

VeriSafe Network Module Subject: User Guide Lit. No.: B21176 Date: June 19 2023 Revision: 3 [English] Model No: VS2-NET

Table of Contents ____

Veb Application
Features
First Login
Web Application Layout
AVT Status Page4
Data Logs Page7
Settings Page
Documentation Page13
Support Page

Data Models14
EtherNet/IP™ Data Model
Modbus TCP Data Model
Rockwell Automation Integration
Automatic Diagnostic AOP Items
Security
Troubleshooting
Warranty
Panduit Limited Product Warranty

The network module is designed to be an optional accessory that enables network capabilities for the VeriSafe 2.0 Absence of Voltage Tester (AVT). The network module provides an integrated web application that is delivered by an on board web server. The web application monitors data from the AVT and provides integration, configuration and firmware update capabilities. The network module supports AVT data over EtherNet/IP and Modbus TCP protocols. The voltage presence discrete outputs may be used as an indication of voltage presence with or without a network connection. The network module provides the ability to log various pieces of data based on built in triggers (see **Data Logs Page** for more information).

Before attempting to physically install the network module in hazardous or ordinary locations, refer to document no. B21148 (VeriSafe Network Module Installation Requirements Manual) for physical installation requirements including; connectivity, ratings and environmental specifications for the network module.





TO REDUCE THE RISK OF INJURY, USER MUST READ INSTRUCTION MANUAL

NOTE: In the interest of higher quality and value, Panduit[™] products are continually being improved and updated. Consequently, pictures may vary from the enclosed product.
 NOTE: Updates to this Instruction Manual may be available. Check www.panduit.com for the latest version of this manual.

Tech Support Emails North America Tech Support: techsupport@panduit.com

EU Tech Support : techsupportemea@panduit.com

techsupportlatam@panduit.com

LATAM Tech Support:

Asia Pacific Tech Support: techsupportap@panduit.com



For a copy of Panduit product warranties, log on to www.panduit.com/warranty

For more information Visit us at www.panduit.com/verisafe



1006819, B21176_EN_rev3

Web Application

FEATURES

The network module web application can be used to configure and monitor the AVT. Access the web application by typing the network module IP address in a supported browser.

FIRST LOGIN

- 1. Type the network module IP address (default: 192.168.2.10) in a supported browser using HTTPS and not HTTP.
 - Supported browsers: Chrome, Edge, Firefox
- 2. If the Browser displays "refused to connect" please double check that you are using "https://" protocol and not "http://"

FIGURE 1. REFUSED CONNECTION EXAMPLE

τĽ	Ľ
\sim	L

This site can't be reached

192.168.2.10 refused to connect.	
Try: • Checking the connection • Checking the proxy and the firewall	
err_connection_refused	
Reload	Details

3. By Default, the Web Interface uses a self-signed certificate. Until a CA signed certificate / key is installed, browsers will display a security error. In Chrome browser, click advanced.

FIGURE 2. CERTIFICATE WARNING

← C		A® .
D Import favorites For quick access, place your favorites here on the favorites bar	Manage favorites now	
	A	
	Your connection isn't private	
	Attackers might be trying to steal your information from 192.168.2.10 (for example, passwords,	
	messages, or creat adruss.	
	Advanced Go back	

 Click on "Continue to 192.168.2.10 (unsafe)" and you will be prompted to the VeriSafe Network Module web application page.

FIGURE 3. CONTINUE TO WEB APPLICATION LINK



- 5. On first login the user is required to change the admin password Web App Login (factory default setting)
 - Username: admin Password: admin

FIGURE 4. CHANGE PASSWORD

	PANDUIT VeriS Network Mo	afe [:] dule
	Login	
	username admin	
	password	
	Login	
Change Pas	sword	
current pass new password Password Req At leas At leas At leas At leas	word rd uirements an 8 and 40 characters. 11 Special Character (1@#5 t one number. t one capital letter. t one lower case letter. password	%^&*).
Passwords do n	ot match.	Update Password

6. Before using the Network Module with an AVT unit, please ensure the firmware is updated to the latest version by selecting the image below. This will take you to Panduit's products software/firmware page where the latest firmware version of the Network Module can be found.

View Latest Network Module Firmware

WEB APPLICATION LAYOUT

The web application layout consists of a left sidebar menu and a content area loaded with content cards. FIGURE 5. WEB APPLICATION DASHBOARD

LOGIN On login the user will be directed to the AVT Status	PANDUIT VeriSafe Network Module	Name Pump 1 Date & Time:5/9/23, 12:2	6 PM	2	3 /oltage Pre	Updated 0 seconds ago		
page.	Pump 1 🚄	AVT Test Data			L1	L2	L3	
	AVT Status	Updated	5/9/23, 12:26 PM		•	•	*	
	Data Logs	Battery Voltage Test Temperature	3.6 V 25°C (77°F)	V	/oltage Mea	asurements		
Sidebar Menu 🛛 🚺	Settings	Updated	5/9/23, 12:26 PM	Line	To Ground	RMS	Peak	
		Connection Status L1	YES	L1		301 Vrms	426 V	
1st Card 🥠	Documentation	Connection Status L2	YES	13		300 Vrms	427 V 425 V	
		Connection Status L3	YES	20		500 1113	425 4	
	Support	Connection Status SND	120	Line	To Line	RMS	Peak	
2nd Card 3	0	Test Result 1	Voltage Exceeded	L1-L	2	521 Vrms	738 V	
	•	Test Result 1 Date	5/9/23, 12:26 PM	L1-L	3	521 Vrms	739 V	
		Test Result 2	Pass	L2-L	3	521 Vrms	739 V	
	Lengut	Test Result 2 Date	5/9/23, 12:25 PM					
	Logout			A	WT Tempe	rature		
		Activate AVT Test		Curr	ent Temperature	25°C (77	F)	

