

Product Manual 26547V2 (Revision A, 1/2021) Original Instructions



MicroNet[™] Safety Module Fault Tolerant Protection System

Optional Supplementary Information

Manual 26547 consists of 2 volumes (26547V1 & 26547V2)

Volume 2—Programming and Configuration

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage. Precautions

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General

Revisions





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Warnings and Notices

Important Definitions



This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER** Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- **WARNING** Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- **NOTICE** Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** Designates an operating tip or maintenance suggestion.



Personal Protective Equipment

- The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:
- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.



Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

Electrostatic Discharge Awareness

NOTICE	Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:
Electrostatic Precautions	 Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control). Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards. Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices. To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules.

Follow these precautions when working with or near the control.

- 1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
- 2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.



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Regulatory Compliance

Regulatory Compliance information is contained in Manual 26547V1.

Chapter 9. Front Panel Interface

Introduction

The front panel of the MicroNet[™] Safety Module allows the user to view current values for any inputs, Alarm, Trip, and Event logs, current values of all logic including configured functions, and navigate through configured logic. The user can also reset a module, initiate start logic, initiate tests (including user defined tests), and configure Speed functions. This chapter defines the features and functions accessible through the Front Panel of the MicroNet Safety Module.

5	W.woodwa	RD	DO NOT OPEN DOOR WHELE EXERCICED URLEES AREA B VIOLAN TO BE MAN HUMBOOID	
	Speed RPM 1875	Speed RPM 1875	Speed RPM 1875	
	TREPTED LEAT ALAGE		MODULE C	
ĨĻ		MicroNet [®] Sa FAULT TOLET	afety Module	

Figure 9-1. Gas Stop/Ratio Valve (typical; 3-inch shown)

There are four main views:

- Monitor Menu—View configuration settings, real time values, and status indications.
- View Logs—View all logged events with corresponding time stamps.
- **Config Menu**—Configure basic operation functions, overspeed, acceleration trip, etc. Complex user defined functionality is configured using the Programming and Configuration Tool (PCT).
- **Test Menu**—Perform system tests. Overspeed, Simulated Speed, Periodic Overspeed, and custom configured user-defined tests.



Screen Layout

Each screen on the MicroNet Safety Module modules follows a consistent layout pattern as shown in Figure 9-2.

	Screen Name			
Screen Name SCREEN DATA SCREEN ANNUNCIATION or Screen Message				
Soft Key 1	Soft Key 2	Soft Key 3	Soft Key 4	

Figure 9-2. MicroNet Safety Module Screen

Screen Name – At the top of each screen is the "Screen Name" which identifies the type of data being displayed or the function being performed on that screen.

Screen Data – The middle or main body of each screen shows either data, a menu of selectable fields, or fields for entering data or passwords. Values in **BLUE font** are values that can change. **BLACK font** is used for static labels or values that can only change by changing the configuration.

Note: In cases where there is too much information to show in the screen data field, a slider bar will appear on the right side to show that additional information can be accessed by using the UP/DN arrow keys.

Screen Annunciation or Message – Below the Screen Data, there is an area reserved for Messages to aid the user. If the screen is in one of the Monitor Menu screens and is just displaying data, this space is reserved to annunciate any alarm or trip messages. The alarm or trip messages are shown in a larger text and highlighted with either yellow or red, respectively. Otherwise this field is used to show user prompts to help with selection or entry of data.

Soft Keys – At the bottom of each screen are four (4) Soft Keys descriptions which are associated with the 4 keys immediately below them. Depending on the screen, the soft keys may be used to select different views, enter data such as setpoints or passwords, select from a list of options, or initiate a function such as performing a test or copying a module's configuration.



Keypad Functions





Unless defined otherwise for a screen, the keys have the following functions:

START	One source of the Start signal defined elsewhere in this manual.
RESET	One source of the Reset signal defined elsewhere in this manual.
Up Arrow	Navigate up through the menus or displayed pages.
Down Arrow	Navigate down through the menus or displayed pages.
Right Arrow	Scroll through the configurable Inputs and Logic menus
Left Arrow	Scroll through the configurable Inputs and Logic menus
ENTER	Select from the menu or edit a specific value in configuration.
VIEW	Displays the Trip Log or Alarm Log, respectively.
Tripped Indicator Unit Health Indicator Alarm Indicator	Illuminates RED when a tripped condition exists. Illuminates GREEN when there are no errors in the safety functionality. Illuminates RED if there is an error in the safety functionality. Off indicates a communication or power failure either to the display or to the module. Illuminates YELLOW when an Alarm condition exists.

Navigation

Selecting the Soft Keys below "Monitor Menu", "View Logs", "Config Menu", and "Test Menu", will bring up the associated menu for that category. Use the Up/Down arrows to navigate through the menu items, Select Enter to open the associated screen.

Home

On power-up, the "Home" page is displayed. The "Home" screen shows the sensed speed and provides access to the soft keys to select from the four main menus. Selecting "HOME" brings up the "Home" screen. Selecting "ESC" repeatedly navigates up through the menu hierarchy until the "Home" screen is displayed.



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Manual 26547V2 With an Alarm

	Home			
Speed RPM 3000				
MODULE ALARM				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-4. Home screen (with Alarm)

With a Trip

Speed RPM 5000				
MODULE TRIP				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-5. Home screen (with Trip)

Passwords

The MicroNet Safety Module utilizes two password levels, a Test Level Password and a Config Level Password. The same passwords are used by the Programming and Configuration Tool (PCT) and Front Panel.

The Test Level Password is required to:

- Initiate tests
- Reset logs (except for the Peak Speed/Acceleration Log)
- Change the Test Level Password

The Config Level Password provides access to any function that requires the Test Level Password. Additionally, the Config Level Password is required to:

- Change any program setting
- Download an application program file into a module
- Reset the Peak Speed/Acceleration Log.
- Change the Config Level Password

Each of these passwords meets NERC (North American Electric Reliability Corporation) cyber security requirements.

MicroNet Safety Module Fault Tolerant Protection System

Password Entry

When prompted for a password, the screen below appears.

- The password is six characters long and can be configured using upper-and lower-case alpha characters, numeric characters, and some special symbols (#, @, !, <, etc.).
 - Use the "Aa 0-9 @" soft key to select upper case letters, lower case letters, numbers, or a list of usable special characters.
 - Use the "Value \checkmark " or "Value \blacktriangle " soft keys to change the highlighted value.
 - \circ Use the "Cursor \rightarrow " soft key to move the highlighted character to the right.
- Press the Enter Key after the password is selected. If the password is invalid, an error message will appear at the bottom of the screen; otherwise, the password is accepted, and the next screen provides access to the password change function.

	Password Entry			
Enter Password				
USETPS				
Press Enter to submit of ESC to cancel				
Range: ABCDEFGHIJKLMNOPQRSTUVWXYZ				
Aa 0-9 @	Value 🔻	Value 🔺	Cursor →	

Figure 9-6. Password Entry Screen

Monitor Menu

From the "Monitor Menu" the user can view configuration settings, real time values, and status indications. When the "Monitor Menu" is selected from the soft keys, the following menu is shown:



Figure 9-7. Monitor Menu

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MicroNet Safety Module Fault Tolerant Protection System

The "Up Arrow" and "Down Arrow" keys are used to highlight the desired sub-menu item. Pressing the "ENTER" key will open the highlighted item screen. The following items are available from the Monitor Menu:

- Summary
- Trip Latch
- Alarm Latch
- Event Latches
- Trip Cycle Time Monitors
- Dedicated Discrete Inputs
- Configurable Inputs
- Configurable Logic
- Programmable Relays
- Speed Input
- Speed Fail Timer
- Analog Output
- Modbus[®] *
- Date / Time
- System Status
- Module Information

*--Modbus is a trademark of Schneider Automation Inc.

Detailed information on the contents of these screens and examples follows:

Monitor Summary (Page 1)

- Speed—Current value of speed in rpm.
- Acceleration—Current value of acceleration in rpm/s.
- Overspeed Trip Setpoint—Current setting for overspeed trip in rpm.
- Speed Fail Override Status—Condition of the override.
- Analog Output—Current value of Analog Output in mA.
- Date—Current date.
- Time—Current time.

Monitor Summary				
Speed 3000 RPM Acceleration 0 RPM/s Overspeed Trip Setpoint 3500 RPM Speed Fail Override Status FALSE Apelog Output 5.5 mA				
Date 08 Jun 2010 Time 12:20:26				
Page 1 of 3				
Monitor Menu	View Logs	Config	Menu	Test Menu

Figure 9-8. Monitor Summary (Page 1)

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Monitor Summary (Page 2)

- Input—Number of the configurable input.
- Name—Application/customer name for that configurable input.
- Value—Current status. Analog value is based on the input scaling.
- Unit—Units configured for the input (PSI shown as example).

	Monitor	Summary	
Input	Name	Yalue	Unit
1	INPUT NOT USED		
2	My Analog CH 2	0.0	244 PSI
3	My Discrete CH3	TRU	JE
4	INPUT NOT USED		
5	INPUT NOT USED		
6	INPUT NOT USED		
7	INPUT NOT USED		
8	INPUT NOT USED		
9	INPUT NOT USED		
10	INPUT NOT USED		
	Page	2 of 3	
Moni	itor Menu View Logs	Config Menu	Test Menu

Figure 9-9. Monitor Summary (Page 2)

Monitor Summary (Page 3)

• Programmable Relay Status.

	Monitor	Summary		
Programmable Relay 1		Alarm	TRUE	
Programmable Relay 2	Not	Not Connected		
Programmable Not Relay 3		Connected	FALSE	
Page 3 of 3				
Monitor Menu V	iew Logs	Config Menu	Test Menu	

Figure 9-10. Monitor Summary (Page 3)

MicroNet Safety Module Fault Tolerant Protection System

Monitor Trip Latch

Displays the status of any latched trip conditions and first out information. All trip conditions are latched and require a reset command to clear the fault indication.

The following trips are always displayed:

- Internal Fault Trip—Indicates a failure internal to the TPS. Additional details on the fault cause are provided in the PCT's Module Faults Log.
- Power Up Trip—Indicates a power-up condition was detected. Only provided if configured as deenergize to trip.
- Configuration Trip—Indicates new configuration settings were loaded into the module. Pressing the Reset button will clear the error.
- Parameter Error— Indicates a parameter error was detected, meaning there was a problem reading the settings out of the ProTech[®] non-volatile memory during initial startup. When this is true, the MicroNet Safety Module remains in a tripped state. The configuration must be re-loaded from the PCT and a power cycle is required to clear this error.
- Overspeed Trip—Indicates an overspeed trip.
- Speed Probe Open Wire—Indicates an open wire on the speed input. Only available when configured for passive probe type.

The following trips are displayed when configured:

- Overaccel Trip—Indicates an overacceleration trip. Speed Lost Trip—Indicates a sudden loss of speed.
- Speed Fail Trip—Indicates speed detected below the fail threshold.
- Speed Fail Timeout Trip—Indicates lack of speed detected during a start condition.
- Resettable Trip—Indicates a trip commanded by the resettable trip function's discrete input.
- Trip Latch xx or the "user-defined" Name for Trip Latch Number xx—Indicates a trip condition caused by the configured trip latch input.

Monitor Trip Latch						
TRIPPED						
Latch Input Name	Latched Inp	out First Out				
Internal Fault Trip	FALSE	FALSE				
Power Up Trip	FALSE	FALSE				
Configuration Trip	FALSE	FALSE				
Parameter Error	FALSE	FALSE				
0∨erspeed Trip	TRUE	TRUE				
Speed Probe Open W	lire FALSE	FALSE				
Monitor Menu View Logs	s Config Menu	Test Menu				

Figure 9-11. Monitor Trip Latch

Monitor Alarm Latch

Displays the status of any latched alarm conditions. All alarm conditions are latched and require a reset command to clear the fault indication. The following alarms are always displayed:

- Internal Fault Alarm—Indicates a failure internal to the TPS. Additional details on the fault cause are provided in the PCT's Module Faults Log.
- Configuration Mismatch—Modules do not have the same configuration.
- Power Supply 1 Fault—Out of range input power detected on Input #1.
- Power Supply 2 Fault— Out of range input power detected on Input #2.
- Tmp Overspeed Setpoint On—Temp Overspeed Setpoint Test Active.
- Manual Sim. Speed Test—Manual Simulated Speed Test Active.
- Auto Sim. Speed Test—Auto Simulated Speed Test Active.
- Periodic Ovrspd Test—Periodic Overspeed Test Active.

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The following alarms are displayed when configured:

- Speed Lost Alarm —Indicates a sudden loss of speed.
- Speed Fail Alarm —Indicates speed detected below the fail threshold.
- User Defined Test 1-3—User Defined Test Active.
- Trip Time Mon 1-2 Alarm —Indicates Trip Cycle Time Monitor time exceeded.
- IRIG Signal Lost Alarm Indicates the IRIG Time Synchronization Signal has been lost
- Alarm Latch xx or the "user-defined" Name for Alarm Latch Number xx —Indicates an alarm condition caused by the configured alarm latch input.

Monitor Alarm Latch						
		ALARMS	PRES	ENT		
		Latch Input Na	me	Latcl	ned Input	
	Inter	nal Fault Alar	m	E/	ALSE	
	Confi	guration Misma	atch	E.	ALSE	
	Powe	r Supply 1 Fa	ault	E.	ALSE	
	Powe	r Supply 2 Fa	ault	T	RUE	
	Tmp	Ovrspd Setpoi	int On	E.	ALSE	
	Manual Sim. Speed Test FALSE					
Monitor	Menu	View Logs	Config	Menu	Test	Menu

Figure 9-12. Monitor Alarm Latch

Monitor Event Latches

• Monitor configurable event latches—Shown with events present.

Monitor Event Latch 1				
	EVENTS	PRESENT		
	Latch Input Name	Latched Inpu	ıt FirstOut	
My Event		TRUE	TRUE	
Reset:	Reset Func	tion St	ate: FALSE	
Press ENTER to branch to input				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-13. Monitor Event Latch

Monitor Trip Cycle Timer Monitors

• Monitor time between trip and acknowledgement of that trip.

Мо	nitor Trip Cyc	cle Time	Monito	ors	
	Trip Cycle T	me Monit	tor 1		
Trip Cycle T	ime	0.728 s			
Trip Cycle A	larm F	ALSE			
Trip Indicato	r Input	Discret	te Inp	ut 3	
	Trip Cycle T	me Monit	tor 2		
	NOT	USED			
Press ENTER to branch to input					
Monitor Menu	View Logs	Config	Menu	Test	Menu

Figure 9-14. Monitor Trip Cycle Time Monitors

Monitor Dedicated Discrete Inputs

- Condition of the Start Reset and Speed Fail Override Inputs.
- Start Input—Start Input Active.
- Note: This is TRUE if either the Front Panel START key or the START discrete input are active.
- Reset Input—Reset Input Active.
- Speed Fail Override Input—Speed Fail Override Input Active.

	Monit	tor	Dedicated	Discret	e Inp	uts	
Start Input (or Start Button)				Т	RUE		
Reset Input Speed Fail Override			e Input	FA FA	ALSE ALSE		
Monitor	Menu	Vie	w Logs	Config	Menu	Test	Menu

Figure 9-15. Monitor Dedicated Discrete Inputs

Monitor Configurable Inputs

• Monitor the configuration and status of the ten configurable inputs.



Figure 9-16. Monitor Configurable Inputs

Monitor Configurable Logic

- Monitor the configuration, setting, and status of configurable logic.
- In all the following screens, when an Input Source is highlighted and "Press ENTER to branch to input" appears in the screen message area, selecting "ENTER" will bring up the monitor screen associated with that source. Also, when an Input Source is highlighted, selecting "Up Arrow" or "Down Arrow" will highlight other inputs to the function.



Figure 9-17. Monitor Logic Gates



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Figure 9-19. Monitor Delay



Figure 9-20. Monitor Analog Comparator



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Figure 9-21. Monitor Timer

Monitor Programmable Relays

Monitor the configuration, setting, and Status of the programmable relays.
 Note: the TRUE or FALSE indication represents the state of the signal driving the relay. Since the Polarity for the relay may be "Inverting" or "Non-Inverting", this does not necessarily reflect the state of the relay.

Monitor Programmable Relays						
		Programmat	ole Relay	y 1		
	Input	Ala	rm		TRUE	
	Programmable Relay 2					
	Input	: Not Cor	nnected		FALSE	
		Programmab	le Relay	/ 3		
	Input	: Not Cor	nnected		FALSE	
Press ENTER to branch to input						
Monitor	Menu	View Logs	Config	Menu	Test	Menu

Figure 9-22. Monitor Programmable Relays

Monitor Speed Input

• Monitor speed and acceleration.

	Monitor 3	Speed In	put		
Speed	ł	30)00 F	RPM	
Accel	eration	0 RPM/S			
Monitor Menu	View Logs	Config	Menu	Test	Menu

Figure 9-23. Monitor Speed Input

Monitor Speed Fail Timer

• Monitor speed fail timer.

	Monitor Speed Fail Timer				
Timer Running ^{Time remaining} 00:00:14					
	Speed Fail Setpoint 100 RPM				
Monitor	Menu	View Logs	Config Menu	Test Menu	

Figure 9-24. Monitor Speed Fail Timer

Timer Inactive: Timer not used or not started

Timer Running: Timer started, timer remaining displayed. Timer starts when the start button is pressed or the start discrete signal occurs.

Timer Expired: Indicates Timer reached zero

Note: The Speed Fail Timeout trip is reset by the reset command. **Note:** If the speed fail timer is active, the Home screen will display the time remaining.

Monitor Analog Output

• Monitor speed and analog output value.

Monitor	Analog	Output	
Speed		250	
Speed		200	
Analog Outp	but	12.(D mA
Monitor Menu View Log	gs Cor	nfig Menu	Test Menu

Figure 9-25. Monitor Analog Output

Monitor Modbus

• Monitor Modbus status.

Monitor Modbus					
N	1odbus Li	nk Status	5		
Monitor Menu	View Logs	Config Menu	Test Menu		

Figure 9-26. Monitor Modbus Status

Link OK: **Modbus** Link OK Link Error: **Modbus** Link not operating properly

Monitor/Set Date & Time

The screen is used to monitor and set the current date and time. The date automatically accounts for leap year. The time setting must be re-set for all local time changes (e.g. daylight savings time).

	Monitor/Set	Date & Time				
Date 24 Jan 2010						
	Time	12:17:15	5			
Press ENTER to set time						
Monitor Menu	View Logs	Config Menu	Test Menu			

Figure 9-27. Monitor Date & Time

To set the Time and Date, press the "ENTER" key.

	Monitor/Set	Date & Time	
	Date 24	Jan 2010	
	11116	12.17.10	,
	Press ENTER	to edit item	
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-28. Set Date & Time

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The field to be edited will be highlighted. Pressing the UP/DOWN/RIGHT/LEFT arrows will highlight other fields. Press ENTER to edit the highlighted item and use the soft keys as indicated to adjust the value to the desired value.

Monitor/Set Date & Time				
	Date <mark>08</mark> Time	Jun 2010 14:51 <mark>:5</mark> 2		
Range:	00:00:00 T	0 23:59:59		
Cursor ←	Value 🔻	Value 🔺	Cursor →	

Figure 9-29. Set Date & Time

Select ENTER to save the change or ESC to return the value to its original value. Set other fields as required. After all changes have been made use the soft keys to either "Set Time" or "Cancel".

Monitor/Set	Date & Time	
Date 08	Jun 2010)
Time	14:55:00)
, me	14.00.00	
 Press ENTER	t to edit item	
Sot Timo	Cancel	
Set Time	Cancer	

Figure 9-30. Monitor/Set Date & Time

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Selecting ESC is the same as "Cancel" and the time and date remain at the original values.

System Status

• Monitor the health status of all modules in the system.

	Monitor S	System Status	
Mod	ule A	Unit Health OK	
Mod	ule B	Unit Health OK	
Mod	ule C	Unit Health OK	
		1 1	
Monitor Menu	View Logs	s Config Menu	Test Menu

Figure 9-31. Monitor System Status

Unknown Status: Status is unknown possibly due to a communication failure with the front panel **Unit Health OK:** Unit is running properly

Internal Alarm: An internal alarm is present. View the PCT Module Faults Log **Internal Error:** An internal error is present. View the PCT Module Faults Log

Module Information

• Displays Product ID, Module S/N, and Software P/N and revision.

	Monitor Modul	e Information		
Product ID	ProTech 1	PS		
Software P/N 5418-3630 NEW				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-32. Monitor Module Information

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View Logs

From the "View Logs" screens the user can view logged events with corresponding time stamps. Logged data can be viewed and exported to a file using the Programming and Configuration Tool (PCT).

The time stamps in the logs are based on the internal clock at the time of the event. Time stamps are not changed when the internal clock time is modified (e.g. time/date is set or a 24 Hr time sync command).

When the "View Logs" is selected from the soft keys, the following menu is shown:

	Logs	Menu			
Overspeed/Acceleration Log Trip Log					
Alarm Log Trip Cycle Time Log Sequence Of Events Log					
Event Log 1					
Monitor Menu	View Logs	Config Menu	Test Menu	r	

Figure 9-33. Logs Menu

The "Up Arrow" and "Down Arrow" keys are used to highlight the desired Log. Pressing the "ENTER" key will open the highlighted Log screen. The following items are available from the Logs Menu:

- Overspeed/Acceleration Log
- Trip Log
- Alarm Log
- Trip Cycle Time Log
- Sequence Of Events Log
- Event Log 1
- Event Log 2
- Event Log 3
- Peak Speed/Acceleration Log
- Reset Logs Menu

Detailed information on the contents of these screens and examples follows:

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Overspeed/Acceleration Log

- Log of any overspeed or acceleration trip events.
- Displays the cause of a trip (Overspeed or Overaccelleration)
- Displays the date and time of the trip
- Displays the speed and acceleration at the time of the trip
- Displays the maximum speed and acceleration reached after the trip.
- Displays time and date stamp, actual values, and configured trip values.

	Overspeed	Acceleration Log	
Overaccelerat	ion Trip	2010-01-24 1	2:13:15
Trip Speed	3194 RPM	Trip Acceleration	1085 RPM/s
Max. Speed	6000 RPM	Max. Acceleration	2983 RPM/s
Overspeed Tri	P	2010-01-24 1	2:03:56 TEST
Trip Speed	4255 RPM	Trip Acceleration	2600 RPM/s
Max. Speed	6000 RPM	Max. Acceleration	373 RPM/s
	Pag	ge 1 of 4	
Monitor Menu	View Log	s Config Menu	Test Menu

Figure 9-34. Overspeed/Overacceleration Log

TEST will appear next to the time in **RED** if the module was in test mode at the time of the trip.

