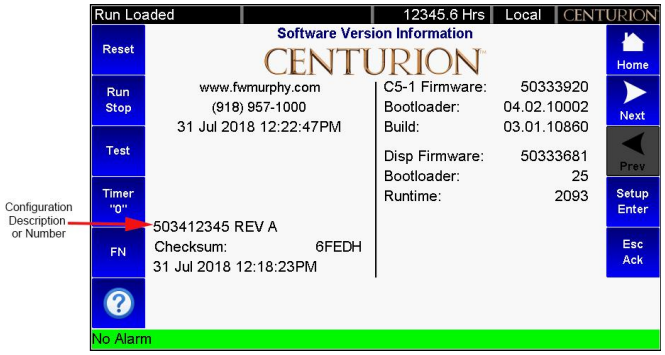


System View Home Screen / Landing Page



Centurion Home Screen / Landing Page

    c. From the Centurion Home Screen / Landing Page, touch the Arrow icon to scroll left until you find the Software Version Information screen.
    d. Verify that the configuration description matches the one you previously recorded from the drawing legend.



    e. Touch the Home icon to return to the Home Screen / Landing Page.

4. Open the following list of screens to verify or change the factory settings as needed for your site location.
    a. We suggest you record these values in the manual Sequence of Operation under Field Settings Section 8. This gives you a reference of any changed settings from the factory default.
    b. From the Home Screen / Landing Page, touch the Setup / Enter icon to open the Setup Menu screen.
    c. Touch the Log On icon and enter the Super Password as shown in the previous section, Passwords.

    d. From Setup Menu screen, touch the Setpoints icon to open it. Open and verify all the set values under the Blue (active) icons. Touch a value to change it.
        i. Touch X to go back one page or touch the Menu icon to go back to the Setup Menu screen.
        ii. Once the Setpoints verification and changes are made and recorded, return to the Setup Menu screen and touch the next icon in the list below. Repeat these steps to verify the set values under the remaining screens listed.
            - Setpoints
            - Control Loop
            - Analog Input
            - General Timer
            - State Timer
            - Temperature Inputs
            - Rod Load Setup

NOTE: Press the  Information icon to view information on available screens.

5. Start the unit.
    a. Clear any Alarms Class A faults from the system. On the display, the unit state will read Panel Ready if no Class A shutdown condition exist.
    b. Touch and hold the Run Stop icon on the display for 2 seconds. This will initiate the start cycle. Depending on your configuration, the Centurion will send signals to possibly prelube the equipment, check pre-starting permissives and then signal the driver to start the equipment. Confirmation of running may be in the form of RPM signal or digital switch input feedback. Once running signal is confirmed, the Centurion will be in a running condition. Class B and S lockout timers will begin timing to faults that require time lockout. Additional warmup and load permissives will be monitored as configured for the package prior to enabling any load control.
    c. After all preload permissives have been achieved, such as oil or water temperatures, and possible minimum warmup times, the Unit State will read Loaded and will continue until the stop button is pressed, RPM is lost or a fault condition exist.

Stops, Faults and Alarms

Normal Stop

When a normal stop is issued and the unit is running, the system will start a normal shut-down sequence.

1. To issue a normal stop, touch and hold the Run Stop icon on the display for 2 seconds.
2. On the display, the Unit State will read Cooldown, and the Cooldown state delay will begin timing (if configured).
3. After the Cooldown is completed, the Unit State will read Stopping.
4. When everything has been recognized as back to normal, the Unit State will read Panel Ready.

Fault Shutdown

The Centurion will continually monitor for Fault or ESD shutdown events which require the equipment to stop immediately or prevent it to start.

On the display, the Unit State will read Shutdown, and an Alarm Shutdown Banner will appear on most Operating screens.

The cause of the event is recorded and can be viewed on the Shutdown History screen with time and date of occurrence.

1. The Shutdown History screen displays information of the fault, touch the Book icon for troubleshooting.
    a. <Centurion Home Screen / FN / Shutdown History>
2. The Shutdown Snapshot screen displays the values of the unit running at the time a fault occurred.
    a. <Centurion Home Screen / FN / Shutdown History/ Right Arrow to scroll >
3. Once the corrections are made, clear the Shutdown condition by touching the Reset icon on the screen.
4. Always make corrections on the unit before attempting to restart the equipment.

Alarms

If an alarm condition is detected, the Alarm/Shutdown banner on the bottom of the screen shows the active alarm messages in the system. Alarms may be configured as self-clearing or as requiring acknowledgement. Self-clearing alarms will auto clear if they're no longer present. Alarms requiring acknowledgement will persist until the ACK key is pressed.

1. Select alarm from the Active Alarms screen. (This screen displays up to 20 active alarms.)
    a. <Centurion Home Screen / FN /Active Alarms>
2. Touch the ESC ACK icon to acknowledge the Active Alarm.

Operational Screens

User-Configurable Screens

The Centurion has (9) user-configurable pages of (4) types. The Centurion Configuration Tool software allows users to configure up to nine (9) screens with controller input signal groupings. Possible custom screen types may include:

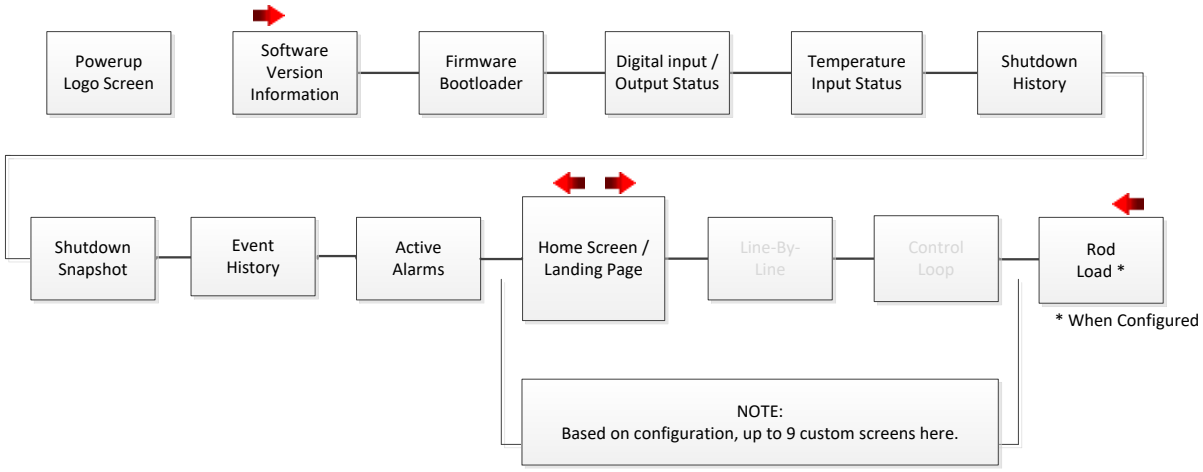
a) Custom Line by Line allows users to display process data in a list format with description and value.
b) Custom Gage allows user to display four (4) most important pieces of data on a 2 x 2 table in larger font.
c) Custom Control Loop allows user to display Control Loop functions. The control output will be displayed as a percentage of the range.
d) Custom Generic Register allows user to display up to 20 items on a page that can be mapped to the Centurion Modbus map and given a label.

For more information on configuring the optional screens through the Centurion Configuration Tool, please refer to the Configuration Tool Quick Start Guide.

Map of Operational Screens

From the Home Screen / Landing Page, use the left and right arrows to view the Operating Screens. A password is not required to view these screens.

Some screens shown below are application specific and may not be used.

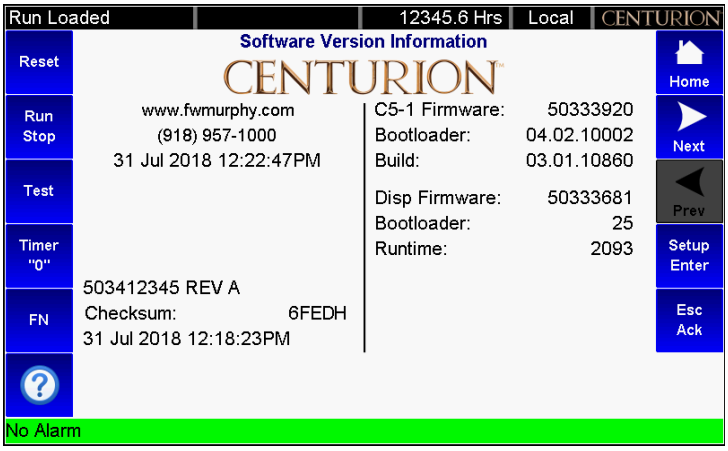


Powerup Logo

Once power is turned on and the system is booting up, the user will view the FW Murphy Centurion logo screen for two seconds then switch to the default operating Home Screen / Landing Page configured for the system.