AVT STATUS PAGE

After the user has logged in they will be redirected to the AVT Status page. This page consists of two data cards with views that will be determined by the type of AVT in use and the user settings. FIGURE 6. AVT STATUS PAGE 3-PHASE AVT (VS2-AVT-3P)

VeriSafe	Name Pump 1		Upda	ated 0 seconds ago				
Network Module	Date & Time:5/9/23, 12:2	6 PM	Voltage Pre	sence				
Pump 1	AVT Test Data	L1	L2	L3				
AVT Status	Updated	5/9/23, 12:26 PM	*		*			
	Battery Voltage	3.6 V						
Data Logs	Test Temperature	25°C (77°F)	Voltage Me	leasurements				
Settings	Updated	5/9/23, 12:26 PM	Line To Ground	RMS	Peak			
bettings	Connection Status L1	YES	L1	301 Vrms	426 V			
Documentation	Connection Status L2	YES	L2	301 Vrms	427 V			
boodmontation	Connection Status L3	YES	L3	300 Vrms	425 V			
Support	Connection Status GND	YES	Line To Line	RMS	Peak			
	Test Result 1	Voltage Exceeded	L1-L2	521 Vrms	738 V			
	Test Result 1 Date	5/9/23, 12:26 PM	L1-L3	521 Vrms	739 V			
	Test Result 2	Pass	L2-L3	521 Vrms	739 V			
	Test Result 2 Date	5/9/23, 12:25 PM						
Logout			AVT Temperature					
	Activate AVT Test		Current Temperature	25°C (77	°F)			

2n

AVT STATUS PAGE FIRST CARD

Data presented in this card is updated as described in table 1. The user is presented with time stamps to indicate when the data was last updated. Some data will not be shown until an absence of voltage test is completed.

FIGURE 7. AVT STATUS PAGE 1ST CARD VIEWS

Pump 1 Date & Time:5/8/23, 10:3	32 AM 2		Pump 1 Date & Time:5/9/23, 8:3	1 AM 2
AVT Test Data				
Updated	5/8/23, 10:30 AM	-	AVT Test Data	
Battery Voltage	3.5 V	3	Lindated	5/9/23 8:23 AM
Test Temperature	26°C (79°F)		Battery Voltage	3.5 V
Updated	5/8/23, 10:30 AM		Test Temperature	25°C (77°F)
Connection Status L1	YES	4	Updated	5/9/23, 8:23 AM
Connection Status L2	YES		Connection Status +	YES
Connection Status L3	YES		Connection Status -	YES
Connection Status GND	YES		Connection Status GND	YES
Test Result 1	Pass		Test Result 1	Pass
Test Result 1 Date	5/8/23, 10:30 AM	6	Test Result 1 Date	5/9/23, 8:23 AM
Test Result 2	Pass	-	Test Result 2	Pass
Test Result 2 Date	5/8/23, 10:18 AM		Test Result 2 Date	5/9/23, 8:23 AM
	6			•

3-Phase View

DC/Single-Phase View

TABLE 1.

1.	Name	User defined AVT name (Default blank). This is used to identify data log files and appears in the side bar menu. Changes are automatically saved.
2.	Date/Time	Current Date/Time of the network module. Updated every 2 seconds.
3.	Battery Voltage and Test Temperature	 Last measured value of the battery voltage and Internal temperature of the AVT. Updated when the user presses the test button and during the wakeup
		Cycle
		Recommended to replace battery in the AVT when measured below 2.9V.
4.	Connection Status	Status of the connectivity between each pair of sensor leads based on the last completed test performed when no voltage is present.
5.	Test Result 1	Show the most recent test result from the AVT
	Test Result 1 Date	Date/Time of AVT test result 1
	Test Result 2	Show the test result prior to test result 1
	Test Result 2 Date	Date/Time of AVT test result 2
6.	AC/DC Selection *(VS-AVT-1P Single phase units only)	Selects the appropriate power system. This will update the card view. Changes are automatically saved.
7.	Activate AVT Test Button	Starts the absence of voltage test

AVT STATUS PAGE SECOND CARD

Data in this card is updated every 2 seconds. For single phase systems the view shown is determined by selection on card 1 (table 1, item 6 AC/DC selection).

