ASCO™

Particulate Monitoring System
P150 Plus

OPERATING MANUAL

www.emerson.com | V_10031 | Rev AA

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1 Technical Support Contact

ASCO provides industry leading Engineering and technical support for all product lines. The technical support department is staffed with a team of engineering professionals. Areas of assistance provided by the Technical Support department include:

- Pre-Installation Site Analysis
- Product Installation
- General Operation
- Application Specific Review
- Routine Calibration
- EPA Compliance
- Performance Upgrades and Add-On Features

To assure the best and most efficient technical support please be prepared with the following information prior to contacting ASCO. If it is determined that the component must be returned for evaluation/repair, a Return Material Authorization (RMA) number will be issued. You must include the RMA number on the packing slip and mark the outside of the shipping container.

- Company Name _____
- Product Model Number _____
- Product Serial Number _____
- Date of Installation _____
- Reason for Return _____

Emerson Technical Support may be reached through:

Website: www.emerson.com/ASCO

- Any control unit or particulate sensor that was exposed to hazardous materials in a process must be properly cleaned in accordance with OSHA standards and a Material Safety Data Sheet (MSDS) must be completed before it is returned to the factory.
- All shipments returned to the factory must be sent by prepaid transportation.
- All shipments will be returned F.O.B. factory.
- Returns will not be accepted without an RMA number.

2 Notifications

Disclaimer

This document contains important information necessary for proper operation of the product. It is strongly urged that all users of the product read this manual in its entirety. All instructions should be followed properly and any questions that arise should be discussed with ASCO.

Any use or distribution of this document without the express consent of ASCO is strictly prohibited. Any reproduction is prohibited without written permission.

In no event will ASCO be liable for any mistake, including lost profits, lost savings, environmental compliance costs or other incidental or consequential damages or injury arising out of the use or inability to use this manual, even if advised of the possibility of such damages, or any claim by any other party. Terms and conditions supplied with each order contain additional liability limitations related to this product.

Symbols and Conventions

WARNING 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Warning statements help you to: • Identify a hazard • Avoid a hazard • Recognize the consequences
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
	Identifies information, sections or statements in this manual that apply to approved hazardous area systems, regulations or installation.

Safety

WARNING

DEVICE SUITABILITY

Area Classification

Before installing any device confirm area classification requirements. Do not install any device that is not tagged as suitable for the required area classification.

Environment

Before installing any device, confirm ambient temperature, process temperature and process pressure requirements. Do not install any device that is not tagged as suitable for the required temperatures and pressures.

WARNING

NOT A SAFETY RATED DEVICE

This model must not be used independently for safety or as a critical input signal to a safety system. This model is designed for general process control, diagnostics and environmental monitoring. Safety must be addressed with detailed engineering, redundancy and safety certified components where applicable. Consult factory for critical safety applications.

WARNING

APPLYING POWER

This apparatus complies with IEC61131-2 clause 11-14, safety requirements for industrial programmable controllers, and has been supplied in a safe condition. Before applying power, verify that the correct safety precautions have been taken.

WARNING

GROUNDING AND FUSING

Before turning on the instrument, you must connect the protective earth terminal of the instrument to a proper earth ground. Grounding to the neutral conductor of a single-phase circuit is not sufficient protection.

Only fuses with the required current, voltage and specified type should be used. Do not use repaired fuses or short-circuited fuse holders.

Installation Personnel

WARNING

INSTALLATION PERSONNEL

Only appropriately licensed professionals should install this product.

Always disconnect power before servicing.

Environment

WARNING

ENVIRONMENT

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters (6562 ft) without de-rating. This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

WARNING

OPEN-TYPE EQUIPMENT

If this equipment is sold as open-type equipment it must be mounted within an enclosure that is designed for environmental conditions present and to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool.

Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications. In addition to this publication, see: NEMA Standards publication 250 and IEC publication 60529, as applicable, for information about the degrees of protection provided by different types of enclosures.

Field Service

WARNING

FIELD SERVICE

All power must be removed prior to performing any field service. Do not attempt to service a system with power applied. Modules are not hot swappable.

Service of individual modules is limited to replacement of the line fuse, connectors or SD card. Do not attempt to disassemble modules. Any components that are not operating properly should be returned to ASCO for service.

IMPORTANT

APPLICABLE FIRMARE REVISION

This manual applies to the P150 Plus Monitor/Controller with firmware revision 2.13 and higher.

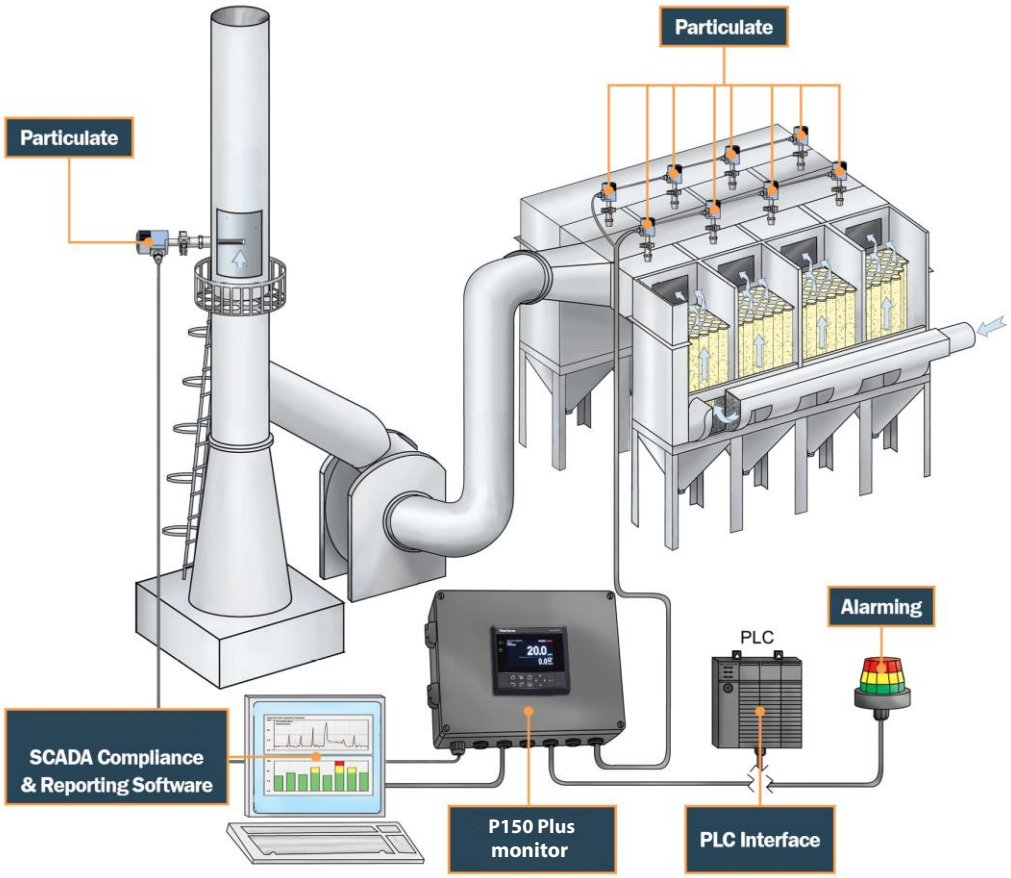
3 Introduction

The P150 Plus is a user-friendly and reliable particulate monitoring system based on ASCO's MICS™ platform (Modular Instrumentation and Control System - Pronounced "mix").

IMPORTANT **Many features are optional**, refer to "Ordering Information" in MICS Hardware Manual or your quotation.

P150 Plus Application

Capability Monitoring, Diagnostics & EPA



The P151 Plus is an advanced particulate monitoring system for fabric filters (i.e. baghouses), cartridge type dust collectors, cyclones, process flow pipes and some ESPs and mist eliminators. The P151 Plus provides a range of capability and functionality in single and multichannel configurations, reliable continuous particulate monitoring, and leak/flow detection along with a solid range of features, functions and I/O via MICS™ platform

Various configurations and monitoring capabilities are offered to meet a wide range of applications and customer needs.

The P150 Plus integrates the following capabilities:

Capability	Detail
All Types of Filters	Configurable to all types of filters: • Baghouse and Cartridge Filters • Single, Multi and Split Compartment Baghouse.
Particulate Monitoring and Leak Analysis	Integrated basic or plus particulate monitoring and filter leak analysis with Induction Technology.
Auxiliary Sensor Monitoring	Directly input auxiliary process sensors for monitoring, display, alarming and logging. • Temperature sensor • Airflow sensor • Other, consult factory
Fieldbus Networking	Interface with PLCs, DCS and HMI/SCADA systems with certified fieldbuses. • DeviceNet • Ethernet/IP • Modbus/RTU • Modbus/TCP • Profibus DP • Profinet IO • Other, consult factory
Alarming System	Powerful and flexible alarming system with multiple alarms per sensor, process diagnostic alarms, system self-test alarms, multiple alarm acknowledge options, remote acknowledge/clear, alarm grouping, fail-safe alarms and more.
Data Historian	Integrated data historian with direct storage of time stamped data. Internal memory and mirroring to removable SD memory card. Storage of all process readings, alarm transitions, self-check results and system/diagnostics messages.
Real-time and Historical Trending	Real-time process and historical data trending. User selectable parameters allow the user to easily configure the trending and compare process trends for the analysis. Select multiple process trends, scale independently, pan and zoom.
Continuous Process Diagnostics	When Leak Locating Factory Option is Enabled: • Leak locating by row

EPA Compliance

The P150 Plus is also the most comprehensive and effective solution for EPA compliance. Particulate monitors offer self-checks that meet EPA standards and the controller offers EPA QA functions (Quality Assurance functions). Optional equipment and proper configurations may be required to meet a specific compliance regulation. Consult the factory for an application review.

4 Before You Begin

Please read this manual in its entirety and note the following important planning items.

Installation

Be sure hardware and sensor installation and commissioning has been completed.

User Interface

Become familiar with the user interface.

Review Trending Setup

Review which process variables are to be trended and the appropriate scaling. Refer to the Trending sections for more information.

Adjust Particulate Smoothing (Real-time output)

Monitor the particulate real-time trend throughout process events including filter cleaning. Adjust the real-time signal smoothing so the baseline signal is relatively smooth while response to peaks is dynamic and fast.

Adjust Particulate Averaging (Averaged output)

Adjust the averaging of the average output to achieve the desired response for long-term trend analysis, or to meet a specific EPA averaging requirement. Refer to the Process Variable Inputs section for more information.

Set Alarm Levels

Establish alarm levels, delays and logic for all monitored variables. Refer to the Alarms section for details.

IMPORTANT **ALARM LEVELS**

The appropriate alarm levels will vary by process and user needs. The default alarm levels should not be relied upon without careful review of each process.

Review Data Historian and Real-Time Clock Setup

Adjust process variables for storage by the Historian. Only process variables stored by the Historian are available for trending. Refer to the Historian section for more information.

Ensure that all Date and Time settings are correct. All process data stored by the system will be time-stamped using the system clock. Refer to the Real-Time Clock Settings section for more information.

Define a Backup Strategy for Data Historian

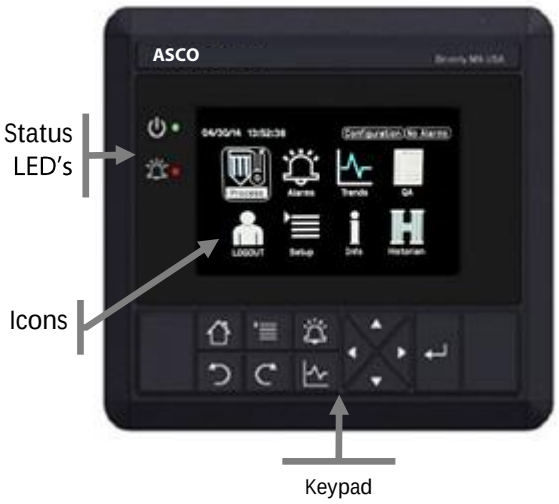
Establish a schedule and policy for backing up data stored by the Historian or onto the SD card. Refer to the Historian section for more information.

5 Getting Started

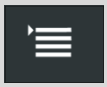
5.1 User Interface

The User Interface consists of a keypad, color display, and status LEDs (green power indicator red/yellow alarm indicator). Upon power up the Home Screen is shown, from which the user can navigate to a desired icon and then press Enter.

User Interface



Keypad

Key	Description
	**Home** (Home screen)
	**Setup** (System menus) (Screen specific menus)
	**Alarms** (Alarm screen)
	**Up/Down** (Move cursor, zoom trends) **Left/Right** (Move cursor) (Pan historical trend)
	**Forward** (Display next screen)
	**Back** (Display previous screen)
	**Trends** (Trending Screen)
	**Enter** (Select current setting) (Toggle trend live/historical)

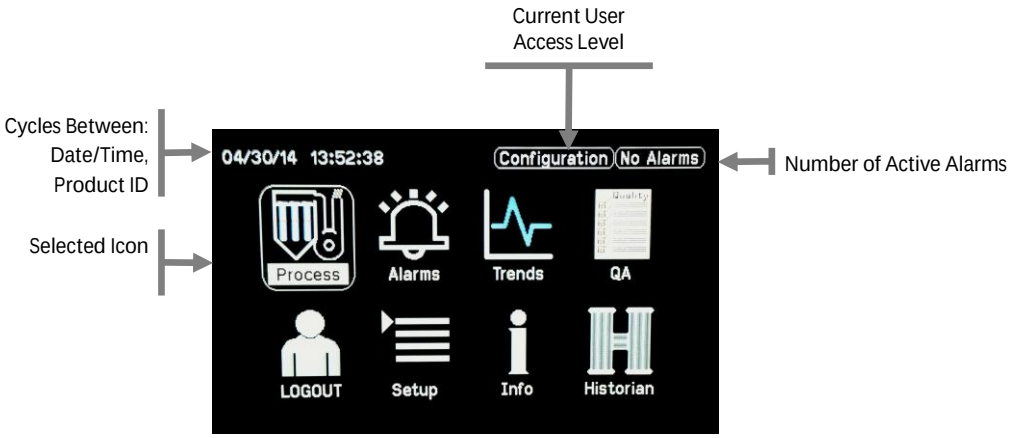
Status LED's

LED	State	Meaning
Power	Green – Solid Off	• Power • No power
Alarm	Red – Blink Red - Solid Yellow – Blink Yellow – Solid	• Active high alarm(s) • Acknowledged high alarm(s) • Active low alarm(s), no high alarms • Acknowledged low alarm(s), no high

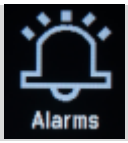
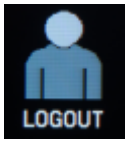
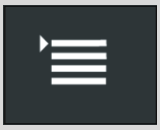
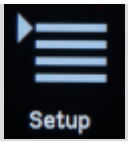
5.2 **Home Screen**

The Home Screen provides access to all screens and user settings. Use the Up/Down/Left/Right keys to move the highlight box to any icon. Press the Enter key to select.

Home Screen



Legend
(See respective manual section for details)

Dedicated Key	Icon	Name	Description
None		**Process Information**	Process overview screen and alternate process screens. Displays process variables and status in multiple user configurable formats.
		**Alarms**	Active and historical alarms, alarm acknowledgment and access to alarm system set up.
None		**Leak Locating Diagnostics**	Displays filter diagnostics when Leak Locating factory option is enabled.
		**Trending**	Real-time and historical trending screens.
None		**User Login**	User login screen.
		**Setup**	From the home screen displays the main setup menu. From other screens displays screen specific menu/options in a popup window.
None		**System Information**	Displays information about the configuration, status, and general operation of system components.
None		**Quality Assurance**	Displays advanced particulate module self-check status and self-check schedule per EPA regulations.
None		**Data Historian**	Displays status and settings for the data historian.

5.3 Process Screens

Icon

The Process Screens display key readings from sensors (current real-time and average process trends), and alarms . All configured Process Screens are shown in a rotation, each appearing for a user-selectable time. A key press will temporarily stop this cycling for a user-set period after which cycling resumes.

Process Screens display process variables with the following indicators:

- Process variables and any associated bar graph will be displayed in white when not in alarm.
- Process variables and any associated bar graph will be displayed in yellow for HI or LO alarm status and in red for HIHI or LOLO alarm status.
- A yellow or red 'ALM' indicator will be displayed next to a bar graph when the process variable is in alarm.
- A yellow or red 'ALM' indicator will be displayed within a trend graph when the process variable is in alarm.

Process variable selection and other features of Process Screen presentation can be modified. Pressing the Setup key displays a screen specific menu/options in a popup window. Setup options include adjustment of alarm thresholds, process variable scaling, screen setup, and trend width.

Bar Graph Screen

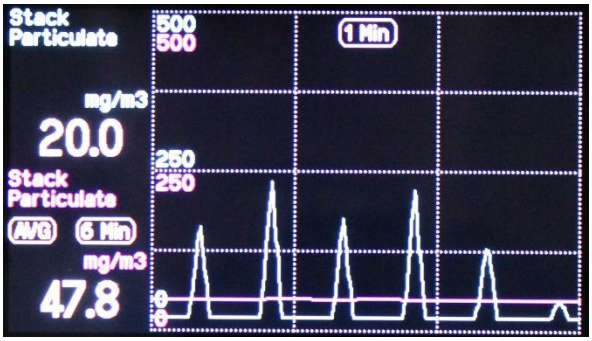
The Bar Graph Screen displays readings in bar graph form for selected process variables. Bar graphs display real-time or averaged readings and current alarm level (if alarms apply) for each process variable.

Bar Graph Screen

Numeric + Live Trend Screen

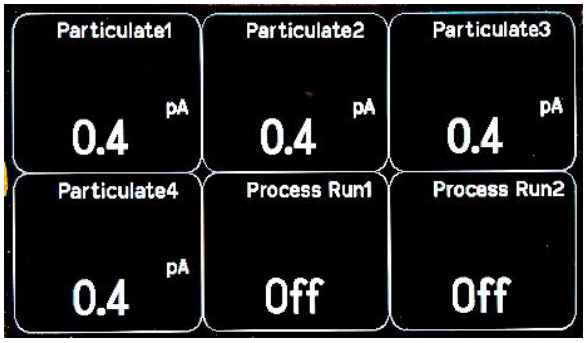
The Numeric + Live Trend Screen displays selected process variables in medium sized digits and as moving trends. This screen and adjustment options available from this screen are discussed in detail in the Trending section. Note: mg/m3 output requires correlation to gravimetric testing.

Live Trend Screen



Tiles Screen

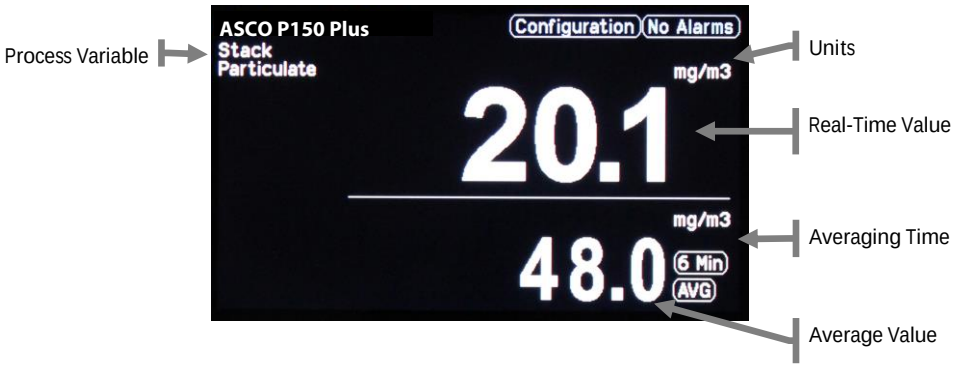
The Tiles Screen displays selected process variables and discrete inputs in medium sized digits. This screen is used to display parameters that have discrete values, but can also display process variables that have numeric values.