Trip Log

• Log of any trip events. Displays event ID, time and date stamp, first out, and test information.

The first-out (FO) symbol indicates the event(s) that caused the trip. Events that occurred while a test mode was active are noted in the Test column. An example would be an overspeed trip that occurred during a periodic overspeed test.

	Trip Log			
Event Id	Time Stamp	Time Stamp FO 1		
Configuration Trip	2010-01-24 12:15:37			
Overspeed Trip	2010-01-24 12:15:26			
Overacceleration Trip	2010-01-24 12:14:21	•		
Speed Fail Trip	2010-01-24 12:13:53			
Speed Lost Trip	2010-01-24 12:13:53			
Configuration Trip	2010-01-24 12:13:26			
Overspeed Trip 2010-01-24 12:13:15				
Page 1 of 5				
Monitor Menu View	Logs Config Menu Test	Me	nu	

Figure 9-35. Trip Log

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Alarm Log

- Log of any alarm events.
- Displays event ID, time and date stamp, and test information.

Events that occurred while a test mode was active are noted in the Test column. An example would be a periodic overspeed test.

Alarm Log				
Event Id Time Stamp				
Speed Fail Alarn	n	2010-01-24 12	2:13:53	
Trip Time Mon 1	Alarm	2010-01-24 11	:56:48	
Power Supply 2	Fault	2010-01-24 11	:04:02	
Power Supply 2	Power Supply 2 Fault 2010-01-24 10:49:48			
Page 1 of 1				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-36. Alarm Log

Trip Cycle Time Log

• Log of any trip cycle time events, and the information for Trip Cycle Time Monitor 1 and 2.

	Trip	Cycle	Time Log	
Trip			2010-06-09	10:21:08
Discrete Input	3		0.728 s	
Discrete Input	3		0.728 s	
Trip			2010-06-09	10:19:07 TEST
Discrete Input	3		1.388 s	
Discrete Input	3		60.000 s	
Page 1 of 8				
Monitor Menu	View	Logs	Config Menu	Test Menu

Figure 9-37. Trip Cycle Time Log

Sequence Of Events Log

- Log of any configured events with up to 1 ms resolution.
- Displays event ID, time and date stamp, and test information.

Sequer	nce Of	Events	Log		
Event Id		Time Stamp			Test
SOE Input 2	2	2010-10-	18 14	1:20:25.570	
Start Function	:	2010-10-	18 14	1:20:24.690	
SOE Input 2	:	2010-10-	18 14	1:20:23.570	
SOE Input 2	:	2010-10-	18 14	1:20:18.320	
Start Function	:	2010-10-	18 14	1:20:17.980	
SOE Input 2	:	2010-10-	18 14	1:20:17.570	
Start Function	2	2010-10-	18 14	4:20:16.340	
Page 1 of 2					
Monitor Menu View L	ogs	Config M	lenu	Test Me	nu

Events Logs 1, 2 & 3

• Log of any configured events; displays event ID, time and date stamp, first out, and test information.

	Event	Log 1		
Even	t Id	Time Stamp		0 Test
My Event		2010-06-09 09	9:41:07	•
My Event		2010-06-09 09	9:40:35	
My Event		2010-06-09 09	9:07:04	
My Event		2010-06-09 08	3:38:58	• •
My Event		2010-06-09 08	3:37:12	•
My Event		2010-06-09 08	3:18:37	
My Event		2010-06-09 08	3:16:57	• •
Page 1 of 3				
Monitor Menu	View Logs	Config Menu	Test	Menu

Figure 9-39. Event Log

Peak Speed/Acceleration Log

• Log of peak speed and acceleration recorded since the saved values were last cleared.

	Peak Speed/Acceleration Log				
Poak	Speed	4000 5	DM		
reak	Speed	4000 RPM			
Peak	Acceleration	920 RPM/s			
Monitor Menu	View Loas	Config Menu	Test Menu		
	Logo	comy nona	leet nonu		

Figure 9-40. Peak Speed/Accel Log

Reset Logs

 Allows the user to reset All Logs (Trip, Alarm, Events, Sequence Of Events, Overspeed/Overacceleration, and Trip Cycle Time Monitor Logs), or just the Peak Speed/Acceleration log.



Figure 9-41. Reset Logs

Reset Log Procedure

- 1. Use the Up Down arrows to select reset "All Logs" or "Peak Speed/Acceleration" and press Enter.
- 2. At the Prompt to "Reset Logs?" or "Reset Peak Speed/Acceleration", select Reset to continue, or Cancel to back out of this screen
- If Reset is selected, the user will be prompted to enter a password. To reset All Logs, either the Test or Config level passwords may be entered. To reset Peak Speed/Acceleration, the Config Level Password must be entered
- 4. After the correct password is entered, press Enter to reset the log.

Configure Menu

The user can configure the standard values from the front panel, such as speed, acceleration, analog output scaling, etc. The Programming and Configuration Tool (PCT) must be used to configure custom logic, timers, latches, and events. The unit must be in a tripped condition for any configuration parameters to be changed whether the Front Panel or the PCT are used.



Figure 9-42. Configure Menu

Entering the Edit Mode from the Front Panel

When a value that can be edited is highlighted, the Screen Message "Press ENTER to Edit value" appears. If the module is not Tripped and ENTER is selected the Screen Message "Module Not Tripped!" appears briefly (for about 5 seconds). If the module is tripped and ENTER is selected, the Password Entry screen appears. When the correct Config Level Password is entered, the fields can be edited with the soft key selections.

	Configure Speed Input				
Probe Type				PASSIV	Ε
Nr of Gear Teeth				I	50
Gear Ratio				1.0000	
0∨erspeed Trip				4000 RPM	
Sudden Speed Loss			SS	TRIP	
Press ENTER to edit value					
Monitor	Menu	View Logs	Config	Menu	Test Menu

Figure 9-43. Configure Speed Input

Once a password has been successfully entered, it will remain in effect until the user exits the configuration menu tree.

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Configuration Procedure

- 1. Module must be tripped to make any configuration changes.
- 2. Use the Up / Down function keys to select the category.
- 3. Use the Up / Down function keys to select the parameter.
- 4. Press Enter to edit a value and the password screen will appear.
- 5. Select the password for Config level, and press Enter.
- 6. The screen is now in edit mode. Using the soft keys, edit the desired value:
 - a. Use the Cursor \rightarrow key to move to the left.
 - b. Use the value $\mathbf{\nabla}$ or \mathbf{A} keys to change the highlighted value.
 - c. Use the Cursor \rightarrow key to move to the right.
- 7. Navigate within the Config Menu to other editable values using Front Panel UP/Down Keys and ESC / Enter keys to change pages.
- 8. After all desired parameters have been changed; press the Home key to exit Configure Mode.
- 9. If any parameters were changed in Configure Mode, the TPS will display a prompt "Save Configuration". The options are:
 - a. Save to save any changes then display the Home screen
 - b. Discard to ignore any changes then display the Home screen
 - c. Cancel to go back to the last used configuration screen
 Note: This does not exit the configure mode so re-entering the Password will not be required if ENTER is selected to edit a value.

	Save Configuration					
5	ave Conf	iguration	?			
	Sa∨e	Discard	Cancel			

Figure 9-44. Save Configuration



Editing Values from the Front Panel

Once a valid password has been entered. The parameter is highlighted. If the parameter is a value or string, a cursor indicates which digit or character is being edited. The soft keys are used to change the digit or character and to move the cursor. The screen message is used to indicated valid ranges or to select from a list of options (i.e. ACTIVE or PASSIVE, TRIP or ALARM, DE_ENERGIZE TO TRIP OR ENERGIZE TO TRIP). Selecting ESC restores a value being edited to its last entered value.

Configure Speed Input					
Probe Type	PASSIVE				
Nr of Gear Tee	th 60				
Gear Ratio	1.0000				
0∨erspeed Trip	3500 RPM				
Sudden Speed	Loss TRIP				
PASSIVE	ACTIVE				
Select ←	Select →				

Figure 9-45 Configure Speed Input

If an attempt is made to adjust a value outside of its permitted range, the value is changed to its closest valid value and the message "**LIMIT REACHED**" appears briefly (for about 5 seconds) next to the Screen Message that indicates the valid range.

Configure Speed

• Set values for speed, acceleration, and start logic.

		Config	jure Sp	eed Sub	omenu		
			Speed	Input			
	Acceleration						
			Start	Logic			
Monitor	Menu	View	Logs	Config	Menu	Test	Menu

Figure 9-46. Configure Speed Submenu

• Configure Speed Input—Set the following parameters.

	Configure S	Speed Input		
Prol	ре Туре	PASSIV	Ξ	
Nr	of Gear Teeth	(50	
Gea	r Ratio	1.00	00	
0∨erspeed Trip		400	DO RPM	
Sud	den Speed Lo	ss TRIP		
Press ENTER to edit value				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-47. Configure Speed Input

• Configure Acceleration—Set the following parameters.

Configure Acceleration					
Enable /	Acceleration Tr	ip	YES		
Accel. Trip Enabled Speed 250 RPM					
Acceleration Trip			5	RPM/s	
Press ENTER to edit value					
Monitor Menu	View Logs	Config	Menu	ſest Menu	

Figure 9-48. Configure Acceleration

• Configure Start Logic—Set the following parameters.

	Configure S	Start Logic		
Speed Fail	Setpoint	10	RPM	
Speed Fail	Trip	NOT USED	1	
Speed Fail	Alarm	NOT USED	I	
Speed Fail	Timeout Trip	USED		
Speed Fail	Timeout Time	00:00:30	0 hh:mm:ss	
Press ENTER to edit value				
Monitor Menu	View Logs	Config Menu	Test Menu	

Figure 9-49. Configure Start Logic

Configure Trip Latch

• Set action of the Trip Latch (Energize or De-energize to Trip).

Configure Trip Latch					
Trip Confi	guration D	E-ENERGIZE T(D TRIP		
Monitor Menu	View Logs	Config Menu	Test Menu		

Figure 9-50. Configure Trip Latch

Configure Analog Output

• Scale the analog output to RPM.

	Configure Ar	nalog Output	
s	peed @ 4mA	0 RPM	1
s	peed @ 20mA	5000 RPI	1
	Press ENTER	to edit value	
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-51. Configure Analog Output
Configure Test Modes

- Set parameters for internal test modes.
 - Temporary Overspeed Trip The value that the overspeed trip setpoint will be changed to while the Temporary Overspeed Trip Test is active.
 - Temp Overspeed Trip Timeout How long the unit will stay in this test mode, before aborting the test (0-30 minutes).
 - Simulated Speed Timeout How long the unit will stay in the Auto or Manual Simulated Speed Test, before aborting the test (0-30 minutes).
 - Test Mode Interlock Disabled NO, will prevent the test from being run when any other module is tripped. YES, will allow the user to run this test regardless if any other modules are tripped.

Configure Test Modes			
Temporary Overspeed Trip2000 RPMTemp. Overspeed Trip Timeout00:00:30 hh:mm:ssSimulated Speed Timeout00:00:40 hh:mm:ss			
Test Mode Interlock Disabled NO			
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-52. Configure Test Modes

Configure Periodic Overspeed Test

- Set parameters for Periodic Overspeed Test.
 - Periodic Test Enabled YES, enables this test.
 - Test Interval Sets automatic Interval of this test (0-999 days).
 - Operator Can Disable Test Set to yes will allow the operator to disable this test from the front panel.

Note: This test can only be configured on Module A. Modules B and C automatically use Module A's settings.

Con	Configure Periodic Overspeed Test		
Periodic	Test Enabled	YES	
Test Interval 7 days		7 days	
Operator Can Disable Test YES		;	
	Proce ENTER	to edit uslue	
	Fress ENTER	to eurc value	
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-53. Configure Periodic Overspeed

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Configure Modbus—Set Parameters for Modbus Communications

- The optional modes are RS-232 or RS-485.
 - Set BAUD rate, parity and slave address
 - Enable Write Commands: NO prevents Modbus data from using write commands, YES allows use of the commands
 - $_{\odot}$ The write commands are Reset, User Defined tests 1 3, and Auto Simulated Speed Test.

Configure Modbus			
Mode		R\$232	
Baud Ra	te	19200	bits/s
Communication Parity		NO PARI	ΓY
Slave Address			2
Enable Write Commands		s NO	
Press ENTER to edit value			
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-54. Configure Modbus

Configuration Management Menu

- Configuration Overview—CRC values for configurable parameters.
- Configuration Compare—User selects if this comparison feature is used or not. This feature continuously compares the configuration of the current module against the other two modules in the MicroNet Safety Module.
- Copy Configuration—Allows the user to copy the configuration in the current module to one or both other two modules in the MicroNet Safety Module.

The following are expected to be unique and are not included in the compare or copy functions:

- Configurable Input names and units
- Trip Latch names
- Alarm Latch names
- Event Latch names
- Modbus Slave Address

Note: Passwords are not considered part of the configuration.

Co	onfiguration Ma	anagement Mer	าน
	Configuratio	on Overview	
Configuration Compare			
Copy Configuration			
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-55. Configuration Management Menu

NOTICE

Before putting the MicroNet Safety Module into operation, verify that the same configuration is in all three modules. Use the Configuration Compare routine to confirm that this is true.

Configuration Overview					
Configuration CRC 68EEh					
	Parameter Bloc	k	CR	C Value	
Spee	d Sense		20	C98h	
Overaccel Trip			4DF2h		
0∨erspeed Trip			CE70h		
Start Logic			3CEFh		
Analog Output			E63Eh		
Programmable Relays		/S	7	3ECh	
Page 1 of 4					
Monitor Menu	View Logs	Config	Menu	Test	Menu

Figure 9-56. Configuration Overview

For additional details on the values displayed on this screen, refer to the Parameter Block Definitions in the Configuration Overview screen section of the Programming and Configuration Tool (PCT) chapter.

Configuration Compare—User selects whether this comparison feature is USED or NOT USED. This
routine compares the configuration of the current module against the other two modules in the
MicroNet Safety Module and generates an alarm if there is a difference.

Configure Configuration Compare			
Conf	iguration Com	pare USE	D
	Press ENIER	to edit value	
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-57. Configuration Compare

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• Copy Configuration—Allows the user to copy the configuration in the current module to one or both of the other two modules in the MicroNet Safety Module.



Figure 9-58. Configuration Copy

Configuration Copy Procedure

- 1. Configuration Compare must be configured to "Used" on the current module and the target module(s), for this routine to function.
- 2. If Configuration Compare is NOT USED on the current module, selecting Copy Configuration will bring up the message:

Configuration Compare Disabled

Configuration Copy is not available

- 3. If the Configuration Compare is NOT USED on the target module, its Configuration Compare Result will show as UNKNOWN and there will be no soft key option to copy to that module.
- 4. The Configuration Copy screen will display the current configuration status of the other two modules.
 - a. Match Indicates that the target module already has the same configuration as the current module.
 - b. No Match Indicates that the configurations do not match.
 - c. Unknown Indicates that the target module is not configured to use Configuration Compare so cannot be read or copied to or that the module is missing, powered off, or that the CAN communications to that module are not working.
- 5. The current module can be in a tripped, or un-tripped state
- 6. Any target modules must be in a tripped state to accept the configuration.
- 7. Press "Copy to _" for either of the other two modules.
- 8. Select the password for Config level, and press Enter.
- 9. Displays "Copying configuration to target...".
- 10. Displays "Done saving target configuration"
- 11. The screen will show that the target module is now a Match.

IMPORTANT The Configuration Copy does NOT copy user defined text associated with Inputs, Outputs, or Alarm, Trip, or Event Latches.

Password Change Menu

- Allows the user to change the Test Level or Configuration Level passwords.
- The current password must be re-entered before any changes can be made.

Password Change Menu						
Test Level Password						
Config Level Password						
		I				
Monitor Me	nu View	Logs	Config	Menu	Test	Menu

Figure 9-59. Password Change

Password Change Procedure

- 1. Select the Level of password to change.
- 2. At the Change Password prompt Select Yes to continue or Cancel to back out of this screen.
- 3. If changing the Test Level Password, either the current test or configure password may be entered. If changing the Config Level Password, the current configure password must be entered.
- 4. After successfully selecting the correct password, press Enter.
- 5. The user must now select the NEW password for that level.
 - a. Use the Aa 0-9 @ soft key to select upper case letters, lower case letters, numbers, or a list of usable special characters.
 - b. Use the value ∇ or \blacktriangle keys to change the highlighted value.
 - c. Use the Cursor \rightarrow key to move the highlighted character to the right.
- 6. Once the new password has been selected press Enter to save it.
- 7. A message will appear to confirm that the password has been changed.

IMPORTANT There is no means to reset the password if it is forgotten. Units requiring a password reset must be returned to Woodward.

Test Modes Menu

The Test Modes Menu provides access to all the MicroNet Safety Module tests. The user can initiate any configured test the front panel. The Test or Config Level password must be entered to start any of these tests except for the Lamp Test.

The system is equipped with several internal test routines to verify configurable logic and that parameters are working correctly. The test menu of the MicroNet Safety Module keypad contains following tests:

• Temporary overspeed setpoint

This is an overspeed test with adjusted test speed setpoint executed with the real hardware speed signal from the rotating machine. The speed of the rotating machine must be raised within the allowed test time span in order to test trip action. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted.

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Manual simulated speed test

This is an overspeed test with the speed setpoint that is valid for the machine executed with a simulated speed signal from an internal frequency generator that initiates at the overspeed setpoint minus 100 rpm and must be manually raised within the allowed time span to above the overspeed setpoint in order to test the trip action. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted.

Auto simulated speed test

This is an overspeed test with the speed setpoint that is valid for the machine executed with a simulated speed signal from an internal frequency generator that initiates at the overspeed setpoint minus 100 rpm and is automatically raised to above the overspeed setpoint in order to test the trip action. If the overspeed setpoint is not exceeded within the requested time span, the overspeed test is aborted.

• Periodic overspeed test

The periodic overspeed test provides an auto simulated speed test at the configured test interval. Since module A initiates the test sequence, the periodic overspeed test can only be configured in module A.

- User defined test 1
- User defined test 2
- User defined test 3

Test Modes Menu			
Te M	emporary O∨er Ianual Simulat Auto Simulate Periodic O∨e User-defin User-defin	speed Setpoin ed Speed Test d Speed Test erspeed Test ed Test 1 ed Test 2	ıt
Monitor Menu	View Logs	Config Menu	Test Menu

Figure 9-69. Test Modes Menu

In general, a test may not be started if any other module is tripped or in test or if the current module is tripped or in test. One exception to these rules is the Temporary Overspeed Trip Setpoint which can be applied to multiple modules or if another module is tripped. The other is the Lamp Test which can be applied to any module at any time without a password. If a test is not permitted, or aborted, the following messages explain the cause:

Module Already Tripped! Test Aborted – Indicates that the test cannot be started because the module is already tripped.

Test in Progress - Indicates that the test cannot be started because the module is already in the test mode.

Other Module Tripped! Test Aborted – Indicates that the test cannot be started or that a running test was aborted because another module is tripped.

NOTE: This test mode interlock can be disabled in the Test Modes Configuration of the PCT.

Other Module In Test Mode! Test Aborted. – Indicates that the test cannot be started because either of the other modules are in a test mode.

Note: The Test Mode Interlock can be disabled in the configurable software.

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Temporary Overspeed Setpoint Test

- Temporary Overspeed Trip Setpoint—Trip setting for testing.
- Actual Speed—Current Actual Speed.
- Overspeed Trip Setpoint—Configured Actual Overspeed Setpoint.

Temporary Oversp	eed Setpoint Test
Temporary O∨ers	peed Trip Setpoint
200	0 RPM
Actual Speed	2000 RPM
0∨erspeed Trip Setp	oint 3500 RPM
	<u> </u>
Start Test	

Figure 9-70. Temporary Overspeed Test

Temp. Overspeed Test Procedure

To configure this test, see Configure Test Modes Procedure in the section above. See Chapter 3 for a full description of this test.

- 1. Module cannot be tripped to run this test.
- 2. Press the Start Test softkey.
- 3. Select the password for Test or Config level.
- 4. To run the test press Apply, or press Cancel to exit..
- 5. The Temp Overspeed Trip Timer will be displayed and counting down.
- 6. The user can end the test and restore the Overspeed Trip Setpoint to the Configured Actual Overspeed Setpoint.
- 7. If the Timer expires before the test has ended, the unit will display a message Test Time Expired, and revert back to the Start test screen

Temporary Oversp	eed Setpoint Test	
Temporary O∨ersp	eed Trip Setpoint	
2000	D RPM	
Actual Speed	1600 RPM	
0∨erspeed Trip Setp	oint 3500 RPM	
Test Time Remaining 00:00:25		
Temporary Overspeed	Trip Setpoint Active	
	End Test	

Figure 9-70. Temporary Overspeed Test

The following Messages may be seen on the Temp. Overspeed Threshold Test page:

At Least One Other Module Is Tripped! – This is only used for the Temporary Overspeed Trip as a warning that another module is tripped. It does not prohibit applying this test.

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Temporary Overspeed Trip Setpoint Active - Indicates the Temporary Overspeed Trip Test is active (and the current speed is less that the Overspeed Trip Setpoint).

Speed > Overspeed Trip Setpoint! - Indicates the Temporary Overspeed Trip Test is active and the current speed is greater than the Overspeed Trip Setpoint. When the test is ended by the user or when the Test Time is Expired, the module will trip.

Test Time Expired - Indicates the timer has reached zero.

Test Ended by Modbus - Indicates the test was ended by a Modbus command.

Simulated Speed Test

- Test Mode—Manual or Auto.
- Actual Speed—Current Actual Speed.
- Overspeed Trip Setpoint—Configured Actual Overspeed Setpoint.

Manual Simulated	Speed Test
Test Mode	MANUAL MODE
Actual Speed	3500 RPM
0∨erspeed Trip Threshold	d 4000 RPM
Start Test	

Figure 9-71. Manual Simulated Speed Test

Note: The resolution of the internal simulated speed decreases as frequency increases. The following table indicates a few spot frequencies. In the following table and graph, it is assumed that a 60 teeth gear is used with a gear ratio of 1, making frequency the same as RPM.