FIGURE 8. AVT STATUS PAGE SECOND CARD VIEWS

Updated 0 second	s ago 🗸		Updated 0 seconds ago	Updated 0 seconds ago					
Voltage Presence 2		Voltage Presence		Voltage Presence					
L1 L2	.3	U	N/L2	+ .					
Voltage Measurements		*	7	• *					
Line To Ground RMS Peak		Voltage Measureme	ents	Voltage Measurements					
L1 301 Vrms 426 V		Line to Ground RMS	IS 678 V	+ 480 V					
L3 300 Vrms 425 V		N/L2 0 Vrms	0 V	- 0 V					
Line To Line RMS Peak		Line To Line L1-N/L2 480 Vm	is 678 V	+ to - 480 V					
L1-L3 521 Vrms 739 V		A)/T Tomporature		AV/T Tomporatura					
139 V		Current Temperature 25	°C (77°F)	Current Temperature 25°C (77°F)					
AVI Temperature 4 Current Temperature 25°C (77°F)									
Three-Phase View		Single-Ph	ase View	DC View					
TABLE 2									
1. AVT Connection Status	Indicates st	atus of the connecti	on between the isolati	on 🔽 OK					
	module and	I network module.							
2 Voltage presence	- Reflect	oltage presence indica	tors (Bed LEDs) on the indicator						
	module	3 110 Status of the v	onage presence mulca						
•	- Roflact	e the status of the v	oltago proconco conta	ete on the natwork module					
		S the status of the v	unage presence coma	cis on the network mouule.					
3. Voltage Measurements		d nook voltago ling							
	to aroun	d heak vollage lille	AC Range	*Accuracy					
	to groun	d BMS and line to	AC Range 0-33 VAC	*Accuracy ± 7V					
	 Calculate Line volta 	ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC	*Accuracy					
	 Calculate Ine volta 	d d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC	*Accuracy ± 7V ± 5V ± 2%					
	 Groun Calculate Line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC	*Accuracy ± 7V ± 5V ± 2% ± 1.5%					
	 Measure to groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC	*Accuracy ± 7V ± 5V ± 2% ± 1.5%					
	 Groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC DC Range	*Accuracy					
	 Recurrent to groun Calculate line volta 	d d ad RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC DC Range 0-100 VDC	*Accuracy ± 7V ± 5V ± 2% ± 1.5% *Accuracy ± 5V					
	 Groun Calculate line volta 	d ad RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC DC Range 0-100 VDC 101-300 VDC	*Accuracy ± 7V ± 5V ± 2% ± 1.5% *Accuracy ± 5V ± 4%					
	 Recurrent to groun Calculate line volta 	d ad RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC DC Range 0-100 VDC 101-300 VDC 301-700 VDC	*Accuracy ± 7V ± 5V ± 2% ± 1.5% *Accuracy ± 5V ± 4% ± 2%					
	 Records of the second se	d ad RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC DC Range 0-100 VDC 101-300 VDC 301-700 VDC 701-1000 VDC	*Accuracy ± 7V ± 5V ± 2% ± 1.5% *Accuracy ± 5V ± 4% ± 2% ± 1.5%					
	 Recurrent to groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC 0-100 VDC 101-300 VDC 301-700 VDC 701-1000 VDC	* Accuracy \pm 7V \pm 7V \pm 5V \pm 2% \pm 1.5% * Accuracy \pm 5V \pm 5V \pm 2% \pm 1.5% \pm 2% \pm 1.5%					
	 Record to groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC 0-100 VDC 101-300 VDC 301-700 VDC 701-1000 VDC To get the most accurappropriate power si web application.	* Accuracy ± 7V ± 5V ± 2% ± 1.5% * Accuracy ± 5V ± 4% ± 2% ± 1.5% urate voltage readings, ensure the system configuration is selected in	e n the				
	 Recurrent to groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC 0-100 VDC 101-300 VDC 301-700 VDC 701-1000 VDC To get the most accu appropriate power s web application. * All values in this ta are expected to be w	*Accuracy ± 7V ± 5V ± 2% ± 1.5% *Accuracy ± 5V ± 4% ± 2% ± 1.5% urate voltage readings, ensure the steem configuration is selected in the selected in the se ranges.	e 1 the and				
	 Record to groun Calculate line volta 	d RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC 0-100 VDC 101-300 VDC 101-300 VDC 701-1000 VDC To get the most accu appropriate power sy web application. * All values in this ta are expected to be w Note: The absence of utilizes a separate ci threshold.	*Accuracy \pm 7V \pm 7V \pm 5V \pm 2% \pm 1.5%*Accuracy \pm 5V \pm 4% \pm 2% \pm 1.5%urate voltage readings, ensure the system configuration is selected inble are to be used as a reference within these ranges.of voltage indication from the AVT rcuit that is optimized for the 3V	e 1 the and T				
	 Recurrent to groun Calculate line volta 	d ed RMS and line to ages	AC Range 0-33 VAC 34-99 VAC 100-300 VAC 301-1000 VAC 0-100 VDC 101-300 VDC 101-300 VDC 701-1000 VDC To get the most accu appropriate power s web application. * All values in this ta are expected to be w Note: The absence of utilizes a separate ci threshold.	*Accuracy $\pm 7V$ $\pm 5V$ $\pm 2\%$ $\pm 1.5\%$ *Accuracy $\pm 5V$ $\pm 5V$ $\pm 2\%$ $\pm 1.5\%$ urate voltage readings, ensure the system configuration is selected in ble are to be used as a reference within these ranges. of voltage indication from the AVT rout that is optimized for the 3V	e n the and T				

DATA LOGS PAGE

This page allows the user to manage the log data stored on the network module SD card.