Large Numeric Screen

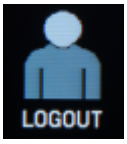
The Large Numeric Screen displays real-time and time-averaged readings for a single process variable with large digits for ease of readability from a distance. Note: mg/m3 output requires correlation to gravimetric testing.

Large Numeric Screen



5.4 User Login

Icon



Selecting the User Login icon from the Home Screen will display a User Login window. Four user levels are available which provide security against unintended changes to various levels of system settings.

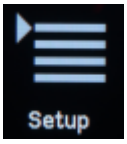
User Login Popup

Login is valid until power is removed or 15 minutes elapses without keypad activity. The current user level is shown in the upper right of the screen. User levels, default passwords, and associated permissions are provided in the table below. Default passwords can be changed in Setup (Systems Settings). A detailed listing of permissions is found in the Settings section.

User Level	Displayed Status	Password Required	Default Password	Permissions
Operator	Operator	No	—	View only, no changes allowed
Supervisor	Supervisor	Yes	5	Change basic alarm set points Change basic Fieldbus set points
Engineer	Engineer	Yes	55	Change all alarm set points Change all Fieldbus set points
Configuration	Configuration	Yes	155	Change all alarm set points Change all Fieldbus set points Change all hardware set points

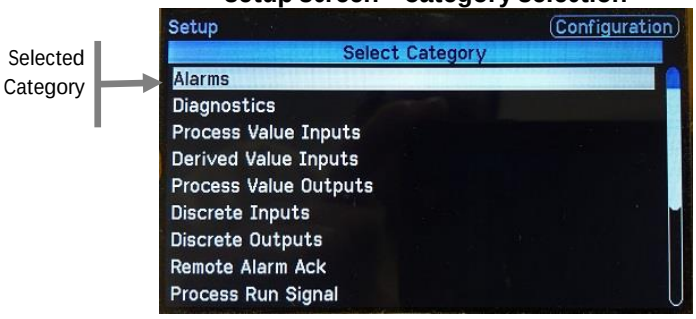
5.5 Setup

Icon	Key



The Setup screen provides access to system configuration settings and screen specific menus/options via a pop up window. The content of the Setup Screens depends on user login. Only configuration settings that apply to the current operating configuration are shown.

Setup Screen – Category Selection



Setup Screen Categories
(Refer to respective manual section for details)

Category	Description
Alarms	Configure alarm levels, delays, groups and logic.
Diagnostics	Configure leak locating diagnostics when Leak Locating factory option is enabled.
Process Variable In/Out	Configure analog inputs/outputs. Reference Hardware Configuration for details.
Derived Variable Inputs	Configure analog inputs derived from other analog inputs. Reference Hardware Configuration for details.
Discrete Inputs/Outputs	Configure discrete inputs/outputs. Reference Hardware Configuration for details.
Remote Alarm ACK	Configure alarm acknowledgement groups.
Process Run Signal	Configure the process running signal. Reference Hardware Configuration for details.
Fieldbus	Configure fieldbus settings.
Node List	Add and remove I/O modules from the system.
System	Configure system level settings.
Screens	Add, remove & configure process screens & trend screens. Reference User Adjustable Screens for details.
Appearance	Adjust process variable and alarm presentation, process screen cycling period, background color and other settings.
Set User Passwords	Configure passwords for user levels.

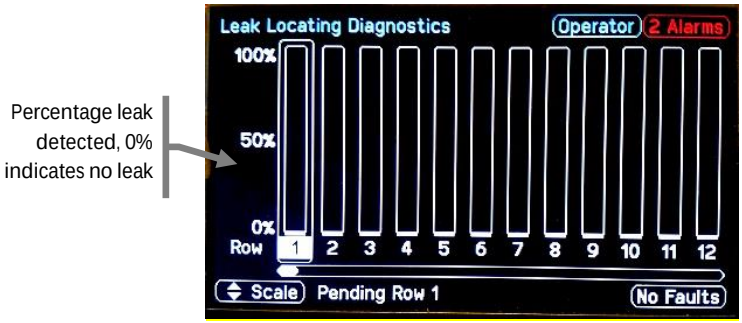
See the Hardware Configuration and System Settings sections for details on Setup parameters.

6 Leak Locating Diagnostics

Icon

The P150 Plus has the ability to perform leak locating by row - continuously analyzing filter operation and diagnosing problems and faults. This feature is available when Leak Locating factory option is enabled, and requires an external leak locating trigger – which can be either a discrete input or fieldbus data.

Leak Locating Diagnostics



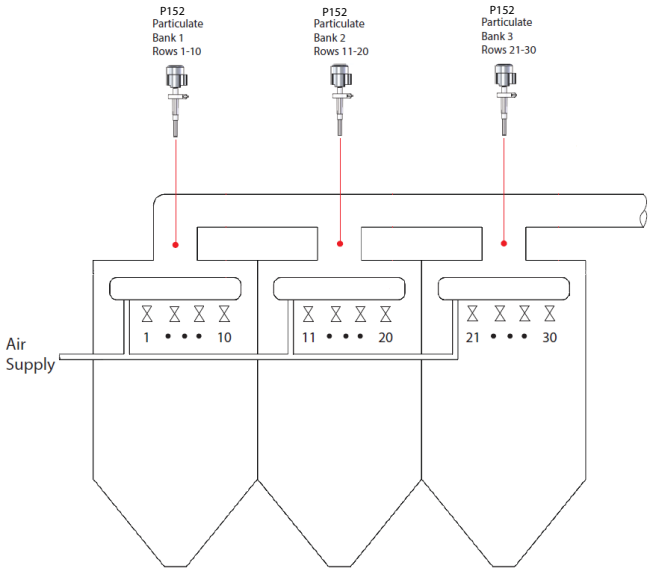
Indicator	Description	Indicator	Description
	Filter normal, low % indicates less particulate leakage		Filter leak detected, high % indicates more particulate leakage

6.1 Filter Leak Diagnostics

The filter leak diagnostics uses advanced, high speed, signal processing to analyze particulate levels by row. The amount of particulate leaking through the filter immediately after a cleaning pulse is normally significantly higher than the baseline bleed-through. When a row is pulsed, the filter cake is temporarily removed from the outside of the filter on that row and the filter media is stretched, allowing a momentary increase in particulate. When filters have small tears or worn areas, cleaning cycles will amplify the existence of the small tears and worn filter media providing early warning. Leak rows can also cause particle build up on the tube sheet. Upon pulsing this particulate can get disturbed and re-entrained back into the exhaust flow. Leaking rows, or rows with developing leaks, may be detected by performing a row-by-row comparison of particulate levels by row. Rows that have significantly higher levels than others are typically leaking. Limits may be set to trigger a leak locating diagnostic alarm.

6.2 Diagnostic Banks

For the most accurate diagnostics of larger filters with multiple pulse header tanks, and multiple outlet ducts, it is generally recommended to monitor the pressure of each header tank and the particulate in each duct. To manage multiple diagnostic sensors the Diagnostic Bank feature is used. A Diagnostic Bank is the grouping and assigning of rows to each sensor. The bank setup allows the user to assign a group of rows to each particulate sensor. There are 8 banks available for filter leak locating. Below is an example of how baghouses with multiple header tanks and clean air outlets would be configured using diagnostic banks.



Configuring Leak Locating Trigger

When the Leak Locating Factory Option is Enabled, the P150 Plus is able to locate leaks for any specific baghouse row. To use this diagnostic feature, the P150 Plus must be provided with an indication of which row was pulsed whenever a cleaning pulse occurs. This 'Leak Location Trigger' indication can be provided to the P150 Plus either through a fieldbus connection or through discrete inputs from a MICS slave module.

- When the diagnostic trigger is provided by fieldbus, the fieldbus data required is simply the row number of the row pulsed. This number should change only when the row requiring diagnostics is changed. Diagnostics will be performed for the specific row sent via fieldbus. This method can handle a variety of cleaning methods since each single row is explicitly sent. Multi-row diagnostics is not supported.
- When the trigger is provided by discrete inputs, two separate signals are required : 'First Row DIN Channel' and 'Row Change DIN Channel'. The discrete input (DIN) assigned as 'First Row DIN Channel' must present a rising-edge pulse whenever baghouse Row 1 is pulsed. The discrete input assigned as 'Row Change DIN Channel' must present a rising-edge pulse whenever any cleaning pulse occurs. This method allows only for single-row, sequential cleaning operation. Skip rows and multi-row pulsing is not handled in this method

The leak locating trigger settings are configured using the Diagnostics menu. These settings are described in the table below.

Diagnostics Setting	Description
Leak Locating Trigger	• Fieldbus – use fieldbus-reported 'Current Row to Pulse' as trigger • Discrete Input – use 'First Row DIN Channel' and 'Row Change DIN Channel' as triggers
First Row DIN Channel	Selects the DIN channel to use to indicate 'first row' cleaning pulse
Row Change DIN Channel	Selects the DIN channel to use to indicate 'row change' cleaning pulse.

Configuring for Multiple Particulate Sensors

The number of rows in each bank is configured using the **Bank x LL Diag Num of Rows** setting where x represents the bank number. Bank 1 begins at row 1 while each of the other banks starts after the last row of the previous bank as shown in the example below. The particulate sensor for each bank is configured using the **Bank x LL Diag PVIN Chan** setting where x represents the bank number.

Leak Locating Diagnostics Example with Two Banks (Number of Rows = 16)

Bank	*LL Diag Num of Rows* Setting	Start Row	End Row
1	8	1	8
2	8	9	16

7 Alarms

Icon	Key
	

Two alarms are assigned to each configured process variable input. An alarm will be activated when the process variable exceeds the **Alarm Set point** continuously for a period longer than the **Alarm Delay** setting. Diagnostics and system alarms are also available. Alarms can be inhibited when the process is off, refer to the Process Run Signal section for integrating a processing running signal.

Active Alarms

IMPORTANT

Alarm Levels

Appropriate alarm levels will vary by process and user needs. Default alarm levels should not be relied upon without careful review of each process.

Default Alarm Logic

Default settings for alarms to clear are configured as follows prior to shipping:

- Alarms automatically clear when an alarm condition returns to normal without requiring the alarm to be acknowledged (non-latching). Alarm relays will clear when an alarm condition is present and the alarm is acknowledged even if the alarm condition remains. Refer to Relay Clearing section for complete details.

Alarm – Alarm Default Settings

Alarm	Type	Group	Level	Delay	Description	Path
Particulate	HIHI	1	30 pA	10 sec	HIHI alarm of particulate	**Setup/Alarms**
Particulate	HI	2	100 pA	5 sec	HI alarm of particulate	**Setup/Alarms**
CAN Network ERR	System	1	-	-	Communication failure between controller and I/O module on CAN network	-
Real-time Clock ERR	System	1	-	-	Invalid time or date	-
SD Card Alarm	System	1	-	-	SD card error, full or not detected	-
Particulate Self-check Err	System	1	-	-	Particulate module self-check error	-
Historian Alarm	System	1	-	-	Historian operational error	-
Leak Locating Trigger Alarm	System	1	-	-	P150 Plus with Leak Locating detects bad external trigger configuration	-

7.1 Alarm Logic

Alarm logic defines how process variable alarms are activated. When the **Alarm Logic** setting is set to HIHI or HI, the alarm is activated when the input exceeds the **Alarm Set point** continuously for a period longer than the **Alarm Delay**. When **Alarm Logic** is set to LOLO or LO, the alarm is activated when the input is below the **Alarm Set point** continuously for a period longer than the **Alarm Delay**.

7.2 Alarm Groups

Alarm groups are used to group similar alarms or alarms with the same level of severity so that they can activate the same discrete output. Alarms from the same group can be acknowledged from the same digital input as described below. The alarm group for each process variable alarm is configured using the **Alarm Group** setting. The group value represents the discrete output channel that will be activated for the selected alarm (for example, group 4 corresponds to DOUT 4). The group for each of the diagnostics and system alarms is fixed at 1.

7.3 Alarm Acknowledgement

Alarms can be acknowledged from the keypad, remotely using discrete inputs or through the fieldbus.

Alarm Acknowledgement through the Keypad

Alarms may be acknowledged from the keypad by pressing the Setup/Menu key within the Active Alarms screen and then selecting either Acknowledge This Alarm or Acknowledge All Alarms. The minimum required login level to acknowledge alarms through the keypad is defined by the **Alarm Ack User Level** setting.

Active Alarms –Options Window

User Interface Alarm Acknowledgement Setting (Setup)

Setting	Login	Default	Notes	Path
Alarm Ack User Level	Configuration	Operator	Minimum login level to acknowledge alarms through the keypad.	**Setup/System**

Alarm Acknowledgement through Fieldbus

Alarms may be acknowledged through the fieldbus interface in both the I/O data and parameter data areas. This can be done by setting the alarm acknowledge word to a value of 1 for 2 seconds then returning it to a value of 0. The alarm acknowledgement word should not be left at 1 since this would acknowledge any new alarms. Refer to the MICS™ Fieldbus Manual for complete details on alarm acknowledgment through fieldbus.

Alarm Acknowledgement through Remote Discrete Signal

Alarms may be acknowledged remotely through I/O module discrete inputs. A discrete input can be used to acknowledge all alarms or to acknowledge alarms from a specific alarm group. The remote acknowledge settings are accessible from the Remote Alarm Acknowledgment screen.

Remote Acknowledge Settings (Alarm Setup)

Setting	Login	Default	Notes	Path
Select Alarm Group	Configuration		Select the alarm group to modify.	**Setup/Alarms/Remote Alarm Ack**
Remote Ack	Configuration	Disabled	Remote acknowledge feature enable.	**Setup/Alarms/Remote Alarm Ack**
Remote DIN	Configuration	DIN1	Discrete input channel used to acknowledge alarms from the selected group.	**Setup/Alarms/Remote Alarm Ack**

7.4 Alarm Latching Logic

Alarm latching allows alarms to be latched in the active state until cleared and acknowledged. This prevents plant personnel from missing an alarm that may have been active only for a short period of time. If the **Alarm Latching** setting is set to Off, an active alarm is cleared when the process variable returns to normal, no acknowledgment is required. If the **Alarm Latching** setting is set to On, an active alarm is cleared by acknowledging the alarm after the process variable returns to normal. Latching for each of the process diagnostics and device system alarms is set to Off by default.

7.5 Relay Clearing

The method to clear an active alarm relay is adjustable with several settings as described below. Clearing an alarm group relay does not mean the active alarm condition has been resolved or that the alarm is no longer present.

Action Required to Clear Relay	Alarm Latching Setting	Clear Alarm Relay when Acknowledged Setting
Remove alarm condition	OFF	DISABLED
Remove active alarm condition or Acknowledge the active alarm group	OFF	ENABLED
Remove alarm condition and Acknowledge the active alarm group	ON	DISABLED
Acknowledge the active alarm group	ON	ENABLED

Clear Alarm Relay when Acknowledged Setting (System Setup)

Setting	Login	Default	Notes	Path
Clear Alarm Relay When Ack	Configuration	Disabled	If enabled, alarm relay is cleared when alarm is acknowledged.	**Setup/System**

7.6 Fail-Safe Relay Logic

Alarm relay logic may be set to normal or fail-safe mode. In normal mode, the alarm relay contact is open under normal conditions and closes when an associated alarm is active. In fail-safe mode, the alarm relay contact is closed under normal conditions and opens when an associated alarm is active or when power to the control unit is removed. The fail-safe mode can be configured by setting the **Invert Logic** setting for the alarm discrete output channel to 1 as described in the Discrete Output section.

Setting	Login	Default	Notes	Path
Invert Logic	Configuration	0	When 0 the logic is Normal, when 1 the logic is Fail Safe.	**Setup/Discrete Outputs**

8 Trending

Icon	Key
	

A key feature of the P150 Plus is the high resolution real-time and historical trending. Trends are displayed in contrasting colors allowing two process variables, or real-time and average trends of the same process variable, to be viewed at the same time. Trend screens are pre-configured but can be modified. Users can also create new trends.

8.1 Live Trends

Live Trends are available from both the Numeric + Live Trend screen, found in the Process Screen rotation, and in the main Trending screen. In the Process rotation from the Numeric + Live Trend screen, the user can view live data, scale trends, change trend width (X-Axis time period), and change scales (Y-Axis) independently.

Live Trend - Overview

Feature	Description
Y-Axis Scaling	Indicates the variable scaling in the same color as the trend.
Name	Indicates the variable name and units in the same color as the trend.
Numeric Reading	Indicates the current reading of the process variable.
Trend Width	Indicates the X-Axis total time period shown on the screen.
Alarm Indicator	Indicates if a process variable is currently in alarm.

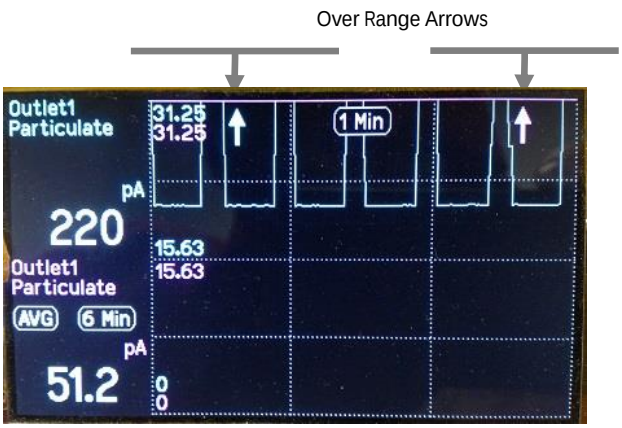
8.1.1 Trend Scaling and Width

The Y-axis scaling of trends can be adjusted. Trends can be scaled as a group using the Up/Down Keys. Trends can be scaled independently by pressing the Setup key. Independent scaling is particularly useful to expose finer detail.

Note that a trend that extends above the top of the Y-axis will be marked with a color-keyed up arrow (consider increasing the Y-axis maximum scale value). A down arrow marks a trend that extends below the bottom of the Y-axis (consider reducing the Y-axis minimum scale value).

The X-axis scale (total time period displayed) can be adjusted by pressing the Setup key. Trend widths between 1 minute and 4 weeks may be selected. Note: mg/m3 output requires correlation to gravimetric testing.

Trend Over Range Indicators

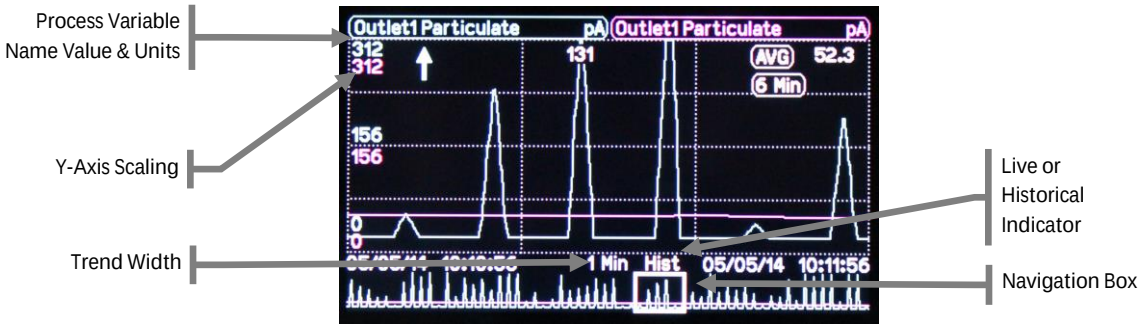


Adjusting Trend Width (X-Axis total time period)

8.2 Trending

The Trending Screen enables full screen trending of both stored data and live readings. The user can scroll back and forth through historical data and live data. From this screen the user can scale trends, and change trend width (X-Axis total time period). The Trending screen is available by pressing the Trends Key or by selecting the Trends icon from the Home Screen and pressing Enter.