Table 9-1. 60 Teeth Gear with Gear Ratio of 1

RPM	Resolution (RPM)
6	9.5E-5
100	.0016
1000	0.16
10000	2.0
32000	20.5

The resolution of the internal frequency generator is described in the following graph. The discontinuities in the chart occur when different internal clock scaling occurs to optimize resolution.



Figure 9-72. Test Frequency Resolution

The following Messages may be seen on the Manual Simulated Speed Test page:

Manual Simulated Speed Active - Indicates the Manual Simulated Speed Test is active.

Auto Simulated Speed Active - Indicates the Auto Simulated Speed Test is active.

Test Time Expired - Indicates the timer has reached zero.

Test Ended by Modbus - Indicates the test was ended by a Modbus command.

Simulated Speed Test (Auto or Manual) Procedure

To configure this test, see Configure Test Modes Procedure in the section above. See Chapter 3 for a full description of this test.

- 1. Module cannot be tripped to run this test.
- 2. Press the Start Test soft key.
- 3. Select the password for Test or Config level.
- 4. To run the test press Apply, or press Cancel to exit.
 - a. Manual Mode
 - i. The Simulated Speed Timeout counter will be displayed and counting down.
 - ii. The user can use the value ♥or ▲ keys to change the simulated speed setting
 - iii.If the simulated speed is raised above the trip point, the unit will switch to the Home screen with the Module Trip displayed.
 - iv.Select End Test to Exit
 - v.If the timer expires before a simulated trip occurs, the unit will display a message Test Time expired and revert back to the Start test Screen.
 - b. Auto Mode
 - i. The module will automatically start ramping the simulated speed up to the trip point
 - ii.When the simulated speed exceeds the trip point, the unit will switch to the Home screen with the Module Trip displayed.
 - iii.There is no timer in Auto mode.
 - iv.Select End Test to Exit

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Mai	nual Simulat	ed Speed Te	st
Test Mod	e	MANU	AL MODE
Actual Sp	beed	34	100 RPM
0verspee	d Trip Setp	oint 39	500 RPM
Simulated Speed 3400 RPM			
Test Time Remaining 00:00:33			
Man	ual Simulate	d Speed Act	ive
	Value 🔻	Value 🔺	End Test

Figure 9-73. Manual Simulated Speed Test

Periodic Overspeed Test

- Displays time until the next test.
- Display results of last test.
- This test can only be configured on Module A.

	Periodic Ove	erspeed Test	
Ti	me Remaining	Until Next Te	st
	7 days 0 hours 0 mins		
Result Of Last Test			
	TEST I	PASSED	
		1	
Start Test			Disable Periodic Test

Figure 9-74. Periodic Overspeed Test

Result of Last Test can be:

TEST NOT STARTED, TEST PASSED, TEST FAILED, TEST NOT COMPLETED.

Periodic Overspeed Test Procedure

To configure this test, see Configure Periodic Overspeed Test Procedure in the section above. See Chapter 3 for a full description of this test.

- 1. No module can be tripped or in the test mode when this test is started.
- 2. Test can only be initiated on Module A.
- 3. Press the Start Test soft key.
- 4. Enter the Test or Config Level Password and select "ENTER".
- 5. Once the correct password has been entered, press the Start Test soft key to initiate the test.
- 6. Module A will initiate the internal Overspeed Trip Test.
- 7. Periodic Overspeed test Active
- 8. If any module is tripped or placed in test, the Time Remaining Until Next Test timer will be prevented from counting below 1 hour. If the timer is already below 1 hour it will be increased to 1 hour.

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- 9. If no other module is tripped.
 - a. The test will run on Module A only
 - b. Switch to the Home screen and display "Module Trip".
 - c. Automatically reset the module.
 - d. Move on to Module B and repeat steps b and c.
 - e. Move on to Module C and repeat steps b and c.
- 10. This test will repeat at the next configured interval.

The operator can disable the periodic test from the front panel of the module. When the Periodic test is Disabled, or if any module is in trip or test, the Time Remaining Until Next Test will be prevented from counting below 1 hour. If the timer is already below 1 hour it will be increased to 1 hour. When Enable Periodic Test is selected and no modules are tripped or in test, this function is removed.

User Defined Test 1, 2, & 3

User configured tests are described in chapter 3.

When one of these screens is selected, one of the following status messages will be shown:

NOT CONFIGURED

Test Not Started

Test Ended by:

- a. Front-Panel
- b. Test Timeout
- c. Configurable Logic

User-defined Test Procedure

To configure this test, see Configure User-defined Test Procedure in the section above. See Chapter 3 for a full description of this test.

- 1. No module can be tripped or in the test mode when this test is started.
- 2. Press the Start Test soft key.
- 3. Enter the Test or Config Level Password and select "ENTER".
- Once the correct password has been entered, the Message "Start User-defined Test X*?" will appear.
- 5. Press the "Start" soft key to initiate the test or "Cancel" to cancel the test.
- 6. The user defined test latch will be set and the associated logic executed.
- 7. During the test, the message **User-defined Test X* Active** and the Test Time Remaining timer, and the "End Test" soft key are shown.
- 8. If End Test is selected, the message End Test Mode? will be shown and the soft keys "Yes" and "No" will be shown. Selecting "Yes" will reset the User-defined Test Latch.
- 9. The test will be ended if the test timer reaches 00:00:00, if the "End Test" soft key is select, if the test is aborted by a Modbus command, or if the Configurable Logic resets the test.

* "X" indicates the number of the User-defined test - 1, 2, or 3

NOTICE The logic behind the User-defined Test must be validated by the user for all possible modes of operation including normal test, test failure(s), or test abort(s).

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	User-defin	ed Test 1	
Test E	inded by:	Trip Conditi	ion
	Start User-de	fined Test 1?	
Start			Cancel



User-defined Test 1			
Test Started by: Front-Panel			
Test Time Remaining 00:00:13			
User-defined Test 1 Active			
End Test			
User-defined Test 1			
Test Ended by: Test Timeout			
Test Time Expired			
Start Test			

Figure 9-76. User Defined Test

I

Lamp Test

The Lamp Test is provided to verify front panel LED functionality. During the test, each LED is cycled off and through the provided color combinations listed below. The test can be repeated as needed. A cancel function is also available. No password is required to run the test.

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Lamp Test Procedure

- 1. Select Start Test
 - a.
 - Tripped LED—Turns red. Unit Health LED—Turns red, then green. b.
 - Alarm LED—Turns yellow. c.
- 2. When the test is complete, LEDs return to normal operation.

	Lamp	Test	
	Start La	mp Test?	
Start Test			Cancel

Figure 9-77. Lamp Test

Chapter 10. Programming and Configuration Tool

General

Each MicroNet[™] Safety Module module includes preset overspeed, over-acceleration, alarm latch, and trip latch functionality. It can be custom configured to meet a specific application through a module's front panel or the provided Programming and Configuration Tool (PCT).

A custom application program is required for use of any of the MicroNet Safety Module control's configurable inputs and outputs and related functionality. The MicroNet Safety Module includes a software based PCT that can be loaded onto a computer and used to:

- Create and change custom application programs
- Change overspeed and over-acceleration functionality settings
- Save application and configuration settings to a file
- Download application and configuration settings to each MicroNet Safety Module module
- Upload application and configuration settings from a MicroNet Safety Module module
- Upload and view stored logged files from a MicroNet Safety Module module



A straight-through serial cable is used to allow the designated computer (with the PCT program loaded on it) to communicate with a MicroNet Safety Module. Refer to Figure 2-18 for cable-specific information.

The PCT consists of a combination of Woodward's "ToolKit" HMI (Human Machine Interface) software program and a special MicroNet Safety Module application file. Although the PCT is provided with each MicroNet Safety Module on an included software installation CD, it can also be uploaded from Woodward's Internet website (www.woodward.com/software).

The PCT is designed to allow off-line (while not connected to the MicroNet Safety Module) program and configuration settings to be generated, saved, then downloaded into a MicroNet Safety Module. On-Line (while connected to the MicroNet Safety Module) configuration settings can be manipulated. This is an example of a typical process to follow to program and/or make changes to the MicroNet Safety Module via the PCT:

- 1. Open ToolKit and select a .wset file to modify/edit or create a new one from SID specification defaults.
- 2. Create program logic or make changes to existing logic.
- 3. Save the .wset file to a directory on the computer.
- 4. Connect to the MicroNet Safety Module via the PCT connection wizard.
- 5. Download the saved .wset file to the MicroNet Safety Module module (module must be in tripped state).
- 6. Using the Config Menu's Configuration Management function copy the downloaded program to the other two MicroNet Safety Module modules.

Installation of the PCT

The MicroNet Safety Module control's PCT is a combination of Woodward's "Toolkit" software and a special MicroNet Safety Module application program.

Use the following installation procedure to install the PCT (Programming and Configuration Tool).

- 1. Locate/obtain MicroNet Safety Module PCT Installation CD provided with each MicroNet Safety Module. (Alternatively, the MicroNet Safety Module PCT can be downloaded from Woodward's Internet website [www.woodward.com/software]).
- 2. Run the installation program and follow all installation instructions.

Programming and Configuration Tool (PCT) Help

On-Line Programming and Configuration Tool (PCT) help is available and included with the installation of the Programming and Configuration Tool (PCT) product. Help can be accessed from the Programming and Configuration Tool (PCT) 'Help' menu located on the Main Window.

Levels of Operation of the Programming and Configuration Tool (PCT)

The MicroNet Safety Module Programming and Configuration Tool (PCT) can be used in different operating levels:

- Isolated from the MicroNet Safety Module (Off-Line)
- Test Level (On-Line)
- Config Level (On-Line)

Isolated level:

- A communication link between PC and MicroNet Safety Module is not required.
- Password is not required.
- The configuration file to be loaded into the MicroNet Safety Module can be created by the Programming and Configuration Tool (PCT).

Test Level:

- A serial communication link must be established and operational.
- Password for Test Level is required.
- The configuration file to be loaded into the MicroNet Safety Module can be created by the Programming and Configuration Tool (PCT).
- The configuration file stored in the MicroNet Safety Module can be copied to the PC.
- Log files can be viewed or exported.
- All logs (except Peak Speed and Peak Acceleration) can be reset.

Config Level:

- A serial communication link must be established and operational.
- A password for Config Level is required.
- The configuration file stored in the MicroNet Safety Module can be copied to the PC.
- The configuration file created by the Programming and Configuration Tool (PCT), can be uploaded to the MicroNet Safety Module.
- Log files can be viewed, exported, or reset.
- On-Line configuration is enabled.



Using the Programming and Configuration Tool (PCT)

In order to use the MicroNet Safety Module Programming and Configuration Tool (PCT), the following actions must be executed:

- 1. The correct Toolkit version is supplied with the Installer CD that is provided with the product and must be installed on a PC.
- 2. Run the Toolkit service tool by double-clicking on the file MicroNet Safety Module.wstool. The following introduction screen will be displayed on the PC.

🗱 MicroNetSM.wstool - Woodward ToolKit			
Ele View Device Settings Tools Help	i Bernet Storent		
Home	Sconnect Disconnect		
MicroNet' - Programming a	nd Configuration Tool WOODWARD		
Non-Line Me	nu (Must be connected to unit)		
CONFIGURATION - Upload - Download	View MicroNet [™] Safety Module Logs		
Edit/View Configuration	View Trip and Alarm Log View Overspeed/Acceleration and Trip Cycle Time Log View Events Log		
View Configuration Error Log	View Sequence of Events Log View Module Faults Log Configuration Overview		
Notes:			
To Edit Off-Line Files - Use the above 'Settings' Edit Settings File Function To Edit On-Line Settings - Use the above 'Connect' Function then the 'On-Line Menu' Functions			
Peak Speed/Acceleration Log	RPM Peak Acceleration RPM/s		
	<u>~</u>		
Disconnected			

The PCT is ready to be used in isolated level. In order to use the PCT in either Test or Config level, the following actions must be executed:

3. A serial interface cable must be installed between PC and one of the units of the MicroNet Safety Module. The serial cable must be wired as shown in Figure 2-19.

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4. Establish communication by using the "connect" function. After pressing "Connect", the following pop-up window appears which prompts you to select a network:

-		
Network		I
СОМ1		
STCP/IP		
Baud Bate: AutoDe		
Always connect to	my last selected network.	
3	Connect	

- 5. Select the Communication port that the serial interface cable is connected to and click on the Connect button in the pop-up window.
- 6. When the communication link is established, the following pop-up window appears:
- 7. Select either "Test Level", or "Config Level", and enter the associated Password for the selected level and log in. Select Close if Test or Config level functions are not required.
- 8. If the communication link cannot be established, the Programming and Configuration Tool (PCT) will continue to attempt to establish the communication link until the Disconnect Button is pressed.
- 9. After communication has been established, the MicroNet Safety Module Programming and Configuration Tool (PCT) provides two menu options:
 - o On-Line Menu
 - o Off-Line Menu



On-Line Menu

₩ MicroNetSM.wstool - Woodward ToolKit				
: File <u>Vi</u> ew <u>D</u> evice <u>S</u> ettings <u>T</u> ools <u>H</u> elp : P P II I II : + + + + + + + + - -	. I I Connect I	Disconnect		
MicroNet [™] Safety Module - Programming and Configuration Tool WOODWARD				
On-Line Menu (Must be connected to unit)				
CONFIGURATION - Upload - Download	d View MicroNet [™] Safety Module L	ogs		
Edit/View Configuration	View Trip and Alarm Log View Overspeed/Acceleratie and Trip Cycle Time Log	on View Events Log		
View Configuration Error Log	View Sequence of Events Log	Configuration Overview		
Notes:				
To Edit Off-Line Files - Use the abo To Edit On-Line Settings - Use the a	ve 'Settings' Edit Settings File Function above 'Connect' Function then the 'On-Line Men	u' Functions		
Peak Speed/Acceleration Log				
Peak Speed	1000 RPM Peak Acceleration	0.00 RPM/s		
Reset Peak Speed/Acceleration	on			
Reset All Logs		_		
Note: This button resets • Trip Log • Alarm Log • Events Log • Sequence of Events Log				
Connected on COM4				

The On-Line menu provides seven buttons:

- Edit/View Configuration
- View Configuration Error Log
- View Trip and Alarm Log
- View Sequence of Events Log
- View Overspeed/Acceleration and Trip Cycle Time Log
- View Event Logs
- View Module Faults Log
- Configuration Overview

This menu is always available; however a communication link must be established before the information in the logs is available for monitoring.

When logged in at the appropriate Security Level, the following buttons are available also:

- Reset Peak Speed/Acceleration
- Reset All Logs

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Selecting **Reset Peak Speed/Acceleration** button will clear the Peak Speed/Acceleration. The Reset All Logs button is only visible when logged in with Test Level permissions or higher. If desired, the logs can be cleared from the front panel user interface (see Logs Menu).

Selecting the **Reset All Logs** button will clear the Trip, Alarm, Overspeed /Acceleration and Trip Cycle Time, Sequence of Events, Event Log 1, Event Log 2 and Event Log 3 logs. The Reset All Logs button is only visible when logged in with Test Level permissions or higher. If desired, the logs can be cleared from the front panel user interface (see Logs Menu).

Home

Use this "Home" button to return to this On-Line Menu after any one of the five logs have been opened.

View Configuration Error Log

After selecting "View Configuration Error Log", a list of all configuration faults of the configuration that have been loaded in the MicroNet Safety Module is displayed.

Note: If the configuration has not been changed since the last power cycle, configuration faults do not appear.

	N	Configuration Error Log	🔹 🕴 Connect 🖉 Disconnect	J
MicroNe Safety Mo	et™ - Programm odule	ing and Configuration Tool	wood	WARD
()	2	Configuration Erro	r Log	
CONFIGUR	ATION - Upload - Dowr	nload View M	licroNet [™] Safety Module Logs	
E	dit/View Configuration	View Trip and Alarm Log	View Overspeed/Acceleration and Trip Cycle Time Log	iew Events Log
View	Configuration Error Log	View Sequence of Events Log	View Module Faults Log	ration Overview
	Message			
Type	Programmable Inp	ut 1 is configured as ANALOG but has no analo	a outputs connected.	
Type Warning		ut 1 is configured as ANALOG but has discrete	outputs connected.	
Type Warning Error	Programmable Inp			
Type Waming Error Waming	Programmable Inp Programmable Inp	ut 2 is configured as ANALOG but has no analo	g outputs connected.	
Type Waming Error Waming Error	Programmable Inp Programmable Inp Programmable Inp	ut 2 is configured as ANALOG but has no analo ut 2 is configured as ANALOG but has discrete	g outputs connected. outputs connected.	
Type Waming Error Waming Error Waming	Programmable Inp Programmable Inp Programmable Inp Programmable Inp	ut 2 is configured as ANALOG but has no analo ut 2 is configured as ANALOG but has discrete ut 3 is configured as DISCRETE but has no disc	og outputs connected. outputs connected. crete outputs connected.	
Type Waming Error Waming Error Waming Waming	Programmable Inp Programmable Inp Programmable Inp Programmable Inp Programmable Inp	ut 2 is configured as ANALOG but has no analo ut 2 is configured as ANALOG but has discrete ut 3 is configured as DISCRETE but has no disc ut 4 is configured as DISCRETE but has no disc	ig outputs connected. outputs connected. crete outputs connected. crete outputs connected.	

Configuration faults include warnings and/or errors.

If a configuration warning exists, the configuration is saved to the MicroNet Safety Module.

Configuration warnings can be logical or analog outputs from any function not connected.

If a configuration error exists, the configuration is not saved and the following screen appears when trying to upload the settings file to the MicroNet Safety Module.

Load Settings File to Device	
Finished	
Configuration Error detec	ted. Close window and check the log listing for details.
	Close

All configuration errors must be resolved before a successful upload of the settings file can be completed. Configuration errors can include:

- Inputs configured as discrete inputs connected to comparators.
- Inputs configured as analog inputs connected to logical inputs.
- Inputs configured as "Not Used" but are connected to other components.

View Trip and Alarm Log

After selecting "View Trip and Alarm Log", a list of all recent trips and/or alarms that have been detected and logged in the MicroNet Safety Module are displayed. Each log can contain up to 50 events. Logs can be cleared from the View Events Log screen or from the front panel user interface, with Test Level permissions or higher.

The list contains a description, the time stamp, first-out and/or test-mode indicators. The first-out indicator contains an asterisk (*) for the first detected fault condition(s) after the latch was cleared of all active faults. The test mode indication contains an asterisk (*) if the ProTech was in any of the test modes when the fault condition(s) occurred.

The logs can be saved to an html file using the Export button.



Log Timestamp

The time stamps in the logs are based on the internal clock at the time of the event. Time stamps are not changed when the internal clock time is modified (e.g. time/date is set or a 24 Hr time sync command).

View Overspeed/Acceleration and Trip Cycle Time Log

After selecting "View Overspeed/Acceleration and Trip Cycle Time Log", two lists are displayed:

- A list of all recent overspeed trips and alarms that have been detected and logged in the ProTech is displayed. The maximum length of this list is 20 lines. The list contains a description, the timestamp, the actual speed when overspeed was detected, the acceleration when overspeed was detected, the maximum speed reached (after trip) and the maximum acceleration.
- A Trip Cycle Time Log which displays the time of the trip and the delay time to receive the trip feedback signal, when used. The cycle time is displayed in milliseconds.



View Event Logs

It is possible to view the contents of the three event logs by selecting "Event Logs". Each log can contain up to 50 events. Log inputs must be configured and displayed 'names' are user-configurable (see configuration of event logs).

The displayed log list contains a user-definable description (name), the time stamp of the event, first out indication and test mode indication. The first out indication contains an asterisk (*) for the first detected event(s) after the event latch was cleared of all active events. The test mode indication contains an asterisk (*) if the ProTech was in any of the test modes when the event occurred.

The logs can be saved to an html file using the Export button.



View Module Faults Log

It is possible to view additional details of Internal Fault Alarm and Trip conditions by selecting "View Module Faults Log". The list contains a description containing type of fault (trip or alarm), fault originator (identify which CPU faulted: Logic, Comm or Display), fault type, fault source code address, and a time stamp of the fault.

Select the **Clear Module Faults Log** button to clear this log. This button is only visible with when logged in with Test Level permissions or higher.

The Module Faults Log is only available from the Programming and Configuration Tool (PCT), it is not displayed on the front panel user interface.

The log can be saved to an html file using the Export button.



Configuration Overview

The Configuration Overview screen shows CRC codes associated with the overall configuration and with individual (sub-component) configurations. The CRC is a value calculated from the configuration data, so that if the data changes, the CRC will change. CRC codes that do not match represent dissimilar configurations and matching CRC codes represent identical configurations.

Comparing CRCs between modules or before and after a software change can provide confirmation of where configurations are the same and to facilitate isolation of configuration changes.

The CRC values are also displayed on the front panel user interface (see Configuration Overview).

The log can be saved to an html file using the Export button.

Parameter Block Definitions

- **Configuration CRC**: CRC codes for the entire configuration individually listed below.
- **Speed Sense**: CRC codes of the following settings in the Configure Speed Input section on the Speed page: Probe Type, Nr of Gear Teeth, Gear Ratio, and Sudden Speed Loss.
- **Overaccel Trip**: CRC codes of the Configure Acceleration section on the Speed page.
- **Overspeed Trip**: CRC codes of the Overspeed Trip setting in the Configure Speed Input section on the Speed page.
- Start Logic: CRC codes of the Configure Start Logic section on the Speed page.
- Analog Output: CRC codes of Configure Analog Output settings on the Other Outputs page.
- **Programmable Relays:** CRC codes of Configure Discrete Outputs settings on the Other Outputs page.
- •
- **Trip Relay:** CRC codes of Configure Trip Latch setting on the Trip Latch page.
- **Configurable Inputs:** CRC codes of programmable input settings (Programmable Inputs 1-10) on the Inputs page. This CRC does not include the user-definable input names or units.
- Alarm Latch: CRC codes of Alarm Latch settings (1-50) on the Alarm Latch page. This CRC does not include the user-definable input names.