Software Version Information

This screen has the FW Murphy corporate contact information, configuration description, checksum and date/timestamp for the configuration loaded in the controller.

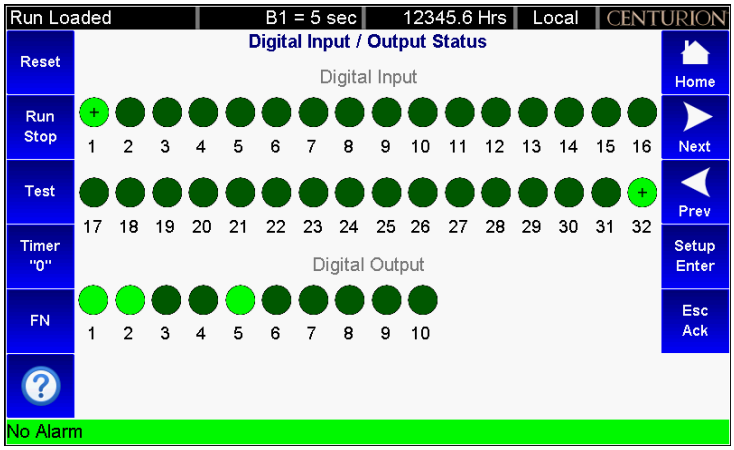


Any configuration changes subsequent to the factory shipment will be indicated by a unique checksum and new date/time stamp.

This screen also provides information such as the bootloader and firmware versions for the core module, the MV display and the expansion module (if used) to FW Murphy Technical Support staff.

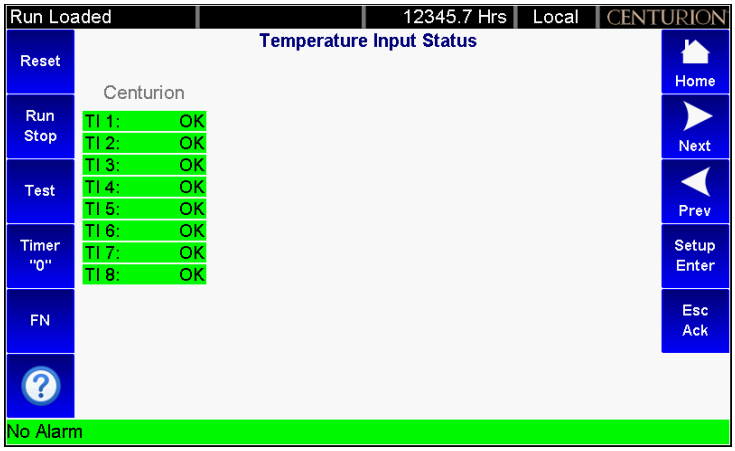
Digital Input / Output Status

The user can see the state of each digital input/output in a table—whether it is open or closed. The plus + or minus - sign will be shown on digital inputs to show whether the input is receiving power or is grounded to DC common.



Temperature Input Status

The user can see the state of each temperature input in a table—whether it is OK or has a wiring fault.

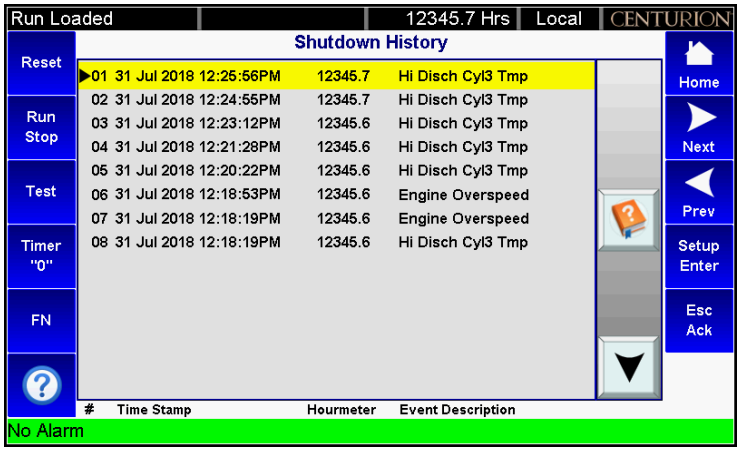


Shutdown History

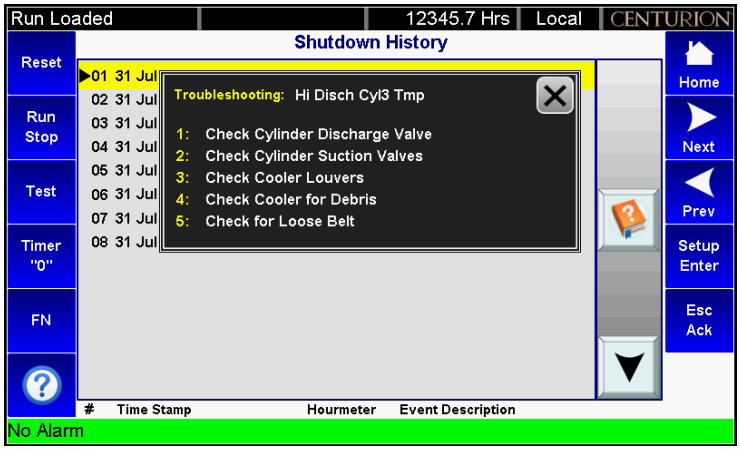
The history of the shutdown is displayed on this screen with the most recent at the top of the list and the oldest at the bottom.

The first number displayed in the line indicates how many entries are in the list.

Each event is displayed with the event label, the real-time clock and hour meter reading.

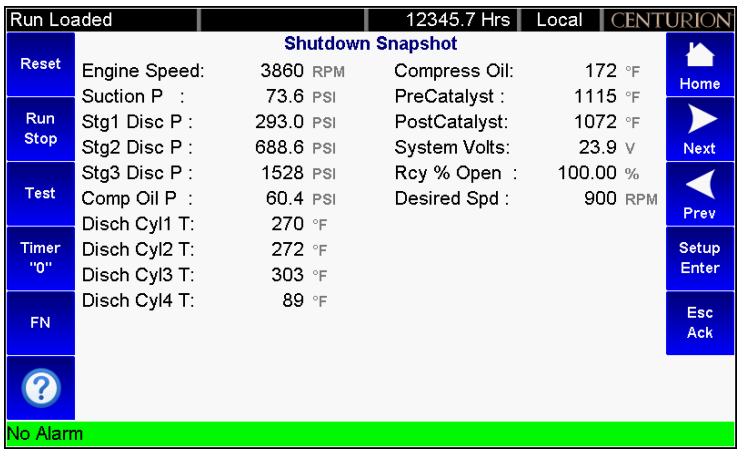


Press the Book icon to get a troubleshooting message to help find an issue.



Shutdown Snapshot

The shutdown snapshot screen is a capture of the values displayed at the time of a Fault SD or ESD event.

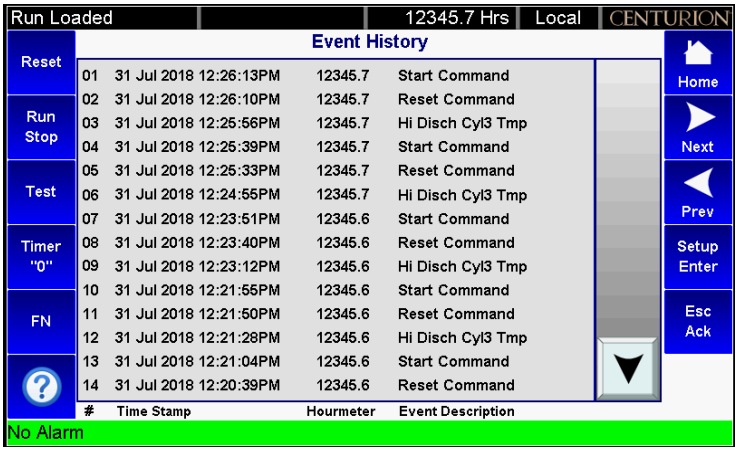


These values are retained and displayed on the Shutdown Snapshot screen until the next Fault SD or ESD event occurs. If a "---" is displayed instead of a value, it indicates the shutdown snapshot has not captured any data. Fault snapshots are taken only while the equipment has been called to start/run. This behavior ensures that repeated attempts to reset a fault will not clear a previous run cycle's fault snapshot.

NOTE: Only the first two line-by-line screens configured will be captured on the fault snapshot page. If no line-by-line custom screens are configured, the shutdown snapshot will not function.

Event History

The history of the last 32 events is displayed on this screen with the most recent at the top of the list and the oldest at the bottom.



The first number displayed indicates how many entries are in the list.