Trending Screen - Overview



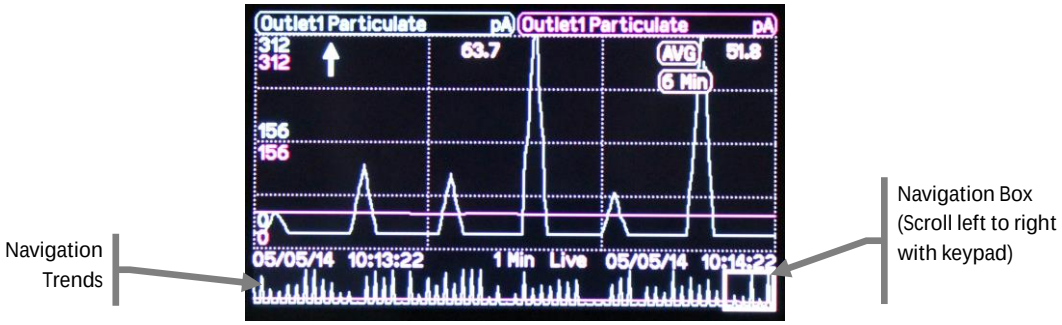
Feature	Description
Process Variable Name	Variable name and engineering units in the same color as the trend.
Numeric Readout	Current value of the variable.
Y-Axis Scaling	Trend scaling in the same color as the trend.
Trend Width	The X-Axis total time duration displayed on the screen.
Over Range Arrows	Indicates for each signal if the data displayed is over or under the range of the Y-Axis Scaling.
Alarm Indicators	Indicates if a variable is currently in alarm.

Navigation Box	Indicates the section of the navigation trend (trend history) that is displayed in the main trend.
Live/Hist Indicator	Indicates if the trend is live real-time data or historical data.

8.2.1 Navigation Trend

At the bottom of the Trends Screen is a Navigation Trend that is 10 times the time width of the upper trend. The Navigation Trend contains a bold rectangular Navigation Box that marks the portion of the Trend that is displayed in the upper trend.

Trending Screen – Navigation Trend/Box



8.2.2 Toggle between Live and Historical Trends

The Trending Screen can show live or historical data. The Enter Key toggles the Trend Screen between Live and Historical mode. In Live mode, the Nav Box is always shown at the right edge of the Navigation Trend.

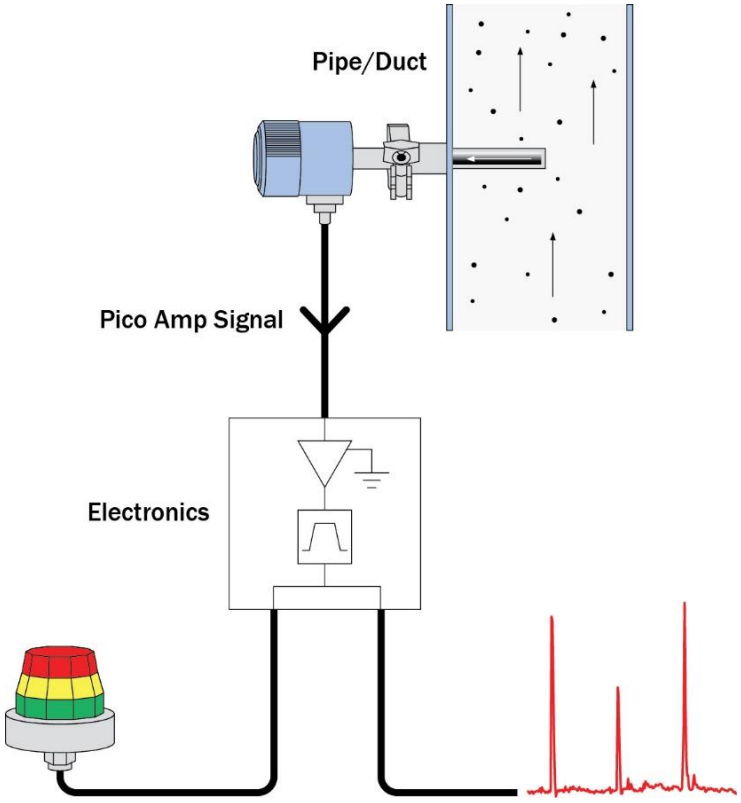
9 Particulate Monitoring

This section provides a general overview of particulate monitoring, system settings and basic alarm guidance. For further information refer to the ASCO Particulate Monitoring and Leak Detection Application and Alarm Guide document.

ASCO particulate monitors include Induction Technology which provides accurate and reliable measurement of particulate concentration over a wide range of process conditions and allows for use of fully insulated probes in most applications.

Induction Technology principle of operation:

- An electrically isolated probe is inserted into a pipe/duct.
- Particles flowing over the probe induce small amounts of charge in the probe which is related to their mass.
- The charge flows through the measurement circuit to ground.
- This charge flow is a current in the picoamp range.
- The picoamp current is passed through a signal processor with multiple high accuracy amplifiers and filtering stages.
- The final output is proportional to mass.



9.1 **Real-time and Averaged Outputs**

This model provides simultaneous output of both real-time and longer term running averaged particulate readings. Particulate readings from most processes, especially larger baghouses and dust collectors, are best evaluated by monitoring both the real-time reading and a running averaged reading.

This is because particulate flow/emissions downstream of baghouses and dust collectors are normally fairly dynamic. This variability tends to increase with the size of the filter and variability of the process. A relatively low baseline reading exists when the filter is not cleaning. Very high, fast peaks occur after each online pulse cleaning of a row. For offline cleaning, a peak will occur after isolation dampers are opened after offline cleaning of a compartment.

The real-time output is effective for process analysis and early warning leak detection. Monitoring the real time output is typically required for EPA filter leak detection regulations such as US-EPA MACT BLDS.

A running averaged output is effective for proportional or correlated mass monitoring for process control or EPA compliance. A long term running averaged output is typically required for EPA continuous particulate monitoring applications such as PM CEMS, PM CPMS and PMDS regulations.

A smoothing adjustment is provided to fine tune the real-time output if necessary. It is adjusted so baseline readings are relatively smooth, while response to peaks is dynamic and fast. Adjusting the real-time smoothing too high may limit setting an alarm for early warning leak detection. Setting the real-time smoothing too low may result in the output being too dynamic.

Real-time smoothing between 2 and 10 seconds is recommended for filter applications with on-line, pulse-jet filter cleaning. Five to 10-seconds or more is recommended for offline cleaning. Real-time smoothing is adjustable through the System Information screen of the particulate I/O module. Refer to the I/O Module Operation section for further information.

Long term averaging is set based on process control and analysis objectives, and or to meet an EPA requirement. One to 6-minute averaging is a common starting point for process control but could be longer. Six minutes or longer is common for EPA regulations. Long term averaging is adjustable through the Process Variable Input screen.

9.2 **Trending**

A good trending practice is to set the trend width (x-axis total time) so the baseline can be distinguished from the cleaning peaks. The trend y-axis scaling should be set so that normal peaks are well within the full scale of the trend so there is room to observe peaks increasing in height as filters begin to wear and leak. A main feature of the high resolution, on-screen trending is to provide quick understanding of particulate readings to aid in setting proper alarm levels.

9.3 **Alarming**

Alarms should be set based on reviewing data over the full process operating range, and for filter applications when the filter media is in good non-leaking condition. For filter applications baseline and peak particulate readings following cleaning cycles should be evaluated over a full range of process load, and with the cleaning system on and off. Once a good set of data is obtained alarms should be set based on the alarming objective. In all cases recall the output of particulate monitor is reasonably proportional to mass. This means that if the readings increase by a factor of 3 for example, the mass will have increased by a factor of 3. High precision models provide increased linearity (i.e. higher accuracy) especially at low particulate levels. Refer to the particulate module specifications.

The following are the main approaches to setting alarms.

Leak Alarming (focus is on detecting leaks in filter media)

- Adjust particulate real-time smoothing for full response to cleaning cycles while keeping the baseline fairly stable.
- Set a HI alarm to capture increasing cleaning cycle peak readings at 1.5x to 5x typical peak height with a 1 to 5 second delay. This provides a pre-visible early warning alarm.
- Set a HIHI alarm to capture increasing baseline readings at 2x to 10x average baseline reading with a 30 to 180 second delay.

Proportional Alarming (focus is on detecting a relative change in the mass concentration)

- Adjust particulate monitor real-time smoothing for minimal response to cleaning cycles.
- Set a HI alarm at a desired multiple over the average baseline reading with a 1 to 60 second delay.
- Set a HIHI alarm at a desired multiple over the average baseline reading with a 30 to 360 second delay.

Gravimetric Alarming (focus is on an alarming at a specific mass concentration value)

- Perform a 3 to 15 point gravimetric correlation using isokinetic sampling.
- Sampling points should ideally be over increasing levels of particulate concentration.
- Set HI and HIHI Particulate alarms in mass units (mg/m3 or gr/cf) with a 30 to 360 second delay.
- Alarms are normally based on running averages 6 minute or 1 hour running averages.
- Alarm levels are based on headroom below the compliance limit.

Refer to ASCO Particulate Monitoring Application and Alarm Guide for further information.

9.4 **Automatic Self Checks**

Plus Particulate modules include automatic self-checks that continuously monitor signal quality and perform automatic zero, upscale/span, sensor and other particulate system checks as scheduled by the user using the internal time/date clock (hourly, daily etc). Refer to the Quality Assurance section for complete details.

10 Data Historian

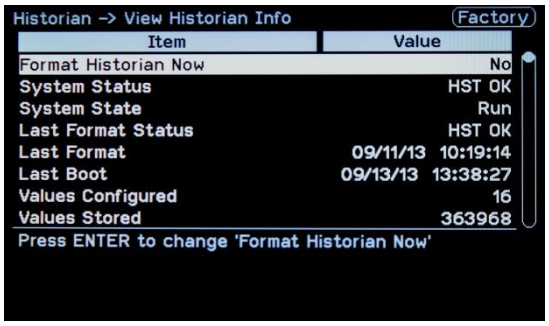
Icon

The Data Historian stores process variables and events (alarms, self-check results and system events) to internal memory. Stored data is available to be mirrored in real-time to a removable SD card for redundancy and expanded long term storage based on the capacity of the SD card. Previously stored data can be manually exported (copied) to a SD card. A description of the types of data that are stored by the Historian and associated storage rates are listed below.

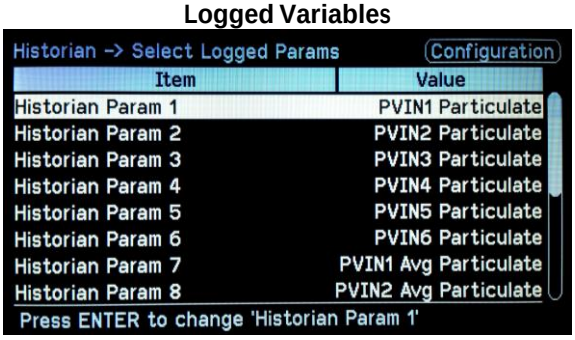
Historian Screens

Categories

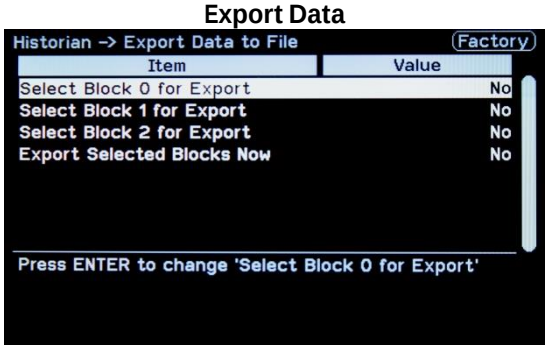
Information



Logged Variables



Export Data



IMPORTANT EPA COMPLIANCE DATA LOGGING

The use of the on-board Historian for EPA compliance record keeping should be accompanied by pc or server archiving EPA compliance software.

10.1 **Process Variable Storage**

Process variables (Particulate, Differential Pressure, Header Pressure Etc.) are stored in the Data Historian and are available to view in the trending screen. The Historian stores data in three internal memory blocks as shown below. All data is stored with a date/time stamp. For trending the Historian will always show data of the highest available resolution. An example of the maximum storage limits when configured to store 4 process variables is shown below.

Process Variable Storage Limits (4 Process Variables)

Block	Data Storage Rate	Storage Limit
0	**200 Millisecond**	10 Minutes
1	**1 Second**	4 Days
2	**6 Minute Average**	12 Months

The oldest data in a block will be overwritten with new data after the storage limit for the block is reached.

10.2 **Event Storage**

Information such as Alarm Events, Self-Check Results and System Events are stored by Historian. All events are stored with a date/time stamp. The maximum storage limits for storing events is listed below.

Event Storage Limits

Event Type	Storage Limit	Description
Alarm Events	Up to 372 events	All alarm events (in alarm, out of alarm, alarm ACK, etc.
Self-Check Results	Up to 1500 records	Advance particulate module self-checks events and results.
System Events	Up to 272 records	System event such as a power loss.

The oldest events will be overwritten with new events after the storage limit is reached.

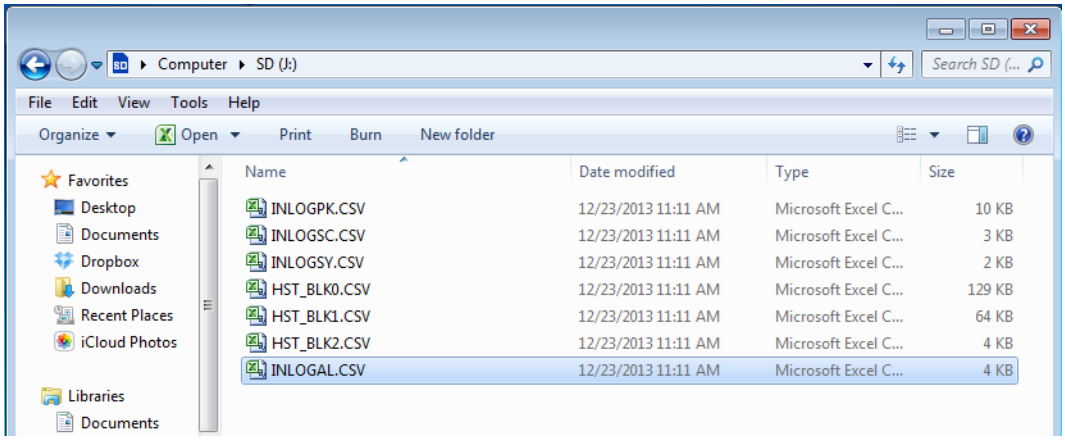
10.3 **Exporting (Copying) Historian Data**

The Historian includes an export data (copy) to SD card feature which saves a copy of previously stored process variable and event data to an SD card. All data remains in the Historian. The exported files are stored in comma separated variable (.csv) format, which may be easily opened with any text editor, with Microsoft Excel, or imported into various standard databases.

IMPORTANT DATA-EXPORT CONSIDERATIONS

- Use the **Safely Remove SD card** setting before removing the SD card to prevent possible SD card data corruption.
- Exporting data (copying data) is used for record keeping or for importing into an external database for analysis.
- Exported data cannot be imported back into the Historian.
- Exported data is not deleted from Historian memory.
- Data exporting is separate from the Historian Data Mirroring feature.

Files Created on SD Card Using the Historian Export Feature



10.4 **Real-Time Clock**

The Historian runs off an internal real-time clock, which is set at time of manufacture. The Date/Time should be adjusted during commissioning to account for time zone shifts. It is not recommended to change the time to accommodate daylight savings as this will result in a need to format the historian when the time is changed back one hour in the fall.

WARNING

Modifying Historian settings, including changing date and time settings to the "past", will require the historian to be reformatted.

Reformatting the Historian will require an SD card in order to back up existing data in the historian. All data in the Historian will then be erased and only the new data will be available.

Real-time Clock Settings

Setting	Login	Default	Notes	Path
Date - Century	Engineer	N/A	Current century (20 for **20**14)	**Setup/System/**
Date - Year	Engineer	N/A	Current year (14 for 20**14**)	**Setup/System/**
Date - Month	Engineer	N/A	Current month (1-12)	**Setup/System/**
Date - Day	Engineer	N/A	Current day (1-31)	**Setup/System/**
Date - Weekday	Engineer	N/A	Current weekday (Monday-Sunday)	**Setup/System/**
Time - Hour	Engineer	N/A	Current hour (0-23)	**Setup/System/**
Time - Minute	Engineer	N/A	Current minute (0-59)	**Setup/System/**

10.5 **Formatting the Historian**

Formatting the historian erases all stored data and re-initializes data storage with the current real-time clock and storage settings. Formatting is required after adding or removing variables to be stored or when changing the real-time clock to a date or time in the "past". Dates and times "in the future" can be set without requiring a format. Before performing a format all historian data should be exported (copied) to an SD card with the Historian Export feature.

WARNING

Modifying Historian settings including adding or removing variables to store and changing the real-time clock time or date will require the historian to be reformatted.

Reformatting the Historian will require an SD card in order to back up existing data in the historian. All data in the Historian will then be erased and only the new data will be available.

11 Historian SD Card Mirroring

The Historian SD Card Mirroring system mirrors time stamped data from the Data Historian to the removable SD memory card. Historian data is written to the SD card in real-time which provides redundant storage of data to both internal memory and removable SD card. The capacity of an SD card is far larger than internal Historian memory which allows the SD card to store much larger amounts of data (months/years) when sampled at a high rate such as 1 second.

SD Mirror Folder and File Types

Mirror	SD Card Folder	Filename Prefix	Description
Process Data	PROCESS	P	Process variable readings that are configured for storage.
Alarm Log	ALARM	A	Alarm events and transitions for all configured alarms.
Particulate Monitor Self- Test	SELFTEST	T	Particulate monitor module self-test results and the results.
Events	EVENT	E	System events and errors for use in system validation and troubleshooting. Values such as results of power-on system self-test, memory tests, configuration errors and run-time operating errors.

IMPORTANT HISTORIAN MIRRORING CONSIDERATIONS

- Use the **Safely Remove SD card** setting before removing the SD card to prevent possible SD card data corruption.
- The use of the on board historian mirroring feature for EPA compliance record keeping should be accompanied by PC or server archiving software.
- The SD card data should be checked at least every 6 months when mirroring data.

11.1 **SD Memory Card**

SD and SDHC memory cards with capacity between 128MB and 32GB are supported by the data-mirroring system. The Process Variable data contains the vast majority of data and can be used to estimate overall storage rate as listed in the table below.

Overall SD Memory Card Storage Size over Time

Number of Logged Process Variables	Storage Rate in Seconds	Logged Size in GB per Year
20 (Default configuration)	1	4.9
	5	1.0
	10	0.5
	60	0.1
32	1	7.5
	5	1.5
	10	0.8
	60	0.1

It is recommended that the SD card contains only the files and folders created by the system, and that the number of files in the root and in each folder be limited to 128 files. The system will at most create one new file each day within each folder; therefore it is good practice to archive all files on the SD card to a PC/Server at least every 6 months.