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- **Trip Latch:** CRC codes of Trip Latch settings (1-25) on the Trip Latch page, excludes the Trip Configuration (energize/de-energize) which is individually stored/displayed (see Trip Relay above). This CRC does not include the user-definable input names.
- Event Latch 1: CRC codes of Event Latch 1 settings on the Event Latches page. This CRC codes does not include the user-definable input names.
- Event Latch 2: CRC codes of Event Latch 2 settings on the Event Latches page. This CRC does not include the user-definable input names.
- Event Latch 3: CRC codes of Event Latch 3 settings on the Event Latches page. This CRC does not include the user-definable input names.
- **Configurable Logic:** CRC codes of the entire configurable logic (Gates, Latches, Delays, Unit Delays, Comparators, Timers, and User Defined Tests). This includes:
 - Gate settings (1-50) on the Logic Gates page.
 - \circ $\;$ Latch settings (1-10) on the Latches page.
 - \circ Delay settings (1-15) on the Delays page.
 - Unit Delay settings (1-10) on the Unit Delays page.
 - Comparators settings (1-10) on the Comparators page.
 - Timers settings (1-15) on the Timers page.
 - User-defined Test settings (1-3) on the Test Modes page.
- Trip Cycle Time Monitors: CRC codes of the settings on the Trip Cycle Timers page.
- **Time Synchronization:** CRC codes of the settings on the Time Synchronization page. This setting, when used, will typically be unique for each module A, B, or C. As a result, this setting is included in the overall CRC but is not used in the configuration compare function (not copied or compared).
- **Speed Test:** CRC codes of the Temporary Overspeed Trip, Temporary Overspeed Trip Timeout, and Simulated Speed Timeout settings in the Configure Test Modes section of the Test Modes page. Note: see Test Modes CRC for Test Mode Interlock Disabled setting.
- **Modbus:** CRC codes of Configure Modbus settings on the Modbus page, excluding the Slave Address setting which has a separate CRC.
- **Configuration:** CRC codes of Module to Module Configuration Compare settings on the Home page of the Program Mode.
- **Resettable Trip:** CRC codes of Resettable Trip settings on the Reset Logic page.
- Test Modes: CRC codes of Test Mode Interlock Disabled setting on the Test Modes page.
- **Periodic Test:** CRC codes of Configure Periodic Overspeed Test settings on the Test Modes page.
- **Modbus Slave Address:** CRC codes of Modbus Slave Address setting on the Modbus page. This setting, when used, will typically be unique for each module A, B, or C. As a result, this setting is included in the overall CRC but is not used in the configuration compare function (not copied or compared).
- **Reset Block:** CRC codes of Configurable Reset Source setting on the Reset Logic page.
- Sequence of Events Log: CRC codes of Sequence of Events Log settings on the Sequence of Events Log page.

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K MicroNetSM.wtool - Woodward ToolKi					
File View Device Settings Tools H	p				
	ofician Querrian	E Germant B D	connect		
	higuration Overview	· J Connect X De	sconnect		
MicroNet [™] - Programming and Configuration Tool №WOODWARD					
Configuration Overview					
CONFIGURATION - Upload - Downle	ad View M	/licroNet™ Safety Module Log	S		
Edit/View Configuration	View Trip and Alarm Log	View Overspeed/Acceleration and Trip Cycle Time Log	View Events Log		
View Configuration Error Log	View Sequence of Events Log	View Module Faults Log	onfiguration Overview		
Parameter Block			CRC Value		
Configuration CRC			0xADE7		
Speed Sense			0x2C98		
Overaccel Trip			0x3CFA		
Overspeed Trip			0xCE70		
Start Logic 0x1687					
Analog Output 0xBFD8					
Programable Relays 0x73EC					
Trip Relay			0xE5B1		
Configurable Inputs			0x6B0A		
Alam Latch			0x162C		
Trip Latch			0x8975		
Event Latch 1			0x843A		
Event Latch 2			0x530F		
Event Latch 3			0x9B4C		
Configurable Logic			0xA884		
Trip Cycle Time Monitors			0xB771		
Time Synchronization			0x003C		
Speed Test			0x9602		
Modbus			0xA7A4		
Configuration			0x2130		
Resettable Trip			0xC031		
Test Modes			0xE011		
Periodic Test			0x78D1		
Modbus Slave Address			0xF0BF		
Reset Block			0x2380		
Sequence Of Events Log			0xC697		
			Export		
Connected on COM4					

Edit/View Configuration

After selecting "Edit/View Configuration", all parameters can be set or changed and loaded to the device while the MicroNet Safety Module is operational. After selecting this button, the following screen is displayed.

Edit/View Configuration			
MicroNet [™] Safety Module - Program	ming and Configuration Tool V	WOODWARD	^
Input Configuration Speed Inputs Modbus Time Synchronization Test Modes	Logic Gates Comparators Latches Timers Delays Trip Cycle Timers	Output Configuration Trip Latch Alarm Latch Reset Logic Other Outputs Event Latches	
Module to Module Configuration Compare	Sequence of Events Log		
		OK <u>C</u> ancel A	pply

A selection can be made for the parameters to be configured on-line. The changes have the same result as off-line configuration - changed parameters are immediately operational. In Off-Line configuration, parameters are only changed in a configuration file.

The Off-Line program mode has the following buttons on the "Home" screen:

- Speed
- Inputs
- Modbus
- Time Synchronization
- Test Modes
- Logic Gates
- Latches
- Delays
- Comparators
- Timers
- Trip Cycle Timers
- Sequence Of Events Log
- Trip Latch
- Alarm Latch
- Reset Logic
- Other Outputs
- Event Latches

These buttons can be used either in On-Line configuration or in Off-Line configuration. Reference the following paragraphs.

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Configuration of the MicroNet Safety Module



Changing the configuration settings in the MicroNet Safety Module is possible in two ways:

- Directly through the front panel of the MicroNet Safety Module
- By the Programming and Configuration Tool (PCT)

The changes that can be done via the front panel are limited to the following functions:

- Speed Probe Type
- Number of Gear Teeth
- Gear Ratio
- Overspeed Trip Setpoint
- Sudden Speed Loss Alarm/Trip
- Acceleration Trip Enable/Disable
- Accel trip Enabled Speed Setpoint
- Acceleration Trip Setpoint [rpm/s]
- Speed Fail Setpoint
- Speed Fail Trip Enable/Disable
- Speed Fail Alarm Enable/Disable
- Speed Fail Timeout Trip
- Speed Fail Timeout Time
- Trip Latch Energize/De-energize to Trip
- Analog Output 4 mA and 20 mA Settings
- Test Modes
- Periodic Overspeed Test
- Modbus Communication Parameters
- Configuration Compare and Copy Features
- Changing Passwords

All other configurations, including the ones that can be configured by the front panel, can only be implemented by use of the Programming and Configuration Tool (PCT). With the PCT, it is possible to do:

- On-Line configuration
- Off-Line configuration

On-Line Configuration



After selecting "Edit/View Configuration", all parameters can be set or changed and loaded to the device while the MicroNet Safety Module is operational.

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For on-line configuration, the following "Home" screen buttons are available:

- Speed
- Inputs
- Modbus
- Time Sync
- Test Modes
- Logic Gates
- Latches
- Delays
- Comparators
- Timers
- Trip Cycle Timers
- Sequence of Events Log
- Trip Latch
- Alarm Latch
- Reset Logic
- Analog and Discrete Outputs
- Event Latches

These buttons are only available if a serial communications link is established.

After selecting one of the buttons, a pop-up screen is displayed in which particular parameters for the selected function can be checked and modified if necessary.

For executing this configuration, see "Configuration Settings" in this chapter.

The right bottom corner of each sub-screen has three buttons and an information bar.

The information bar shows the minimum and maximum values that can be selected on the input field where the cursor is located.

In the example below (in the speed pop-up screen), if the cursor is located at the overspeed setting, the valid range of values is between 100 and 32000.

	ОК	Cancel	Apply	
Min: 100, Max: 32000				1

If a serial communication link is active, and Config level is active, and there are no configuration errors, then:

• After the OK or Apply button is pressed, the new configuration setting will immediately be uploaded to the MicroNet Safety Module.

If the new configuration setting is not immediately uploaded, there are three possibilities:

- Test level was selected.
- A configuration error is detected.
- MicroNet Safety Module module is not in trip condition.

Test level was selected

If test level was selected, the following pop-up window appears:

Load Settings File to Device	
Finished	
Configuration Level Access is required to load settings.	
	Close

Now communication must be stopped and restarted using Config level. Once logged in at the Config level, configuration settings can be changed.

A configuration error is detected

If a configuration error is detected, the following pop up window appears:



MicroNet Safety Module module is not in a trip condition

If the MicroNet Safety Module module is not in a trip condition, the following pop-up window appears:

Load Settings File to Device	
Finished	
Module is not tripped. Configuration could not be loaded.	
	Close

To load a configuration from a PC to a MicroNet Safety Module, the MicroNet Safety Module must be in a trip condition. If the unit is not in trip condition, uploading is inhibited. If no trip condition is present and the unit is configured as "De-energize to Trip", a power-up trip condition can be established by cycling the power supply.

For configuration of all parameters, see "Configuration Settings" in this chapter.

Off-Line Configuration

With the Programming and Configuration Tool (PCT), a settings file can be created, modified, saved, loaded to, and retrieved from the MicroNet Safety Module.

Configuration can only be created or modified by the editing of the settings files that are transferred to or from the MicroNet Safety Module.

Creating the configuration settings in the MicroNet Safety Module:

- 1. Create the settings file.
- 2. Save the settings file on the PC.
- 3. Load the settings file from PC to the MicroNet Safety Module.

Modifying the configuration settings in the MicroNet Safety Module:

- 1. Copy the settings file from MicroNet Safety Module to a file on the PC.
- 2. Modify the settings file.
- 3. Save the settings file on the PC.
- 4. Load the settings file to the MicroNet Safety Module.

See Drop-down Menu "Settings" for information on how to create and modify configuration files.

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Drop-down Menu "Settings"

The drop-down menu settings are used to create and modify the configuration files for the MicroNet Safety Module.

Configuration files can be created, modified, loaded, retrieved, compared, etc.

The following selections are available in the Drop-down Menu "Settings":

💥 MicroNetSM.wtool - Woodward ToolKit				
: File View Device	Settings Tools Help			
i 🗅 💣 📕 🚼	New from SID Specification Defaults			
A.4'	Save from Device to File			
Microivet'	Edit Settings File			
Safety Module	Load Settings File to Device			
	Associate Settings File with Application			
	Compare Settings File Differences			
	Replace the Settings in an Application File			

Using the Programming and Configuration Tool (PCT) for preparation of the configuration file

When using the MicroNet Safety Module Programming and Configuration Tool (PCT) for preparation of the configuration file, in isolated level, following selections from the settings drop-down menu can be used:

- New from SID Specification Defaults
- Edit Settings File
- Compare Settings File Differences

Using the Programming and Configuration Tool (PCT) in Test Level

When using the MicroNet Safety Module Programming and Configuration Tool (PCT) in test level, the management of log files is active, and the following selections from the settings pull down menu can be used:

- New from SID Specification Defaults
- Save from Device to File
- Edit Settings File
- Compare Settings File Differences

Using the Programming and Configuration Tool (PCT) in Config Level

When using the MicroNet Safety Module Programming and Configuration Tool (PCT) in config level, the management of log files is active, and the following selections from the settings pull down menu can be used:

- New from SID Specification Defaults
- Save from Device to File
- Edit Settings File
- Load Settings File to Device
- Compare Settings file Differences

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New from SID Specification Defaults

With the selection "New from SID Specification Defaults...", under "Settings", a new application with default settings can be started.

After clicking this selection, the following sub-window appears with a list of applications:

SID Specification Selec	stor
Please select the SID Spe with.	ecification file that goes with the application program you intend to use the settings file
Specification Name	Description
MicroNetSM Version-197	MicroNet [™] Safety Module (MSM)
SID File Locations	

Select the appropriate file compatible with your ProTech software. If other Woodward applications are installed on your PC, a list of choices in addition to ProTech may appear in this list.

🙀 MicroNetSM Version-197 Default Sett	ings - Settings Editor		
<u>Eile E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> elp			
: 📙 : 🖾 - 🗄 - 🤅 😋 Home			
MicroNet™ Safety Module - Programmi	ing and Configuration Tool	WOODWARD	
	Off-Line Program Mo	ode	
Input Configuration	Program Logic	Output Configuration	
Speed	Logic Gates Comparator	s Trip Latch	
Inputs		Alarm Latch	
Modbus	Latches Timers	Reset Logic	
Time Synchronization	Delays Trip Cycle Tin	Other Outputs	
Test Modes		Event Latches	
	Sequence of Events Log		
Module to Module Configuration Compare	Yes		
Notes			<u> </u>
			100
			N N

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MicroNet Safety Module Fault Tolerant Protection System

With this new window, a new configuration file for the MicroNet Safety Module can be created which means that:

- No logic is pre-programmed
- No Trip, Alarm or Event latches have been configured
- No inputs have been configured
- No test routines have been configured

For executing this configuration, see "Configuration Settings" in this chapter.

After the configuration is complete, the newly created settings file must be saved by using the drop-down menu "File", followed by "Save As".

Assign a file location and name, save the file on the PC and close the Settings Editor screen.

The settings files have a *.wset extension.

Once the file is saved, it can be uploaded to the MicroNet Safety Module by using pull down menu "Settings" followed by sub-selection "Load settings file to Device".

Save from Device to File

In order to modify the configuration in the MicroNet Safety Module, either the settings file of the MicroNet Safety Module must be already available or a settings file must be created by loading the configuration data from the MicroNet Safety Module to a file on PC. With the selection "Save from Device to File", a configuration file can be loaded from the MicroNet Safety Module to a settings file on a PC. A new file can be created or an existing file can be modified.

To save a setting file from the MicroNet Safety Module to a file, either the test or config level login is required.

After clicking this selection, the following sub-window appears:

Browee
Didwac

- 1. Use the Browse button to select the location and name of the settings file to be created or to be modified. The settings files have a *.wset extension.
- 2. Saving settings from device to file requires either the test or config level login. There are two valid conditions:
 - Serial communication was already established, and test level or config level was selected.
 - Serial communication was not yet established.

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MicroNet Safety Module Fault Tolerant Protection System

Serial communication was already established, and test level or config level was selected

- 3. If serial communication was already established, and test level or config level was selected, the transfer of the configuration file from the MicroNet Safety Module starts immediately.
- 4. The configuration file is ready to be modified by the MicroNet Safety Module Programming and Configuration Tool (PCT). See "Edit Setting File" in this chapter for information on how to modify the configuration file.

Serial communication was not yet established

5. If serial communication was not yet established, and after the filename is defined and the "Next" button is selected, the following pop-up screen appears. Select the appropriate network.

Select a network: Network COM1 TCP/IP Baud F	
	ate: AutoDetection

- 6. Highlight the communication port where the serial interface cable is connected to and click on the Next button in the pop-up window.
- 7. If a communications link is established, the following pop-up window appears:

Security Lo Security	agin Iogin requested.	
9	Device 0 is a secure device. Please log in. Security Level: Test Level Password:	
		Cancel Next >

MicroNet Safety Module Fault Tolerant Protection System

- 8. Select "Config Level" security level in the drop down menu and enter the associated password for the selected level. After the password is entered, click on the Next button and the transfer of the configuration file from the MicroNet Safety Module to the PC file starts immediately.
- 9. The configuration file is ready to be modified by the MicroNet Safety Module Programming and Configuration Tool (PCT). See "Edit Setting File" below for information on how to modify the configuration file.
- 10. If the communication link cannot be established, the PCT will continue to attempt to establish the communication link until the Disconnect Button is selected.

Edit Settings File

With this selection, an existing configuration file can be modified.

In order to modify the configuration in the MicroNet Safety Module, a file must be created (see "Save from Device to File" section), then modified (instructions in this section), and then re-loaded to the MicroNet Safety Module (see Load Settings File to Device).

After clicking the selection "Edit Settings File" in the pull-down menu "Settings", the following sub-window appears with a list of settings files.

The settings-files have extension *.wset.

Open Settings	File					? 🛛
Look in:	C Settings Files		~	00	🖻 🛄 •	
My Recent Documents	i defaults.wse i test.wset	t				
My Documents						
My Computer					14	
S	File name:				*	Open
My Network	Files of type:	Settings Files (*.wset)			~	Cancel

If no settings files are available, a settings file must be created (New from SID Specification Defaults), or a settings file must be loaded from the MicroNet Safety Module to a PC (Save from Device to File).

After file selection, the Settings Editor window opens.


MicroNetSM Version-197 Default Sett	ings - Settings Editor	
Ele Edit View Tools Help		
MicroNet™ Safety Module - Programm	ing and Configuration To	WOODWARD
	Off-Line Program	Mode
Input Configuration	Program Logic	Output Configuration
Speed Inputs	Logic Gates Com	Trip Latch Alarm Latch
Modbus	Latches	mers Reset Logic
Test Modes	Delays Trip Cy	cle Timers Event Latches
	Sequence of Events Log	
Module to Module Configuration Compare	Yes v	
N		¥
notes		<u>×</u>
[]		

With this new window, the configuration file for the MicroNet Safety Module can be modified by using the left-right selection buttons or the drop down menu.

🕼 tes	t.wset	- Setti	ings Edit	tor	
File	Edit	View	Tools	Help	
	- 📅	- ¹⁰	00	Logic Gates 1-6	

For off-line configuration, the following selections can be used:

- Speed
- Inputs
- Modbus
- Time Sync
- Test Modes
- Logic Gates
- Latches
- Delays
- Comparators
- Timers
- Trip Cycle Timers
- Sequence of Events Log
- Trip Latch
- Alarm Latch
- Reset Logic
- Analog and Discrete Outputs
- Event Latches

After the configuration is finished, the newly created settings file must be saved by using the drop down menu "File", followed by "Save", or "Save As".

Assign a file location and name, and save the file, or overwrite the existing settings file on the PC, then close the Settings Editor screen.

The settings files have a *.wset extension.

Once the file is saved, it can be uploaded to the MicroNet Safety Module by using drop down menu Settings followed by sub-selection "Load settings file to Device". For configuration of all particular parameters, see "Configuration Settings" in this chapter.



Before the Settings editor is closed, the newly created or modified settings file must be saved in order to have this file available for upload to the MicroNet Safety Module.

To save the created file, use the drop-down menu "File".

Load Settings File to Device

In order for the newly created or modified settings to be applied to the MicroNet Safety Module, the saved settings file must be uploaded to the MicroNet Safety Module.

With the selection "Load Settings File to Device", a configuration file can be loaded from the PC to the MicroNet Safety Module.

IMPORTANT	To save a settings file from the Device to a file, the Config security level is required. The Test security level is not sufficient.
	To load a settings file to the Device, the MicroNet Safety Module must be in a trip condition. If the unit is not in a trip condition, uploading is inhibited. If no trip condition is present, a power-up trip condition can be established by cycling the power supply.

After clicking "Load Settings File to Device", the following sub-window appears:

Settings File Selection Select the settings file to load.	
Click 'Browse' to select the file.	Browse
Set selected directory as default directory	
	Cancel Next >

- 1. Use the Browse button to select the location and name of the settings file to be uploaded to the MicroNet Safety Module. The settings-files have a *.wset extension.
- 2. For uploads, Config level is required. Test level is not sufficient. There are three valid conditions:
 - Serial communication was already established, and config security level was selected.
 - Serial communication was already established, and test security level was selected.
 - Serial communication was not yet established.

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Serial communication was already established, and config security level was selected

3. If serial communication was already established and Config level was selected, and there are no configuration errors, the transfer of the configuration file to the MicroNet Safety Module starts immediately. For uploads, Config level is required. The Test level is not sufficient. If no trip condition exists, transfer is inhibited. A trip condition can be established by a power supply cycle.

If a configuration error exists, uploading of the configuration file is inhibited. All configuration errors must be resolved before a successful upload can be accomplished. See "View Configuration Error Log" in this chapter.

Serial communication was already established, and test security level was selected

4. If serial communication was already established, and test level was selected, then the transfer of the configuration file to the MicroNet Safety Module cannot be established. For uploads, Config level is required. Test level is not enough. The following sub-window appears:

Load Settings File to Device	
Finished	
Configuration Level Access is required to load settings.	
-	
	Close

5. Use the disconnect button and reconnect utilizing the password for Config security level and restart the "Load Settings File to Device" procedure.

Serial communication was not yet established

6. If serial communication was not yet established, and after the filename is defined and the "Next" button is selected, the following pop-up screen appears that requests you to select a Network.



Load Settings File to Device				
Network Selection Select the network to connect with.				
Select a network: Network COM1 TCP/IP	Baud Rate:	AutoDetection		
			Cancel	Next >

- 7. Highlight the communication port where the serial interface cable is connected to and click on the Next button in the pop-up window.
- 8. If a communications link is established, the following pop-up window appears:

Security L Security	ogin Iogin requested.	
9	Device 0 is a secure device. Please log in. Security Level: Test Level Password:	
		Cancel Next >

- 9. Select "Config Level", and enter the associated password for the selected security level. After the password is entered, the transfer of the configuration file to the MicroNet Safety Module starts. For uploads, Config level is required. Test level is not sufficient. If no trip condition exists, transfer is inhibited. A trip condition can be established by cycling the power supply.
- 10. If the communication link cannot be established, the PCT will continue to attempt to establish the communication link until the disconnect button is used.

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Compare Settings File Differences

The MicroNet Safety Module Configuration Service Tool can compare two configuration files. By selecting "Compare Settings File Differences", the files can be compared for differences in either values and/or names.

After clicking this selection, the following sub-window appears:

🙀 Compare Settings File	e Differences 🛛 🔀
Click 'Browse' to select the	two files to compare.
File 1:	Browse
File 2:	Browse
	OK Cancel

Select the files to be compared by clicking the appropriate Browse button and select the "OK" button.

ue Differences Name Differences		
Name	Test A	Test B
ervice ToolDatabase.ConfigData.CfgLogicParams.Del ervice ToolDatabase.ConfigData.CfgLogicParams.Gat	Not Connected And	Start Function Or
		View Differences

The following sub-window is displayed, which shows all differences between the files:

If the configuration contents of a MicroNet Safety Module need to be compared with the configuration contents of a file, a configuration file of the contents of the MicroNet Safety Module must first be created by selecting "Save from Device to File".