LOG TRIGGERS

Log entries are triggered by specific AVT events:

- Change in state of any voltage presence indicator
- Initiating the absence of voltage test
- Daily AVT wakeup cycle

FIGURE 9. DATA LOGS PAGE DETAILS

PANDUIT	Reques	st Data Lo	gs D	ownload Lo	gs (CS\) Dow)			Delet	e Logs							
VeriSafe [®]	_	0		2)			3				_	4							
Network Module	Filters																			^
Pump 1	Fro	5 m:				/oltage Not	Present	L1 Disconne	cted	Test In	itiated									
AVT Status	Sta	rt Date				/oltage Not	Present	L2 Disconne	cted	Test P	assed									
Data Logs	To:	5			UL31	/oltage Not	Present	Ground Disc	cted onnected	U Test F	ailed	Update Filte	ers)							
Settings	End	d Date																		
Documentation	Ē	3										Clear Filter	s							
Support		6													Items	per page: 2	•	1 - 3 of 3	K	< > >1
	Entry ID	Date 🕹	Voltage Presence	Connection Status	Battery (V)	Last Test Result	Test Initiated	AVT Temperature	Peak Voltage L1 (V)	Peak Voltage L2 (V)	Peak Voltage L3 (V)	RMS Voltage L1 (Vrms)	RMS Voltage L2 (Vrms)	RMS Voltage L3 (Vrms)	Peak Voltage L1-L2 (V)	Peak Voltage L1-L3 (V)	Peak Voltage L2-L3 (V)	RMS Voltage L1-L2 (Vrms)	RMS Voltage L1-L3 (Vrms)	RMS Voltage L2-L3 (Vrms)
Logout	2	5/24/23, 9:02 AM	L1:NO L2:NO L3:NO	L1:Ok L2:Ok L3:Ok GND:Ok	3.6	Pass	YES	25°C (77°F)	0	0	0	0	0	0	0	0	0	0	0	0
	3	5/24/23, 9:02 AM	L1:NO L2:NO L3:NO	L1:Ok L2:Ok L3:Ok GND:Ok	3.6	Pass	YES	25°C (77°F)	0	0	0	0	0	0	0	0	0	0	0	0
	1	5/24/23, 9:01 AM	L1:YES L2:NO L3:NO	L1:0k L2:0k L3:0k GND:0k	3.6	Voltage Exceeded	YES	25°C (77°F)	678	0	0	480	0	0	678	0	0	480	0	0

TABLE 3.

1.	Request Data Logs	Request data log file from the network module
2.	Download Logs (CSV)	Download the data log file to local PC in CSV form
3.	Download Filtered Logs (CSV)	If filters are applied download the filtered data set only
4.	Delete Logs	Deletes all entries from the data log file
5.	Filters	Select filters. Use Update Filters and Clear Filters to manage selections.
6.	Log Items	Data associated with each log entry.

NOTE: When log data is critical it is recommended the user periodically download the logs or to integrate the system (**EtherNet/IP™** or Modbus TCP) with an external data logging system.

SETTINGS PAGE

The settings page allows the user to configure and view the current state of the network module, retrieve AVT information, check active faults, and update firmware.

	Network Module Settings		G	About AVT	
VeriSafe Network Module	Date & Time Network Module FW Version	5/8/23, 12:45 PM Set Time 2.0.0		AVT FW Version AVT Model	2.0.0
Pump 1	Use NTP Server			AVI UID	540620856:13/9094529:32/726
/T Status	NTP Server Address Power System Configuration	Pool.ntp.org Auto Detect		Active Faults	
ta Logs	Modbus EtherNet/IP			ID Description	Date & Time
ttings	DHCP IP Address	192.168.2.10			Clear Faults
cumentation	Netmask Gateway	255.255.255.0		Change Password	
pport	DNS1 DNS2	8.8.8		current password	
	Web Server Mode	Unsecure (HTTP) 👻		new password Password Requirements:	
gout		Download Certificate Select PEM Certificate Choose File No file chosen Upload Certificate Select PEM Private Key Choose File No file chosen Upload Private Key		Between 8 and 40 characte At least 1 Special Characte At least one number At least one capital letter. At least one lower case lett confirm new password Passwords do not match.	n. (1@+5%&*). tr. Update Password
	Use Custom Cert and Key			Firmware Update	
	Language Restart	English		Select AVT Firmware Choose File No file choser	ı
	Factory Reset	Save Settings and Restart			Update AVT
				Select Network Module Choose File No file choser	Firmware
					date Network Module

NETWORK MODULE SETTINGS FIGURE 11. NETWORK MODULE SETTINGS CARD DETAILS

Network Module Settings			REFRESH
Date & Time	3/22/23 9:15 AM Set Time 3		Replace all data in fields with the last saved settings.
Network Module FW Version 4	2.0.0		·····
Ise NTP Server			
TP Server Address 6	pool.ntp.org		
ower System Configuration	Auto Detect	T	
lodbus			
therNet/IP			
HCP 10			
Address	192.168.2.10		
letmask	255.255.255.0	_	
Sateway	0.0.0.0		
DNS1	8.8.8.8		
NS2	8.8.4.4		
eb Server Mode 12	Unsecure (HTTP) 👻		
	Download Certificate Select PEM Certificate Choose File No file chosen Upload Certificate		SAVE SETTINGS AND RESTART ²⁰ Saves modified settings and restarts the network module.
	Select PEM Private Key	_	RESTART
	15 Choose File No file chosen		Restart the network module without
	Upload Private Key		saving changes to settings.
Use Custom Cert and Key 16			
anguage	English	-	FACTORY RESET
Restart 18	20		Reset the network module to factory default settings (see Table 4).
Factory Reset 19	Save Settings and Res	tart	NOTE: If the web application is unavailable, the network module can be physically reset by depressing the User Reset Button (refer to document no. B21148 VeriSafe Network Module Installation Requirements Manual

TABLE 4.