IMPORTANT SD MEMORY CARD RECOMMENED MAINTENANCE

- Archive data and remove all files every 6 months and before the SD card becomes full.

11.2 **Removing the SD Card**

To prevent possible data corruption the data mirroring system must be disabled before removing the SD card. The **Safely Remove SD Card** setting is available in the System Setup screen to temporarily enable and disable Historical SD Card Mirroring for safe card removal.

Setting	Login	Default	Notes	Path
Safely Remove SD Card	Operator	NO	Select and Change to YES to safely remove the SD Card.	**Setup/System/Safely Remove SD Card**

IMPORTANT TO PROPERLY REMOVE THE SD CARD

- Enter System Setup screen and select **Safely Remove SD Card** Setting.
- Remove the SD card.

To prevent the possible loss of data due to failure to re-enable data mirroring the system will automatically re-enable Historical Mirroring 2 minutes after a card is inserted into the SD card slot.

11.3 **SD Card Alarm**

A system alarm is provided that will generate a Group 1 alarm if SD card data mirroring is enabled and there is any problem detected including:

- No SD card installed
- SD card is full
- SD card is corrupt
- SD card contains too many files

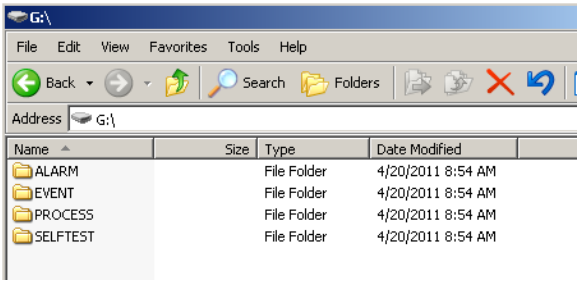
This alarm may be disabled if desired with the **SD Card Alarm** setting in the System Setup screen.

Setting	Login	Default	Notes	Path
SD Card Alarm	Configuration	Disabled	Changing to Enabled will turn on the SD Card Alarm.	**Setup/System/SD Card Alarm**

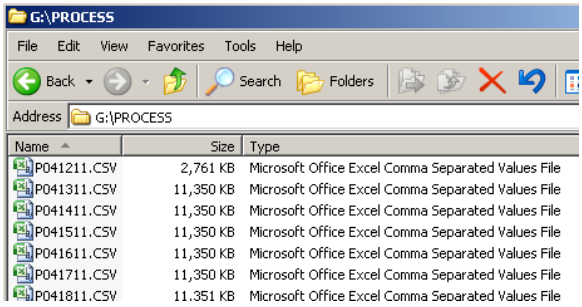
11.4 **Folders and Files**

The Historian Mirroring system creates a folder for each mirror type; alarm, event, process and self-test. Records are stored to mirror files in the created folders with a new file created each day. Files are stored in comma separated variable format, which may be easily opened with any text editor, with Microsoft Excel, or imported into various standard databases. The file names consist of a prefix representing the mirror type and a date stamp indicating when the file was created.

Folders



Files



11.5 **Process Variable Mirror**

The process variable mirror file includes a header stored at the beginning of the file showing details of the mirror file and values being stored. Records are written to the process mirror file periodically as defined by the **Historian SD Card Mirror Rate** setting. Each record contains a date/time stamp which indicates the exact time the data was sampled along with a value for each process variable.

Setting	Login	Default	Notes	Path
Historian SD Card Mirror Rate	Configure	60 Seconds	Process variable data-mirroring sample rate.	**Setup/System/**

Process Variable File Example

19									
20	Timestamp	Val1	Val2	Val3	Val4	Val5	Val6	Val7	Val8
21	8:43:22.441	1.369	0.053	0.075	0.521	0.21	0.116	0.074	0.445
22	8:43:23.351	2.191	0.052	0.073	0.509	0.207	0.113	0.072	0.444
23	8:43:24.399	2.571	0.052	0.07	0.499	0.209	0.11	0.068	0.44
24	8:43:25.408	2.688	0.051	0.073	0.487	0.202	0.108	0.062	0.431
25	8:43:26.360	2.671	0.05	0.073	0.479	0.198	0.107	0.06	0.42

11.6 **Alarm Mirror**

The alarm mirror file includes a header stored at the beginning of the file showing details of the mirror file. Records are written to the alarm file whenever there is an alarm event or transition. Each record contains a date/time stamp, which indicates the exact time of the event along with the alarm state and settings.

Alarm File Example

9											
10	Timestamp	ProcessID	State	Description	Group	Type	Process Value	Setpoint	Delay	Logic	Latching
11	14:16:57.107	ALM	INALM	HI Particulate	Group 1	ANALOG	49.11	30	8	HI	NO
12	14:17:11.167	ALM	UNACKRTN	HI Particulate	Group 1	ANALOG	28.63	30	8	HI	NO
13	14:17:33.203	ALM	INALM	HI Particulate1	Group 2	ANALOG	48.68	30	8	HI	NO
14	14:17:40.207	ALM	UNACKRTN	HI Particulate1	Group 2	ANALOG	20.5	30	8	HI	NO

Alarm States

State	Description
INALM	Alarm is activated.
UNACKRTN	Alarm is cleared without acknowledgment.
ACKALM	Alarm is acknowledged.
ACKRTN	Alarm is cleared after acknowledgment.
INHON	Alarm is inhibited and will not be activated.
INHOFF	Alarm is no longer inhibited and can be activated.

11.7 **Particulate Monitor Self-Test Mirror**

The particulate monitor self-test mirror file includes a header listed at the beginning of the file showing details of the mirror file. Records are written to the particulate self-test mirror file whenever there is a self-test event. Each record contains a date/time stamp, which indicates the exact time of the event along with the module ID and details.

Self-Test File Example

9					
10	Timestamp	NodeID	ProcessID	Event	Status
11	8:44:12.536	4	SelfCk	Self Ck Run	
12	8:44:12.537	4	SelfCk	Zero Ck Results	PASS
13	8:44:12.537	4	SelfCk	HiGain Results	PASS
14	8:44:12.538	4	SelfCk	MidGain Results	PASS
15	8:44:12.539	4	SelfCk	LoGain Results	PASS
16	8:44:12.541	4	SelfCk	Sensor Ck Results	PASS

Self-Test Process ID Values

ProcessID	Description
SelfCk	Particulate monitor self-check has run, and lists the zero, upscale, and sensor check results.
Ground	Particulate sensor ground error occurred or cleared.
Temp	Particulate monitor temperature error occurred or cleared.
SigQual	Particulate sensor signal quality error occurred or cleared.

11.8 **Event Mirror**

The event mirror file includes a header stored at the beginning of the file showing details of the mirror file. Records are written to the file whenever there is a system event. Each record contains a date/time stamp, which indicates the exact time of the event along with the event description. The events include results of the tests performed at power up, events such as user login, and any encountered errors.

Event File Example

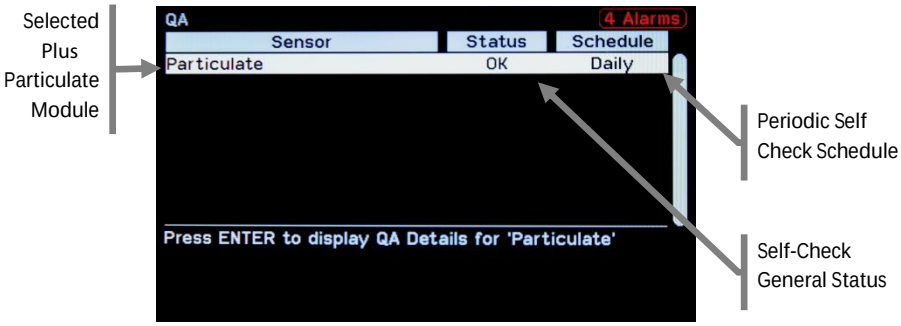
9			
10	Timestamp	ProcessID	Event
11	9:01:47.432	SYS	System RESET
12	9:01:47.432	SYS	SCU_SYSSTATUS Register:
13	9:01:47.433	SYS	SRAM_ERROR = 0
14	9:01:47.433	SYS	ACK_PFQBC = 0
15	9:01:47.433	SYS	LVD_RESET = 0
16	9:01:47.434	SYS	WDG_RST = 0
17	9:01:47.434	SYS	LOCK_LOST = 0
18	9:01:47.434	SYS	LOCK = 1
19	9:01:47.434	SYS	HW Init PASSED

12 Quality Assurance

Icon

The Quality Assurance Screen lists configured Plus Particulate Modules with their internal self-check status and self-check schedule, and allows for adjustment of Plus Particulate Monitor QA self-check settings.

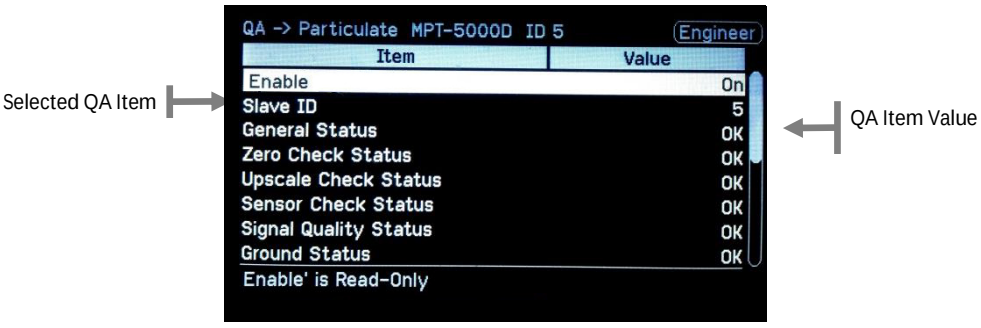
Quality Assurance (QA) - Plus Particulate Module Overview



12.1 **Plus Particulate Module Self Check System**

Plus Particulate modules contain an internal self-check system to automatically (or manually) perform zero and upscale (span) checks of the measurement circuit, and to check the performance of the sensor and cable. Additional self-checks include continuous checks for temperature, ground connection, signal quality, and over range.

Quality Assurance (QA) - Plus Particulate Module Details



The Plus Particulate Module details screen entries for Engineer login level are described in the table below.

Entry	Values	Description
General Status	OK Self-Check Error	Error when there is a system or module self-check error. Self-Check when self-check is running, and OK otherwise
Zero Check Status	OK Self-Check Error	Error when there is a zero check error, Self-Check when zero check is running, and OK otherwise
Upscale (Span) Check Status	OK Self-Check Error	Error when there is an upscale (span) check error, Self-Check when upscale (span) check is running, and OK otherwise
Sensor Check Status	OK Self-Check Error	Error when there is a sensor check error, Self-Check when sensor check is running, and OK otherwise
Signal Quality Status	OK Error	Error when particulate reading is not varying within parameters
Ground Status	OK Error	Error when the advanced particulate module system is not grounded properly
Temperature Status	OK Error	Error when the advanced particulate module temperature is too high or low
Over Range Status	OK Error	Error when the particulate signal exceeds the range of the advanced particulate module.
Run Self-Check	NO	Used to initiate self-check when logged in as Engineer.
Clear Self-Check Errors	NO	Used to clear self-check errors when logged in as Engineer.
Periodic Self Check	Disabled/Daily/ Weekly/Monthly	Set periodic self-check date and time when logged in as Engineer.
Real-time Smoothing (Time constant)	5.0 sec (Default)	Signal smoothing which can be modified by pressing the enter key, Increase for smoother reading, decrease for more dynamic.

Periodic Particulate Self-Checks

The periodic self-check feature checks the measurement circuitry and the remote sensor and cable. Self-checks may be initiated manually from the keypad, through the fieldbus interface or automatically at a specific periodic date and time. The self-check tests include zero, upscale (span), and sensor and cable checks as described in the table below.

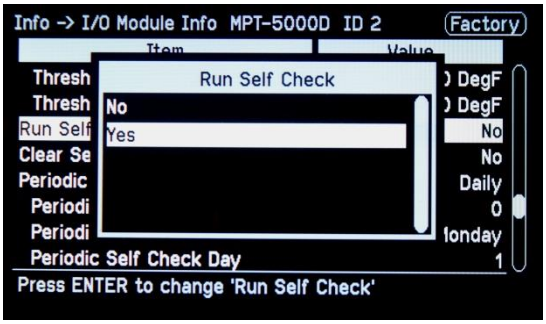
Self Check Test	Description
Zero	Checks the zero offset of the measurement circuit Consult factory when error
Upscale (Span)	Inputs multiple upscale test signals Consult factory when error
Sensor and Cable	Checks the sensor condition and cable for shorts Consult factory when error cannot be cleared by checking sensor and cable connections

Self-checks may be initiated by following the steps below:

IMPORTANT METHODS TO INITIATE A SELF CHECK

- Select the Run Self-Check entry in the detail screen while logged in as Engineer.
- Press the enter key to display the Run Self Check screen.
- Select Yes and press the Enter Key to initiate the self-check.

Run Self Check Screen

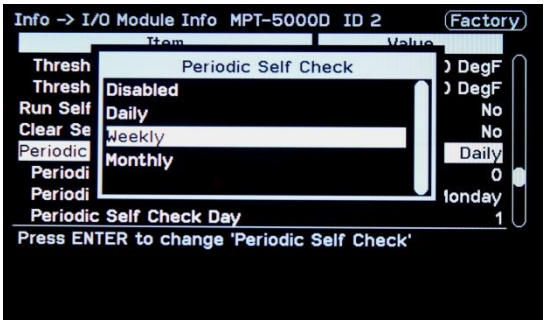


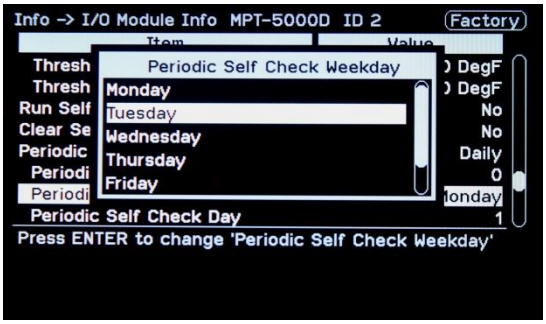
The periodic self-check may be configured by following the steps below:

IMPORTANT PROCEDURE TO CONFIGURE A PERIODIC SELF CHECK

- Select the Periodic Self-Check entry in the detail screen while logged in as Engineer.
- Press the Enter Key to display the Periodic Self-Check screen.
- Select how often to run the self-check and press the Enter Key.
- Scroll through all the steps to set the time and date when the self-check will run.

Periodic Self-Check Screen





Analog outputs for plus particulate modules can be used to indicate when the self-check is running and/or when there is a zero or upscale (span) check error as described in the table below.

Settings		Analog Output		
Output 3.6mA When Zero/ Upscale Error	**Output 3.8mA When Self Check is Running**	**Self-Check Running**	**Self-Check Not Running and No Zero/Upscale (Span) Error**	**Self-Check Not Running and Zero/Upscale (Span) Error**
Disabled	Disabled	Scaled output	Scaled output	Scaled output
Enabled	Disabled	Scaled output	Scaled output	3.6mA
Disabled	Enabled	3.8mA	Scaled output	Scaled output
Enabled	Enabled	3.8mA	Scaled output	3.6mA

Continuous Particulate Self-Checks

In addition to the periodic zero, upscale (span), sensor, cable checks, plus particulate modules continuously perform system checks to ensure proper operation of the measurement system. The module checks the ground connection, module temperature, signal quality, and over range as described in the table below.

System Check	Description
Signal Quality	Detects when measured reading is not properly responding Check coax cable and sensor for shorts
Ground	Detects ground connection issue - Check ground connection
Temperature	Detects when module temperature is too high or low – Consult factory
Over Range (fware V2.14+)	Detects when the input particulate signal is outside the range of the device – Consult Factory

SD Card Mirroring

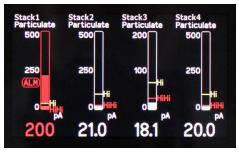
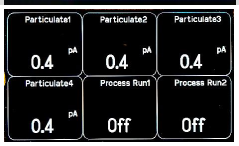
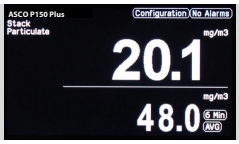
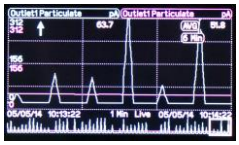
The Historian SD card Mirroring system stores particulate monitor self-check results and error events to the SD card.

Fieldbus

The fieldbus interface may be used to control the self-check for the plus particulate module and access the module status values using parameter data. Refer to the MICS Platform Fieldbus Manual for more details about the fieldbus parameters.

13 User Adjustable Screens

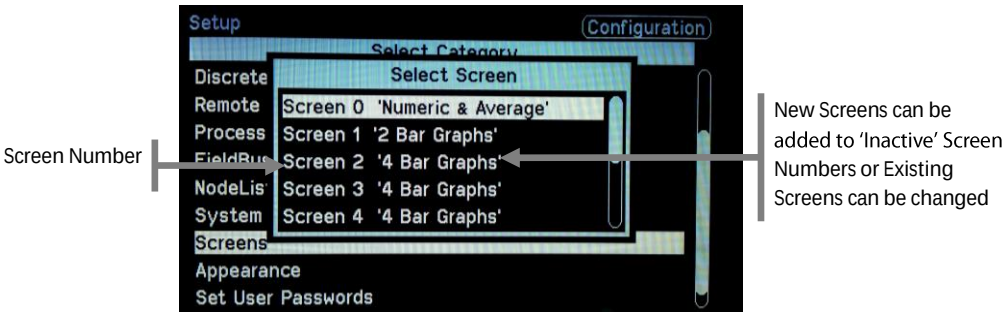
The P150 Plus features a number of process and trend screen types. These screens are pre-configured at the factory before shipment. New process and trend screens can be added. Existing screens can be modified by the user. A Configuration-level user can modify screens through the Screens setup menu and through some screens directly.

Screen Type	Login	Screen Example	Category	User Modifications Available
Bar Graphs (1,2,3 or 4 Bar Graphs)	Configuration		Process Icon Screen Rotation	Enable/Disable Bar Graphs Add/Remove Variables Adjust Bar Graph Scaling
Live Trend	Configuration		Process Icon Screen Rotation	Add/Remove Variables (Up to 2 per Screen) Adjust Trend Scaling Adjust Trend Width
Tiles	Configuration		Process Icon Screen Rotation	Add/Remove Variables (Up to 6 per screen)
Large Numeric	Configuration		Process Icon Screen Rotation	Assign Variables
Historical Trend	Configuration		Trend Icon Trend Key	Add/Remove Variables (Up to 2 per Screen) Adjust Trend Scaling Adjust Trend Width

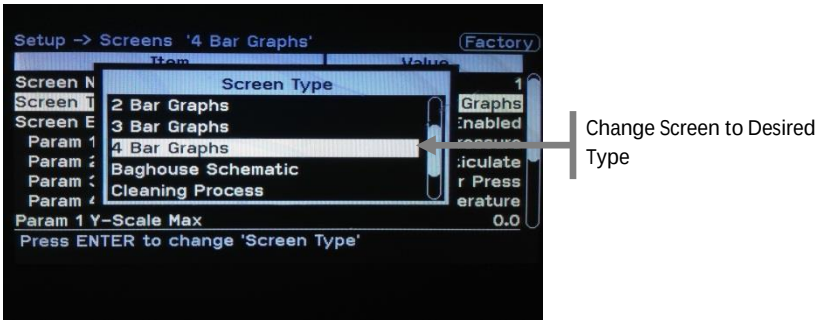
13.1 Adding New Screens

A Configuration-level user can add screens through the Screens setup menu. The user can select an 'Inactive' screen and set it to the desired screen type. Once the screen type is selected, the user may select and adjust the parameters for that screen to the desired inputs. If all screen numbers are in use, then existing screens can be changed following the same procedure as for adding a screen.