Configuration Settings

The parameter configuration of the MicroNet Safety Module can be modified by either on-line or off-line configuration. Once the communication link is established for on-line configuration, or the **settings editor** is active in off-line configuration, the following parameters can be configured by using the selection buttons in the settings editor:

- Speed
- Inputs
- Modbus
- Time Sync
- Test Modes
- Logic Gates
- Latches
- Delays
- Comparators
- Timers
- Trip Cycle Timers
- Sequence of Events Log
- Trip Latch
- Alarm Latch
- Reset Logic
- Analog and Discrete Outputs
- Event Latches

Speed

If the "Speed" button is selected, the following screen is displayed:

🔡 • 📆 - 🛛 🗿 Spe	d	
MicroNet™ afety Module - Prog	ramming and Configuration Tool 🛛 💦 woo	DWARD
	Off-Line Program Mode - Speed	
Speed	Inputs Modbus Time Synchronization	Test Modes
Trip Latch	Alarm Latch Reset Logic Other Outputs	Event Latches
ogic Gates Latches	Delays Comparators Timers Trip Cycle Timers	Sequence of Events Log
gure Speed Input	Configure Acceleration	I
of Core Tool	Passive Concentration Trip Frankle Sound	100 004
or Gear Teeth	1 0000 Acceleration Trip Enable Speed	00 RPM
ar Ratio	Acceleration Trip	U RPM/s
erspeed I rip		
dden Speed Loss	Trip 💌	
gure Start Logic	100 000	
eeu Fail Selpoint		
	Not Used	
eeu Fall Alarm	Not Used	
eeu Fan Timeout Trip		
eed Fall Timeout Time	1 S	
55		

The following parameters can be set:

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Configure Speed Input

- **Probe Type:** Select speed probe type. Valid values: passive or active.
- Nr of Gear Teeth: Set the number of teeth on the gear that the speed sensor is mounted. Valid values: 1-320
- **Gear Ratio:** Set the ratio of the sensed-to-actual speed (sensor wheel/shaft speed). Valid values: 0.1-10
- **Overspeed Trip:** Speed setpoint for an overspeed trip. Valid values: 0-32000 rpm. Frequency equivalent must not exceed 32000 Hz (configuration error).
- Sudden Speed Loss: Select action to take when a sudden speed loss is detected. Valid values: trip or alarm

Configure Acceleration

- Enable Acceleration Trip: Set to yes to use this function. Valid values: yes or no.
- Acceleration Trip Enable Speed: Speed setpoint at which over-acceleration trip is active. Below this speed the acceleration trip is not active. Valid values: 0-32000 rpm.
- Acceleration Trip: Over-acceleration trip setpoint in rpm/second. Valid values: 0-25000 rpm/s.

Configure Start Logic

- **Speed Fail Setpoint:** Speed setpoint below which the speed signal is considered failed. Valid values: 0-25000 rpm
- **Speed Fail Trip:** When Used, this trip is activated when speed is below the Speed Fail Setpoint and the Speed Fail Override discrete input is not closed. Valid values: Not Used or Used
- **Speed Fail Alarm:** When Used, this alarm is activated when speed is below the Speed Fail Setpoint. Valid values: Not Used or Used
- **Speed Fail Timeout Trip:** When Used, this trip is activated if speed is below Speed Fail Setpoint when the Speed Fail Timeout Time expires. Valid values: Not Used or Used
- **Speed Fail Timeout Time:** Max time for speed to exceed the Speed Fail Setpoint after a 'start' command. This setting is used in conjunction with the Speed Fail Timeout Trip. Valid values: 1-28800 seconds

Inputs

Each of the three modules of the MicroNet Safety Module has 10 configurable inputs that can be configured for either analog or discrete input.

When "Inputs" is selected, the following screen is displayed:

🙀 Settings.wset - Settings Editor	
Eile Edit View Tools Help	
Programmable Inputs 1-4	<u> </u>
MicroNet™ - Programming and Configur Safety Module	ation Tool WOODWARD
Off-Line Program N	lode-Programmable Inputs 1-4
Speed Inputs Ma	dbus Time Synchronization Test Modes
Trip Latch Alarm Latch Rese	t Logic Other Outputs Event Latches
Logic Gates Latches Delays Compara	tors Timers Trip Cycle Timers Sequence of Events Log
Programmable Inputs 1-4 Programma	ble Inputs 5-8 Programmable Inputs 9-10
Input 1 Mode Name	Input 2 Mode Name
Analog Input 💌 Input 1	Analog Input 🕑 Input 2
Scaling Unit Unit	Scaling Unit Unit
Input 4mA Value 4.0000 mA	Input 4mA Value 4.0000 mA
Input 20mA Value 20.0000	Input 20mA Value 20.0000
Setpoints	Setpoints
Lo 0.0000 HiHi 0.0000	Lo 0.0000 HiHi 0.0000
LoLo 0.0000 Hi 0.0000	LoLo 0.0000 Hi 0.0000
Input 3 Mode Name	Input 4 Mode Name
Discrete Input V Input 3	Analog Input V Input 4
	Scaling Unit Unit
	Input 4mA Value 4.0000 mA
	Input 20mA Value 20.0000
	Lo 0.0000 HiHi 0.0000
Notes	
	×

Inputs can be configured using the Programmable Inputs 1-4, 5-8 and 9-10 screens and the options include:

- Not Used
- Discrete Input
- Analog input

Each input can have a name assigned by using the name field. This name is displayed on the front panel on the analog input monitoring screens. The text name for inputs is for reference only and is not used for configuring inputs in ToolKit.

Analog inputs have fields for scaling and assigning engineering units.

Scaling		Unit
Input 4mA Value	0.0000	mA
Input 20mA Value	120.0000	

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Analog Inputs have fields for assigning low and high setpoints for trips, alarms, events, or any status, or enable purposes.

Setpoints			
Lo	40.0000	HiHi	120.0000
LoLo	30.0000	Hi	110.0000

In order to establish that the low and high setpoints have any effect, these setpoints must be configured as an input in a trip latch, alarm latch, event latch, or any logic gate.

If a discrete input is not used as an input in any other function, the Configuration Error Log will indicate a warning.

If an input is used as input to a comparator while this input is configured to be a discrete input, the Configuration Error Log will indicate an error and the configuration cannot be uploaded to the MicroNet Safety Module.

If none of the results of an analog input are used as an input in any other function, the Configuration Error Log will indicate an alarm.

If any result from the analog input is used, either the analog value or one of the setpoints, then the configuration is regarded correct and no alarm will be displayed in the Configuration Error Log.

If the analog result from the analog input is used as an input for a Boolean (logical) function like a logic gate, delay, etc, the Configuration Error Log will show an error and the configuration cannot be loaded to the MicroNet Safety Module.

The following fields are available for each configurable input:

Configure Input

- Input Mode: Selects the input usage. Valid values: Not Used, Analog Input, or Discrete Input
- Name: User-defined name for the input. Valid values: up to 24 characters

Configure Scaling (only visible if Input Mode is Analog)

- Input 4 mA Value: Scaling value for the input, in user-defined units, corresponding to 4 mA. Valid values: -999999 to 999999
- Input 20 mA Value: Scaling value for the input, in user-defined units, corresponding to 20 mA. Valid values: -999999 to 999999
- Unit. User-defined units for the input. Valid values: up to 7 characters

Configure Setpoints (only visible if Input Mode is Analog)

- Lo: Lo input level setting, in user-defined units, below which the Analog Input Lo indication is active. Valid values: -999999 to 999999
- LoLo: LoLo input level setting, in user-defined units, below which the Analog Input LoLo indication is active. Valid values: -999999 to 999999
- **Hi:** Hi input level setting, in user-defined units, above which the Analog Input Hi indication is active. Valid values: -999999 to 999999
- **HiHi:** HiHi input level setting, in user-defined units, above which the Analog Input HiHi indication is active. Valid values: -999999 to 999999

NOTICE

It is highly recommended that the setpoints are used as an integrity check of the analog input signal. These setpoints can be used to detect signals that are out of range of normal operating limits.

Modbus

The parameters for Modbus communication can be set in the "Modbus Interface" menu. Modbus utilizes a master/slave network protocol. The MicroNet Safety Module is always a "slave".

Configure Modbus	
Mode	RS232 🔽
Baud Rate	19200 💙 bits/s
Communication Parity	No Parity 🔽
Slave Address	2
Enable Write Commands	No 💙

The following fields are available:

Configure Modbus settings

- Mode: Select the serial communication mode. Valid values: RS-232 or RS-485
- Baud Rate: Sets the serial data rate. Valid values: 19200, 38400, 57600, or 115200 bits/second
- **Communication Parity:** Sets the serial parity. Valid values: No Parity, Even Parity, or Odd Parity
- Slave Address: Unique identifier for this module. If all three modules are connected, each will need a unique identifying address. Valid values: 1-247
- Enable Write Commands: Set to yes to allow Modbus commands to be written to the ProTech (e.g. Reset, Initiate User-def Test 1) see Monitor and Control section in Modbus chapter. When set to no, Modbus becomes a monitor-only interface. Valid values: yes or no

Time Synchronization

The internal clock of the MicroNet Safety Module can be synchronized to external devices using a discrete input (24h Time Sync) or using the IRIG-B Time Synchronization protocol (IRIG-B).

- Mode: Select the time sync mode. Valid values: Not Used, 24h Time Sync or IRIG-B.
- **Synchronization Input Selection:** Selects the discrete input used for synchronizing time. Only appears when Mode is set to 24h Time Sync. Valid values: Discrete Input 1-10
- **Time to Set:** Time of day to be set when commanded by the discrete input. Only appears when Mode is set to 24h Time Sync. Displayed hh:mm:ss, 24-hour format. Valid values: 0-23 for hours, 0-59 for minutes, and 0-59 for seconds.

If 24-hour time-sync is selected, additional input fields appear for the selection of a discrete input for synchronization pulse and the set time.

Mode		24h Time Sync 💟
Synchronization Input Selection		Discrete Input 1 💌
Time to Set	0	: :

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Test Modes

The system is equipped with several internal test routines to verify configurable logic and that parameters are working correctly. The test menu of the MicroNet Safety Module keypad contains following tests:

Temporary overspeed setpoint

This is an overspeed test with adjusted test speed setpoint executed with the real hardware speed signal from the rotating machine. The speed of the rotating machine must be raised within the allowed test time span in order to test trip action. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted.

Manual simulated speed test

This is an overspeed test with the speed setpoint that is valid for the machine executed with a simulated speed signal from an internal frequency generator that initiates at the overspeed setpoint minus 100 rpm and must be manually raised within the allowed time span to above the overspeed setpoint in order to test the trip action. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted.

Auto simulated speed test

This is an overspeed test with the speed setpoint that is valid for the machine executed with a simulated speed signal from an internal frequency generator that initiates at the overspeed setpoint minus 100 rpm and is automatically raised to above the overspeed setpoint in order to test the trip action. If the overspeed setpoint is not exceeded within the requested time span, the overspeed test is aborted.

• Periodic overspeed test

The periodic overspeed test provides an auto simulated speed test at the configured test interval. Since module A initiates the test sequence, the periodic overspeed test can only be configured in module A.

- User defined test 1
- User defined test 2
- User defined test 3

Lamp test

The lamp test verifies the front panel LED functionality by cycling through the color combinations. When the test is started, the following sequence is followed.

- 1. Tripped, Unit Health, and Alarm LEDs are turned off for 1 second.
- 2. Tripped LED is on and **red**, Unit Health LED is on and **red**, and Alarm LED is on and **yellow** for 1 second.
- 3. Unit Health LED turns green for one second.
- 4. Tripped, Unit Health, and Alarm LEDs are turned off for 1 second.
- 5. LEDs return to displaying their active state based on operating conditions.

The test can be repeated as needed. A cancel option is also provided to cancel the test or to return to the previous test modes screen.

When "Test Modes" is selected, the following screen is displayed:



The following fields are available:

Configure Test Modes settings

- Temporary Overspeed Trip: Overspeed setpoint setting for overspeed tests with actual turbine speed signal. Valid values: 0-32000 rpm and frequency equivalent must not exceed 32000 Hz (configuration error).
- **Temporary Overspeed Trip Timeout:** Sets the time allowed to raise the actual turbine speed above the temporary overspeed setpoint in order to test the trip action. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted. Valid values: 0-1800 seconds
- **Simulated Speed Timeout:** Sets the maximum time allowed during the Manual Simulated Speed Test. If the overspeed setpoint is not exceeded within this time span, the overspeed test is aborted. Valid values: 0-1800 seconds
- Test Mode Interlock disable: Set to yes to disable the interlock. Normally this is set to No, however, disabling the interlock may be desirable during commissioning to facilitate testing while the other modules are tripped. Valid values: Yes or No

Configure Periodic Overspeed Test settings

- Periodic Test Enabled: Set to yes to use the function. Valid values: Yes or No
- Test Interval: Interval time for the periodic test (how often it runs). Valid values: 1-999 days
- **Operator can disable test:** Set to yes to permit test intervention. Test disable command options are available from the front panel. When set to no, the test cannot be manually stopped. Valid values: Yes or No

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User-defined Test settings

- Is Enabled: Set to yes to use the function. Valid values: Yes or No
- Set input: Selection to start the user-defined test. Valid values: (see selection list below)
- Reset input: Selection to stop the user-defined test. Valid values: (see selection list below)
- **Timeout:** Max test time setting. The test will abort after the timeout expires. Valid values: 0-1800 seconds

User-defined Test Input selections

- Not Connected
- Reset Function
- Discrete Input 1-10
- Analog Comparator 1-10
- Logic Gate 1-50
- Latch 1-10
- Delay 1-15
- Timer 1-15 HiHi
- Timer 1-15 Hi
- Unit Delay 1-10

Logic Gates

There are 50 Logic gates available that can be used to create customized logic. These gates can each be custom defined by a selection from following functions:

- AND
- NAND
- OR
- NOR
- XOR
- XNOR
- NOT



Figure 10-1. Logic Gate Monitor screen (front panel)

When "Logic Gates" is selected in the settings editor, the following screen is displayed:

🙀 Settings.	wset - Settings Edito	ог					
Ele Edit View Iools Help							
i 🖌 i 🗂 •	: 🛃 - 🛗 - 📴 - Logic Gates 1-6						
Microl Safety N	MicroNet [™] - Programming and Configuration Tool WARD						
	<u></u>	Of	f-Line P	rogram Mod	le -	Logic Ga	ates 1-6
Spe	ed 🛛	Inputs	s	Modbus		Time Synchronizatio	n Test Modes
Trip L	atch	Alarm La	atch	Reset Logic		Other Outputs	Event Latches
Logic Gate	s Latches		Delays	Comparators	Timers		e Timers Sequence of Events Log
Logic date					Timere		
Gates 1-6	Gates 7-12	Gates	13-18 Gat	es 19-24 Gates 25-	30	Gates 31-36	Gates 37-42 Gates 43-50
Logic Gate 1 -			Logic Gate 2			Logic Gate 3	
Туре	And 🐱		Туре	And 💌		Туре	And 🔽
Inputs			Inputs			- Inputs	
1	Start Function	~	1	Not Connected	~	1	Not Connected
2	Not Connected	*	2	Not Connected	~	2	Not Connected
3	Not Connected	*	3	Not Connected	~	3	Not Connected
4	Not Connected	~	4	Not Connected	~	4	Not Connected
5	Not Connected	~	5	Not Connected	~	5	Not Connected
Logic Gate 4			Logic Gate 5			Logic Gate 6 -	
Туре	And 💙		Туре	And 🔽		Туре	And 🗸
Inputs			Inputs			- Inputs	
1	Not Connected	~	1	Overspeed Trip	~	1	Not Connected
2	Not Connected	~	2	Not Connected	~	2	Not Connected
3	Not Connected	*	3	Not Connected	~	3	Not Connected
4	Not Connected	~	4	Not Connected	~	4	Not Connected
5	Not Connected	~	5	Not Connected	~	5	Not Connected
Copyright @ 2010 - Woodward Governor Company. All rights reserved.							
Notes							1.00
		1					

Specific gates can be selected by the buttons near the top of the page.

Gates 1-6	Gates 7-12	Gates 13-18	Gates 19-24	Gates 25-30	Gates 31-36	Gates 37-42	Gates 43-50

The function of the gates can be selected by the Type selection input field.

Logic Gate 43			_
Туре	And	*	

- AND, OR, NAND, and NOR gates can have up to five inputs.
- XOR, and XNOR gates have two inputs.
- NOT gates have one input.

In each input selection field, the origin of the signal can be entered. These inputs can be any function result from another gate, or from an analog input alarm setpoint, or a timer, etc.

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For this purpose, all functions like logic gates, timers, inputs, etc are numbered which allow easy referencing of logic gate inputs to outputs from other functions. An example of how inputs are numbered is shown below:

Logic Gate 43	
Туре	And 🔽
Inputs	
1	Overspeed Trip
2	Overspeed Trip
3	Not Connected
4	Not Connected
5	Not Connected

A complete listing of the input selections is provided below (see Logic Gate Input selections table). For additional details on each selection refer to section on Configurable Logic Selection Definitions.

If the result of a logic gate is not used as an input in any other function, the Configuration Error Log will indicate a warning.

If Inputs configured as analog input are connected to the logic gate, the Configuration Error Log will indicate an error and uploading of the configuration file will not be possible.

Not Connected	Periodic Ospd Test Active	Latch 1-10
Always FALSE	User Defined Test 1-3	Delay 1-15
Always TRUE	Configuration Mismatch	Timer 1-15 HiHi
Start Function	Speed Fail Alarm	Timer 1-15 Hi
Reset Function	Trip	Unit Delay 1-10
Speed Fail Override	Alarm	Trip Time Mon 1 Alarm
Overspeed Trip	Event Latch 1-3	Trip Time Mon 2 Alarm
Overacceleration Trip	Analog Input 1-10 HiHi	Power Up Trip
Speed Fail Trip	Analog Input 1-10 Hi	Internal Fault Trip
Speed Fail Timeout	Analog Input 1-10 Lo	Internal Fault Alarm
Speed Lost Alarm	Analog Input 1-10 LoLo	Configuration Trip
Speed Lost Trip	Analog In 1-10 Range Err	Resettable Trip Input
Speed Probe Open Wire	Discrete Input 1-10	Power Supply 1 Fault
Tmp Ovrspd Setpoint On	Analog Comparator 1-10	Power Supply 2 Fault
Man Simulated Speed Active	Logic Gate 1-50	Parameter Error

Table 10-2. Logic Gate Input selections

Auto Test Speed Active

Latches

There are ten latches (set/reset flip-flops) available that can be used to create an output available for trips, alarms, or any logical function. The latch is reset dominant, meaning the output is false if the reset input is true regardless of the set input.



Figure 10-2. Latch Monitor screen (front panel)

When "Latches" is selected in the settings editor or config menu, the following screen is displayed:

🔏 Settings.wset - Settings Editor						
<u>File Edit View T</u> ools <u>H</u> elp						
🗄 🛃 🗧 📲 🗧 😧 🜍 🗘 Latches			-			
MicroNet™ Safety Module - Program	ming and C	Configuration 1	^{rool} N	J.woo	DWARD	^
	Off-Li	ne Prograi	m Mode	- Latches	i	
Speed	puts	Modbus	Time Sy	nchronization	Test Modes	
Trip Latch Alarr	n Latch	Reset Logic	Othe	er Outputs	Event Latches	
Logic Gates Latches	Delays	Comparators	Timers	Trip Cycle Timers	Sequence of Events Log	
Latch 1 2 3 4 5 6 7 8 9 10	Set Input Not Connected Not Connected Not Connected Not Connected Not Connected Not Connected Not Connected Not Connected Not Connected Not Connected		Reset Input Not Connected Not Connected			
Notes						~
Notes						

Latch settings

- Set Input. Selection for the reset-dominant latch block set input. The set and reset inputs for each latch can be any function result from another gate or from an analog input alarm setpoint, a timer, etc. Valid values: (see Logic Gate Input selection list)
- **Reset Input.** Selection for the reset-dominant latch block reset input. Valid values: (see Logic Gate Input selection list)

If the result of a latch is not used as an input in any other function, the Configuration Error Log will indicate a warning. If Inputs configured as analog input are connected to the latch, the Configuration Error Log will indicate an error and uploading of the configuration file will not be possible.

Delays

There are 15 Delay functions (timers) available that can be used to create an output available for trips, alarms, or any logical function. Each delay function can have a pickup time and a drop-off time (delay in switching from False to True, delay in switching from True to False).



Figure 10-3. Delay Monitor screen (front panel)

When "Delays" is selected in the settings editor or the Config menu, the following screen is displayed:

🖗 Settings.wset - Settings Editor							
<u>Eile E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> elp	Ele Edit View Iools Help						
🗄 🔚 🗄 🕶 🔚 🚽 🕄 🕤 Delay:	s		<u> </u>				
MicroNet™ - Progra Safety Module	amming and (Configurati	on Tool	M	wo	ODWARD	
	Off-L	ine Pro	gram M	ode -	Delays		
Speed	Inputs	Modbu	s	Time Synch	nronization	Test Modes	
Trip Latch	Alarm Latch	Reset Lo	gic	Other C	outputs	Event Latches	
Logic Gates Latches	Delays	Comparators	; Time	ers 🛛	Trip Cycle Time	Sequence of Events Log	
	De	ays	Unit Delays				
Delay		Fals	e Delay	True C	Delay		
1	Not Connected	~	0.000	s	0.000	s	
2	Not Connected	~	0.000	S	0.000	s	
3	Not Connected	~	0.000	s	0.000	s	
4	Not Connected	~	0.000	s	0.000	s	
5	Not Connected	~	0.000	s	0.000	s	
6	Not Connected	~	0.000	s	0.000	s	
7	Not Connected	~	0.000	s	0.000	s	
8	Not Connected	~	0.000	s	0.000	s	
9	Not Connected	~	0.000	s	0.000	s	
10	Not Connected	~	0.000	s	0.000	s	
11	Not Connected	~	0.000	s	0.000	s	
12	Not Connected	~	0.000	s	0.000	s	
13	Not Connected	~	0.000	s	0.000	s	
14	Not Connected	~	0.000	s	0.000	s	
15	Not Connected	Image: A state of the state	0.000	s	0.000	s	
				-			
Copyright @ 2010 - Woodward Governor Company, All rights reserved.							
Notes						1.020	
[]	Min: 0.000, Max: 3600.0	00					

The delay requires that the input be true for a configurable True Delay Time before the output changes state to true, and that the input be false for a configurable False Delay Time before the output changes state to false.

The input field for each delay can be any function result from another gate or from an analog input alarm setpoint, or a timer, etc. For this purpose, all functions like logic gates, timers, inputs, etc are numbered. Referencing logic gate inputs to outputs from other functions is done by this numbering.