Events include shutdowns, starts, stops, resets, etc. The user easily can view the events (alarms, etc.) logged before and after a shutdown.

Each event is displayed with the event label, real time-clock and hour meter reading.

Active Alarms

All active alarms and warnings will be displayed on the Active Alarms screen.

Unacknowledged alarms will be preceded by an asterisk, and acknowledged alarms will clear the asterisk.

Pressing ACK on this screen will acknowledge all active alarms.

The top right corner will indicate the number of alarms and which line the cursor is currently on. Example: 3/10 indicates 10 alarms, and the cursor is on line 3 of the list. A maximum of 20 active alarms will be displayed.

NOTE: Alarms are warnings based on setpoints and/or digital inputs which are separate from shutdowns that allow the equipment to continue to run.

Alarm / Shutdown Banner

This screen shows the alarm / shutdown annunciation as it will appear on most Operating Status screens.

The message(s) will be visible at the bottom line of the status screen area and then briefly clear once a second.

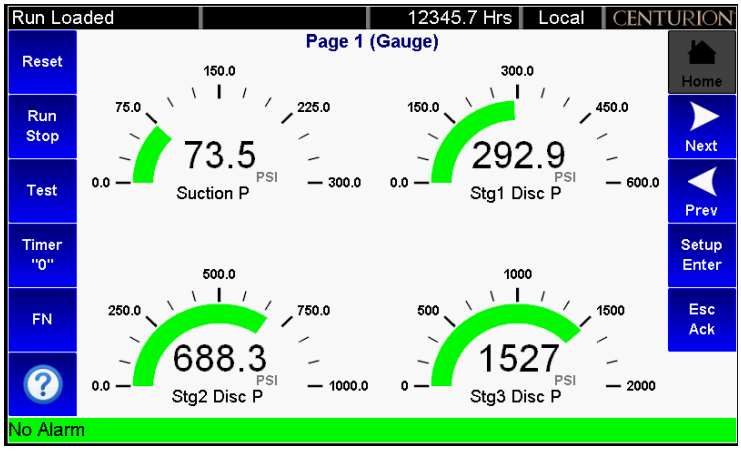
This will continue until alarms are acknowledged and/or shutdowns are cleared.

If there is more than one unacknowledged alarm active, each alarm will be displayed for one second each until acknowledged.

Pressing the Fn key followed by the ACK key will switch to the active alarms screen.

Gage

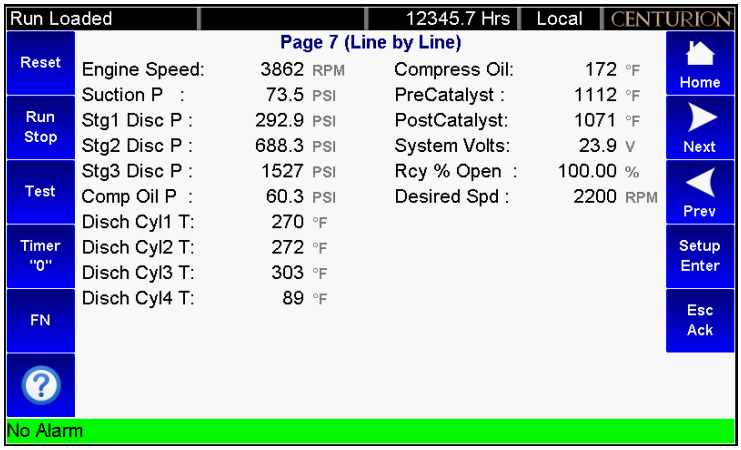
This is an example of a custom-built Home Screen / Landing Page. This display provides larger characters for easier viewing as well as a means to prominently display items of interest.



Line-by-Line

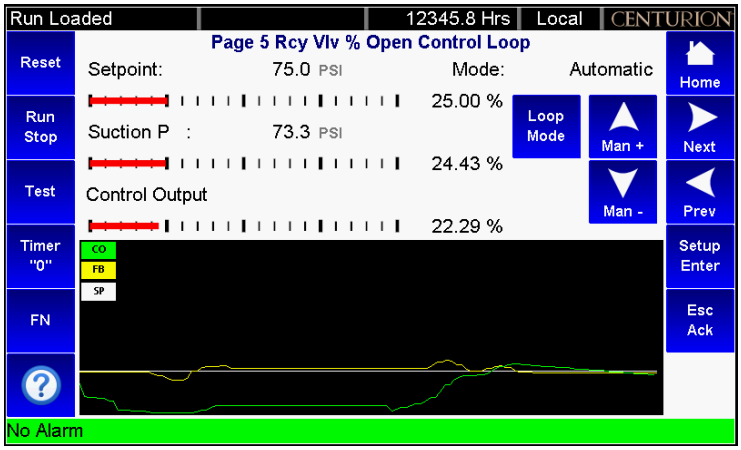
This is an example of a custom-built Line-by-Line Status screen.

If the parameters do not fit in the viewable area of the screen, up/down arrow icons will appear to indicate the ability to scroll up or down to see additional parameters.



Control Loop

The user may choose to display any configured Control Loop functions in this convenient format. The control output will be displayed as a percentage of the range.

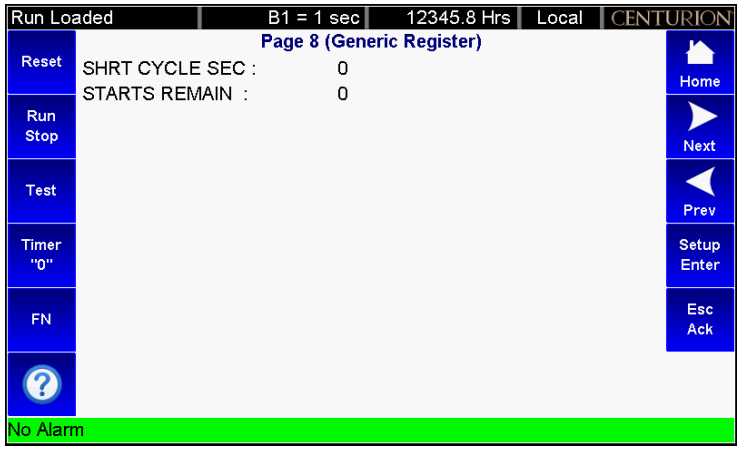


Touch the Loop Mode icon on this page to toggle the mode between Auto and Manual modes of control loop operation.

If the Control Loop is in Manual, touch the Man + and Man - arrow icons to adjust the output directly to make adjustments to the desired setting.

Generic Register

The Centurion has 9 user-configurable pages of 4 types. This Generic Register screen shows up to 20 items in a list that can be mapped to the Centurion Modbus map and given a label.

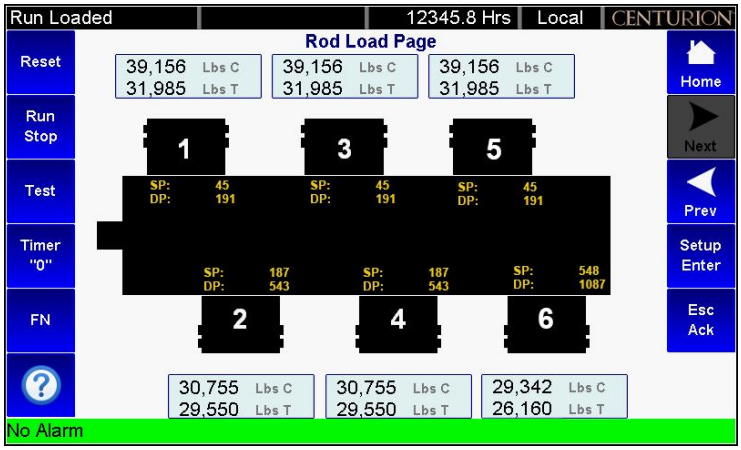


Data is shown as a signed 16-bit integer with fixed decimal place. The data on this page can be changed using the Centurion Configuration Software.

Rod Load

If Rod Load calculations have been enabled on the Centurion Configuration, the calculated tension and compression forces on the rod are displayed in Imperial or Metric units as configured by the user.

There is support for 1 through 6 throws of rod load calculation.



Setup Menu

The Setup Menu screens provide access to system parameters. These settings can be modified with appropriate password access.

This example shows Centurion Operator as the security level and is listed on the bottom of screen.

Depending on your security access level, you may be able to view the screens but not make any edits, or you may be prompted to enter a password to open the screen. See the section Passwords for detailed password information.

Touch on your selection.

Setpoints Setup

The Setpoints Setup screen can display up to 192 setpoints that may be configured in the system by the Centurion Configuration Tool software. The values for the setpoints are user-editable.