User Adjustable Screens – Adding a New Screen



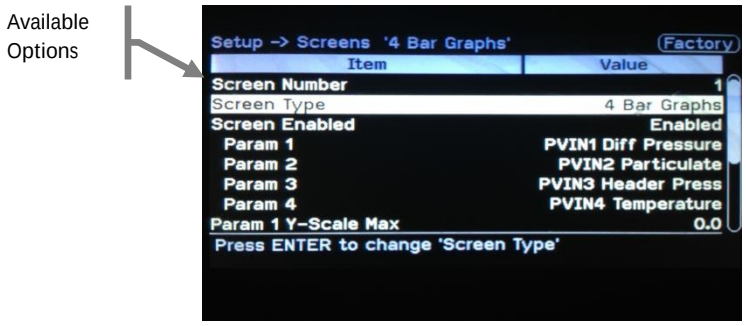
User Adjustable Screens – Selecting Screen Type



13.2 **Modifying Screens**

A Configuration-level user can modify screens through the Screens setup menu or through some screens directly. The user can enable or disable screens, select screen type, choose parameters for display, change the scaling of bar graphs, and update trend scaling and duration.

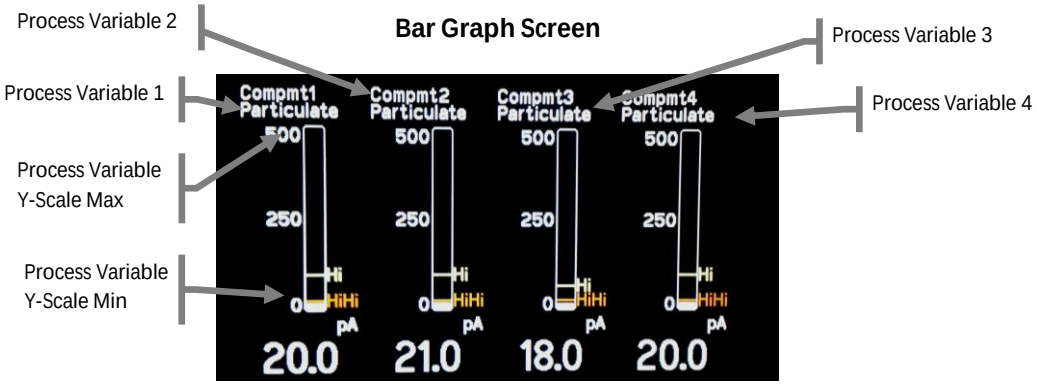
Setup Screen



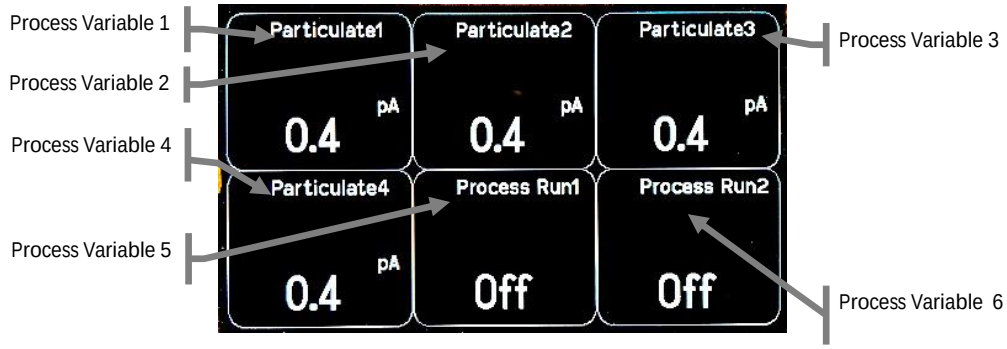
Screen Modification Options

Below are examples of the available modifications for each screen and the locations of each. These settings are found in the **Setup Screen** options as described above.

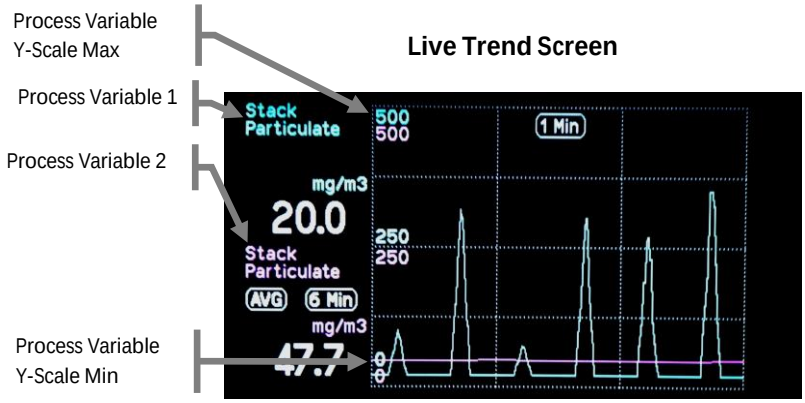
Bar Graph Screen



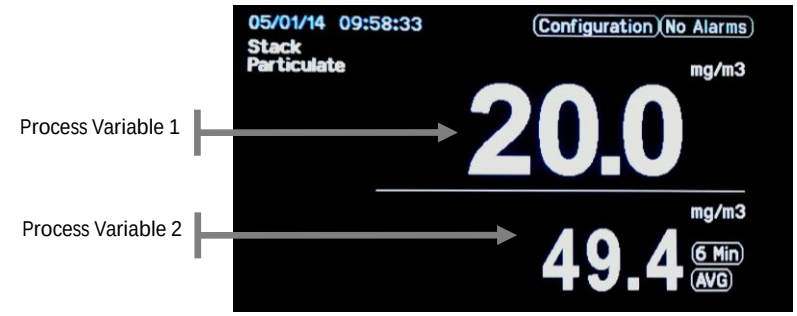
Tiles Screen



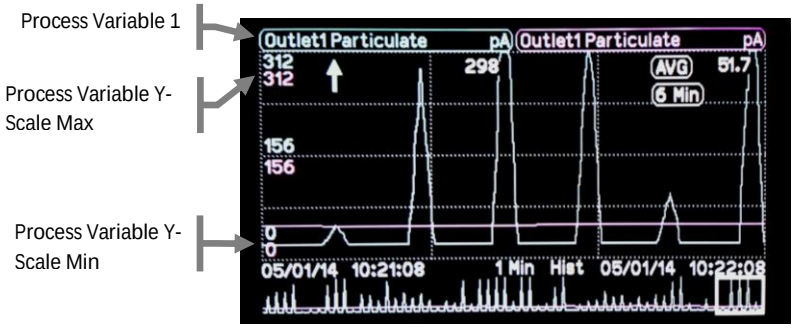
Live Trend Screen



Large Numeric Screen



Historical Trend Screen



14 System Information

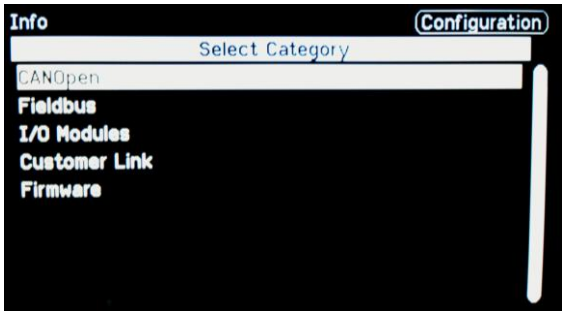
Icon

System and I/O information screens are used to access important information about the status and configuration of the controller and configured I/O modules.

14.1 System Information Screen

The System Information Screen provides access to information about the configuration, status, and general operation of system components.

Info Screen



Category	Description
CANOpen Info	Status of the CanOpen I/O network.
Fieldbus Info	Status and configuration of the fieldbus card.
I/O Module Info	Provides readings, status and settings from individual I/O modules on the CANOpen network. Modules that have outputs also support forcing to specific values for testing. These screens are discussed in detail in the System and I/O Information section.
Customer Link Info	Contact information for technical support.
Firmware Info	Information about enabled product options.

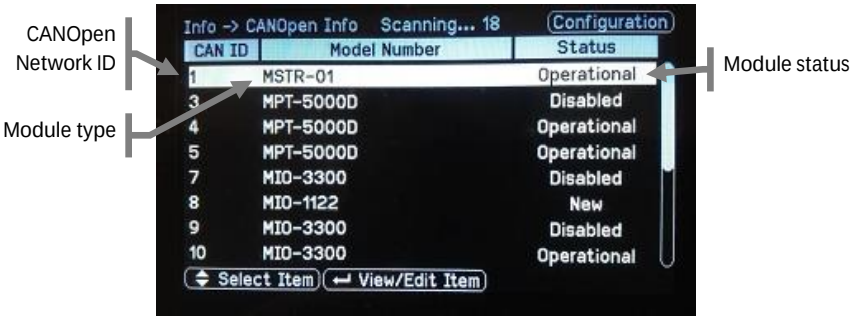
14.2 **CANOpen**

The CANOpen information screen displays a list of all I/O modules on the CANOpen DIN rail bus network and the status of each module. The status will show Operational for all configured modules that are operating properly. While the CANOpen information screen is displayed, the system will scan all IDs on the CANOpen network and determine the status of all detected modules.

CANOpen Info Status Values

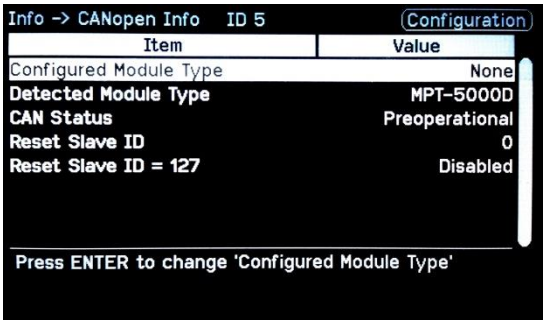
Status	Description
Operational	Communication with module is started.
Disabled	Module is offline.
Comm Failed	Communication with module has stopped.
Mismatch	Detected module type is different than configured type.
New	Detected module is not configured.
Boot up	Module is booting up.
Preoperational	Module boots up with no errors but communication is not started.
Stopped	Communication with module was stopped.
Waiting 1st	Waiting for communication with module to start.
Timeout Ck	Module communication is being checked.

CANOpen Information Screen



More detailed information about individual modules can be viewed by pressing Enter as shown below.

Module Specific CanOpen Information Screen



The slave network ID of a specific module may be changed when logged in as Engineer by following the steps below:

IMPORTANT I/O MODULE NETWORK ID CHANGE PROCEDURE

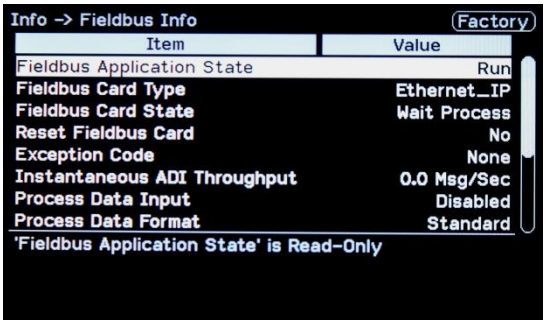
- Select the Reset Slave ID entry.
- Press the Enter key to enter a new Slave ID.
- Select the new module ID and press the Enter key to initiate the ID change.

Reset Slave ID Screen

14.3 **Fieldbus**

The Fieldbus information screen displays information about the fieldbus system.

I/O Module Info – Fieldbus Info



The Fieldbus Info screen shows the type and status of the fieldbus card, fieldbus card exception codes, and fieldbus message errors as described in the tables below.

Fieldbus Card Types

Fieldbus Application State	Description
Initialization	Internal fieldbus system initializing.
Reset Delay	Internal fieldbus system has been reset.
Startup Delay	Internal fieldbus system is starting.
Startup Check	Internal fieldbus system running checks before startup.
Run	Internal fieldbus system is running.
No Fieldbus Card Found	Internal fieldbus system is idle.

Fieldbus Card Types

Fieldbus Card Type	Description
Unknown	No fieldbus card is installed
DeviceNet	DeviceNet card installed
Modbus Ser	Modbus Serial card installed
Ethernet_IP	Ethernet/IP card installed
Modbus_TCP	Modbus/TCP card installed
Profibus_DP	Profibus DP card installed
Profinet IO	Profinet IO card installed

Fieldbus Card States

Fieldbus Card State	Description
Setup	Fieldbus system is performing power up initialization tasks.
Network Init	Fieldbus system is performing network-related initialization tasks.
Wait Process	The network Process Data channel is temporarily inactive.
Idle	The network interface is idle.
Proc Active	The network Process Data channel is active and error free.
Error	There is at least one serious network error.
Exception	Error occurred causing an unrecoverable state that requires restarting the system.

Fieldbus Card Exception Codes

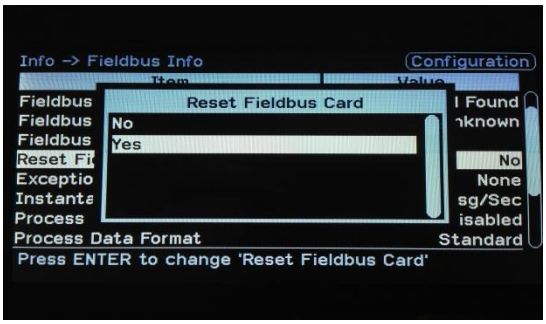
Exception Code	Description
None	No exception
App Timeout	Application timeout
ID Error	Invalid device address
Comm Set Err	Invalid communication settings
App Error	Unrecoverable application event
Wait App Rst	Waiting for application reset
Pdata Error	Invalid process data configuration
App Resp Err	Invalid application response
Cksum Error	Nonvolatile memory checksum error

The fieldbus card may be reset if required to re-establish lost communication with the fieldbus network. Cycling power to the controller is not required.

IMPORTANT Fieldbus Card Reset Procedure

- Select the Reset Fieldbus Card Option
- Change the value to YES and press the Enter Key

Fieldbus Info – Reset Fieldbus Card

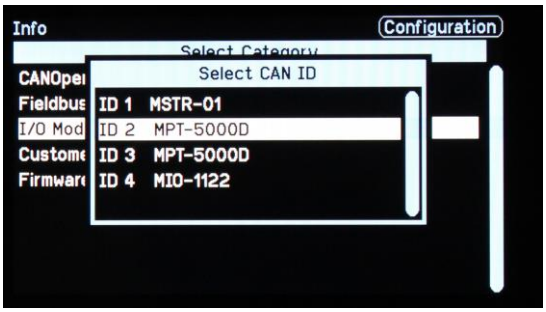


The Fieldbus Info screen also shows the IO Write Size Bytes which is the size in bytes of the I/O data sent to the network and the IO Read Size Bytes which is the size in bytes of the I/O data received from the network. I/O data received from the network is only supported by DeviceNet, Ethernet/IP, Profibus DP and Profinet IO fieldbus cards. Refer to the MICS Platform Fieldbus Manual for more details about the fieldbus interface.

14.4 Module Operation

The modules information screens display a list of process data and settings for the selected module.

Module Info –Select CAN ID



14.4.1 Forcing Outputs

The I/O module process outputs can be forced by following the steps below:

IMPORTANT

I/O MODULE OUTPUT FORCING PROCEDURE

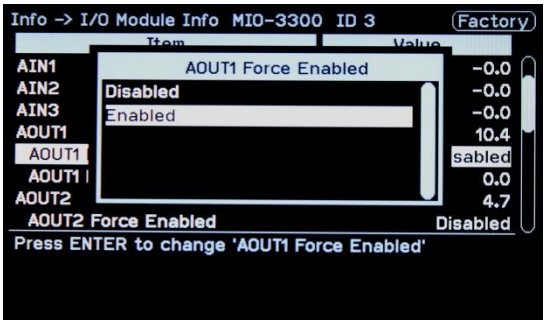
- Log on at Engineer user level.
- Select the process output entry and press the enter key to display the Enable Force Output Screen.
- Select Forcing Enabled and press the Enter Key to display the Enter Forcing Value Screen.
- Modify the forcing value.
  Press the Enter Key to display the I/O Module Info Screen

  MIO-3300 Information Screen with AOUT1 Forced (figure below).

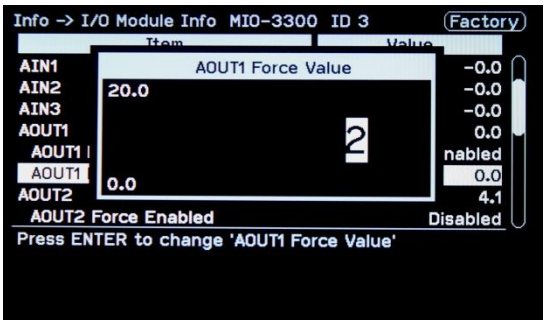
After the process output is forced, it will stay forced until forcing is disabled by following the steps below:

- Select the process output entry and press the Enter Key to display the Enable Force Output Screen.
- Select Forcing Disabled and press the Enter Key.

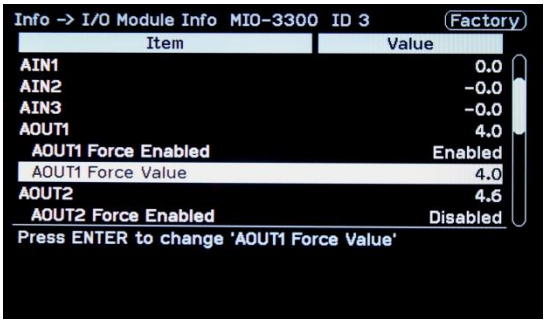
Enable Force Output Screen



Enter Forcing Value Screen



MIO-3300 Information Screen with AOUT1 Forced



14.4.2 **Plus Controller MSTR-01**

The MSTR-01 information screen displays the settings and status of the controller. The System Status entry will show OK if there are no system errors. If it shows Error, scroll down the list to determine the cause of the error. Consult factory if errors remain present even after a power cycle.

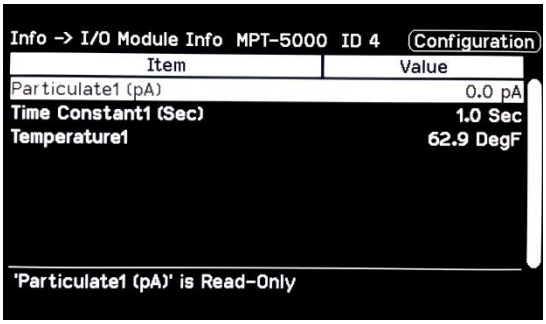
System Errors

Error	Description
System Error SCU	Master processor clock system error
System Error FMI	Master processor memory error
System Error COPINIT	CANOpen network initialization error
System Error COPPROC	CANOpen network process startup error
System Error NV	Non-volatile memory CRC error
System Error NLIST	Node list startup error
System Error PDO	CANOpen PDO configuration error
System Error ALM	Alarming system configuration error
System Error PV	Process variable configuration error
System Error SDNR	SD card error
System Error EFSFS	File system general error
System Error EFSFL	File system file error
System Error DLG2	Historian mirror system error

14.4.3 **Basic Particulate MPT-5000 and MPT-50002**

The MPT-5000 (single channel) or MPT-50002 (dual channel) basic particulate module information screen displays the process data and settings of the MPT-5000 or MPT-50002 basic particulate module. It displays the particulate reading and real-time smoothing (time constant) setting for each channel, it also shows the temperature of the module. Engineer login is required to modify the real-time smoothing (time constant). Increasing the real-time smoothing makes the reading less dynamic, decreasing makes it more dynamic.