The False delay field defines the drop-off time (delay switching from True to false). The True delay field defines the pick-up time (delay switching from False to True).

Delay settings

- Input: Selection for the block input. Valid values: (see Logic Gate Input selection list)
- **False Delay:** Time delay that the input must remain false before the output goes false. The minimum detectable resolution is 4 ms. Valid values: 0-3600 seconds
- **True Delay:** Time delay that the input must remain true before the output goes true. The minimum detectable resolution is 4 ms. Valid values: 0-3600 seconds

If the result of a delay is not used as an input in any other function, the Configuration Check Error Log will show a warning.

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If inputs configured as 'analog input' are connected to the delay function, the Configuration Check Error Log will show an error and uploading of the configuration file will not be possible.

Unit Delays

Ten-unit delay blocks are available to break loops detected in the configurable logic by forcing a specific execution order. The output of the unit delay equals the input of the block the last time it was executed.

If any block input is connected to its output or if a loop is detected, the Configuration Check Error Log will show an error and uploading of the configuration file will not be possible. Properly inserting a unit delay block in the loop will enforce program execution and satisfy the loop check algorithm.



Figure 10-4. Unit Delay Monitor screen (front panel)

When "Unit Delays" is selected, the following screen is displayed:

Unit Delay Settings

• **Input.** Selection for the block input. The input field for each unit delay can be any function result from another gate or from an analog input alarm setpoint, or a timer, etc. .Valid values: *(see Logic Gate Input selection list)*

Comparators

There are ten comparators available that can be used to create an output available for trips, alarms, or any logical function.



Figure 10-5. Comparator Monitor screen (front panel)

When "Comparators" is selected, the following screen is displayed:

🖗 Settings.wset - Setting	gs Editor			
<u>Eile E</u> dit <u>V</u> iew <u>T</u> ools	Help			
	Comparators			
MicroNet™ Safety Module	Programming and	d Configuration Tool	W.woo	DDWARD
	Off-Lir	ne Program Mo	de - Comparato	ors
Speed	Inputs	Modbus	Time Synchronization	Test Modes
Trip Latch	Alarm Latch	Reset Logic	Other Outputs	Event Latches
Logic Gates Late	ches Delays	Comparators	Timers Trip Cycle Timers	Sequence of Events Log
	Comparator Not Connected 1 Not Connected 2 Not Connected 3 Not Connected 4 Not Connected 5 Not Connected 6 Not Connected 7 Not Connected 8 Not Connected 9 Not Connected 10 Not Connected	Off Level ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000 ✓ 0.0000	On Level 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	
Notes				
L	Min: 0.000 May: 360	0.000		

The block input is compared to fixed on and off values. The values entered have the same scaling as the connected analog input (speed is in rpm and acceleration is in rpm/s).

The difference between ON-level and OFF-level can be used to create hysteresis.

If ON-level is greater than the OFF-level, the output becomes TRUE when the input is higher than the ON-level and goes FALSE when the input becomes less than OFF-level.

If ON-level is less than the OFF-level, the output becomes TRUE when the input is less than the ON-level and goes FALSE when the input becomes higher than OFF-level.

If On-level equals OFF-level, there is no hysteresis and the output becomes TRUE when the input is higher than the ON-level and goes FALSE when the input becomes less than ON-level.

Comparator Settings

- Input. Selection for the block input. Valid values: Speed, Acceleration, or Analog Input 1-10.
- Off Level. Comparator OFF value, in engineering units. Valid values: -999999 to 999999
- On Level. Comparator ON value, in engineering units. Valid values: -999999 to 999999

If the result of a comparator is not used as an input in any other function, the Configuration Error Log will indicate a warning.

If inputs configured as 'discrete input' are connected to the comparator, the Configuration Error Log will indicate an error and uploading will be inhibited.

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Timers

Fifteen timers are available. Each timer has a start input, a reset input, an elapsed time output, a Hi setpoint reached output, and a HiHi setpoint reached output. The timer counts up while the start input is true.

The elapsed time output is reset to zero and the Boolean outputs (Hi and HiHi) set false when the reset input is true. The start input is ignored whenever the reset input is true. For example, if the reset input is set to true, and the start input is set to true, the timer remains reset. If the reset input changes to false with the start input still true, the timer will start.

The output value is displayed in milliseconds and can be viewed on the front panel or over Modbus as well as the status of the Hi and HiHi outputs.



Figure 10-6. Timer Monitor screen (front panel)

When "Timers" is selected in the settings editor or config menu, the following screen is displayed:

🙀 Settings.wse	t - Settings Editor							
<u>E</u> ile <u>E</u> dit ⊻ie	ew <u>T</u> ools <u>H</u> elp							
i 🖌 i 📅 • 🖻	Timers		•					
MicroNe Safety Mod	MicroNet [™] - Programming and Configuration Tool WOODWARD							
	2	Off-Line Program	n Mode - Timers					
Speed	Inputs	Modbus	Time Synchronization	Test Modes				
Trip Latch	Alarm La	tch Reset Logic	Other Outputs	Event Latches				
Logic Gates	Latches	Delays Comparators	Timers Trip Cycle Timers	Sequence of Events Log				
Timer —		Reset Input	— Hi Setpoint — HiHi S	etpoint				
1	Not Connected	Not Connected	0.001 s	0.001 s				
2	Not Connected	Not Connected	0.001 s	0.001 s				
3	Not Connected	Not Connected	0.001 s	0.001 s				
4	Not Connected	Not Connected	0.001 s	0.001 s				
5	Not Connected	Not Connected	0.001 s	0.001 s				
6	Not Connected	Not Connected	0.001 s	0.001 s				
7	Not Connected	Not Connected	0.001 s	0.001 s				
8	Not Connected	Not Connected	0.001 s	0.001 s				
9	Not Connected	Not Connected	0.001 s	0.001 s				
10	Not Connected	Not Connected	0.001 s	0.001 s				
11	Not Connected	Not Connected	0.001 s	0.001 s				
12	Not Connected	Not Connected	0.001 s	0.001 s				
13	Not Connected	Not Connected	0.001 s	0.001 s				
14	Not Connected	Not Connected	0.001 s	0.001 s				
15	Not Connected	Not Connected	0.001 s	0.001 s				
				<u>~</u>				
Notes								
	Min: 0.00	0, Max: 3600.000		.::				

The Start input field and the Reset Input field for each timer can be any function result from another gate or from an analog input alarm setpoint, or a timer, etc.

The Hi and HiHi setpoint setpoints are user configurable. The Hi Setpoint setpoint field defines the time delay until the Hi output becomes True. The HiHi Setpoint field defines the time delay until the HiHi output becomes True.

Timer settings

- Start Input. Selection for the timer start input. Valid values: (see Logic Gate Input selection list)
- **Reset Input.** Selection for the timer reset input. Valid values: (see Logic Gate Input selection list)
- **Hi Setpoint**. Accumulated time setting for the timer block Hi output. The minimum detectable resolution is 4 ms. Valid values: 0-3600 seconds
- **HiHi Setpoint**. Accumulated time setting for the timer block HiHi output. The minimum detectable resolution is 4 ms. Valid values: 0-3600 seconds

If the result of a timer is not used as an input in any other function, the Configuration Error Log will indicate a warning.

To use a timer, both Start and Reset input must be configured to a value other than 'Not Connected' otherwise the Configuration Error Log will indicate an error and uploading of the configuration file will not be possible.

Trip Cycle Timers

A trip cycle timer is a function that measures the time from a trip event until the trip is confirmed by an input (for instance trip and throttle valve limit switch), or by any internally created logic function. An Alarm is indicated if the time is expired before the feedback confirmation is received. There are two trip cycle timers available.

The trip cycle time is measured in milliseconds and shown in Monitor mode on the MicroNet Safety Module display.

When "Trip Cycle Timers" is selected in the settings editor or in the config menu, the following screen is displayed:

🐖 Settings.wset - Settings E	litor
Ele Edit View Tools H	ép frip Cycle Timers
MicroNet™ Safety Module - Pro	ogramming and Configuration Tool WOODWARD
	Off-Line Program Mode - Trip Cycle Timers
Speed	Inputs Modbus Time Synchronization Test Modes
Trip Latch	Alarm Latch Reset Logic Other Outputs Event Latches
Logic Gates Latches	Delays Comparators Timers Trip Cycle Timers Sequence of Events Log
Monitor 1	Monitor 2
Trip Indicator Input	Event Latch 3 🗸 Trip Indicator Input Analog Input 1 HiHi 🗸
Maximum Cycle Time	5 ms Maximum Cycle Time 20 ms
Notes	
	Min: 1, Max: 60000

The Trip Indicator input field has to be connected to the signal that is used for the trip feedback confirmation (for example, a trip valve limit switch). This trip Indicator input field for each timer can be any function result from a discrete input, another gate, or from an analog input alarm setpoint, etc.

Trip Cycle Timer settings

• Trip Indicator Input. Selection for the indicator feedback.

Valid values:

Trip Cycle Time Monitor Input selections Not Connected Event Latch 1-3 Analog Input 1-10 HiHi Analog Input 1-10 Hi Analog Input 1-10 Lo Analog Input 1-10 LoLo **Discrete Input 1-10** Analog Comparator 1-10 Logic Gate 1-50 Latch 1-10 Delay 1-15 Timer 1-15 HiHi Timer 1-15 Hi Unit Delay 1-10 **Resettable Trip Input**

Maximum Cycle Time. The Maximum Cycle Time defines the time allowed between a trip
occurrence and the feedback confirmation. This value is expressed in milliseconds. Valid values: 160000 ms

The output of the Trip Cycle Monitor is automatically connected to the Alarm Latch, user connection is not required.

Sequence of Events Log

The Sequence of Events Log allows the user to log events with a resolution of up to 1 ms. This resolution is only achieved when IRIG-B time synchronization is enabled and when capturing Configurable Discrete Inputs. Other inputs will be captured with their respective update rate, for example 4 ms for the Configurable Logic inputs.

The Sequence of Events Log logs any configured input's state transition from false to true with a userconfigurable event ID, a time and date stamp and a test mode indicator. The test mode indicator shows if the event occurred while the module was executing a test.

Unlike the Trip, Alarm or Event Latches, the Sequence of Events Log does not provide an output for connection to other configurable logic blocks. It only logs the state of its inputs.

Each of the Sequence of Events Log's 20 user-configurable inputs can be assigned from discrete inputs or configurable logic. The user can assign a description to each user-configurable input by just replacing the default text, where the description can have up to 24 alphanumeric characters maximum.

When the Sequence of Events Log button is selected, the following screen is displayed:

MicroNet [™] Safety Module - Programming and Configuration Tool Configuration Tool Config						
Speed	Inp	uts	Modbus	Time Syr	nchronization	Test Modes
Trip Latch	Alarm	Latch	Reset Logic	Othe	r Outputs	Event Latches
Logic Gates Lato	hes	Delays C	Comparators	Timers	Trip Cycle Timers	Sequence of Events Log
Discrete Input 1 Discrete Input 1 2 Not Connected 3 Not Connected 4 Not Connected 5 Not Connected 6 Not Connected 7 Not Connected 8 Not Connected 9 Not Connected	>	Name Boller Trip SOE Input 2 SOE Input 3 SOE Input 3 SOE Input 4 SOE Input 5 SOE Input 6 SOE Input 7 SOE Input 8 SOE Input 8	Input 11 12 13 14 15 16 17 18 19	Not Connected	× × × × × × × × × × × × × × × × × × ×	Vame SOE Input 11 SOE Input 12 SOE Input 13 SOE Input 14 SOE Input 15 SOE Input 15 SOE Input 15 SOE Input 17 SOE Input 18 SOE Input 19
10 Not Connected		SOE Input 10	20	Not Connected	×	SOE Input 20

In the example above, Sequence of Events Log input #1 is connected to Discrete Input 1. The name is Boiler Trip.

The Sequence of Events Log is reset by the Reset All Logs button on the Home Page.

Trip Latch

The output of the Trip Latch goes true if any of its inputs are true. Once the output of the trip latch is true, it remains true until the trip reset function occurs and all inputs are false. The output of the trip latch drives the trip voter relays.

The trip voter relays can be configured to energize for trip or de-energize for trip, which can be selected by entering the particular selection in the trip configuration input field.

The inputs of this trip latch are 11 fixed trip causes and can be expanded with up to 25 programmable trip causes. The fixed trip causes are:

- **Power-up Trip:** At power up, the unit always starts in trip condition which can be reset. This trip cause is always enabled and cannot be inhibited.
- Internal Module Fault: This trip cause is active if any fault is detected by the internal diagnostic logic.
- **Overspeed Trip:** This trip cause is always enabled and cannot be inhibited.
- **Speed Fail Trip:** This trip cause can be enabled or disabled in the configuration screen of the speed inputs.
- **Speed Lost Trip:** This trip cause can be disabled (set to Alarm) in the configuration screen of the speed inputs.
- Speed Probe Open Wire Trip: Open wire detection is only possible if MPU speed probes are used.
- **Speed Fail Timeout Trip:** This trip cause can be enabled or disabled in the configuration screen of the speed inputs.
- **Over-acceleration Trip:** This trip cause can be enabled or disabled in the configuration screen of the speed inputs.
- **Configuration Trip:** Indicated during a configuration save.
- **Parameter Error Trip:** This trip cause is active if settings are not correctly read out of EEPROM.
- **Resettable Trip Input:** This trip cause can be enabled or disabled in the configuration screen of the Reset inputs.

In addition, 25 trip causes can be programmed. These trip causes can be either from discrete inputs, comparators, latches, logic gates, etc. The user can assign a description to each user-configurable input by just replacing the default text, where the description can have up to 24 alphanumeric characters maximum. This description will show on the MicroNet Safety Module screen when the corresponding trip cause is active.



When the Trip Latch button is selected, the following screen is displayed:

🙀 Settings.wset - Settings Edit		
Eile Edit View Tools Help		
🗄 🔚 🗄 🕶 🔚 🗧 😋 🕤 Trip	atch 1-10 🔹	
MicroNet™ Safety Module - Prog	amming and Configuration Tool WARD	^
	Off-Line Program Mode - Trip Latch 1-10	
Speed	Inputs Modbus Time Synchronization Test Modes	
Trip Latch	Alarm Latch Reset Logic Other Outputs Event Latches	
Logic Gates Latches	Delays Comparators Timers Trip Cycle Timers Sequence of Events Log	
	Trip Latch 1-10 Trip Latch 11-25	
Trip Con	Juration	
	De-energize to Trip	
Number	Name	
1	Discrete Input 1	
2	Not Connected Trip Latch Input 02	
3	Not Connected Trip Latch Input 03	
4	Not Connected Trip Latch Input 04	
5	Not Connected Trip Latch Input 05	
6	Not Connected Trip Latch Input 06	
7	Not Connected V Trip Latch Input 07	
8	Not Connected Trip Latch Input 08	
9	Not Connected	
10	Net Connected	
10		
		~
Notes		
		>
	Enter up to 24 characters.	

In the example above, programmable trip latch input #1 is connected to Discrete Input 1. The name is Lube Oil Pressure Trip.

Alarm Latch

The output of the Alarm Latch goes true if any of its inputs are true. Once the output of the Alarm latch is true, it remains true until the trip reset function occurs and all inputs are false. The output of the alarm latch is connected by default to programmable relay 1.

The alarm latch provides up to 50 user-configurable inputs.

These inputs can be from discrete inputs, comparators, latches, Logic gates, etc, by using the selector menu (black triangle)

The user can assign a description to each user-configurable input by just replacing the default text, where the description can have up to 24 alphanumeric characters maximum.

This description will show on the MicroNet Safety Module screen when the corresponding alarm cause is active.

When Alarm Latch is selected, the following screen is displayed:

Settings.wset - Settings Edit Ele Edit View Tools Help Ele Edit • • • • • • • • • • • • • • • • • • •	or m Latch 1-10	I)		
MicroNet™ Safety Module - Prog	ramming and Con	figuration Tool	W.wo	ODWARD
	Off-Line Pro	gram Mode	- Alarm Latch	n 1-10
Speed	Inputs	Modbus	Time Synchronization	Test Modes
Trip Latch	Alarm Latch	Reset Logic	Other Outputs	Event Latches
Logic Gates Latches	Delays C	omparators Ti	mers Trip Cycle Time	ers Sequence of Events Log
Alarm Latch 1-10	Ala	arm Latch 11-30	Alarr	n Latch 31-50
Number 1	Analog Comparator 1	Name Speed >	3700 RPM	
2	Not Connected	 Alam La 	tch Input 02	
3	Not Connected	 Alam La 	tch Input 03	
4	Not Connected	Alam La	tch Input 04	
5	Not Connected	Alam La	tch Input 05	
6	Not Connected	Alarm La	tch Input 06	
7	Not Connected	Alarm La	tch Input 07	
8	Not Connected	Alarm La	tch Input 08	
9	Not Connected	Alam La	tch Input 09	
10	Not Connected	V Alarm La	tch Input 10	
ntes				

In the example above, programmable Alarm Latch Input #1 is connected to Analog Comparator 1. The name is: Speed > 3700 RPM.

Reset Logic

This screen facilitates configuration of the configurable reset command and a resettable trip input.

Configurable Reset Command

The "Reset Logic" screen allows selecting additional reset inputs for resetting the alarm and trip latches.

By using this selection, the reset can be established not only by the Reset button on the MicroNet Safety Module keypad, but also by an external function or by a function created in logic.

To do so, the extra reset source can be entered in the input field for the configurable reset source, or by setting Mode = Used and assigning one of the discrete inputs to input field "Reset Input Selection".

Resettable Trip Input

The "Reset Logic" screen allows selecting an input to the trip latch that has been pre-configured to provide a resettable trip feature. With this feature, the ProTech trip output can be reset while this trip input is still commanding a trip. Example use of this function is MicroNet Safety Module product connection into a turbine trip string as an input and output, as a latch-up prevention.

When set to 'Used', the Resettable Trip Function is automatically connected into the Trip Latch. While this trip input is active (commanding a trip; open discrete input), the ProTech trip output can be reset.

If the discrete input closes and then re-opens after the reset, a trip shall be re-activated. If the discrete input closes and then re-opens prior to a reset, the trip shall remain active (and not clear and re-appear).

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Resettable Trip Logic

When "Reset Logic" is selected, the following screen is displayed:

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i 📊 i 📅 - 📴 - i 😧 🔊 Reset Logic	1.02
MicroNet [™] - Programming and Configuration Tool WOODWARD	
Off-Line Program Mode - Reset Logic	
Speed Inputs Modbus Time Synchronization Test Modes	
Trip Latch Alarm Latch Reset Logic Other Outputs Event Latches	
Logic Gates Latches Delays Comparators Timers Trip Cycle Timers Sequence of Events Log	
Configurable Reset Source Discrete Input 1	
Resettable Trip Use (reset clears trip)	
Reset Input Selection Discrete Input 2	
	•
Notes	-
Enter up to 24 characters.	٦,:

Configurable Reset Source

• Input: Selection for the configurable reset input. Valid values: (see Logic Gate Input selection table)

Resettable Trip

- Resettable Trip Use (reset clears trip): Set to Used to enable this function. Valid values: Not Used or Used
- Input Selection: Selection for the configurable reset input Valid values: *Discrete Input 1-10*

The output of the Resettable Trip function is automatically connected to the Trip Latch, user connection is not required. The output of the Resettable Trip function is available for connection to other blocks in the configurable logic.

Other Outputs

Each unit has three configurable relay outputs and one 4-20 mA analog output.

The analog output is a 4–20 mA signal proportional with measured speed of which scaling can be adjusted using the 4 mA value and 20 mA value input fields.

The relay outputs can be connected to any discrete signal inside the MicroNet Safety Module. Including the discrete inputs.

When "Other Outputs" is selected, the following screen is displayed:

Settings.wset - Settings	Editor
<u>File E</u> dit <u>V</u> iew <u>T</u> ools	Heb
📮 📅 - 🛗 - 🗿 🕥	Other Outputs
MicroNet™ Safety Module - F	Programming and Configuration Tool WARD
	Off-Line Program Mode - Other Outputs
Speed	Inputs Modbus Time Synchronization Test Modes
Trip Latch	Alarm Latch Reset Logic Other Outputs Event Latches E
Logic Gates Latch	es Delays Comparators Timers Trip Cycle Timers Sequence of Events Log
	Configure Discrete Outputs
	Relay Polarity
	1 Alarm Von Inverting V
	2 Not Connected V Non Inverting V
	3 Not Connected V Non Inverting V
	Configure Analog Output
	Speed @ 4mA 0 RPM
	Speed @ 20mA 32000 RPM
Notes	
	Enter up to 24 characters
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Configure Discrete Outputs

- Relay Input: Selection for the configurable reset input. Valid values: (see Logic Gate Input selection table)
- Polarity: Output inversion option. Valid values: Non-Inverting or Inverting

Configure Analog Output

- Speed @ 4 mA: The speed value at min (4 mA) for scaling the analog output. Valid values: 0-32000 RPM
- Speed @ 20 mA: The speed value at max (20 mA) for scaling the analog output. Valid values: 0-32000 RPM

Event Latches

Three event latches are available. Each event latch has up to 25 user-configurable inputs. The output of the event latch goes true if any input is true. These inputs can be either from discrete inputs, comparators, latches, logic gates, etc.

The user can assign a description to each user-configurable input, by just replacing the default text, where the description can have up to 24 alphanumeric characters maximum. This description will show on the MicroNet Safety Module screen when the corresponding event has occurred.

Once the output of the event latch is true, it remains true until its reset input becomes true and all inputs are false.

The typical connection for the reset input is the 'Reset Function' however other connection options can be selected by entering any signal in the reset input field.

Each input has an associated first-out Boolean output that is true if that input became true when the output of the trip latch was false.

Once true, the first-out Boolean values remains true until the event latch output becomes false.

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The first-out Boolean values are available on Modbus and the front panel display. They are not available as inputs to the configurable logic blocks or the programmable relays.