1.	Refresh	Replace all data in fields with the last saved settings
2.	Date & Time	Displays current date and time associated with the network module.
3.	Set Time	Applies local web browser time to the network module.
4.	Network Module FW Version	Firmware version of the network module
5.	Use NTP server	Check to enable the use of NTP (Network Time Protocol)
6.	NTP server address	Enter server address to set time using NTP. Editable if Use NTP Server is checked.
7.	Power System Configuration*	Configuration of the power system that the AVT is monitoring. To report accurate voltage data, the correct power system configuration must be selected. Default is Auto-Detect *
8.	Modbus	Enable or disable the Modbus TCP interface (default enabled)
9.	EtherNet/IP™	Enable or disable the EtherNet/IP™ interface (default enabled)
10	. DHCP	Enable or disable DHCP (default disabled)
11.	. IP Address Netmask Gateway IP DNS1 DNS2	Current IP address, Netmask and Gateway IP (read-only when DHCP is enabled) DNS1 & DNS2 are always editable

Continued on next page

under the System Overview Section for location on the Network Module).

12. Web Server Mode	The web server can be configured for either HTTP or HTTPS (default is HTTPS)
13. Download Certificate	Download the network module certificate.
14. Upload PEM Certificate	Upload a user supplied PEM certificate (default uses on board PEM certificate)
15. Upload PEM Private Key	Upload a user supplied PEM private key (default uses on board PEM private key)
16. Use Custom Cert and Key	Check to enable use of the user supplied certificate and private key for HTTPS. Disabled if HTTPS is not selected for Web Server Mode.
17. Language	Select desired language from the drop-down menu. English, French, French (Canada), German, Italian, Korean, Spanish (Latin America), Chinese
18. Restart	Restart the network module without saving changes to settings
19. Factory Reset	Reset the network module to factory default settings
20. Save Settings and Restart	Saves modified settings and restarts the network module.

*POWER SYSTEM CONFIGURATION

The AVT measures voltage between the sensor leads and ground leads and computes the associated phase-to-phase and RMS voltages. The voltage measurements are then reported to the network module.

To report accurate voltage data, the appropriate power system configuration must be selected. The Standard selection (default) assumes a wye or delta power system and is sufficient for most applications. If a special configuration (corner grounded delta, high-leg delta, and single-phase 3-wire) is desired, select the appropriate application from the drop-down menu.

ABOUT AVT FIGURE 12. ABOUT AVT CARD DETAILS

Displays firmware version, model number and universal identifier (UID) of the AVT. Use the refresh button to update the card.

About AVT	0 C	Refresh	1
AVT FW Version	2.0.0		
AVT Model	1		
AVT UID	540620856:1379094529:327726		
		AVT Data	2

ACTIVE FAULTS FIGURE 13. ACTIVE FAULTS CARD DETAILS

This card will display active faults in the network module. The fault information is updated automatically every 3 seconds. See Troubleshooting for additional information.



TABLE 5.

1.	Faults	ID Description	
		0	Network Module Hardware Failure. Flash code 2 during boot up
		1	Power from the network module to the AVT is over the limit.
		2	Indicate the network module has been reset to factory defaults
		3	Data received from AVT was unable to be processed
		4	Timeout while communicating with AVT
		5	General SD card error
		6	SD card is full
7			Time has not updated
		8	Time not set
		9	Web server could not load custom certificate
2.	Clear Faults	The C modu prese	Clear Faults button allows the user to clear any faults on the network ile. If the fault condition is still present then the fault may be inted after some time.

CHANGE PASSWORD

On initial login and factory reset the user will be prompted to change the password. **FIGURE 14**.

current password	
new password	
Password Requirements:	
• Between 8 and 40 characters.	
At least 1 Special Character (!@#\$%	^&*).
At least one number. At least one capital latter	
At least one lower case letter.	
confirm new password	
commini new password	

UPDATE FIRMWARE

Download the latest firmware at www.panduit.com

Select **Browse**, navigate to the firmware file, and click the appropriate **Update** button.. The firmware update process for both the network module and AVT should take approximately one minute.

FIGURE 15. UPDATE FIRMWARE CARD

d.			
Update AVT	1		
d.			
1	Update AVT	Update AVT	ule Firmware



DOCUMENTATION PAGE

This page provides the user with the information necessary to utilize the **EtherNet/IP[™]** (EDS file download) and Modbus TCP communications protocols. The web-application documentation page has the appropriate EDS file readily available. For all other information regarding the communication protocols, please refer to page 14 on this manual for the EtherNet/IP[™] data model and page 19 for the Modbus TCP data model.