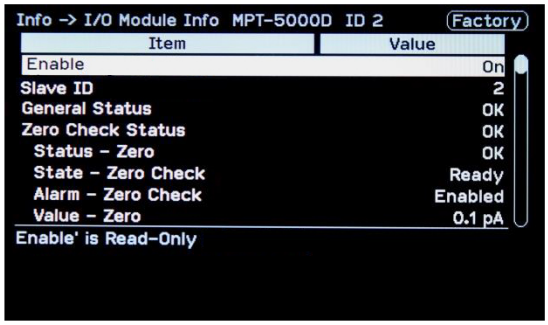
Information Screen for Basic Particulate Module



14.4.4 **Plus Particulate MPT-5000D**

The MPT-5000D plus particulate module information screen displays the process data, settings, and status of the plus particulate module with advanced signal processing and automatic self-test features. The internal self-check feature is used to automatically (or manually) perform zero and upscale (span) checks of the measurement circuit, and to check the performance of the sensor and cable. Additional self-checks include continuous checks for temperature, ground connection, signal quality, and over range.

Information Screen for the Plus Particulate Module

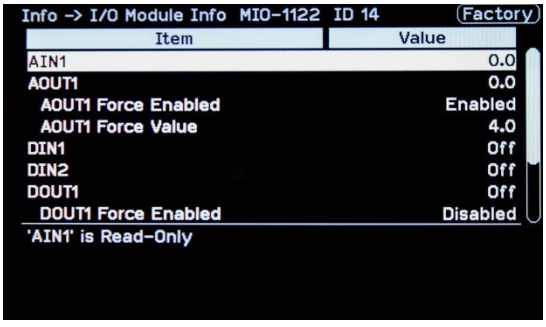


Refer to the Quality Assurance section for complete details on Plus Particulate Monitor information and operation.

14.4.5 **Mixed I/O MIO-1122**

The MIO-1122 information screen displays the process data of the MIO-1122 mixed I/O module. It shows the measured milliamps from AIN1 and the milliamps output at AOUT1. It also shows the input values from DIN1 and DIN2 and the output state of DOUT1 and DOUT2. The process outputs AOUT1, DOUT1, and DOUT2 can be forced by the user if logged in as Engineer.

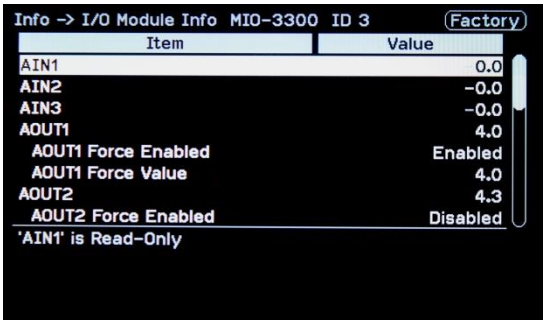
Information Screen for the Mixed I/O Module



14.4.6 Analog I/O MIO-3300

The MIO-3300 information screen displays the process data of the MIO-3300 analog I/O module. It shows the measured milliamps from AIN1, AIN2, and AIN3. It also shows the milliamps output at AOUT1, AOUT2, and AOUT3. The process outputs AOUT1, AOUT2, and AOUT3 can be forced by the user if logged in as Engineer.

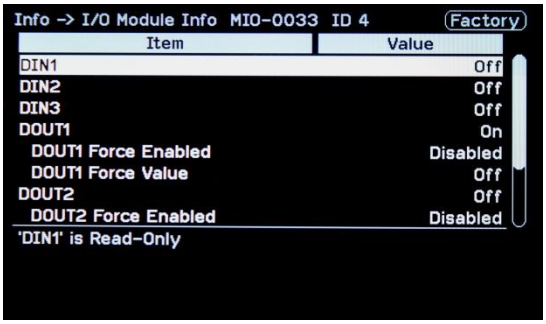
Information Screen for the Analog Module



14.4.7 Discrete I/O MIO-0033

The MIO-0033 information screen displays the process data of the MIO-0033 discrete I/O module. It shows the input values from DIN1, DIN2, and DIN3. It also shows the output state of DOUT1, DOUT2 and DOUT3. The process outputs DOUT1, DOUT2 and DOUT3 can be forced by the user if logged in as Engineer.

Information Screen for the Discrete Module



15 Hardware Configuration

Hardware configuration is performed from the Setup menu. This includes adding new modules, modifying and configuring inputs and outputs.

Setup Menu	Description
Node List	Configures expected I/O module types at each CANOpen network ID
Process Variable IN	Configures process variable input settings
Process Variable OUT	Configures process variable output settings
Discrete IN	Configures discrete input settings
Discrete OUT	Configures discrete output settings
Process Run Signal	Configures process run signal settings

15.1 **Node List**

The Node List is used to configure I/O modules installed in the CANOpen DIN Rail buss or to add new ones to the system. I/O modules must be included in the Node List at the appropriate network ID to be able to exchange data with the controller. This is performed by following the steps below:

IMPORTANT NODELIST ADJUSTMENT PROCEDURE

- Enter the Node List menu
- Select the desired node ID to configure
- Set the model number of the module

The CANOpen system information screen may be used to verify that all I/O modules in the node list are configured properly and are operational.

Node List Settings

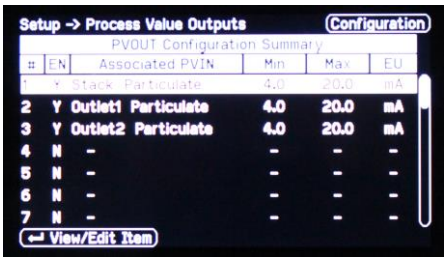
Setting	Login	Default	Notes	Path
Select ID	Engineer	ID 2	Network ID for I/O module to be configured	**Setup/NodeList/**
Model Number	Engineer	None	I/O module type (MIO-1122, MIO-3300, etc..)	**Setup/NodeList/**

15.2 **Process Variable Input**

A process variable input represents a reading or value from a process sensor that is connected to a MICS I/O module input channel such as particulate or differential pressure. These values are read and scaled to appropriate engineering units 10 times per second. Once enabled, a process variable input has the following features:

- Available for display on any process screen
- Mapped to a process variable output with the same channel number (for example PVIN 4 is mapped to PVOUT 4).
- Assigned two independent alarms
- Assigned a long term average
- Available for storage and trending through the historian
- Available for mirroring to the SD card
- Available for monitoring through fieldbus communication

Process Variable Input Settings – Select PVIN



Process Variable Input Settings

Setting	Login	Default	Notes	Path
Select Process Variable Input	Configuration	PVIN #1	Select PVIN channel to be configured	**Setup/Process Variable Inputs/**
Enabled	Configuration	Disabled	Enables or disables the selected PVIN channel	**Setup/Process Variable Inputs/PVIN#/**
Process Name	Configuration	None	Process name (BH1, BH2, BH3…)	**Setup/Process Variable Inputs/PVIN#/**
Process Value Type	Configuration	Direct	Select Direct for Normal PVIN Select Derived for calculated PVIN	**Setup/Process Variable Inputs/PVIN#/**
Parameter Name	Configuration	None	Parameter Name (Particulate 1, Particulate 2, Particulate 3…)	**Setup/Process Variable Inputs/PVIN#/**
Engineering Units	Configuration	None	Unit (pA, Mg/M3, Gr/Sec…)	**Setup/Process Variable Inputs/PVIN#/**
Raw MINIMUM	Configuration	0	Minimum value of the I/O input (example 0.0)	**Setup/Process Variable Inputs/PVIN#/**
Raw MAXIMUM	Configuration	0	Maximum value of the I/O input (example 5000)	**Setup/Process Variable Inputs/PVIN#/**
Scaled MINIMUM	Configuration	0	Minimum value of the scaled I/O input (example 0.0 pA)	**Setup/Process Variable Inputs/PVIN#/**
Scaled MAXIMUM	Configuration	0	Maximum value of the scaled I/O input (example 5000pA)	**Setup/Process Variable Inputs/PVIN#/**
Relative Factor	Configuration	1	Relative factor to be used as a multiplier of the scaled I/O input	**Setup/Process Variable Inputs/PVIN#/**
Averaging Period	Configuration	6 Min	Averaging Used for AVG Process Readings	**Setup/Process Variable Inputs/PVIN#/**
Averaging Buffer Clear	Configuration	No	Clear Averaging Buffer and start averaging again	**Setup/Process Variable Inputs/PVIN#/**
Input Slave ID	Configuration	0	I/O module network ID to acquire data from	**Setup/Process Variable Inputs/PVIN#/**
Input Channel	Configuration	AIN 1	I/O module channel to acquire data from (AIN1, AIN2, DIN1…)	**Setup/Process Variable Inputs/PVIN#/**

Inputs are scaled based on the **Raw MINIMUM**, **Raw MAXIMUM**, **Scaled MINIMUM**, and **Scaled MAXIMUM** settings. The resulting value is multiplied by the **Relative Factor** setting to produce the process variable input value. As an example, the following table shows how to configure particulate for an MPT-5000DK module with ID2 as PVIN1. The Raw and Scaled MINIMUM and MAXIMUM values are equal because the module's input is a signal in picoAmps (with pA units). This would be used for monitoring only – not control.

Process Variable Input Settings –Configure PVIN

Setting	Value
Select Process Variable Input	PVIN #1
Enabled	Enabled
Process Name	BH1
Process Variable Type	Direct
Parameter Name	Stack Particulate
Engineering Units	pA
Raw MINIMUM	0
Raw MAXIMUM	10,000
Scaled MINIMUM	0
Scaled MAXIMUM	10,000
PVIN 1 Relative Factor	1
Averaging Period	6 Min
Averaging Buffer Clear	No
PVIN 1 Input Slave ID	2
PVIN 1 Input Channel	AIN 2

15.2.1 Long Term Averaging

Each process variable input includes a long term average that is adjustable between 1 and 60 minutes with the **Averaging Period** setting. The **Averaging Buffer Clear** setting can be used to clear the averaging buffer, resetting the average to 0.

Process Variable Input Averaging Settings

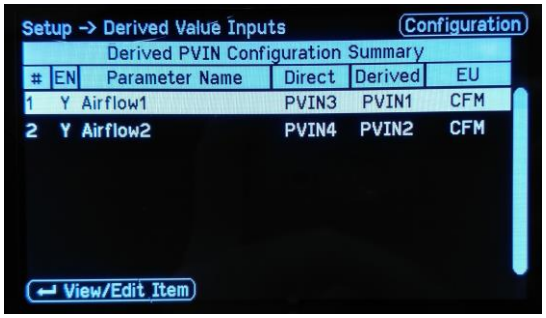
Setting	Login	Default	Notes
Averaging Period	Engineer	6 Minutes	Period for the process variable input average
Averaging Buffer Clear	Engineer	NO	Clears the buffer used to calculate the process variable input average

15.3 Derived Variable Input

A derived variable input is a process variable whose range and value is calculated using the value of a different configured PVIN as the input to an equation with user-adjustable factors. To configure a process variable as a derived variable input, select a PVIN in 'Process Variable Inputs', set its 'Process Variable Type' to 'Derived', and select a 'Parameter Name'.

In 'Derived Variable Inputs', select the parameter whose Derived channel matches the PVIN# you just configured as a Derived PVIN.

Derived Variable Input Settings – Select Derived PVIN



Derived Variable Input Settings

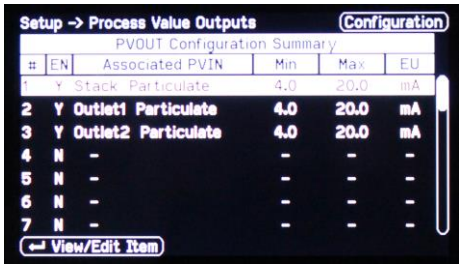
In 'Derived Variable Inputs', select the Conversion Type, the PVIN to be used as an input to the derived variable calculation (using the 'Reference PVIN Channel' setting), and set the user-adjustable factors based on the operating environment. The algorithm calculates the range and value of the resulting 'Derived Variable'. A 'Derived' PVIN behaves exactly like a 'Direct' PVIN with respect to presentation on process screens, alarming, logging and exposure on fieldbus.

Setting	Login	Default	Notes	Path
Parameter Name	Configuration	Unused	Read-only. Set when "Parameter Name" is set for the PVIN which was changed from Direct to Derived.	**Setup/Derived Value Inputs/DPVIN#/**
Conversion Type	Configuration	None	Type of conversion to be applied to the Reference PVIN channel's value.	**Setup/Derived Value Inputs/DPVIN#/**
Engineering Units	Configuration	None	Read-only. Set based on "Conversion Type"	**Setup/Derived Value Inputs/DPVIN#/**
Use Averaged Input	Configuration	No	No – use the Reference PVIN's current real-time value. Yes – use the Reference PVIN's averaged value (avg. period is configured in the reference PVIN channel's Long-Term Averaging configuration).	**Setup/Derived Value Inputs/DPVIN#/**
Reference PVIN Channel	Configuration	None	None, PVIN1, PVIN2, etc. This is the input to the conversion.	**Setup/Derived Value Inputs/DPVIN#/**
Derived PVIN Channel	Configuration	None	None, PVIN1, PVIN2, etc. This is the result of the conversion.	**Setup/Derived Value Inputs/DPVIN#/**
Conversion Parameters (multiple)	Configuration	n/a	Depending on the "Conversion Type" setting, additional settings will be available to perform the required conversion.	**Setup/Derived Value Inputs/DPVIN#/**

15.4 **Process Variable Output**

The process variable output scales process variable input data and sends it to the analog output channel of an I/O module in the network. Each process variable input is mapped to the process variable output with the same channel number (for example PVIN 4 is mapped to PVOUT 4). The **Log Scale Decades** setting is used to select between linear and logarithmic output scale. When the process variable input is acquired from a plus particulate module, the corresponding process variable output is set to 3.8mA when the self-check is running and to 3.6mA when there is a zero or upscale check error.

Process Variable Output Settings – Select PVOUT



Process Variable Output Settings

Setting	Login	Default	Notes	Path
Select Process Variable Output	Engineer	PVOUT #1	Select PVOUT channel to be configured	**Setup/Process Variable Outputs/**
Enabled	Engineer	Disabled	Enables or disables the selected PVOUT channel	**Setup/Process Variable Outputs/PVOUT#/**
Raw MINIMUM	Engineer	0	Minimum value of the process variable input (example 0.0pA)	**Setup/Process Variable Outputs/PVOUT#/**
Raw MAXIMUM	Engineer	0	Maximum value of the process variable input (example 1000pA)	**Setup/Process Variable Outputs/PVOUT#/**
Scaled MINIMUM	Engineer	0	Minimum value of the process variable output which is typically 4.0mA	**Setup/Process Variable Outputs/PVOUT#/**
Scaled MAXIMUM	Engineer	0	Maximum value of the process variable output which is typically 20.0mA	**Setup/Process Variable Outputs/PVOUT#/**
Log Scale Decades	Engineer	0	Number of decades - Set to 0 for linear scale and 1 to 10 for logarithmic scale	**Setup/Process Variable Outputs/PVOUT#/**
Output Slave ID	Engineer	2	I/O module network ID to send output to	**Setup/Process Variable Outputs/PVOUT#/**
Output Channel	Engineer	AOUT1	I/O module channel to send output to (AOUT1, AOUT2…)	

If **Log Scale Decades** is 0, the process variable output value is scaled using the **Raw MINIMUM**, **Raw MAXIMUM**, **Scaled MINIMUM**, and **Scaled MAXIMUM** settings. For example, in order to linearly scale the particulate reading represented by PVIN 1 so that 0-1000pA corresponds to 4-20mA and use the AOUT channel of the MIO-1122 with ID 2, the following settings are required:

Setting	Value
Select Process Variable Output	PVOUT 1
Enabled	Enabled
Raw MINIMUM	0
Raw MAXIMUM	1000
Scaled MINIMUM	4
Scaled MAXIMUM	20
Log Scale Decades	0
Output Slave ID	2
Output Channel	AOUT1

If **Log Scale Decades** is between 1 and 10, the logarithmic scale is used so that the process variable output is scaled starting from **Raw MINIMUM**. For example, in order to logarithmically scale the particulate reading represented by PVIN 1 so that 5-5000pA corresponds to 4-20mA and use the AOUT channel of the MIO-1122 with ID 2, the following settings are required:

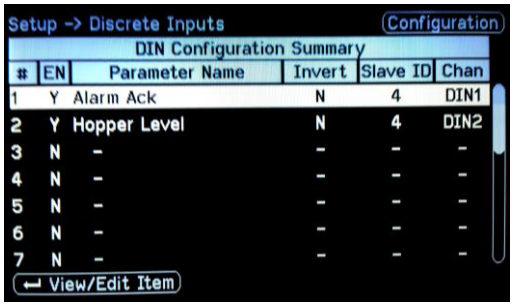
Setting	Value
Select Process Variable Output	PVOUT 1
Enabled	Enabled
Raw MINIMUM	5
Raw MAXIMUM	5000
Scaled MINIMUM	4
Scaled MAXIMUM	20
Log Scale Decades	3
Output Slave ID	2
Output Channel	AOUT1

NOTE: If Raw Minimum is 0, the logarithmic scale cannot be used, and the process variable output will default to linear scaling even though Log Scale Decades is non-zero. This is because the log of 0 is undefined.

15.5 **Discrete Input**

The discrete input represents a value from a generic discrete input channel of an I/O module. Discrete inputs are continuously read from input channels, and inverted if needed to acknowledge or inhibit alarms.

Discrete Input Settings – Select DIN



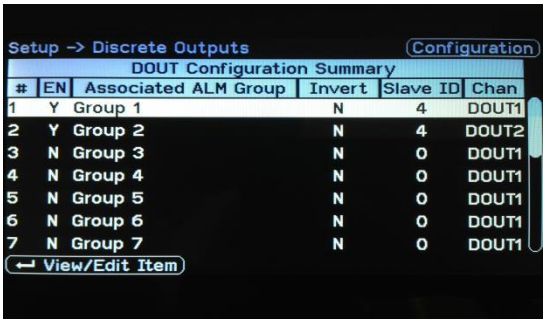
Discrete Input Settings

Setting	Login	Default	Notes	Path
Select Discrete Input	Engineer	DIN #1	Select DIN channel to be configured	**Setup/Discrete Inputs/**
Enabled	Engineer	Disabled	Enables or disables the selected DIN channel	**Setup/Discrete Inputs/DIN#/**
Process Name	Engineer	None	Process name (hopper level, process run signal…)	**Setup/Discrete Inputs/DIN#/**
Invert Logic	Engineer	0	Inverts I/O input when set to 1	**Setup/Discrete Inputs/DIN#/**
Input Slave ID	Engineer	0	I/O module network ID to acquire data from	**Setup/Discrete Inputs/DIN#/**
Input Channel	Engineer	DIN1	I/O module channel to acquire data from (example DIN1, DIN2…)	**Setup/Discrete Inputs/DIN#/**

15.6 **Discrete Output**

The discrete output sends data to a relay or discrete output channel of an I/O module in the network. Each alarm group is mapped to the discrete output with the same group/channel number (For example group 4 is mapped to DOUT 4). If the **Invert Logic** setting is set to 0, the discrete output is normally 0 (open relay) and is set to 1 when new alarms are activated from the group. If **Invert Logic** is set to 1, the discrete output is normally 1 (closed relay) and is set to 0 when new alarms are activated from the group.