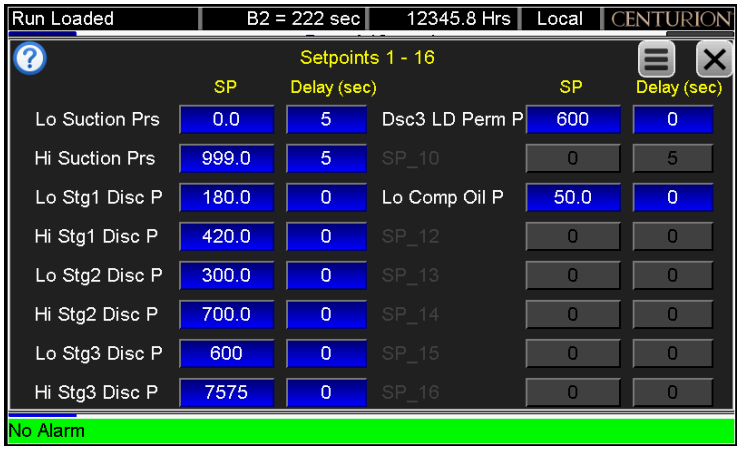
Setpoints are thresholds which can be configured as >= or <= and analog, temperature, speed or voltage input used for alarms, shutdowns and permissive signals for operating states.

Multiple setpoints are often applied to a process. Groups which are not highlighted have no setpoints used in them.

Touch a setpoint group to view and edit items in that group.

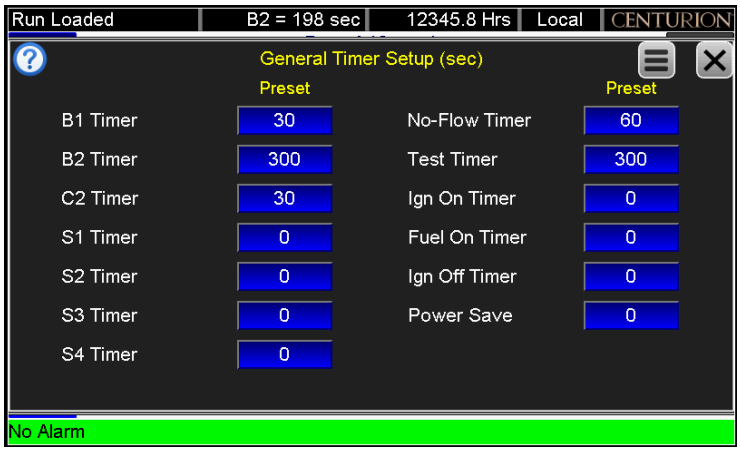
Setpoints 1 – 16 page

Click on blue icon to make edits. Gray icons are not active.



General Timer

General timers affect driver operation and also help define an event arming condition.



B1, B2 and S1-4 Timers are start-run lockout timers. Events configured to these class types do not arm for a specified time at start up.

C4 Timer is lockout until time after reaching a loaded condition.

No-Flow Timer is for class NF faults and enabled after the B1 expires.

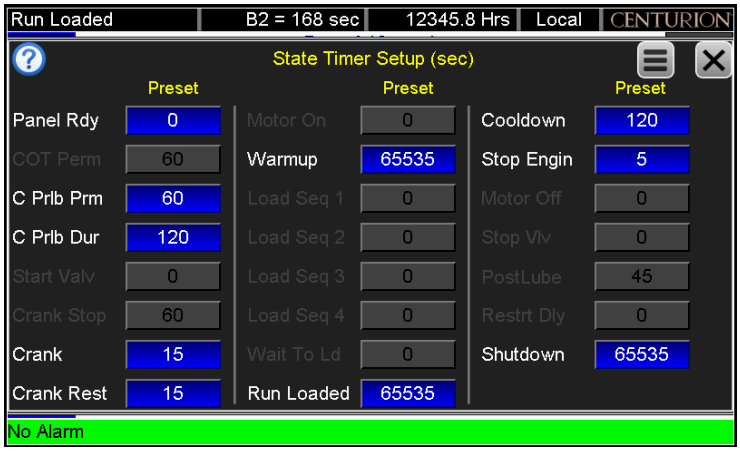
Test Timer is time given to allow for maintenance testing of end devices without triggering a fault or shutdown condition.

Ignition On Timer and Fuel On Timer staggers the engines outputs at startup for engine fuel purge.

Ignition Off Timer allows unspent fuel to burn off after a stop.

State Timer

User may edit all state timers (except Panel Ready/Shutdown) if marked in use. When a state timeout value is reached, the state logic proceeds to the next in-use state.

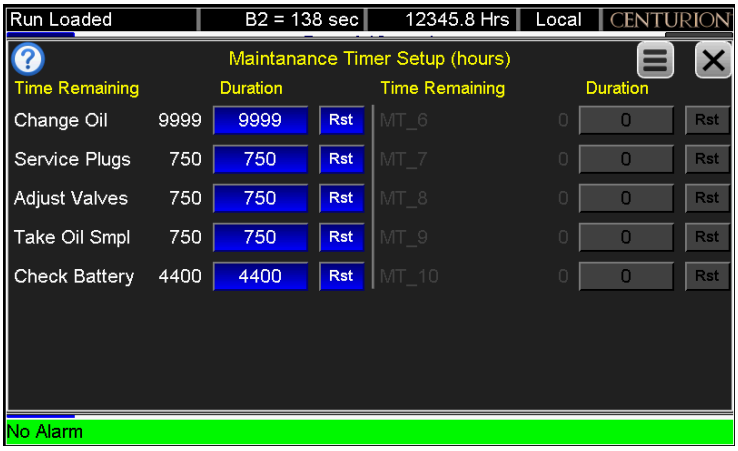


A state timeout may also be configured to trigger a fault event, such as a prelube permissive failure; however, the operation depends on the configuration.

A setting of 65535 disables the timeout event.

Maintenance Timers

User may access and edit the maintenance interval presets and view the time remaining settings, if used by configuration.

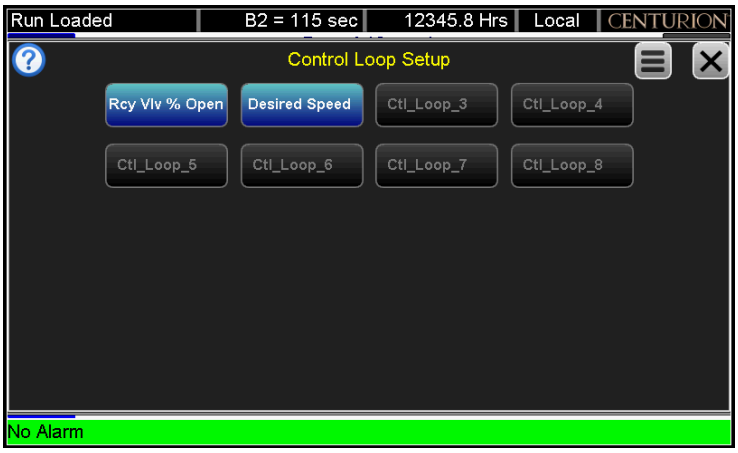


If an interval time has elapsed, a message event is typically used to indicate maintenance is due.

Reset the timer after maintenance is performed by pressing the RST icon on this page.

Control Loop Setup

User may edit up to 8 configured control loop settings.

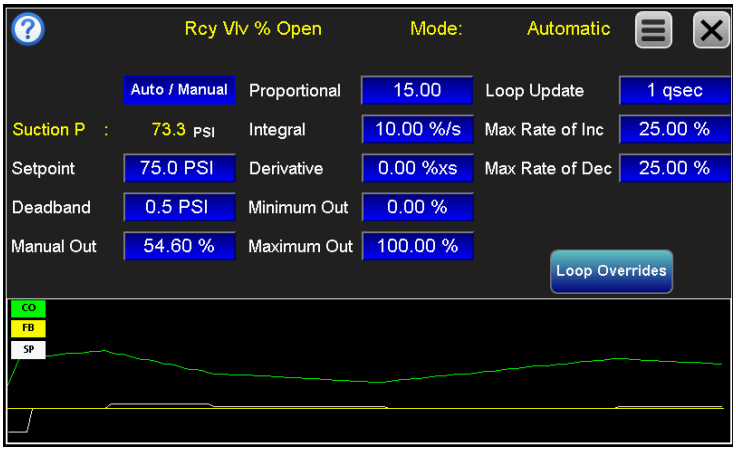


The settings on these pages differ depending on the type of control loop configured.

The control loops operate on the principle of a 0-100% output with special considerations for digital output loop types.

Control Loop Typical

The pen chart shows the PID output (CO), Feedback (FB) and Setpoint over the last 2 minutes. Use this to help tune the closed loop control.