Verioare				
Network Module	Data Item	Description		
Pump 1	Date Time	Current date and time set in the gateway. Microseconds since epoch.		
	Battery Voltage	Last voltage reading of the AVT battery		
/T Status	Voltage Presence	Voltage Presence. Bits L3:L2:L1		
	Connectivity Status	Connected Status of each sensor lead L1, L2, L3, PE Ground during last test.		
ta Logs	RMS Line Voltage L1 - G	RMS Voltage from L1 to Ground		
4 2090	RMS Line Voltage L2 - G	RMS Voltage from L2 to Ground		
ings	RMS Line Voltage L3 - G	RMS Voltage from L3 to Ground		
	Peak Line Voltage L1 - G	Peak Voltage from L1 to Ground		
ourseptation	Peak Line Voltage L2 - G	Peak Voltage from L2 to Ground		
ocumentation	Peak Line Voltage L3 - G	Peak Voltage from L3 to Ground		
port	RMS Line Voltage L1 - L2	RMS Voltage from L1 to L2		
	RMS Line Voltage L1 - L3	RMS Voltage from L1 to L3		
	RMS Line Voltage L2 - L3	RMS Voltage from L2 to L3		
	Peak Line Voltage L1 - L2	Peak Voltage from L1 to L2		
	Peak Line Voltage L1 - L3	Peak Voltage from L1 to L3		
	Peak Line Voltage L2 - L3	Peak Voltage from L2 to L3		
out	AVT Test Temperature	Temperature inside the AVT at the time of last AVT test (*C)		
,	Disconnect State (Unused)	UNUSED		
	Status	Status bits associated with the network module and AVT.		
	AVT Result 1	Most recent Test Result of an AVT test.		
	AVT Result 2	Second Most recent Test Result of an AVT test.		
	AVT Result 1 Datetime	Datetime of AVT Result 1. Microseconds since epoch.		
	AVT Result 2 Datetime	Datetime of AVT Result 2. Microseconds since epoch.		
	Current Temperature	Current temperature inside the AVT (°C)		
	Activate AVT Test	Activates an AVT Test		

SUPPORT PAGE

- Provides contact information and a link to the VeriSafe landing page on www.panduit.com
- Queries the AVT and network module for product information to assist in technical support.
- Contains a Licenses section outlining the Panduit License Agreement as well as the Web and System licenses used in the creation of this product.

FIGURE 16. SUPPORT PAGE



Data Models

The following data models will describe the parameters utilized in the EtherNet/IP[™] and Modbus TCP communication protocols.

ETHERNET/IP™ DATA MODEL

- Network Module Unit Object (100~Decimal, 64~Hex 1 Instance)
- All attribute IDs are in decimal value for each data item.
- All attribute IDs are Instance 1 except for the revision item located in the first row of the table.

Item Name	Description	Value Type (size bytes)	Range
Revision (Instance 0)	Revision Number Attribute ID: 1 Access Rule: Get	UINT(2)	Data Value: 2
Battery Voltage	Last voltage reading of the AVT battery (last test) Attribute ID: 1 Access Rule: Get	REAL(4)	0.0 to 4.0 V
Date/Time	Current Date/Time set in the network module Attribute ID: 2 Access Rule: Get	ULINT(8)	microseconds since epoch
Voltage Presence	Bit field status of the phase indicator LEDs (red LEDs) Attribute ID: 3 Access Rule: Get	WORD(2)	BitBit Name0Present L1 POS1Present L2 NEG2Present L30: Voltage not detected1: Voltage detected
Connectivity Status	Connected status of each sensor lead L1, L2, L3, PE Ground during last test. Attribute ID: 4 Access Rule: Get	WORD(2)	BitBit Name0Connected L11Connected L22Connected L33Connected PE GND0: Sensor lead disconnected1: Sensor lead connected

Item Name		Description	Value Type (size bytes)	Range
	L1-G	L1 to Ground Attribute ID: 5 Access Rule: Get		
Line to Ground RMS Voltage	L2-G	L2 to Ground Attribute ID: 6 Access Rule: Get		0 to 1100 Vrms
	L3-G	L3 to Ground Attribute ID: 7 Access Rule: Get		
	L1-G	L1 to Ground Attribute ID: 8 Access Rule: Get		0 to 1500 V
Line to Ground Peak Voltage	L2-G	L2 to Ground Attribute ID: 9 Access Rule: Get		
	L3-G	L3 to Ground Attribute ID: 10 Access Rule: Get		
	L1-L2	L1 to L2 Attribute ID: 11 Access Rule: Get	INT(2)	
Line to Line RMS Voltage	L1-L3	L1 to L3 Attribute ID: 12 Access Rule: Get		0 to 1100 Vrms
	L2-L3	L2 to L3 Attribute ID: 13 Access Rule: Get		
	L1-L2	L1 to L2 Attribute ID: 14 Access Rule: Get		
Line to Line Peak Voltage	L1-L3	L1 to L3 Attribute ID: 15 Access Rule: Get		0 to 1500 V
	L2-L3	L2 to L3 Attribute ID: 16 Access Rule: Get		
Test temperature		Temperature inside the AVT at the time of the last AVT test (°C) Attribute ID: 17 Access Rule: Get		-40°C to 85°C (-40°F to 185°F)
Disconnect state		Disconnect phase open or closed	W0BD(2)	BitDescription0L1 open1L2 open
Disconnect state [NOT IMPLEMENTED]		Attribute ID: 18 Access Rule: Get		2 L3 open 0: Blade closed 1: Blade open