Discrete Output Settings – Select DOUT



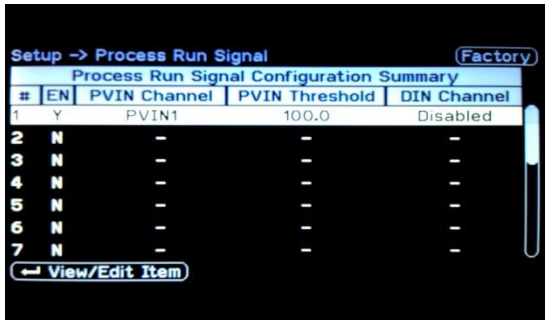
Discrete Output Settings

Setting	Login	Default	Notes	Path
Select Discrete Output	Engineer	DOUT 1	Select DOUT channel to be configured	**Setup/Discrete Outputs/**
Enabled	Engineer	Disabled	Enables or disables the selected DOUT channel	**Setup/Discrete Outputs/DOUT#/**
Invert Logic	Engineer	0	Inverts discrete output when set to 1	**Setup/Discrete Outputs/DOUT#/**
Output Slave ID	Engineer	0	I/O module network ID to send output to	**Setup/Discrete Outputs/DOUT#/**
Output Channel	Engineer	DOUT1	I/O module channel to send output to (DOUT1, DOUT2…)	**Setup/Discrete Outputs/DOUT#/**

15.7 **Process Run Signal**

The process run signal indicates if the process is running using a discrete input, a process variable input, or both and may be used to inhibit alarms while the process is not running. The process run signal may also be used to check and record in-situ process sensor zero checks.

Process Run Signal –Select Process Run Signal



Process Run Signal Settings

Setting	Login	Default	Notes	Path
Select Process Run Signal	Engineer	PRS #1	Select PRS channel to be configured	**Setup/Process Run Signal/**
Enabled	Engineer	Disabled	Enables or disables the selected PRS channel	**Setup/Process Run Signal/PRS#/**
PVIN Channel	Engineer	Disabled	PVIN channel to be used as a source of the process run signal (Disabled, PVIN 1, PVIN 2…)	**Setup/Process Run Signal/PRS#/**
PVIN Threshold	Engineer	0	Threshold for the selected PVIN channel	**Setup/Process Run Signal/PRS#/**
DIN Channel	Engineer	Disabled	DIN channel to be used as a source of the process run signal (Disabled, DIN1, DIN2…)	**Setup/Process Run Signal/PRS#/**

The process run signal value of 1 indicates that the process is running. The following table presents the conditions required to indicate that the process is running.

DIN Channel	PVIN Channel	Process Running Conditions
Disabled	Disabled	N/A
DINx	Disabled	DINx value is 1
Disabled	PVINx	PVINx value is greater than the threshold for at least 2 seconds
DINx	PVINx	PVINx value is greater than the threshold for at least 2 seconds and DINx value is 1 at the same time

16 Saving and Loading System Settings

The save and load settings features allow the user to store all system settings to the SD card or load the settings from a settings file in the SD card. They can be used to transfer configuration from one unit to another or request a new configuration from the factory. They can also be used to transfer system settings when updating firmware.

IMPORTANT

WHEN LOADING NEW SYSTEM SETTINGS

The settings required for the unit to function properly such as hardware and system configuration may be modified when using the load feature. Therefore, care must be taken when using this feature.

Saving and Loading Settings

Setting	Login	Default	Notes	Path
Save Settings to SD Card	Engineer	NO	Save a settings file to the SD card	**Setup/System/**
Load Settings from SD Card	Engineer	NO	Load settings from the SD card	**Setup/System/**

16.1 Saving Settings

Saving settings to the SD card can be performed by following the steps below:

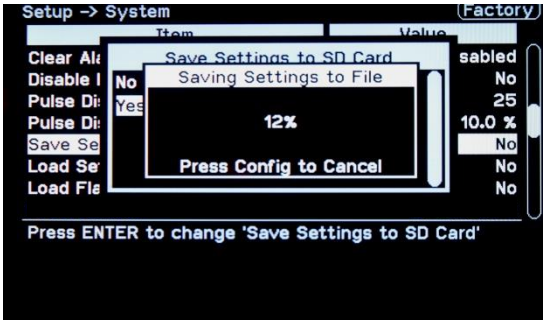
IMPORTANT

SAVING SETTINGS TO SD CARD PROCEDURE

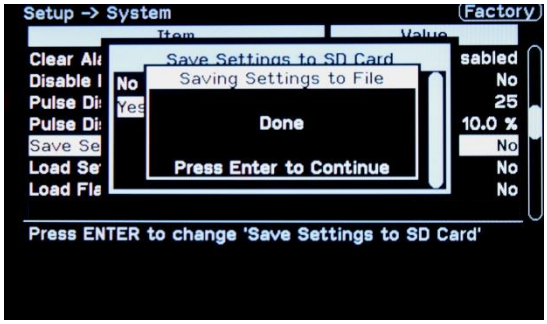
- Insert an SD card into the unit
- Set the **Save Settings to SD Card** setting to Yes and press the Enter Key to initiate saving the settings
- The progress screen is displayed
- Wait for the progress screen to show Done then press the Enter Key
- The settings file "NVBACKUP.CSV" should be in the SD card
- Contact factory if any error message is displayed

The following screens show an example of saving settings to the SD card.

Saving Settings in Progress



Saving Settings Complete



16.2 **Loading Settings**

Loading settings from the SD card requires a valid settings file either created using the save settings feature or acquired from the factory. Loading settings will replace all current settings including system and hardware settings required for the unit to function properly. It can be performed by following the steps below:

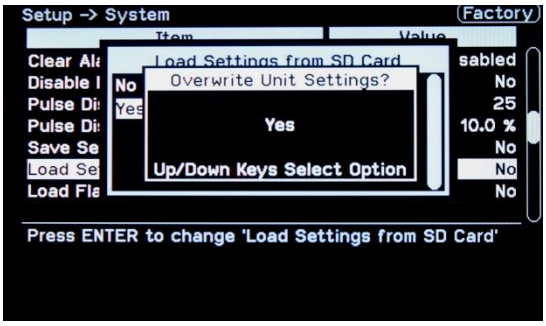
IMPORTANT LOADING SETTINGS FROM SD CARD PROCEDURE

- Save a backup of current settings to the SD card as described above
- Place the new settings file on the SD card and ensure the file name is "NVBACKUP.CSV"
- Insert the SD card into the unit
- Set the **Load Settings from SD Card** setting to Yes and press the Enter Key to start testing the settings file
- The progress screen is displayed
- Wait for the overwrite settings confirmation screen
- Select Yes and press the Enter Key to start replacing unit settings.
- The progress screen is displayed
- Wait for the progress screen to show Done then press the Enter Key
- Cycle power and verify that the power up screen shows "Self-Test: PASSED"
- Verify that the CANOpen status LED for all installed modules is solid green
- Test the system to verify that it is functioning properly
- Contact factory if any error message is displayed

The following screens show an example of loading settings from the SD card.

Step1 - Testing Settings File in Progress

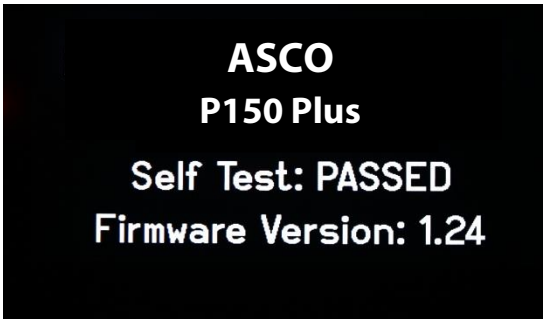
Step2 - Overwrite Settings Confirmation Screen



Step3 - Loading Settings in Progress

Step4 - Loading Settings Complete

Step5 - Power Up Screen Showing "Self-Test: PASSED"



17 Firmware Updates

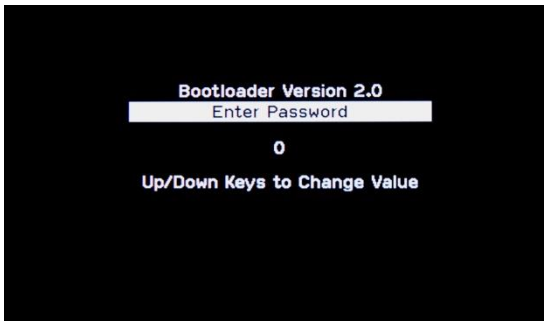
The P150 Plus includes a boot loader that can be used to update firmware in the field or save an image of installed firmware. System settings should be saved before programming firmware. The boot loader automatically starts installed firmware after 30 seconds of no user activity.

IMPORTANT INITIATING THE BOOTLOADER PROCEDURE

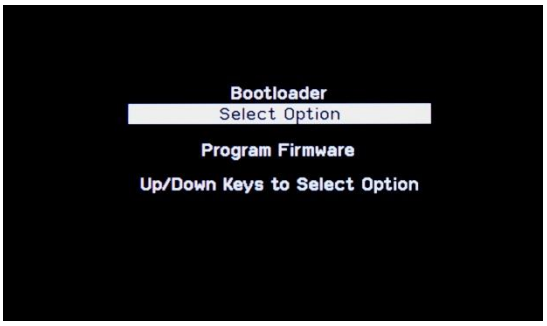
- Remove power from the unit
- Apply power to the unit while holding the Setup key to start the boot loader
- Enter password 55 in the displayed Login screen
- The Select Option screen is displayed after successful password login

The following screens show an example of running the boot loader.

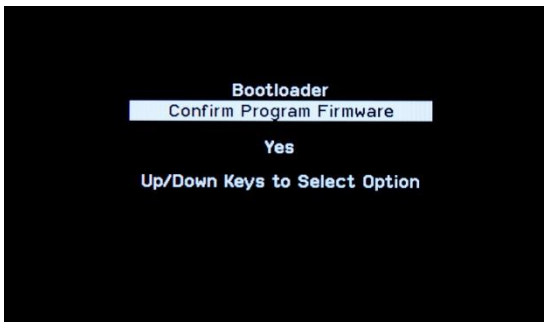
Step1 – Boot loader Login Screen



Step2 - Boot loader Select Option Screen



Step3 - Boot loader Confirm Selection Screen



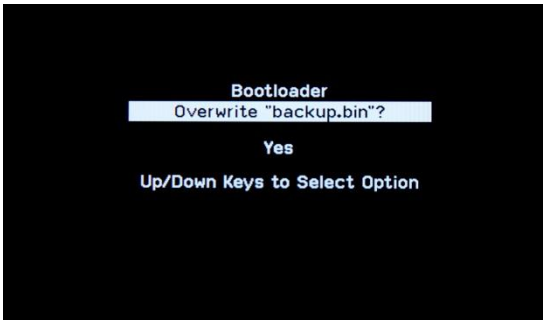
17.1 **Saving Firmware Backup**

The boot loader can be used to create a binary image of installed firmware. The created file can be used to program a unit with a compatible hardware version. However, the file does not include system settings required for the unit to function properly. The created file is saved to the SD card as "backup.bin". Saving firmware backup can be performed by following the steps below:

IMPORTANT SAVING A FIRMWARE BACKUP PROCEDURE

- Insert an SD card into the unit.
- Enter the boot loader and select Create Firmware Backup from the Select Option screen, then confirm selection.
- The Overwrite File screen is displayed to ask the user to confirm overwriting the "backup.bin" file if it exists.
- A popup screen showing "Saving Backup..." is displayed.
- If save operation is completed successfully, a popup screen showing "Backup Saved!" is displayed.
- Contact factory if any error message is displayed.

Boot loader Overwrite File Screen



17.2 **Loading New Firmware**

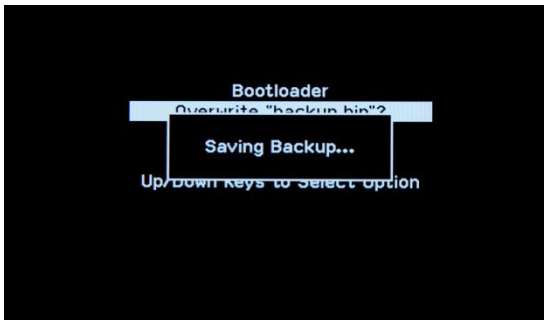
The boot loader can be used to program a unit using a binary image file. Programming firmware erases all system settings including system and hardware settings required for the unit to function properly. System settings must be saved to the SD card before programming firmware and re-loaded once firmware is installed successfully. The new firmware may have new features that may require configuration even after re-loading the old settings. Loading firmware can be performed by following the steps below:

IMPORTANT LOADING NEW FIRMWARE PROCEDURE

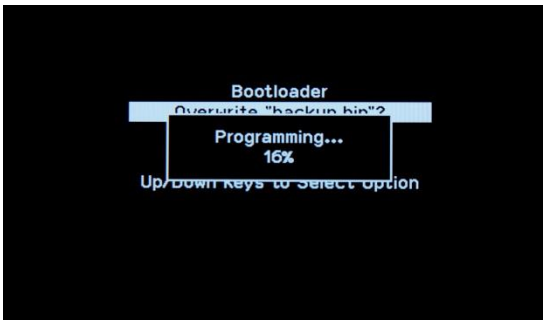
- Place the binary image file in the SD card and ensure the file name is "firmware.bin"
- Insert the SD card into the unit
- Enter the boot loader and select Program Firmware from the Select Option screen then confirm selection
- Select Yes and press the Enter Key in the displayed Unit Settings Saved screen if settings were already saved
- The Overwrite File screen is displayed to ask the user to confirm overwriting the "backup.bin" file if it exists
- A pop up screen showing "Saving Backup..." is displayed
- A pop up screen showing "Erasing Flash..." is displayed
- A pop up screen showing "Programming..." is displayed.
- If program operation is completed successfully, a pop up screen showing "Programming Complete!" is displayed
- Select Start Firmware from the Select Option screen and confirm selection
- The firmware should start and show an EEPROM Format Error Detected screen
- Select Reset to Defaults and press the enter key
- Confirm the selection in the Confirm Reset Default Values Screen.
- The Restoring Flash progress screen is displayed
- If restore operation is completed successfully, the progress screen shows PASS and the firmware starts
- Load system settings as described in section 16.2 Loading Settings
- Contact factory if any error message is displayed
- Save a backup of current settings to the SD card as described in section 16.1 Saving Settings

The following screens show an example of loading new firmware.

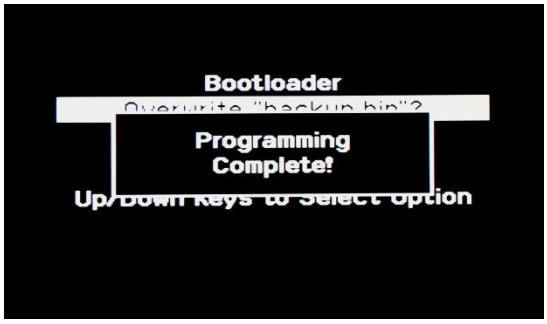
Step1 - Boot loader Unit Settings Saved Screen



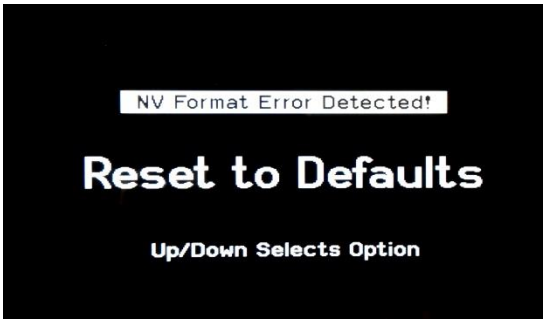
Step2 - Boot loader Programming in Progress Screen



Step3 - Boot loader Programming Complete Screen



Step4 - Firmware EEPROM Format Error Detected Screen



Step5 - Firmware Confirm Reset Default Values Screen

18 System Troubleshooting

The troubleshooting section can be used to help troubleshoot possible issues with the configuration and operation of the system. It presents a list of issues that might be encountered and how to troubleshoot those issues if they occur.

Process Input Troubleshooting

Issue	Possible Cause	Details
Process input reading is incorrect	Configuration	Enter the Information Screen to check the IO module's raw reading. If the raw reading is correct, there may be a hardware configuration issue. Check the scaling in the Setup Screen to make sure that the raw min and max and the scaled min and max are setup correctly.
Process input reading is unresponsive	Module is offline, wiring, or connected devices	Enter the Information Screen to check the CANOpen screen to verify that the module status is operational. If it is not, the module is not communicating. Try cycling power and ensure it has a solid connection to the DIN rail bus. If the module is communicating and the reading is still unresponsive then verify that the input wiring is correct. If the input wiring is correct then verify the sensor operation to make sure that is responding to process changes.
4-20mA input reading is incorrect	Wiring or connected devices	Connect the input to a 4-20mA source to check the reading in the Information Screen. If the reading is correct, there is an issue with the wiring or connected devices. If the 4-20mA sourced input is not generating the correct scaled readings then please check the Setup Screen and select the process variable you are testing to make sure the scaling is setup correctly.
Discrete input reading is incorrect	Wiring or connected devices	Connect the input to a voltage source and enter Information Screen to check the IO module's raw reading. If the raw reading is correct, check to make sure that the scaling is setup correctly. If everything looks to be configured correctly then verify the wiring. If the configuration and the wiring are correct, verify the sensor or voltage source operation.

Process Output Troubleshooting

Issue	Possible Cause	Details
Process output is incorrect	Configuration	Enter the Information Screen to check the IO module's raw reading. If the raw reading is correct, there may be a hardware configuration issue. Check the scaling in the Setup Screen to make sure that the raw min and max and the scaled min and max are setup correctly.
Process output is unresponsive	Module is offline, wiring, or connected devices	Enter the Information Screen to check the CANOpen screen to verify that the module status is operational. If it is not, the module is not communicating. Try cycling power and ensure it has a solid connection to the DIN rail bus. If the module is communicating and the reading is still unresponsive then verify that the output wiring is correct. If the output wiring is correct then verify the connection to the connected device to make sure it is correct.
4-20mA output is incorrect	Wiring or connected devices	Connect the output to a 4-20mA meter and check the output reading in the Information Screen, force the output and verify the 4-20mA output signal seen on the meter matches the set output. If the 4-20mA sourced output is generating the correct output readings then verify the scaling in the Setup Screen for that process variable output. If the scaling is correct and the forced output is correct then verify the wiring to the connected device.
Alarm relay is not working properly	Wiring or connected devices	Remove all wiring from the output, then connect the output to an Ohmmeter and enter the Information Screen to force the relays On or Off. If the measured output is correct, there is an issue with the wiring or connected devices.