Press the Auto/Manual button change modes. In automatic, the control loop will try to maintain the setpoint +/- the deadband using calculation against the error (how far away from setpoint) of the loop.

Press the Manual Out edit box to set a desired output in manual if desired.

P = tunes for the Error at present condition.

I = adjust the output value on the accumulated error over time.

D = affects the output value based on the rate of change of the error.

Bigger numbers will result in larger changes in output %. General tuning guidelines start with **I** and **D** at low numbers, using only proportional. Once ringing is seen, reduce **P** slightly and increase **I** slowly. **D** may be introduced as a predictive measure, derivative adjust the output based on how much the error is changing in a given calculation loop.

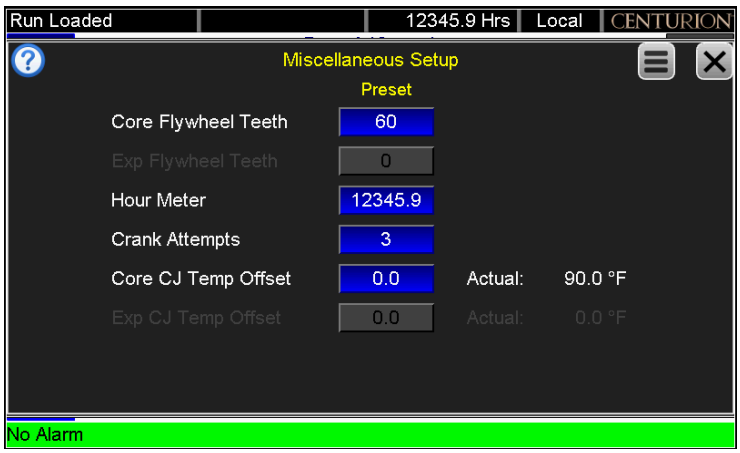
Output ramp rates and min/max calculation limits are adjustable. Press loop overrides to adjust any possible control loop override factors.

The controller uses the parallel form of the PID equation as follows:

$$\% \text{ Output} = Kp(\text{Error}) + Ki\int(\text{Error})dt + Kd \times d\text{Error}/dt$$

Miscellaneous Setup

Set the Flywheel Teeth to calibrate the magnetic pickup input RPM calculations.



Set/Rest the run Hour Meter which accumulates run time.

Crank Attempts Setpoint is the limit for crank cycles before overcrank faults.

Electric motor short cycle fault is set by the Maximum starts per hour limit.

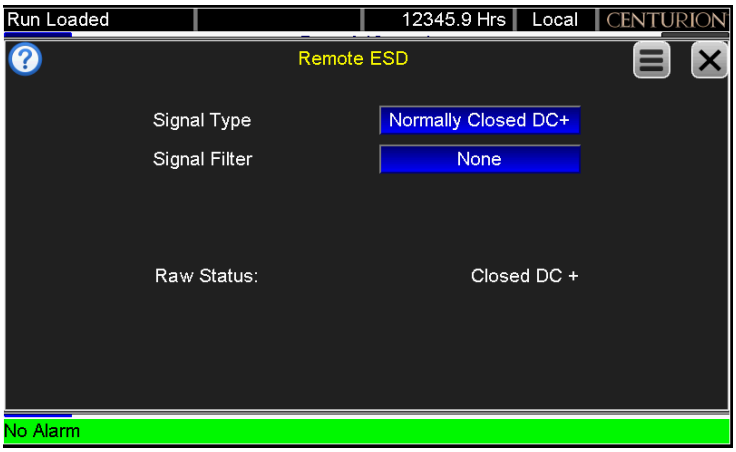
Core junction offset is used to globally shift the internal temperature sensor.

Digital Input Setup/Pulse Status

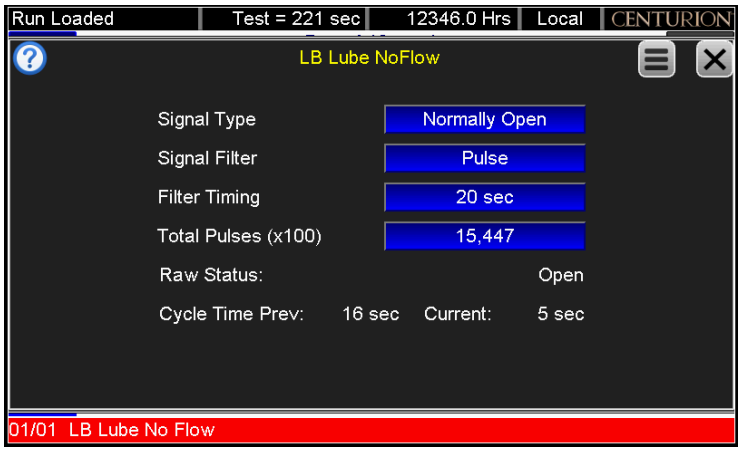
Touch the desired output to view output status and modify output setup. Only outputs in use by the configuration are settable.

Pulse cycle input times and totals can be viewed and reset for each input.

Digital Input (Typical)



Pulse Input…An Input Configured For Pulse (Typical)



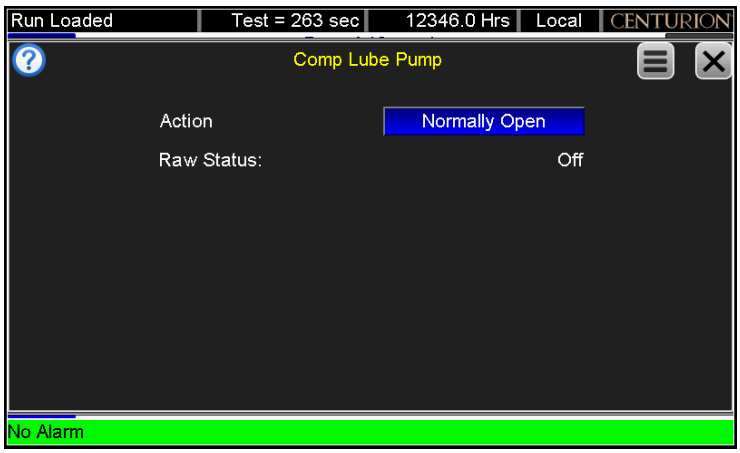
Digital Output Setup

Touch the desired output to view output status and modify output setup. Only outputs in use by the configuration are settable.

Digital Output (Typical)

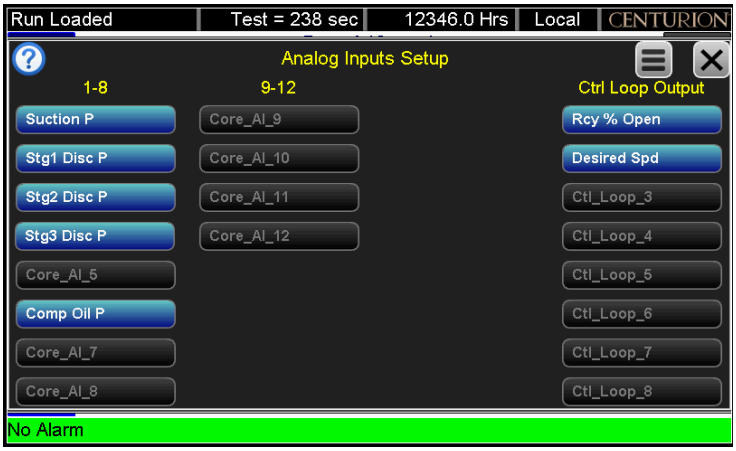
Select normally open or normally closed. Normally closed inverts the logic associated with the output if desired.

The actual status of the output is shown as OFF or ON.

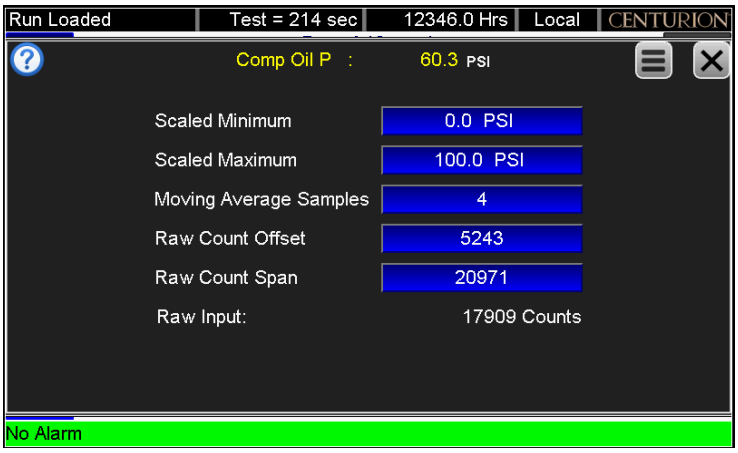


Analog Input Setup

Touch the desired input to view input status and modify input scaling. Only input in use by the configuration are settable.