Item Name	Description	Value Type (size bytes)		Range
			Bit	Bit Name
			0	Battery Warning Indicator 0: Battery OK 1: Check battery (low or not present)
			1	AVT Temperature Fault 0: OK 1: Fault
			2	AVT Power Source 0: Battery 1: Aux
			3	Phase Number 0: 3 Phase 1: Single phase
Status	Status bits associated with the network module and AVT Attribute ID: 19 Access Rule: Get	DWORD(4)	4	User Threshold Triggered [NOT IMPLEMENTED] 0: Not triggered 1: Triggered If any user defined threshold is triggered this bit will go to active (1)
			5	Disconnect Module Present [NOT IMPLEMENTED] 0: No 1: Yes
			6	AVT Internal Fault 0: OK 1: Fault
			7	Network Module Fault 0: OK 1: Fault

Item Name	Description	Value Type (size bytes)		Range
Item Name	Description	Value Type (size bytes)	Bit 0 1 2 3	RangeResultPassedOFBattery Voltage Low1FVoltage Exceeded2FTemperature not in range2E
AVT Result 1	Most recent test result of an AVT test Attribute ID: 20 Access Rule: Get	WORD(2)	5	4F Diagnostic 5 5F Diagnostic 6
			7	6F Diagnostic 7 7F Diagnostic 8 8
			#F indicates be seen on th this error cod 0: false 1: true	the number of flashes that will he AVT indicator module for de

Item Name	Description	Value Type (size bytes)		Range
			Bit	Result
AVT Result 2			0	Passed OF
			1	Battery Voltage Low 1F
			2	Voltage Exceeded 2F
			3	Temperature not in range 3F
	Second most recent test result of an AVT test Attribute ID: 21 Access Rule: Get	WORD(2)	4	Connectivity not Confirmed 4F
			5	Diagnostic 5 5F
			6	Diagnostic 6 6F
			7	Diagnostic 7 7F
			8 #F indicates to be seen on the this error coord 0: false 1: true	Diagnostic 8 8 the number of flashes that will the AVT indicator module for de
AVT Result 1 Date/Time	Date/Time of AVT result 1 Attribute ID: 22 Access Rule: Get	ULINT(8)	Microsecon	ds since epoch
AVT Result 2 Date/Time	Date/Time of AVT result 2 Attribute ID: 23 Access Rule: Get	ULINT(8)	Microseconds since epoch	
Current Temperature	Current Temperature inside the AVT (°C) Attribute ID: 24 Access Rule: Get	INT(2)	-40°C to 85	°C (-40°F to 185°F)
Activate AVT Test	Starts the absence of voltage test Attribute ID: 25 Access Rule: Get/Set	DINT(4)	0: Test not a 1: Test activ	activated vated

MODBUS TCP DATA MODEL

INPUT DATA

All values are contained in input registers (offset 30000).

Input Data Item	Description	Value Type (size bytes)	Range
Date/Time	Current Date/Time set in the network module Start Address: 1 End Address: 4	uint64_t(8)	Microseconds since epoch
Battery Voltage	Last voltage reading of the AVT battery (last test) Start Address: 5 End Address: 6	float(4)	0.0 to 4.0 V
Voltage Presence	Bit field status of the phase indicator LEDs (red LEDs) Start Address: 7 End Address: 7	uint16_t(2)	BitBit Name0Present L1 POS1Present L2 NEG2Present L30: Voltage not detected1: Voltage detected
Connectivity Status	Connected status of each sensor lead L1, L2, L3, PE Ground during last test. Start Address: 8 End Address: 8	uint16_t(2)	BitBit Name0Connected L11Connected L22Connected L33Connected PE GND0: Sensor lead disconnected1: Sensor lead connected

Input Data Item		Description	Value Type (size bytes)	Range	
	L1-G	L1 to Ground Start Address: 9 End Address: 9			
Line to Ground RMS Voltage	L2-G	L2 to Ground Start Address: 10 End Address: 10		0 to 1100 Vrms	
	L3-G	L3 to Ground Start Address: 11 End Address: 11			
	L1-G	L1 to Ground Start Address: 12 End Address: 12			
Line to Ground Peak Voltage	L2-G	L2 to Ground Start Address: 13 End Address: 13		0 to 1500 V	
	L3-G	L3 to Ground Start Address: 14 End Address: 14			
	L1-L2	L1 to L2 Start Address: 15 End Address: 15	int16_t(2)		
Line to Line RMS Voltage	L1-L3	L1 to L3 Start Address: 16 End Address: 16		0 to 1100 Vrms	
L2-L3		L2 to L3 Start Address: 17 End Address: 17			
	L1-L2	L1 to L2 Start Address: 18 End Address: 18			
Line to Line Peak Voltage	L1-L3	L1 to L3 Start Address: 19 End Address: 19		0 to 1500 V	
	L2-L3	L2 to L3 Start Address: 20 End Address: 20			
Test temperature		Temperature inside the AVT at the time of the last AVT test (°C) Start Address: 21 End Address: 21		-40°C to 85°C (-40°F to 185°F)	
Disconnect state [NOT IMPLEMENTED]		Disconnect phase open or closed Start Address: 22 End Address: 22	uint16_t(2) Bit Description 0 L1 open 1 L2 open 2 L3 open		