When "Event Latches" is selected, the following screen is displayed:

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<u>Eile E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> elp			
	nt Latch 1.1-10		
MicroNet™ Safety Module - Prog	ramming and Configu	ration Tool 🔥	WOODWARD
	Off-Line Progra	m Mode - Event L	atch 1.1-10
Speed	Inputs N	Nodbus Time Synchron	nization Test Modes
Trip Latch	Alarm Latch Re	set Logic Other Outp	Event Latches
Logic Gates Latches	Delays Compa	rators Timers Trip	Cycle Timers Sequence of Events Log
Event Latch 1.1-10 Event Latc	h 1.11-25 Event Latch 2.1-10	Event Latch 2.11-25 Even	t Latch 3.1-10 Event Latch 3.11-25
Number		Name	
1	Start Function	Event Latch 1 Input 01	
2	Reset Function	Reset issued	
3	Discrete Input 2	Boiler Trip	
4	Not Connected	Event Latch 1 Input 04	
5	Not Connected	Event Latch 1 Input 05	
6	Not Connected	Event Latch 1 Input 06	
7	Not Connected	Event Latch 1 Input 07	
8	Not Connected	Event Latch 1 Input 08	
9	Not Connected	Event Latch 1 Input 09	
10	Not Connected	Event Latch 1 Input 10	
			~
Notes			
	Enter up to 24 characters.		

In the example above, configurable event latch input #2 is connected to speed lost alarm, and input #3 is connected to discrete input 2. And the description is Boiler trip.

Configurable Logic Selection Definitions

The following table provides a definition of the input selections available in the configurable logic.

Selection Identifier	Description of selection
	This is the setting to be selected for an input that is not used.
	NOTE: If a block is not to be used, its inputs should be "Not
Not Connected	Connected", otherwise a configuration warning will be generated.
Always FALSE	Sets the value of the input to a fixed setting of FALSE.
Always TRUE	Sets the value of the input to a fixed setting of TRUE.
Start Function	Start function output. This is a short pulse that goes true on the rising edge of a start command (front panel or discrete input) and is automatically set back to false 4 ms later.
Reset Function	Reset function output. This is a short pulse that goes true on the rising edge of a reset command (front panel or discrete input) and is automatically set back to false 4 ms later.
Speed Fail Override	Speed Fail Override discrete input status indication. True when the input is high and false when low.

Table 10-3. Input Selections in the Configurable Logic Definitions

nual 26547V2	MicroNet Safety Module Fault Tolerant Protection Syst		
Selection Identifier	Description of selection		
Overspeed Trip	Overspeed indication. True when speed is above the overspeed setpoint and false otherwise.		
Overacceleration Trip	Over acceleration indication. True when acceleration is above the acceleration trip setpoint and speed is above the accel trip enabled speed.		
Speed Fail Trip	Speed Fail Trip indication. True when the speed lost trip condition is detected. Remains true until cleared by a reset.		
Speed Fail Timeout	Speed Fail Timeout indication. This is a short pulse that goes true when the condition is detected and is automatically set back to false 4 ms later.		
Speed Lost Alarm	Speed Lost Alarm indication. True when the speed lost trip condition is detected. Remains true until cleared by a reset.		
Speed Lost Trip	Speed Lost Trip indication. True if a speed lost trip is detected. Remains true until cleared by a reset.		
Speed Probe Open Wire	Speed Probe Open Wire indication. True while an open wire is detected.		
Tmp Ovrspd Setpoint On	Tmp Ovrspd Setpoint On indication. True while the test is in the Active state.		
Man Simulated Speed Active	Man Simulated Speed Active indication. True while the test is in the Active state.		
Auto Test Speed Active	Auto Test Speed Active indication. True while the test is in the Active state.		
Periodic Ospd Test Active	Periodic Ospd Test Active indication. True while the test is in the Active state.		
User Defined Test 1-3	User Defined Test 1, 2, or 3 active indication. True while the specified User Defined Test is in the Active state.		
Configuration Mismatch	Configuration Mismatch indication as determined by the module- to-module configuration compare function.		
Speed Fail Alarm	Speed Fail Alarm indication. True if a speed fail alarm is detected.		
Trip	Trip Latch output. True if any trip is detected. Remains true until cleared by a reset.		
Alarm	Alarm Latch output. True if any alarm is detected. Remains true until cleared by a reset.		
Event Latch 1-3	Event Latch 1, 2, or 3 output. True if any events in the specific Event Latch is detected and latched. Remains true until cleared by a reset.		
Analog Input 1-10 HiHi	Analog Input HiHi output. This output is true when the input current is above the HiHi setting and false when at or below.		
Analog Input 1-10 Hi	Analog Input Hi output. This output is true when the input current is above the Hi setting and false when at or below.		
Analog Input 1-10 Lo	Analog Input Lo output. This output is true when the input current is below the Lo setting and false when at or above.		
Analog Input 1-10 LoLo	Analog Input LoLo output. This output is true when the input current is below the LoLo setting and false when at or above.		
Analog In 1-10 Range Err	Analog Input Range Error output. This output is true when the input current is above 22 mA or below 2 mA.		
Discrete Input 1-10	Discrete input status indication. True when the input is high and false when low.		
Analog Comparator 1-10	Comparator block output.		
Logic Gate 1-50	Logic Gate block output.		
Latch 1-10	Latch block output.		

lanual 26547V2	MicroNet Safety Module Fault Tolerant Protection System
Selection Identifier	Description of selection
Delay 1-15	Delay block output.
Timer 1-15 HiHi	Timer block HiHi output.
Timer 1-15 Hi	Timer block Hi output.
Unit Delay 1-10	Unit Delay block output.
Trip Time Mon 1 Alarm	Trip Cycle Time Monitor 1 output. True when the trip cycle time alarm condition is detected. Remains true until a reset is commanded.
Trip Time Mon 2 Alarm	Trip Cycle Time Monitor 2 output. True when the trip cycle time alarm condition is detected. Remains true until a reset is initiated.
Power Up Trip	Power up trip indication. This is a short pulse that transitions to true on power-up only if configured as de-energize to trip and is automatically set back to false 4 ms later.
Internal Fault Trip	Indicates an internal fault trip condition was detected. When this is true, the product remains in a tripped state. A power cycle is required to clear this error.
Internal Fault Alarm	Indicates an internal fault alarm condition was detected. When this is true, the MicroNet Safety Module remains in an alarm state. A RESET or power cycle is required to clear this error.
Configuration Trip	Indicates the product is tripped as a result of loading new configuration settings. This indication is true while loading and goes false when the configuration load is completed (either successfully or failed/error).
Resettable Trip Input	Output from the Resettable trip function to the trip latch. True means trip.
Power Supply 1 Fault	Output from the power supply fault detection function to the alarm latch. True means alarm.
Power Supply 2 Fault	Output from the power supply fault detection function to the alarm latch. True means alarm.
Parameter Error	Indicates a parameter error was detected, meaning there was a problem reading the settings out of the EEPROM. When this is true, the MicroNet Safety Module remains in a tripped state. A power cycle is required to clear this error.

Configuration of Custom Logic

Custom logic can be built by combining logical functions like comparators, latches, gates, etc. The results of this logic can be used to cause a trip or alarm by using these results as inputs to the trip-latches, etc., or can be connected to one of the relay outputs.

Connecting outputs (results) from one function to inputs of other functions always has to be defined by entering in the input fields of functions a reference to another function.

Before you start entering custom logic, Woodward recommends you make a logic diagram and keep this diagram in the documentation files. Woodward also recommends keeping the diagrams up to date after a modification in custom logic. Reconstruction of the logic interconnections from the configuration files after-the-fact is possible, but time consuming.

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The customer is responsible for fully testing their logic configuration.

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The custom logic uses a non-latching 'one-shot' on the start and reset functions. If a condition needs to remain latched that is initiated by either start or reset function, a latch must be used.

MicroNet Safety Module Configuration Checks

When a settings file is loaded to the device, the values are checked in the control. Configuration **Warnings** are provided for detected configuration issues that are questionable and should be verified. A Configuration Error indicates a problem in the settings file that needs correcting. If a configuration error is detected during a settings file load, the file load is aborted, and the values are discarded. Detection of configuration warnings will not preclude a settings file load operation.

Configuration Checks are only detecting customer input values such as limits, required values, syntax errors, etc. Configuration Checks are not detecting functional safety settings. All functional safety and operation settings need to be verified for the specific site application to ensure the system response meets the customer requirements.

Configuration Check Message Summary

- 1. Error <block identifier> has unconfigured inputs.
- 2. Error <block identifier> has improper inputs configured.
- 3. Error <block identifier> is used but has no inputs configured.
- 4. Error *<block identifier>* has outputs connected but no inputs configured.
- 5. Error *<block identifier>* is not used but has outputs connected.
- 6. Error *<block identifier>* is configured as not used but has outputs connected.
- 7. Error <block identifier> is configured as analog but has discrete outputs connected.
- 8. Error *<block identifier>* is configured as discrete but has analog outputs connected.
- 9. Error *<block identifier>* is in a circular configuration loop.
- 10. Warning *<block identifier>* is used but has no outputs connected.
- 11. Warning *<block identifier>* is configured but has no outputs connected.
- 12. Warning *<block identifier>* is configured as analog but has no analog outputs connected.
- 13. Warning *<block identifier>* is configured as discrete but has no discrete outputs connected.
- 14. Error *<block identifier>* is set to an invalid or out-of-range value.
- 15. Error Proposed configuration contains data that is invalid (out-of-range).

Configuration Check Definitions

Text:	Error – <block identifier=""> has unconfigured inputs.</block>
Condition:	The identified block has inputs that are not configured. The following configurations will trigger this error:
	 AND, NAND, OR, NOR, XOR or XNOR gate with less than two inputs configured.
	2. Latch or Timer block without both inputs configured.
Example 1:	Error – Logic Gate 1 has unconfigured inputs.
	Logic Gate 1 input is configured as an AND block but has only 1 input configured (2+ are required).
Example 2:	Error – Latch 2 has unconfigured inputs.
	One of the inputs (Set or Reset) on the logic Latch 2 block is not configured .

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2	
Text:	Error - < block identifier> has improper inputs configured.
Condition:	The identified block has inputs that are improperly configured. The following configurations will trigger this error:
	1) XOR or XNOR gate with inputs 3, 4 or 5 connected.
	2) NOT gate with inputs 2, 3, 4 or 5 connected.
Examples:	Error - Gate 1 has improper inputs configured.
	a) Gate 1 is type XOR connected to Gate 2 but Gate 1's input 3 is configured
	(must be inputs 1 & 2, inputs 3-5 are not valid for this block type).
	b) Gate 1 is a NOT connected to Gate 2 but Gate 1's input 2 is configured (must
	be input 1).

3	
Text:	Error – <block identifier=""> is used but has no inputs configured.</block>
Condition:	The identified function is configured as used but the block inputs are not configured.
	This error applies to the resettable trip function.
Example:	Error – Resettable Trip is used but has no inputs configured.
-	The Resettable Trip function is configured as 'Used' but the function's input is not
	configured.

4	
Text:	Error - <block identifier=""> has outputs connected but no inputs configured.</block>
Condition:	The identified block has inputs that are not configured but has connected outputs. This error applies to the Trip Cycle time monitor, Event Latches, and all configurable logic blocks.
Example 1:	Error - Gate 1 has outputs connected but no inputs configured.
	Gate 1 is connected to Gate 2 but Gate 1's inputs are set to Not Used.
Example 2:	Error - Latch 3 has outputs connected but no inputs configured.
	Latch 3 is connected to another block but Latch 3's Reset input is set to Not Used.
Example 3:	Error - Event Latch 2 has outputs connected but no inputs configured.
	Event Latch 2 is connected to another block but Event Latch 2's Reset input is set to
	Not Used or no event inputs are configured.

Note: The exception to this check is User-Defined Test which is allowed to be used and
unconfigured since it can be started and stopped from Modbus or the Front Panel.

5	.
Text:	Error – <block identifier=""> is not used but has outputs connected.</block>
Condition:	The identified function is configured as 'Not Used' but has connected outputs. This
	error applies to the User Defined Test, Over-acceleration, and Resettable trip.
Example 1:	Error – Over-Accel Trip is not used but has outputs connected.
-	The over-acceleration trip is connected to another block but the function is not
	configured for use.
Example 2:	Error – Resettable Trip is not used but has outputs connected.
-	Resettable Trip is connected to other logic but Resettable Trip is configured as 'Not
	Used'.

•	
Text:	Error – <block identifier=""> is configured as not used but has outputs connected.</block>
Condition:	The identified analog/discrete input is configured as 'Not Used' but has connected
	outputs.
Example:	Error – Programmable Input 10 is not used but has outputs connected.
•	Delay 1 input is configured as 'Input 10 discrete' but Programmable Input 10 is
	configured as 'Not Used'.

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Text:	Error – <block identifier=""> is configured as analog but has discrete outputs connected</block>
Condition:	The identified analog/discrete input is configured as an analog input but has an output
	connected to the discrete input function.
Example:	Error – Input 3 is analog but has discrete outputs connected.
-	Delay 1 input is configured as 'Input 3 discrete' but Input 3 is configured as an analog
	input.

8	
Text:	Error – < block identifier> is configured as discrete but has analog outputs connected.
Condition:	The identified analog/discrete input is configured as an discrete input but has an output
	connected to an analog input function.
Example:	Error – Input 4 is discrete but has analog outputs connected.
-	Trip Latch input 1 is configured as 'Input 4 Hi Hi' but Input 4 is configured as a discrete
	input.
	nipul.

9	
Text:	Error – <block identifier=""> is in a circular configuration loop</block>
Condition:	A loop has been detected in the configuration. The identified block is one of the blocks
	in this loop. Only one loop at a time is and each block in the detected loop is identified.
	A Unit Delay (Z ⁻¹ equivalent) must be inserted in the loop to provide a break in the loop.
Example:	Error – Logic Gate 14 is in a circular configuration loop.
	Error – Logic Gate 15 is in a circular configuration loop.
	Error – Logic Gate 16 is in a circular configuration loop.
	The configuration of the identified blocks creates a loop that needs to be resolved. A
	Unit Delay block is required to break this loop.
Example 2:	Error – Logic Gate 34 is in a circular configuration loop.
	Logic Gate 34 output is directly connected to its input, creating a loop. A Unit Delay
	block is required between the output and the input to break this loop.

10	
Text:	Warning – <block identifier=""> is used but has no outputs configured.</block>
Condition:	The identified block has inputs that are configured but has no connected outputs. This error applies to the Trip Cycle Time Monitor function and the Event Latches.
Example:	Warning – Trip Cycle Mon 1 is used but has no outputs configured. The Trip Cycle Time Monitor 1 function is configured as 'Used' but the block output is not connected to any other blocks.

11	
Text:	Warning – <block identifier=""> is configured but has no outputs connected.</block>
Condition:	The identified block has inputs that are configured but has no connected outputs. This
	error applies to all configurable logic blocks.
Example:	Error – Logic Block 3 is configured but has no outputs connected.
-	Logic Block 3 is of type AND with 2 inputs configured but the block output is not
	connected to any other blocks.

12	
Text:	Warning – <block identifier=""> is configured as analog but has no analog outputs</block>
	connected.
Condition:	The identified analog/discrete input is configured as analog but none of the block's analog output indications are connected

Text:	Warning – <block identifier=""> is configured as discrete but has no discrete outputs connected.</block>
Condition:	The identified analog/discrete input is configured as discrete but input's discrete indication is not connected to any other block inputs.

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14	
Text: Condition:	Error – <i><block identifier=""></block></i> is set to an invalid or out-of-range value. The identified block has inputs that are configured to values that are not allowed or are out of range. This error applies to the Overspeed Trip Setting and the Temporary Overspeed Trip Setting. These settings are not permitted to exceed the input frequency range of 32 KHz.
15	
Text:	Error – Proposed configuration contains data that is invalid (out-of-range).
Condition:	A setting has been detected that is out of the range allowed. This error condition needs to be corrected in the Programming and Configuration Tool (PCT) and should be reported to Woodward for correction.

Error Messages and Solutions

Configuration Error



If a configuration error exists, the Configuration Error Log must be reviewed. See "View Configuration Error Log" section in this chapter.

Note: The configuration check is performed by the MicroNet Safety Module after a settings file is loaded to the ProTech. The PCT must be connected to the MicroNet Safety Module to see this log. The results are stored in volatile memory so a power cycle would clear this log.


Chapter 11. Example Applications

This chapter describes sample safety applications.

Example 1—Steam Turbine Driving a Generator

The installation contains the following equipment:

- Steam turbine
- Generator
- Turning gear
- Lube oil tank
- AC lube oil pump
- Emergency DC lube oil pump
- A vibration monitoring system

The following safety provisions must be provided:

- One 2-o-o-3 safety trip block that dumps the hydraulic oil pressure to the main trip valve in case of emergency stop.
- Overspeed protection
- Emergency lube oil pump control
- Vibration and axial displacement protection
- Zero speed detection for turning gear clutch permission
- Lube oil low supply pressure protection
- bearing high temperature protection

For the purpose of these safety provisions, the following sensors are installed:

- 3 MPU speed sensors
- 1 proximity sensor for zero-speed detection
- A number of vibration and displacement sensors
- 3 lube oil supply pressure transmitters (4–20 mA)
- Simplex temperature transmitters for the bearings (4–20 mA)
- Voltage sensors on the dual redundant voltage supply for the trip valve block

Requirements

- Trip action
 - o Overspeed
 - Turbine speed exceeds 3950 rpm
 - o Overacceleration
 - Turbine acceleration exceeds 50 rpm/s while speed is more than 3700 rpm.
 - o Trip request from Vibration and axial displacement monitoring system
 - o Lube Oil Pressure Low Low AND No zero speed
 - o 2-o-o-3 speed sensor failure.
 - Any bearing temperature High High
- Overrides
 - o Speed sensor failure override
 - Override removed after minimum speed detected, or 60 seconds after override input is removed.

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Alarms

- Turbine speed exceeds 3700 rpm (overacceleration trip imminent)
- o Alarm from Vibration and axial displacement monitoring system (Discrete Input)
- Health status from Vibration and axial displacement monitoring system (Discrete Input)
- Zero speed sensor failure (Logic)
- Any Speed sensor failure
- Any lube oil supply pressure sensor failure
- o Any temperature sensor failure
- Lube oil pressure Low
- Any bearing temperature High
- Trip Valve Supply Voltage Failure
- Events
- Run Command to Emergency Lube Oil Pump
 - Lube Oil Pressure Low AND No zero speed (latched)
- Stop Command to Emergency Lube Oil Pump
 - o Manual action
- Turning Gear Clutch Enable
 - Zero speed detected plus delay AND No zero speed sensor failure
- Test sequences
 - Weekly MicroNet[™] Safety Module overspeed test on each TPS module
 - Weekly Trip valve test on each TPS module
- Speed Readout
 - One simplex 4–20 mA signal from Unit A
- Input Redundancy

о О	Overspeed:	Sensors triple	Processing Triple
0	Zero speed:	Sensor Simplex	Processing Triple
0	Lube Oil Press:	Sensors Triple	Processing Triple
0	Discretes from		
	Vibration Monitor:	Contact Simplex	Processing Triple
0	Pressure sensors		
	Trip Block	Sensors Simplex	Processing Triple
0	Temperature sensors	Sensors Simplex	Processing Dual
0	Valve supply voltage Fail	Contact Simplex	Processing Simplex

I/O Allocation

Prog Relay #1	= Clutch Enable	
Prog Relay #2 and #3	= Emergency Pump	0
Input #1	= Discrete input	= Zero speed detection Proximiter
Input #2	= Analog Input	= Lube Oil Pressure
Input #3	= Discrete Input	= Trip from Vibration system
Input #4	= Discrete Input	 Alarm from Vibration system
Input #5	= Discrete Input	= Healthy from Vibration system
Input #6	= Analog Input	= Pressure in leg A of trip block (Unit B: leg B, Unit C: leg C)
Input #7	= Analog Input	= Pressure in leg B of trip block (Unit B: leg C, Unit C: leg A)
Input #8	= Analog Input	= Pressure in leg C of trip block (Unit B: leg A, Unit C: leg B)
Input #9 (Unit A, B)	= Analog Input	= Temperature inlet end bearing (Dual Redundant)
Input #10 (Unit A, B)	= Analog Input	= Temperature Exhaust end bearing (Dual Redundant)
Input #9 (Unit C)	= Discrete Input	 Valve supply voltage failure (Simplex)

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MicroNet Safety Module Fault Tolerant Protection System

Wiring Diagrams

- Trip valve block control circuit
- Trip valve block pressure check circuit
- Turning gear enable output
- Emergency pump MCC
- Proximiter
- Vibration monitor system
- Lube oil pressure sensors
- speed override signal
- Temperature sensor



Figure 11-1. Trip Valve Block Control Circuit

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Figure 11-2. Trip Valve Block Pressure Check Circuit

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Figure 11-3. Turning Gear Enable Output





Figure 11-4. Emergency Pump MCC

MicroNet Safety Module Fault Tolerant Protection System



Figure 11-6. Zero Speed Detection Proximiter

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Figure 11-7. Vibration Monitor System











Figure 11-10. Temperature Sensors

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MicroNet Safety Module Fault Tolerant Protection System

Configuration Sheet

- Inputs
- Outputs
- Speed
- Trip Latch
- Alarm Latch
- Event Latch
- Comparators
- Logic Gates
- Latches
- Delays
- Timers

Inputs

Ê	Off-Line P	rogram Mode-Pi	rogrammable	Inputs 1-4
Speed	Inputs	Modbus	Time Sync	Test Modes
Trip Latch	Alarm Latch	Reset Logic	Other Outputs	Event Latches
Logic Gates	Latches	Delays Compari	ors Timers	Trip Cycle Timer
nput 1 Mode Discrete Input 💌	Name Zero Speed Detection	Input 2 Mode	Name Lube Oil F	Pressure
nput 1 Mode	Name	Input 2 Mode Analog Input Scaling Input 4mA Va	Name Lube Oil F	Pressure Unit 0 Bar
nput 1 Mode	Name	Input 2 Mode Analog Input Scaling Input 4mA Va Input 20mA V	Name Lube Oil F	Pressure Unit Unit Bar
nput 1 Mode	Name	Input 2 Mode Analog Input Scaling Input 4mA Va Input 20mA V Setpoints Lo	Name Lube Dil F	Pressure Unit Unit 0 Bar 5 filhi0

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Input 5 Mode	Name Vibratio	on System Health	у	Input 6 Mode	ut 💌	Name	r.Press in Leg A	
				Scaling ——				— Unit — —
				Input 4mA \	Value		0	Bar
				Input 20mA	Value		5	
				Setpoints —				
				Lo		0	HiHi	0
				LoLo		0	Hi	0
Input 7 Mode	Name			Input 8 Mode	• ———	Name —		
Analog Input 💌	Hydr.P	Press in Leg B		Analog Inp	ut 💌	Hyd	r.Press in Leg C	
Scaling			Unit	Scaling —				— Unit ———
Input 4mA Value		0	Bar	Input 4mA \	Value		0	Bar
Input 20mA Value		5		Input 20mA	Value		5	
Setpoints				Setpoints —				
Lo	0	ніні 🛛	0	Lo		0	HiHi	0
LoLo	0	ні	0	LoLo		0	Hi	0