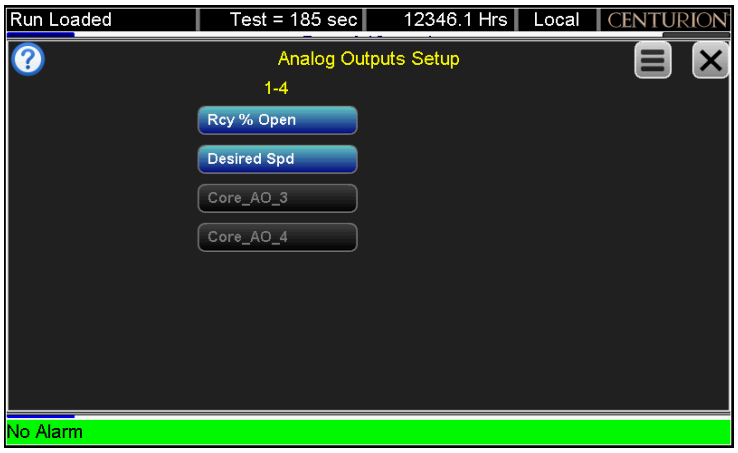


Anolog Input (Typical)

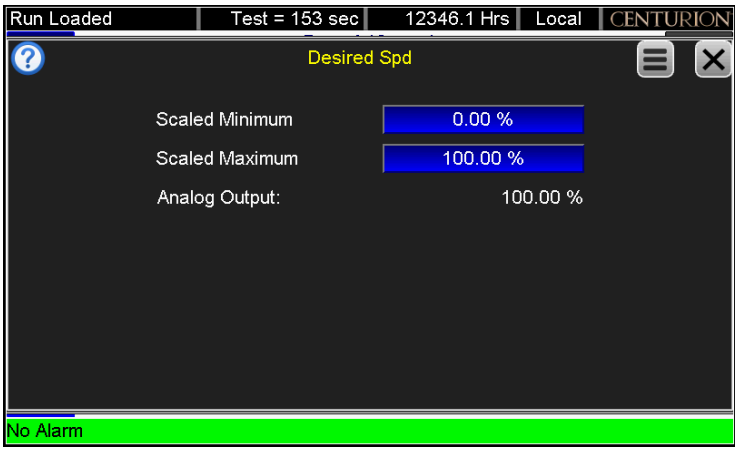


Analog Output Setup

Touch the desired output to view output status and modify output scaling. Only outputs in use by the configuration are settable.

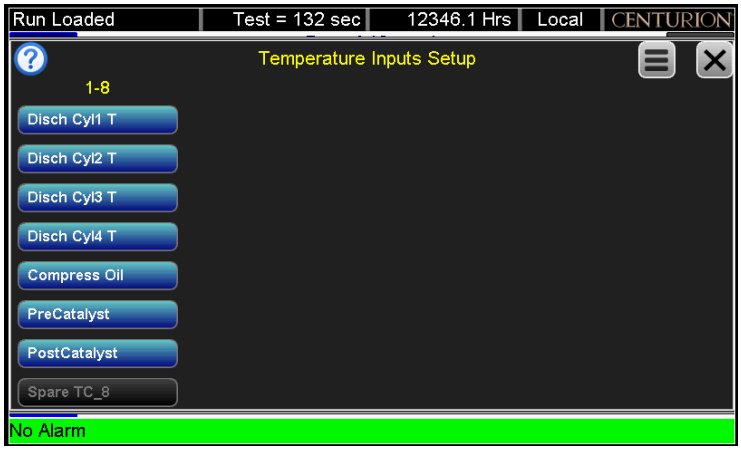


Analog Output (Typical)

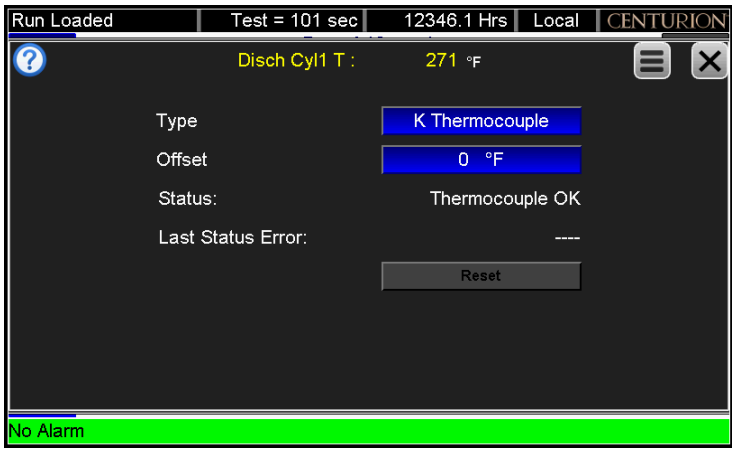


Temperature Input Setup

Touch the desired input to view input status and modify input type. Only inputs in use by the configuration are settable.



Temperature Input Typical

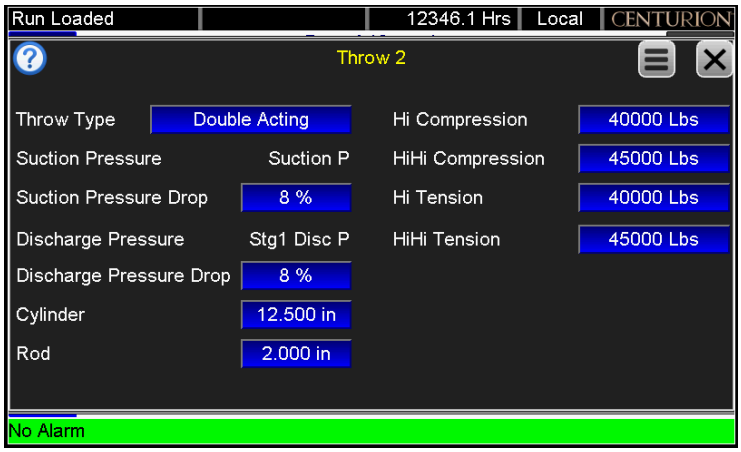


Rod Load Setup

Touch the desired throw number to view and modify rod load configuration. Only throws in use by the configuration will be settable.

Rod Load (Typical)

Set the configuration for the compressor throw. The compressor performance run sheet will have this information.



Action may be changed from single to double throw. Set the pressure drop values to approximate internal gas pressures.

The drop includes piping and valve losses from the measurement point.

Tandem cylinder options have additional settings for the low and high pressure cylinder.

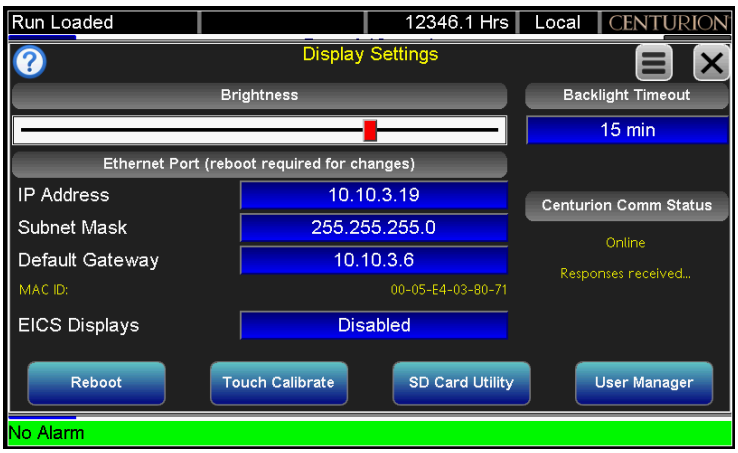
High setpoints are for the Alarms only.

HiHi setpoints are for shutdown fault event thresholds.

Some values, such as reassignment of pressure channels, are modified using the Centurion configuration tool.

Display Settings

Use this page to modify setpoints specific to the display and communication parameters on the display.



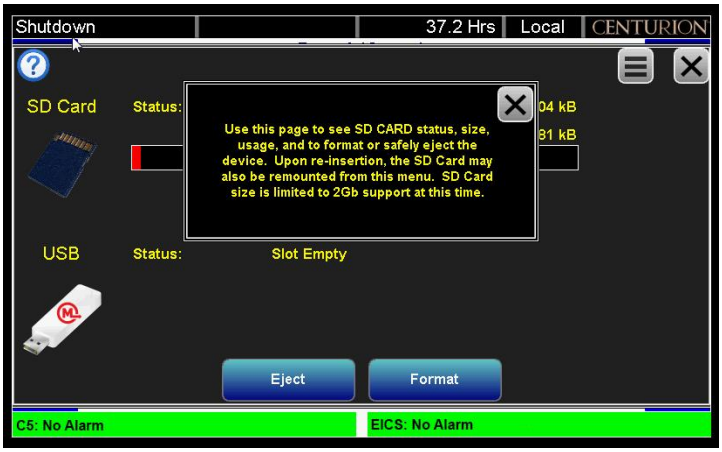
The communication status to the Centurion may be monitored on this page and used for troubleshooting purposes.