Basic Particulate Monitor Troubleshooting

Issue	Possible Cause	Details
Particulate signal believed to be too HIGH (False Alarms)	Elevated Particulate Levels Sensor Housing Sensor Coax Cable.	Check to make sure the particulate has not increased. The particulate sensors detect very low levels of particulate. Check the sensor cover and conduit seal to make sure water has not entered the housing. Check the coaxial cable by measuring the impedance between the terminals with a multimeter and checking for a short circuit. If nothing is found then perform a manual system zero check.
Particulate signal believed to be too LOW (No Alarms When Believed Necessary)	Low/No Particulate Levels Sensor Coax Cable	Increase the particulate level or introduce particulate into the air stream and monitor for response. If the system responds properly re-evaluate the selected alarm set points. If there is NO response check the electrical continuity from the sensor to the control unit end of the coaxial cable. Contact ASCO for a Field Test Unit that can generate a signal to response and calibration of monitor.

Plus Particulate Monitor Troubleshooting (Internal Self-Checks)

Issue	Possible Cause	Details
Zero LED Flashing (Particulate Self-Check Error Alarm) **OR/AND** Span LED Flashing (Particulate Self-Check Error Alarm)	Bad/Intermittent Ground Connection	Check to make sure that there is a good ground connection to terminal 33 on the Particulate Module. If there is a good ground and the issue persists please contact the factory.
Sensor LED Flashing (Particulate Self-Check Error Alarm)	Sensor Coax Cable Particulate Sensor Damage	Check the coaxial cable by measuring the impedance between the terminals with a multimeter and checking for a short circuit. If the coax cable is ok, remove the particulate sensor to inspect for damage. If nothing is apparent contact the factory for assistance.
System LED Flashing (Particulate Self-Check Error Alarm)	Bad/Intermittent Ground Connection Sensor Coax Cable Monitor/Module Over Heating	Check the system information screen for the module. Take action based on which status is in the 'Error State': 1) **Signal Quality Status: Error** - Check to make sure that there is a good ground connection to terminal 33 on the Particulate Module. If there is a good ground and the issue persists please contact the factory. 2) **Ground Status: Error -** Check to make sure that there is a good ground connection to terminal 33 on the Particulate Module. Also check to make sure that the PS 10 sensor has a good ground. If there are good grounds and the issue persists please contact the factory. 3) **Overrange Status: Error** – Run a self-check or restart unit to initiate a self-check. Verify all other self-check status show OK. If the overrange error is still present then check the sensor and the cable. If nothing is found and the error remains then contact the factory. 4) **Temp Status: Error** – Make sure the minimum spacing is maintained in the enclosure. Ensure that the unit is installed in a location that is not causing overheating. (refer to 225-1073-HDWR manual for details).

18.1 **Module Replacement**

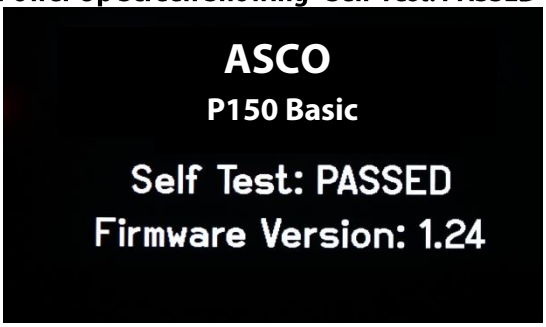
The P150 Basic is a modular system designed so that I/O modules can be replaced or added. Each I/O module in the CANOpen DIN rail bus network must have a unique ID used for CANOpen communication. In addition, I/O modules must be added to the controller node list to be able to exchange data with the controller. An I/O module can be replaced by following the steps below:

IMPORTANT

PROCEDURE FOR REPLACING AN EXISTING I/O MODULE

- Determine the network ID of the I/O module to be replaced by reading the tag on the front of the module.
- Set the new module to the ID determined in the previous step if needed
- Cycle power and verify that the power up screen shows "Self-Test: PASSED".
- Verify that the CANOpen status LED for all installed modules is solid green.
- Enter the module's information screen.
- Verify that all inputs are read correctly
- Verify that all outputs are set correctly using the forcing feature

Power Up Screen Showing "Self-Test: PASSED"



A new I/O module can be added by following the steps below:

IMPORTANT

PROCEDURE FOR ADDING A NEW I/O MODULE

- Determine the next unused ID in the CANOpen DIN rail bus network by reading the ID tags on the front of installed modules or viewing all configured ID's in the CANOpen system information screen.
- Set the new module to the next unused ID if needed
- Add the new module to the controller node list at the programmed ID Configure the new module's analog and discrete input and output channels
- Cycle power and verify that the power up screen shows "Self-Test: PASSED".
- Verify that the CANOpen status LED for all installed modules is solid green.
- Enter the module's information screen.
- Verify that all inputs are read correctly
- Verify that all outputs are set correctly using the forcing feature
- Configure alarms for the newly configured process variable inputs if needed.

18.2 **Plus Controller Replacement**

In the event that the Plus Controller fails or is damaged and needs to be replaced it is possible to remove it and install a new one in the field. This requires that the settings be backed up first. Once the settings are backed up the system power is shut down. All connections are removed from the Plus Controller including the CAN connector, dedicated Ethernet, Fieldbus and SD card. The procedure to remove the Plus controller is detailed below:

IMPORTANT PROCEDURE FOR REPLACING A PLUS CONTROLLER

- Apply power to the system.
- Save settings to the SD card
- Remove power from the system.
- Remove all connects to the Plus Controller.
- Remove the 6 screws holding the bezel onto the enclosure.
- Remove the ground connection to the enclosure from the Plus Controller.
- Install new Plus Controller by following the above steps in reverse.
- Apply power and load saved settings to the new controller
- If saving and loading the settings is not possible as a result of controller malfunction, follow the steps below:
- Apply power to the system.
- Login as Configuration.
- Enter Setup/Diagnostics settings and record all diagnostics settings.
- Enter Setup/Alarm settings and record the settings for all alarms and all used groups.
- Enter Setup/System settings and record all system settings.
- Enter Setup/Fieldbus settings and record all Fieldbus settings if Fieldbus card is installed.
- Enter Info/CANOpen Info and record the ID and Model Number for all configured I/O modules.
- Enter Setup and record the settings for all enabled process variable inputs, process variable outputs, discrete inputs, discrete outputs, and process run signals.
- Remove power from the system and replace the controller.
- Apply power then apply all recorded settings to the new controller.

19 Commissioning

The following is a basic guide to follow when commissioning new equipment. A more detailed commissioning checklist is available from ASCO if desired.

Installation

Action	Reference
Verify all equipment is rated for the process environment it is installed in.	
Verify input power to the system is within the range listed on the equipment serial number tag.	Equipment S/N Tag
Verify all wire types and connections meet requirements listed in the MICS Hardware Manual and local codes.	MICS Hardware Manual
Verify installation of the controller meets requirements listed in the MICS Hardware Manual and local codes.	MICS Hardware Manual

Initial Power Up and I/O Check

Action	Reference
Apply power to the controller and verify that the power on self-test passes with no errors.	
Verify all process variable inputs are operating correctly and that readings are within expected range.	Hardware Configuration
Verify all discrete inputs are operating correctly when actuated from the remote device.	Hardware Configuration
Verify all process variable outputs are operating correctly and that readings are scaled correctly into remote PLC/DCS.	Hardware Configuration
Verify all discrete alarm outputs are operating correctly and that remote indicators operate correctly.	Alarming

Fieldbus

Action	Reference
Verify fieldbus connection is operating correctly if installed.	MICS Fieldbus Manual
Verify process data and parameter data read/write operates properly	MICS Fieldbus Manual

Alarms

Action	Reference
Determine appropriate alarm levels, delays and groups and adjust settings as required.	Alarms
Determine how alarm acknowledgment will be handled and adjust local and remote alarm acknowledgment settings as required.	Alarms
Determine how alarm relays should operate and adjust latching and fail safe settings as required.	Alarms
Verify alarm operation by temporarily changing alarm levels or introducing a simulated signal.	Alarms

Historian

Action	Reference
Verify System clock is set to correct date and time including after a power cycle	Historian
Verify Historian System Status is OK	Historian
Format Historian if date and time have been adjusted	Historian

Historian SD Card Mirroring

Action	Reference
Verify system clock is set to correct date and time including after a power cycle	Historian
Verify SD card data logging is operating correctly if installed.	Historian

20 System Settings

A complete listing of all available settings is detailed below. Settings designated with (T) are only listed once for a group of similar typical settings.

Alarm Settings – Alarms (Typical for each alarm)

Setting	Login	Default	Notes
Select Alarm	Supervisor		Select the alarm to be modified
Setpoint	Supervisor	Varies (Reference Alarm Section)	Limit for alarm activation
Delay	Supervisor	Varies (Reference Alarm Section)	Amount of time reading must exceed setpoint to activate alarm
Group	Supervisor	Varies (Reference Alarm Section)	Group associated with the selected alarm
Latching	Supervisor	Off	Requires user acknowledgment to clear alarm if latching is On
Logic	Supervisor	Varies	Activation logic (HI, HIHI, LO or LOLO)

Process Variable Inputs (Typical for each PVIN)

Setting	Login	Default	Notes
Select Process Variable Input	Configuration	PVIN #1	Select PVIN channel to be configured
Enabled	Configuration	Disabled	Enables or disables the selected PVIN channel
Process Name	Configuration	BH1	Process name (BH1, BH2, BH3…)
Parameter Name	Configuration	None	Parameter name (Particulate 1, Particulate 2, Particulate 3…)
Engineering Units	Configuration	None	Unit (pA, Mg/M3, Gr/Sec)
Raw MINIMUM	Configuration	0	Minimum value of the I/O input (example 0.0)
Raw MAXIMUM	Configuration	0	Maximum value of the I/O input (example 1000)
Scaled MINIMUM	Configuration	0	Minimum value of the scaled I/O input (example 0.0pA)
Scaled MAXIMUM	Configuration	0	Maximum value of the scaled I/O input (example 1000pA)
Relative Factor	Configuration	1	Relative factor to be used as a multiplier of the scaled I/O input
Averaging Period	Configuration	6 Minutes	Period for the process variable input average
Averaging Buffer Clear	Configuration	NO	Clears the buffer used to calculate the process variable input average

Input Slave ID	Configuration	0	I/O module network ID to acquire data from
Input Channel	Configuration	AIN 1	I/O module channel to acquire data from (AIN1, AIN2, DIN1…)

Derived Variable Inputs (Typical for each DPVIN)

Setting	Login	Default	Notes
Parameter Name	Configuration	Unused	Read-only. Set when "Parameter Name" is set for the PVIN which was changed from Direct to Derived.
Conversion Type	Configuration	None	Type of conversion to be applied to the Reference PVIN channel's value.
Engineering Units	Configuration	None	Read-only. Set based on "Conversion Type"
Use Averaged Input	Configuration	No	No – use the Reference PVIN's current real-time value. Yes – use the Reference PVIN's averaged value (avg. period is configured in the reference PVIN channel's Long-Term Averaging configuration).
Reference PVIN Channel	Configuration	None	None, PVIN1, PVIN2, etc. This is the input to the conversion.
Derived PVIN Channel	Configuration	None	None, PVIN1, PVIN2, etc. This is the result of the conversion.
Conversion Parameters (multiple)	Configuration	n/a	Depending on the "Conversion Type" setting, additional settings will be available to perform the required conversion.

Process Variable Outputs (Typical for each PVOUT)

Setting	Login	Default	Notes
Select Process Variable Output	Configuration	PVOUT #1	Select PVOUT channel to be configured
Enabled	Configuration	Disabled	Enables or disables the selected PVOUT channel
Raw MINIMUM	Configuration	0	Minimum value of the process variable input (example 0.0pA)
Raw MAXIMUM	Configuration	0	Maximum value of the process variable input (example 1000pA)
Scaled MINIMUM	Configuration	0	Minimum value of the process variable output which is typically 4.0mA
Scaled MAXIMUM	Configuration	0	Maximum value of the process variable output which is typically 20.0mA
Log Scale Decades	Configuration	0	Number of decades - Set to 0 for linear scale and 1 to 10 for logarithmic scale
Output Slave ID	Configuration	2	I/O module network ID to send output to
Output Channel	Configuration	AOUT1	I/O module channel to send output to (AOUT1, AOUT2…)

Discrete Inputs (Typical for each DIN)

Setting	Login	Default	Notes
Select Discrete Input	Configuration	DIN #1	Select DIN channel to be configured
Enabled	Configuration	Disabled	Enables or disables the selected DIN channel
Process Name	Configuration	None	Process name (hopper level, process run signal…)
Invert Logic	Configuration	0	Inverts I/O input when set to 1
Input Slave ID	Configuration	0	I/O module network ID to acquire data from
Input Channel	Configuration	DIN1	I/O module channel to acquire data from (example DIN1, DIN2…)

Discrete Outputs (Typical for each DOUT)

Setting	Login	Default	Notes
Select Discrete Output	Configuration	DOUT #1	Select DOUT channel to be configured
Enabled	Configuration	Disabled	Enables or disables the selected DOUT channel
Invert Logic	Configuration	0	Inverts discrete output when set to 1
Output Slave ID	Configuration	0	I/O module network ID to send output to
Output Channel	Configuration	DOUT1	I/O module channel to send output to (DOUT1, DOUT2…)

Remote Alarm Acknowledge (Groups)

Setting	Login	Default	Notes
Select Group	Configuration	Global	Select alarm group to configure
Remote Acknowledge	Configuration	Disabled	Enables or disables the selected remote aknowledge input
Remote Discrete Input	Configuration	DIN1	Discret input used for remote acknowledge for grouped alarms

Remote Alarm Acknowledge (General Acknowledge Settings)

Setting	Login	Default	Notes
Clear Alarm Relay when Ack	Configuration	Disabled	Remote acknowledge clears relay output associated with group
Alarm ack User Level	Configuration	Operator	Allow certain users to acknowledge alarms

Process Run Signal

Setting	Login	Default	Notes
Select Process Run Signal	Configuration	PRS #1	Select PRS channel to be configured
Enabled	Configuration	Disabled	Enables or disables the selected PRS channel
PVIN Channel	Configuration	Disabled	PVIN channel to be used as a source of the process run signal (Disabled, PVIN 1, PVIN 2…)
PVIN Threshold	Configuration	0	Threshold for the selected PVIN channel
DIN Channel	Configuration	Disabled	DIN channel to be used as a source of the process run signal (Disabled, DIN1, DIN2…)

Fieldbus – General

Setting	Login	Default	Notes
Process Data Format	Configuration	Standard	Selects a specific I/O data map, options are Standard, Compatible to 1.021, Compatible to 1.04, Test Pattern, Standard Profibus and Minimal #1. See MICS Fieldbus Manual for full details.
Process Data Input	Configuration	Disabled	Enables/Disables I/O data produced by the network and consumed by the PM 100 to be copied to PM 100 internal memory and settings.

Fieldbus – DeviceNET

Setting	Login	Default	Notes
DeviceNET Node ID	Configuration	2	Node ID for DeviceNet network
DeviceNET Baud Rate	Configuration	125 kbits/sec	DeviceNet network baud rate

Fieldbus –Modbus RTU

Setting	Login	Default	Notes
Modbus Serial Node ID	Configuration	2	Node ID for Modbus RTU and ASCII serial networks
Modbus Serial Parity, Stop	Configuration	None, 1 Stop	Parity and stop bits settings for Modbus RTU and ASCII serial networks
Modbus Serial Baud Rate	Configuration	19200 bits/sec	Modbus RTU and ASCII networks baud rate
Modbus Serial Mode	Configuration	RTU	RTU or ASCII
Modbus Serial V2 Comp	Configuration	Disabled	Register addressing compatible with V2 control units and software

Fieldbus –Ethernet IP/Modbus TCP/Profinet IO

Setting	Login	Default	Notes
IP Address 1 of 4	Configuration	192	First part of IP address for Ethernet Fieldbus types XXX.---.---.---
IP Address 2 of 4	Configuration	168	Second part of IP address for Ethernet Fieldbus types ---.XXX.---.---
IP Address 3 of 4	Supervisor	0	Third part of IP address for Ethernet Fieldbus types ---.---.XXX.---
IP Address 4 of 4	Configuration	1	Fourth part of IP address for Ethernet Fieldbus types ---.---.---.XXX
Subnet mask 1 of 4	Configuration	255	First part of subnet mask for Ethernet Fieldbus types XXX.---.---.---
Subnet mask 2 of 4	Configuration	255	Second part of subnet mask for Ethernet Fieldbus types ---.XXX.---.---
Subnet mask 3 of 4	Configuration	255	Third part of subnet mask for Ethernet Fieldbus types ---.---.XXX.---
Subnet mask 4 of 4	Configuration	0	Fourth part of subnet mask for Ethernet Fieldbus types ---.---.---.XXX
Gateway 1 of 4	Configuration	255	First part of gateway for Ethernet Fieldbus types XXX.---.---.---
Gateway 2 of 4	Configuration	255	Second part of gateway for Ethernet Fieldbus types ---.XXX.---.---
Gateway 3 of 4	Configuration	255	Third part of gateway for Ethernet Fieldbus types ---.---.XXX.---
Gateway 4 of 4	Configuration	0	Fourth part of gateway for Ethernet Fieldbus types ---.---.---.XXX
DHCP Operation	Configuration	Disabled	Enable or disable DHCP operation

Fieldbus –Profibus

Setting	Login	Default	Notes
Profibus Node ID	Configuration	2	Node ID for Profibus network

Fieldbus –ControlNET

Setting	Login	Default	Notes
ControlNET Node ID	Configuration	2	Node ID for Profibus network

NodeList

Setting	Login	Default	Notes
Select ID	Configuration	ID 2	Network ID for I/O module to be configured
Model Number	Configuration	None	I/O module type (MIO-1122, MIO-3300, etc.)

System

Setting	Login	Default	Notes
Historian SD Card Mirror Rate	Engineer	60 Seconds	Process variable data-logging sample rate
Safely remove SD Card	Operator	NO	Disables Logging so that the SD card does not get corrupted when removed. Logging will resume once an SD card is reinstalled
SD Card Alarm	Configuration	Disabled	Send alarm to Group 1if SD card has an error
Save Settings to SD Card	Engineer	NO	Save a settings file to the SD card
Load Settings from SD Card	Engineer	NO	Load settings from the SD card
Output 3.8mA during Self-Check	Engineer	Enabled	Output 3.8 mA from Output mapped to particulate module when self-check in progress
Output 3.6mA with fault	Configuration	Enabled	Output 3.4 mA from Output mapped to particulate module when self-check fails
Save Settings to SD Card	Configuration	NO	Save a settings file to the SD card
Load Settings from SD Card	Configuration	NO	Load settings from the SD card
Date - Century	Engineer	N/A	Real-time clock current century (20 for 2011)
Date - Year	Engineer	N/A	Real-time clock current year (11 for 2011)
Date - Month	Engineer	N/A	Real-time clock current month (1-12)
Date - Day	Engineer	N/A	Real-time clock current day (1-31)
Date - Weekday	Engineer	N/A	Real-time clock current weekday (Monday-Sunday)
Time - Hour	Engineer	N/A	Real-time clock current hour (0-23)
Time - Minute	Engineer	N/A	Real-time clock current minute (0-59)

Screens (Typical for all screens)

Setting	Login	Default	Notes
Select Screen Number	Configuration	Screen 1	Select screen to be modified
Screen Type	Configuration	None	Select screen Ttype (4 Bar Graphs, Live Trens…)
Param #	Configuration	None	Select parameter to adjust
Param Y-Scale Min/Max	Configuration	NO	Adjust Y scaling of associated pens or bar graphs

21 Installation Documents

Refer to installation drawings supplied with your order and to the MICS Platform Hardware Manual.

22 Notes