Inputs 9 and 10 for Unit A and B

_

Programmable Inputs 1-4			Programmable Inputs 5-8			Programmable Inputs 9-10		
Input 9 Mode	Name	End Brg temp		- Input 10 Mode]	Name Rear	End Brg Temp)
Scaling Input 4mA Value		0	Unit	Scaling Input 4mA Value			0	— Unit ———
Input 20mA Value		200		Input 20mA Value			200	
Setpoints				Setpoints				
Lo	0	HiHi 🛛	0	Lo		0	HiHi	0
LoLo	0	ні Г	0	LoLo		0	Hi	0

Inputs 9 and 10 for Unit C

Programmable Inputs 9-10									
			Home	Speed	Trip Latch	Outputs			
1.4	F 0	0.10	Modbus	Conf. Management	Alarm Latch	Event Latch			
1-4	5-8	9-10	Comparators	Logic Gates	Latches	Delays			
			Timers	Trip Cycle Timers	Time Sync	Reset and Trip			
Input 9 Mode Name Input 10 Mode Discrete Input T Supply Voltage Fail Not Used T									



MicroNet Safety Module Fault Tolerant Protection System

Outputs

Relay #1 = Latch 1 = Turning Gear Enable Relay #2 = Latch 2 = Emergency Pump Control Relay #3 = Latch 2 = Emergency Pump Control

Relay	-Input			Polarity
1	Latch 1		•	Non Inverting 💌
2	Latch 2		•	Non Inverting 💌
3	Latch 2		•	Non Inverting 💌
Analog Output S	icaling —			
Output 4mA V	alue	0	rpm	
Output 20mA	Value	4000	rpm	

Speed

Configure Start Logic			
Speed Fail Setpoint	100 rpm		
Speed Fail Trip	Enabled 💌		
Speed Fail Alarm	Enabled 💌		
Speed Fail Timeout Trip	Disabled 💌		
Speed Fail Timeout Time	1 s		
Configure Speed Input		Configure Acceleration	
Probe Type	Passive 💌	Enable Acceleration Trip	Enabled 💌
Nr of Gear Teeth	60	Acceleration Trip Enable Speed	3700 rpm
Gear Ratio	1	Acceleration Trip	50 rpm/s
Overspeed Trip	3950 rpm		
Sudden Speed Loss	Alarm 💌		

MicroNet Safety Module Fault Tolerant Protection System

Trip Latch

Logic Gate 1 = Trip request from Vibration Monitoring System Logic Gate 2 = Lube Oil Pressure Low Low And No zero speed

Logic Gate 3 = Any Bearing Temperature High High

	Off-Line	Progra	m Mode	e - Trip Latch	1-10
Speed	Inputs	Mod	ous	Time Sync	Test Modes
Trip Latch	Alarm Latch	Reset	Logic	Other Outputs	Event Latches
Logic Gates	Latches Delays		Comparitors	s Timers	Trip Cycle Timers
Configure Trip Latch	RD_DE_ENERGIZE_TO_T				
Number			Name ———		
1	Logic Gate 1	•	Vibratio	n System Trip	
2	Logic Gate 2	-	Lube 0	il Pressure Lo Lo	
3	Logic Gate 3	•	Bearing	Temperature	
4	Not Connected	•	Trip La	ich 04	

Alarm Latch

Comparator 1 = Speed > 3700 rpm Logic Gate 5 = Vibration Monitor Alarm Logic Gate 6 = Vibration Monitor Fail Logic Gate 7 = Zero speed sensor Fail Logic Gate 8 = Any speed sensor Fail Logic Gate 9 = Any Lube Oil Pressure sensor Fail Logic Gate 10 = Any Temperature sensor Fail Logic Gate 11 = Lube Oil Pressure Low

Logic Gate 12 = Any Bearing Temp High Logic Gate 13 = Supply Voltage Fail

	Alarm Latches 1-10		Alarm Late	ches 11	-30	Alarm Latches 31-50
Number –				Name		
1		Analog Comparator 1	•		Speed > 3700 rp	m
2		Logic Gate 5	-		Vibration Monitor	Alarm
3		Logic Gate 6	-		Vibration Monitor	Fail
4		Logic Gate 7	•		Zero Speed Sen	sor Fail
5		Not Connected	•			
6		Analog In 2 Range Err	•		Any LubOil Press	s. Fail
7		Logic Gate 10	•		Any Temp Senso	or Fail
8		Analog Input 2 Lo	•		Luboil Press. Lov	N
9		Logic Gate 12	•		Any Bearing Ten	np Hi
10		Not Connected	•		Supply Voltage F	ail

MicroNet Safety Module Fault Tolerant Protection System

Event Latch

- Comparators for units A and B.
- Comparator 1 = speed > 3700 Comparator 2 = Bearing Temp #1 > 110 deg. C Comparator 3 = Bearing Temp #1 > 130 deg. C Comparator 4 = Bearing Temp #1 > 110 deg. C Comparator 5 = Bearing Temp #1 > 130 deg. C Comparator 6 = Speed > 100 Comparator 7 = speed > 250

Modbus Time Sync Tes Inputs Speed Alarm Latch Reset Logic Other Outputs Even Trip Latch Logic Gates Latches Delays Comparitors Timers Trip Comparitor Off Level On Level • 3500 3700 1 Speed ſ 100 110 2 Analog Input 09 💌 130 Analog Input 09 💌 100 3 100 110 Analog Input 10 💌 4 5 Analog Input 10 💌 100 130 100 Speed 100 6 • 250 Speed -100 7 0 Not Connected 💌 0 8 0 Not Connected 💌 0 9 þ 0 Not Connected 10

Comparators for unit C.

Comparator 1 = speed > 3700Comparator 6 = speed > 100Comparator 7 = speed > 250

Comparator —		- Off Level	- On Level
1	Speed 💌	3500	3700
2	Not Connected	100	110
3	Not Connected	100	130
4	Not Connected	100	110
5	Not Connected	100	130
6	Speed	100	100
7	Speed 💌	100	250

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MicroNet Safety Module Fault Tolerant Protection System

Logic Gates

- Logic Gate 1 = Trip from Vibration System.
- Not Gate on input 3 because trip from vibration system is open contact.
- Logic Gate 2 = Lube Oil Pressure Low Low And No zero speed
- AND gate on Logic Gate 15 (no zero speed) and input #2 (lube oil pressure Lo Lo).
- Logic Gate 3 = Any Bearing Temperature High High
- OR gate on comparator 3 and comparator 5
- Logic Gate 4 = Spare
- Logic Gate 5 = Vibration Monitor Alarm
- Not Gate on input 4 because Alarm from vibration system is open contact.
- Logic Gate 6 = Vibration Monitor Fail
- Not Gate on input 5 because Healthy from vibration system is open contact if not healthy.
- Logic Gate 7 = Zero speed sensor Fail
- AND gate on zero speed (Gate 14) AND Comparator 6 (speed > 100)
- Logic Gate 8 = Spare
- Logic Gate 9 = Spare
- Logic Gate 10 = Any Temperature Sensor Fail
- OR gate on Analog In 9 Range Err and Analog In 10 Range Err (This configuration only on Units A and B)
- Logic Gate 11 = Spare
- Logic Gate 12 = Any Bearing Temp Hi
- OR gate on comparator 2 and comparator 4
- Logic Gate 13 = Supply Voltage Fail
- NOT gate on Discrete Input 9 (On unit C only)
- Logic Gate 14 = Zero speed
- OR gate on delay 1 and delay 2
- Logic Gate 15 = Not zero speed
- NOT gate on Logic Gate 14.
- Logic Gate 16 = Inverter on Discrete input #1 (zero speed detection)
- Logic gate 17 = No zero-speed sensor failure
- Not gate on Logic Gate 7
- Logic Gate 18 = Zero speed detected, and no sensor fail
- AND gate on gate 17 and gate 14.

Gates 1-6 Gates 7-1	Gates 13-18	Gates 19-24	Gates 25-30	Gates 31-36	Gates 37-42	Gates 43-50
Logic Gate 1	Lo	gic Gate 2	And	— Logic G	ate 3	
Inputs	J Ing	uts		- Inputs -	10	
Discrete Input 3	<u> </u>	Logic Gate 15	► DLo	A	nalog Comparator 3 nalog Comparator 5	-
		Not Connected	•	N	ot Connected	-
		Not Connected	•	N	ot Connected	•
		Not Connected	<u> </u>	1	ot Lonnected	<u> </u>
Logic Gate 4	Lo,	gic Gate 5		— Logic G	ate 6	
Type And 💌] .	Гуре	Not 💌	Туре	Not	
Inputs	Inp	iuts		- Inputs -		
Not Connected	•	Discrete Input 4	•	D	iscrete Input 5	▼
Not Connected	•					
Not Connected	•					

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Logic Gate 7	Logic Gate 8	Logic Gate 9
Type And	Type And 💌	Type And 💌
Inputs	Inputs	
Logic Gate 14	Not Connected	Not Connected
Analog Comparator 6	Not Connected	Not Connected
Not Connected	Not Connected	Not Connected
Not Connected	Not Connected	Not Connected
Not Connected	Not Connected	Not Connected
Lasta Cata 10	Lucia Cata 11	Lucia Colu 12
lype Ur	Iype And	Type Ur 💌
	Inputs	
Analog In 9 Range Err	Not Connected	Analog Comparator 2
Analog In 10 Range Err	▼ Not Connected ▼	Analog Comparator 4
Not Connected	Mat Connected	Mat Connected
Logic Gate 13	Logic Gate 14	- Logic Gate 15
Type Not 🔻	Type Or 🔻	Type Not 🔻
Inputs		Inputs
Not Connected	Telau 1	Logic Bate 14
	Delay 2	
	Not Connected	
	Not Connected	
Logic Gate 16	Logic Gate 17	– Logic Gate 18 –
Type Not 🔻	Type Not V	
		Inputs
Discrete Input 1	▼ Logic Gate 7	Logic Gate 17
Discrete input i		
		Logic Gate 14

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MicroNet Safety Module Fault Tolerant Protection System

Latches

Latch 1 = Turning gear enable.

Set at zero speed detected (logic Gate 18), Reset if speed > 250 (Comparator 7).

Latch 2 = Emergency Pump on

Set on logic gate 2, Reset after manual Reset action

			Latches			
	Home		Speed	Trip Latch	Outputs	Test Mo
	Mo	odbus	Conf. Management	Alarm Latch	Event Latch	Input:
	Com	parators	Logic Gates	Latches	Delays	Unit Del
	Т	mers	Trip Cycle Timers	Time Sync	Reset and Trip	
Latch	Set		Reset			
1 Lo	gic Gate 18	•	· Ar	nalog Comparator 7		
2 Lo	gic Gate 2	•	R	eset Function	•	
3 No	t Connected	•	· No	ot Connected	•	
4 St	art Function	•	B	eset Function	•	

Delays

Delay 1 = 60 seconds on Discrete input 1 (Proximiter has been high for 60 seconds) Delay 2 = 60 seconds on Logic Gate 16 (Proximiter has been low for 60 seconds)

			Delays			
		Home	Speed	Trip Latch	Outputs	Test Mi
		Modbus	Conf. Management	Alarm Latch	Event Latch	Inpu
		Comparators	Logic Gates	Latches	Delays	Unit De
		Timers	Trip Cycle Timers	Time Sync	Reset and Trip	
Delay —	Input		alse Delay	True Delay	. <u> </u>	
1	Discrete Input 1	•		0 s	50 s	
2	Logic Gate 16	•		0 s	60 s	
3	Not Connected	•		0 s	0 s	

Timers

There are no Timers programmed.

Logic Diagram

- Zero speed Detection
- Zero speed detector failure
- Zero speed and no zero speed failure
- Turning gear permissive
- Trip valve block test logic.









Chapter 12. Configuration Worksheet

Date:___

ProTech Part Number:_____ ProTech Serial Number:_____ Site/Application:_____

Module A Module B Module C Probe Type Active / Passive Active / Passive Active / Passive No. Gear Teeth Gear Ratio SPEED Overspeed Trip rpm rpm rpm Sudden Speed Trip / Alarm Trip / Alarm Trip / Alarm Loss

	Enable	Yes / No	Yes / No	Yes / No
ACCELERATION	Acceleration Trip Enable Speed	rpm	rpm	rpm
	Acceleration Trip	rpm/sec	rpm/sec	rpm/sec

	Speed Fail Setpoint	rpm	rpm	rpm
	Speed Fail Trip	Used / Not Used	Used / Not Used	Used / Not Used
	Speed Fail Alarm	Used / Not Used	Used / Not Used	Used / Not Used
START LUGIC	Speed Fail	peed Fail Used / Not Used	Llead / Nat Llead	Llead / Not Llead
	Timeout Trip			
	Speed Fail	500	500	500
	Timeout Time	360	300	360

TRIP LATCH	Trip Configuration	Energize-To-Trip / De-Energize- To- Trip	Energize-To-Trip / De-Energize-To- Trip	Energize-To-Trip / De-Energize-To- Trip
ANALOG	Speed @ 4 mA	rpm	rpm	rpm
OUTPUT	Speed @ 20 mA	rpm	rpm	rpm

	Configure Test Modes			
	Temporary Overspeed Trip	rpm	rpm	rpm
	Temporary Overspeed Trip Timeout	sec	sec	sec
	Simulated Speed Timeout	sec	sec	sec
	Test Mode Interlock Disabled	Yes / No	Yes / No	Yes / No
	User Defined Test 1			
	Is Enabled	Yes / No	Yes / No	Yes / No
TEST MODES	Timeout	sec	sec	sec
	Set Input			
	Reset Input			
	User Defined			
	Test 2			
	Is Enabled	Yes / No	Yes / No	Yes / No
	Timeout	sec	sec	sec
	Set Input			
	Reset Input			
	User Defined			
	Test 3			
	Is Enabled	Yes / No	Yes / No	Yes / No
	Timeout	Sec	sec	Sec
	Set Input			
	Reset Input			

DEDIODIC	Enabled	Yes / No	Yes / No	Yes / No
	Test interval	days	days	days
TEST	T Operator Can Disable Test		Yes / No	Yes / No
		Module A	Module B	Module C
	Mode	RS-232 / RS-485	RS-232 / RS-485	RS-232 / RS-485
MODBUS		19200 /	19200 /	19200 /
	Baud Rate	38400 /	38400 /	38400 /
		57600 /	57600 /	57600 /
		115200	115200	115200
	Communication Parity	No Parity /	No Parity /	No Parity /
		Even Parity /	Even Parity /	Even Parity /
		Odd Parity	Odd Parity	Odd Parity
	Slave Address			
	Enable Write	Vec / No	Vec / No	Vec / No
	Commands	165/10	163/110	163/110
CONFIGURATION MANAGEMENT	Configuration Compare	Used / Not Used	Used / Not Used	Used / Not Used

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		Not Llood /	Not Llood /	Not Llood /
		Not Used /	Not Used /	Not Used /
	Input 1 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 1 Analog Mode	20 mA value:	20 mA value:	20 mA value:
	Settings	LoLo	LoLo	LoLo
		setpt :	setpt :	setpt :
	Name:	Lo	Lo	Lo
		HI a a test s		
			setpt :	
		Not Used /	Not Used /	Not Used /
	Input 2 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 2 Analog Mode	20 mA value:	20 mA value:	20 mA value:
	Settings	LoLo	LoLo	LoLo
	_	setpt :	setpt :	setpt :
PROGRAMMABLE	Name:	Lo	Lo	Lo
INPUTS		setpt :	setpt :	setpt :
		Hi	Hi	Hi
		setpt :	setpt :	setpt :
		HiHi setpt :	HiHi setpt :	HiHi setpt :
		Not Used /	Not Used /	Not Used /
	Input 3 Mode	Analog /	Analog /	Analog /
	-	Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 3 Analog Mode	20 mA value:	20 mA value:	20 mA value:
	Settings	LoLo	LoLo	LoLo
		setpt :	setpt :	setpt :
	Name:	Lo	Lo	Lo
		setpt :	setpt :	setpt :
		Hi	Hi	Hi
		setpt :	setpt :	setpt :
		HiHi setpt :	HiHi setpt :	HiHi setpt :
		Not Used /	Not Used /	Not Used /
	Input 4 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
	Input 4 Analog	Units:	Units:	Units:
	Settings	4 mA value:	4 mA value:	4 mA value:
	1			

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	Name:	20 mA value:	20 mA value:	20 mA value:
		setot :	setot ·	setot ·
		setpt :	setpt :	setpt :
		Hi	Hi	Hi
		setpt :	setpt :	setpt :
		HiHi setpt :	HiHi setpt :	HiHi setpt :
		·	·	
		Not Used /	Not Used /	Not Used /
	Input 5 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 5 Analog Mode	20 mA value:	20 mA value:	20 mA value:
	Settings			
	Counigo	setpt :	setpt :	setpt :
	Name:	Lo	Lo	Lo
		setpt :	setpt :	setpt :
		Hi	' <u>Hi</u>	Hi
		setpt :	setpt :	setpt :
		HiHi setpt :	HiHi setpt :	HiHi setpt :
		Not Used /	Not Used /	Not Used /
	Input 6 Mode	Analog /	Analog /	Analog /
	-	Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 6 Analog Mode	20 mA value:	20 mA value:	20 mA value:
PROGRAMMABLE	Settings	LoLo	LoLo	LoLo
INPUTS	Ū	setpt :	setpt :	setpt :
	Name:	Lo	Lo	Lo
		setpt :	setpt :	setpt :
		Hi	Hi	Hi
		setpt :	setpt :	setpt :
		HiHi setpt :	HiHi setpt :	HiHi setpt :

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		Not Llood /	Not Llood /	Not Llood /
		Not Used /	Not Used /	Not Used /
	Input 7 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 7 Analog	20 mA value:	20 mA value:	20 mA value:
	Mode			
	Settings			
	Counigo	setnt ·	setnt ·	setnt ·
	Name:			
	Name.	LU cotot :	LU cotot :	LU sotat :
				зеірі
			setpt :	
		HIHI Setpt :	HIHI setpt :	HIHI Setpt :
		Not Used /	Not Used /	Not Used /
	Input 8 Mode	Analog /	Analog /	Analog /
		Discrete	Discrete	Discrete
		Units:	Units:	Units:
		4 mA value:	4 mA value:	4 mA value:
	Input 8 Analog	20 mA value:	20 mA value:	20 mA value:
	Mode			
	Settings	LoLo	LoLo	LoLo
	· · · · · · · · · · · · · · · · · ·	setot :	setot :	setpt :
PROGRAMMABLE	Name [.]	10		lo
INPUTS	i lamoi	setot ·	setot ·	setot ·
		Hi	Hi	Hi
		setot ·	setnt ·	setnt ·
		HiHi setnt	HiHi setnt	HiHi setnt
		rin il octpr.	Thin boopt .	
		Not Used /	Not Llood /	Not Llood /
	Innut O Mada		Not Useu /	Not Oseu /
	input 9 Mode	Analog /	Analog /	Analog /
	Input 9 Mode	Discrete	Analog / Discrete	Analog / Discrete
		Discrete Units:	Analog / Discrete Units:	Analog / Discrete Units:
		Discrete Units:	Analog / Discrete Units:	Analog / Discrete Units:
	input 9 Mode	Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value:
		Analog / Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value:
	Input 9 Analog	Discrete Units: 4 mA value: 20 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value:
	Input 9 Mode	Analog 7 Discrete Units: 4 mA value: 20 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value:
	Input 9 Analog Mode Settings	Analog 7 Discrete Units: 4 mA value: 20 mA value: LoLo	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo
	Input 9 Analog Mode Settings	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt :
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Lo	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt :
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : Hi	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : Hi	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : Hi
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : Hi setpt : Hi setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : Hi setpt : Hi setpt :
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt :	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt :
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used /	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used /	Analog / Discrete Units: 4 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used /
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog /	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog /	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog /
	Input 9 Analog Mode Settings Name:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete
	Input 9 Analog Mode Settings Name: 	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:
	Input 9 Analog Mode Settings Name: Input 10 Mode	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units:
	Input 9 Analog Mode Settings Name: Input 10 Mode Input 10 Analog Mode Settings	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Mot Used / Analog / Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Not Used / Analog / Discrete Units: 4 mA value:	Analog / Discrete Units: 4 mA value: 20 mA value: 20 mA value: LoLo setpt : Lo setpt : Hi setpt : HiHi setpt : Mot Used / Analog / Discrete Units: 4 mA value:



Name:	20 mA value:	20 mA value:	20 mA value:
	LOLO	LOLO	LOLO
	setpt :	setpt :	setpt :
	Hi	Hi	Hi
	setpt :	setpt :	setpt :
	HiHi setpt :	HiHi setpt :	HiHi setpt :

TIME	Mode	Not Used /	Not Used /	Not Used /
SYNCHRONIZATION		24h Time Sync	24h Time Sync	24h Time Sync

	Monitor 1			
	Trip Indicator			
	Input			
	Max Cycle			ms
TRIP CYCLE TIMERS	Time	ms	ms	
	Monitor 2			
	Trip Indicator			
	Input			
	Max Cycle	ms		200
	Time		ms	Ins

	Configurable Reset Source	Used / Not Used	Used / Not Used	Used / Not Used
RESET LOGIC	Resettable Trip	Non Inverting /	Non Inverting /	Non Inverting /
	Use	Inverting	Inverting	Inverting
	(reset clears trip)			

	17			
		Module A	Module B	Module C

	Relay Output 1			
	Relay Driver Function			
	Polarity	Non Inverting / Inverting	Non Inverting / Inverting	Non Inverting / Inverting
	Relay Output 2			
	Relay Driver			
OTHER OUTPUTS	Function			
	Polarity	Non Inverting / Inverting	Non Inverting / Inverting	Non Inverting / Inverting
	Relay Output 3			
	Relay Driver			
	Function			
	Polarity	Non Inverting / Inverting	Non Inverting / Inverting	Non Inverting / Inverting



MicroNet Safety Module Fault Tolerant Protection System

Revision History

Changes in Revision A—

• Installed an Important Box on Page 103



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