Tap on the icons to open.

SD Card Utility

From the Display Settings screen, touch the SD Card Utility to open the SD Card Status.

This SD page displays the SD Card status, size and usage. SD Card size is limited to 2Gb support at this time.



Touch the Format icon to format the card

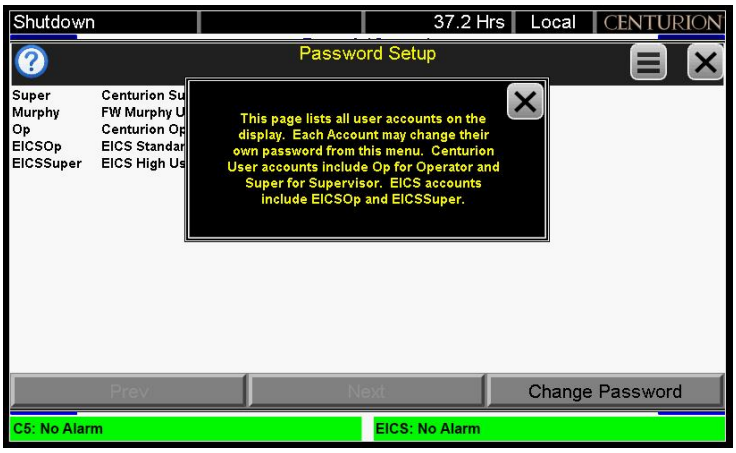
Touch the Eject icon to safely eject the SD Card.

The SD Card may also be remounted from this menu.

Password Setup Page

From the Display Settings screen, touch the User Manager icon for the Password Setup page.

The Password Setup page lists the security access accounts with password protection. Each account may change their own password from this menu.



Setting Password Rules

Any alphanumeric password may be used on each user account.

Centurion user names include Op for operator and Super for supervisor.

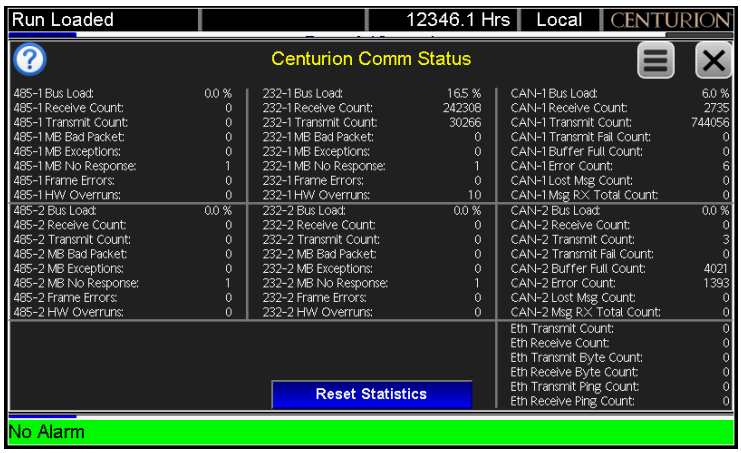
EICS user names include EICSop for operator and EICSSuper for supervisor.

> **NOTE:** The screen will time out after 10 minutes without activity, and a password must be re-entered to return to the setup and edit menus.

Always remember to touch the Log Off icon to deactivate your security access before you leave the premises.

Centurion Comm Status

Users may view the status for all the Centurion communication ports since last power up.

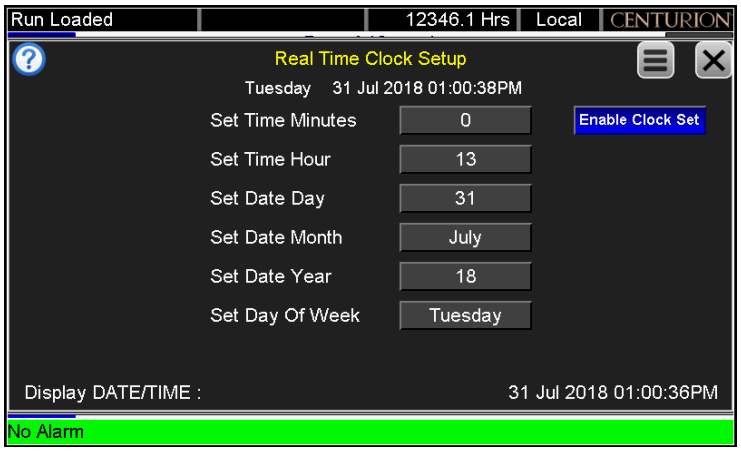


This page can assist with diagnosing connections to the Centurion from outside devices.

Touch Reset Statistics icon to reset the counters.

Real-Time Clock Setup

Touch Enable Clock Set icon to enter the edit mode.

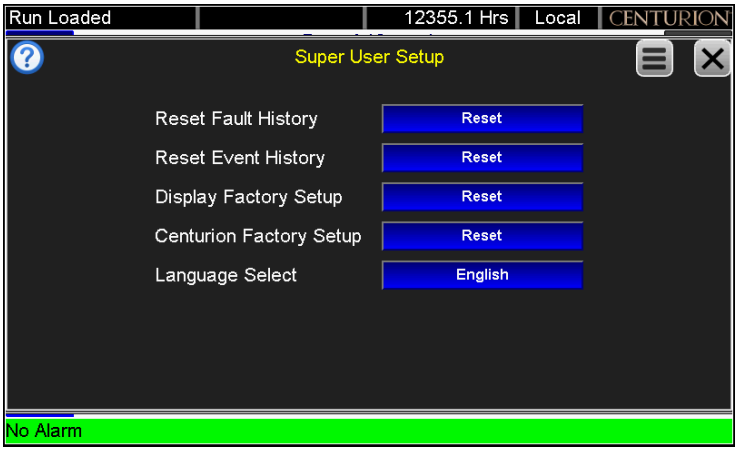


This setting is on the Centurion; however, the display clock and Centurion clock automatically synchronize.

When the settings are complete, touch the Press to Set icon to enter the new clock setting.

Super User Menu (Super User Passcode Required)

The Reset Fault History will clear the stored faults.



The Reset Event History will clear the events.

The Display Factory Setup will restore language, backlight timeout, brightness and other settings stored in the display.

The Centurion Factory Setup will restore all setpoints to what was set up in the Configuration that was used.

The Language Select will change the language from English or Spanish.

For electric motor short cycle start per hour limiting, the fault may be set on this page to allow for a restart before the minimum time of 1 hour wait time to restart.

Centurion Comm Port Setup (Super User Passcode Required)

Touch the desired communication port to view and edit port setup.

RS485-1

The RS485 is used for long distance serial comunication. Distances up to 4000 feet are possible and multiple devices can be on the network.

120 ohm twisted shielded pair cable should be used for proper line integrity, wired in a daisy-chain fashion.

Star networks should be avoided.

Fail-safe Biasing should be turned on only once. Typically done by the Client device.

Line termination should be turned on at the ends of the network.

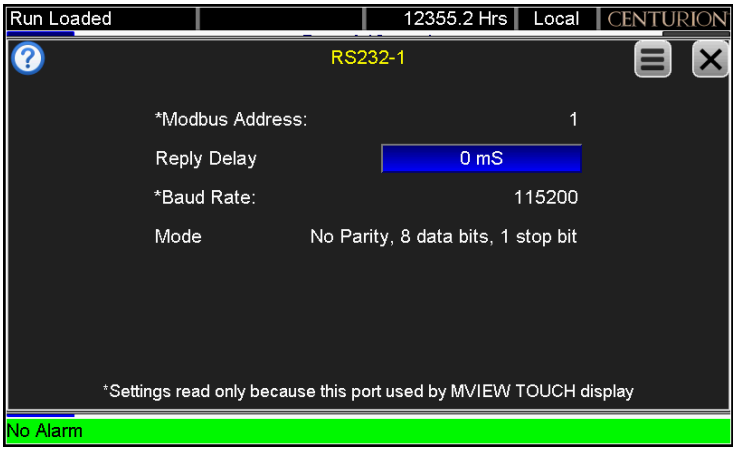
Modbus Address is for this Centurion on the Network. The Centurion is a Modbus RTU server.

Set the communication parameters to match the Modbus RTU Client device.

Reply Delay is only used to slow down the port if the Client requires additional time.

RS232-1

RS232 is used for short distance serial communication. Distances less than 35 feet are ideal in a point-to-point communication.



Low capacitance, shielded 3 conductor cable should be used, with adequate gage wire to reduce voltage losses. Devices must share a DC common reference.

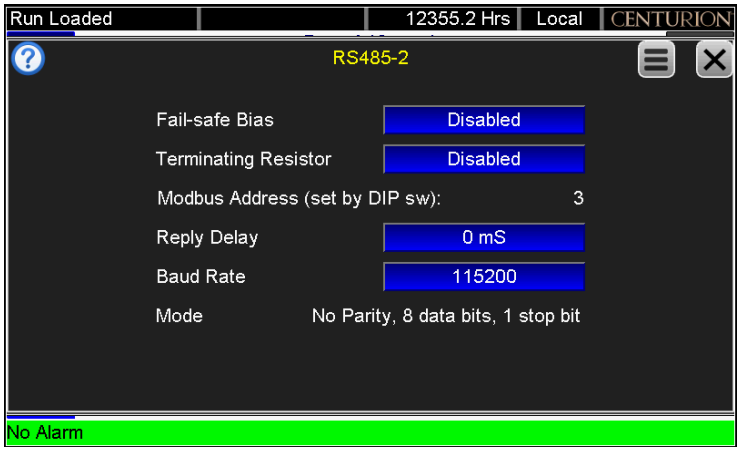
Modbus Address is for this Centurion on the Network. The Centurion is a Modbus RTU server.

Set the communication parameters to match the Modbus RTU Client device.

Reply Delay is only used to slow down the port of the Client requires additional time.

RS485-2

The RS485 is used for long distance serial comunication. Distances up to 4000 feet are possible and multiple devices can be on the network.



120 ohm twisted shielded pair cable should be used for proper line integrity, wired in a daisy-chain fashion.

Star networks should be avoided.

Fail-safe Biasing should be turned on only once. Typically done by the Client device.

Line termination should be turned on at the ends of the network.

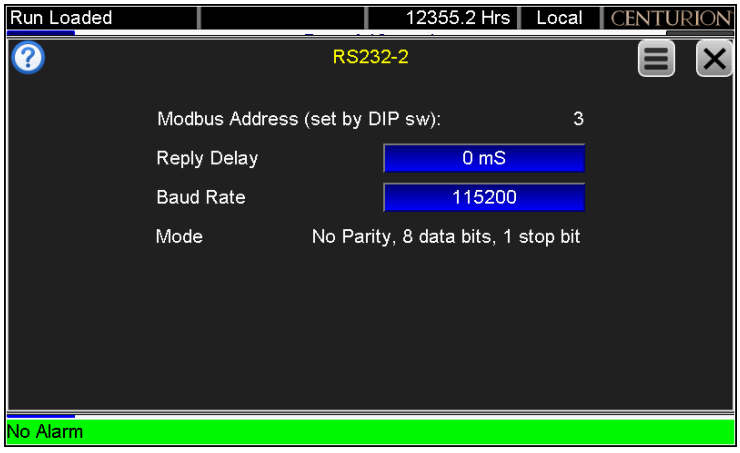
Modbus Address is for this Centurion on the Network. The Centurion is a Modbus RTU server.

Set the communication parameters to match the Modbus RTU Client device.

Reply Delay is only used to slow down the port of the Client requires additional time.

RS232-2

RS232 is used for short distance serial communication. Distances less than 35 feet are ideal in a point-to-point communication.



Low capacitance, shielded 3 conductor cable should be used, with adequate gauge wire to reduce voltage losses. Devices must share a DC common reference.

Modbus Address is for this Centurion on the Network. The Centurion is a Modbus RTU server.

Set the communication parameters to match the Modbus RTU Client device.

Reply Delay is only used to slow down the port of the Client requires additional time.

Can Port Settings – Can-1

CAN bus is used for long distance high speed communication. Distances up to 100 feet are possible depending on data rates, and multiple devices can be on the network.

120 ohm twisted shielded pair cable should be used for proper line integrity, wired in a daisy-chain fashion.

Star networks should be avoided.

Claimed Address is displayed for the address that was negotiated.

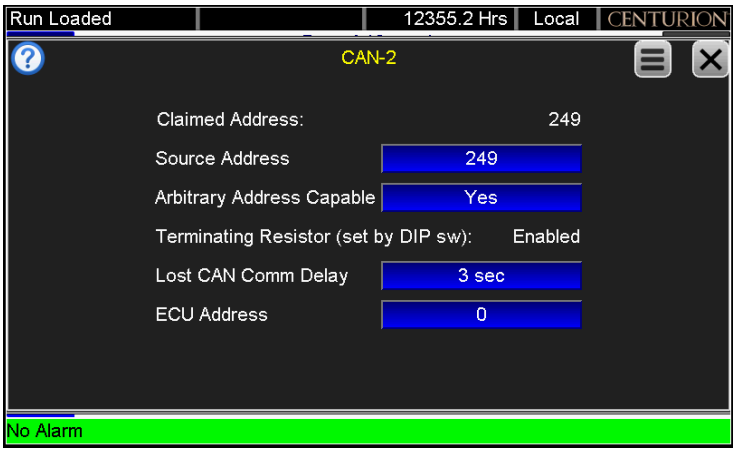
Source Address is for this Centurion on the network.

Arbitrary Address Capable is yes if other devices support address arbitration.

Terminating Resistor (set by DIP sw) is enabled. Line termination should be turned on at the ends of the network.

Can Port Settings – Can-2

CAN bus is used for long distance high speed communication. Distances up to 100 feet are possible depending on data rates, and multiple devices can be on the network.



120 ohm twisted shielded pair cable should be used for proper line integrity, wired in a daisy-chain fashion.

Star networks should be avoided.

Claimed Address is displayed for the address that was negotiated.

Source Address is for this Centurion on the network.

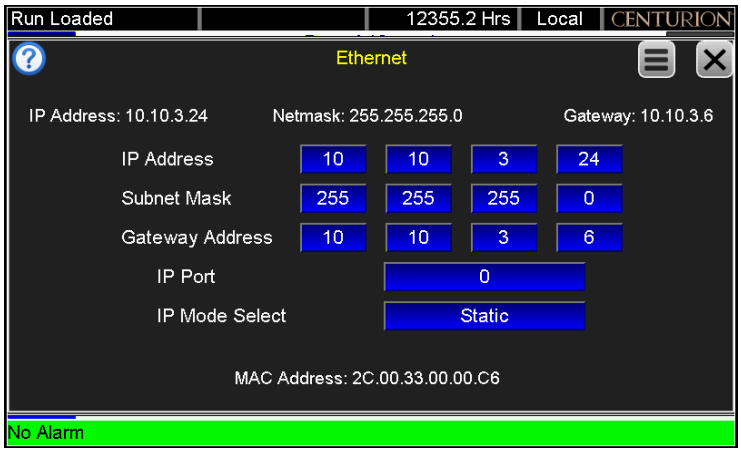
Arbitrary Address Capable is enable/yes if other devices support address arbitration.

Terminating Resistor (set by DIP sw) is enabled. Line termination should be turned on at the ends of the network.

ECU Address is the engine ECU source address. Some engine ECUs require a specific source address to respond to data request. Refer to engine documentation.

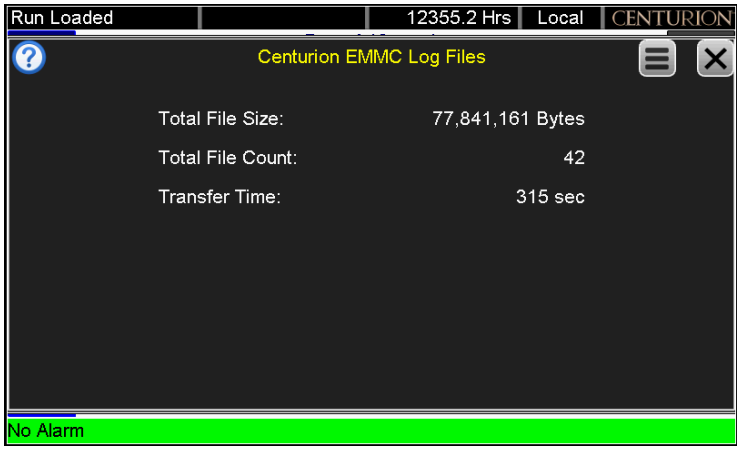
Ethernet Settings for the C5

The Ethernet port settings are for the Centurion. The two ports share the same connection and act as a 2-port switch.



Centurion EMMC Log File Menu (Super User Passcode Required)

The Centurion ENNC Log Files page displays the number of files on the internal EMMC memory storage on the Centurion.



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