Input Data Item	Description	Value Type (size bytes)		Range
			Bit	Bit Name
			0	Battery Warning Indicator 0: Battery OK 1: Check battery (low or not present)
			1	AVT Temperature Fault 0: OK 1: Fault
			2	AVT Power Source 0: Battery 1: Aux
			3	Phase Number 0: 3 Phase 1: Single phase
Status	Status bits associated with the network module and AVT Start Address: 23 End Address: 24	uint32_t(4)	4	User Threshold Triggered [NOT IMPLEMENTED] 0: Not triggered 1: Triggered If any user defined threshold is triggered this bit will go to active (1)
			5	Disconnect Module Present [NOT IMPLEMENTED] 0: No 1: Yes
			6	AVT Internal Fault 0: OK 1: Fault
			7	Network Module Fault 0: OK 1: Fault

Input Data Item	Description	Value Type (size bytes)		Range
			Bit	Result
			0	Passed OF
			1	Battery Voltage Low 1F
AVT Result 1			2	Voltage Exceeded 2F
	Most recent test result of an AVT test Start Address: 25 End Address: 25	uint16_t(2) #Find the set of the	3	Temperature not in range 3F
			4	Connectivity not Confirmed 4F
			5	Diagnostic 5 5F
			6	Diagnostic 6 6F
			7	Diagnostic 7 7F
			8	Diagnostic 8 8
			#F indicates be seen on th this error con 0: false 1: true	the number of flashes that will he AVT indicator module for de

Input Data Item	Description	Value Type (size bytes)		Range	
			Bit	Result	
AVT Result 2			0	Passed OF	
			1	Battery Voltage Low 1F	
			2	Voltage Exceeded 2F	
			3	Temperature not in range 3F	
	Second most recent test result of an AVT test Start Address: 26 End Address: 26	uint16_t(2)	4	Connectivity not Confirmed 4F	
			5	Diagnostic 5 5F	
			6	Diagnostic 6 6F	
			7	Diagnostic 7 7F	
			8 #F indicates be seen on	Diagnostic 8 8 the number of flashes that will the AVT indicator module for this error code 0: false 1: true	
AVT Result 1 Date/Time	Date/Time of AVT result 1 Start Address: 27 End Address: 30	uint64_t(8)	Micro	seconds since epoch	
AVT Result 2 Date/Time	Date/Time of AVT result 2 Start Address: 31 End Address: 34	uint64_t(8)	Microseconds since epoch		
Current Temperature	Current Temperature inside the AVT (°C) Start Address: 35 End Address: 35	int16_t(2)	-40°C to 85	-40°C to 85°C (-40°F to 185°F)	
Data Model Version	Version number of the data model Start Address: 36 End Address: 36	int16_t(2)		Data Value: 2	

OUTPUT DATA

Output Coils Available (offset 0)

Output Coil	Description	Bit Number
Activate AVT Test	0: Coil resets to 0 once test is complete 1: Activates an AVT test	1

Rockwell Automation Integration

The **EtherNet/IP[™]** protocol is supplemented by an Add-On Profile (AOP) for easy integration with products from Rockwell Automation. The AOP supports the Automatic Diagnostics feature.

AOP available in Studio 5000 Logix Designer V33.01 or greater

AUTOMATIC DIAGNOSTIC AOP ITEMS

REQUIREMENTS

- Logix controller must be V33 or greater
- Factory Talk View software must be V12 or greater

CONNECTIVITY STATUS

WORD(2)

Sensor lead status is based on the last completed test. This value will only be updated when a test is completed with no voltage present.

TABLE 6.

	Bit				
	0	1	2	3	
Connectivity Status	Connected L1	Connected L2	Connected L3	Connected PE GND	
Diagnostic Message	0: L1 Sensor lead disconnected 1: L1 Sensor lead connected	0: L2 Sensor lead disconnected 1: L2 Sensor lead connected	0: L3 Sensor lead disconnected 1: L3 Sensor lead connected	0: PE GND Sensor lead disconnected 1: PE GND Sensor lead connected	

STATUS

DWORD(4)

Status bits associated with the network module and AVT. This value will only be updated when an absence of voltage test is completed.

TABLE 7.

	Bit						
	0	1	6	7			
	Battery Warning Indicator	AVT Temperature Fault	AVT Internal Fault	Network Module Fault			
SI	0: Battery OK	0: OK	0: OK	0: OK			
Stat	1: Check battery (Battery low or not present)	1: Fault	1: Fault	1: Fault			
ıostic sage	0: Battery OK	0: AVT temperature OK	0: AVT OK	0: Network module OK			
Diag Mes	1: Check battery	1: AVT temperature fault	1: AVT Internal fault	1: Network module fault			

AVT RESULT 1

WORD(2)

- Most recent test result of an AVT test
 - This report has the following possible bit states to indicate a passed test or the reason for a failed AVT test

TABLE 8.

	Bit					
	0	1	2	3	4	
AVT Result 1	Passed OF	Battery voltage low 1F	Voltage exceeded 2F	Temperature not in range 3F	Connectivity not confirmed 4F	
Diagnostic Message	0: AVT test failed 1: AVT test passed	0: OK 1: AVT battery low	0: OK 1: Voltage exceeds AVT limits	0: OK 1: AVT temperature outside supported range	0: OK 1: AVT sensor lead disconnected	

	Bit continued			
	5	6	7	8
AVT Result 1	Diagnostic 5 5F	Diagnostic 6 6F	Diagnostic 7 7F	Diagnostic 8
ostic age	0: OK	0: OK	0: OK	0: OK
Diagno Messi	1: AVT diagnostic 5	1: AVT diagnostic 6	1: AVT diagnostic 7	1: AVT diagnostic 8

Security

The Network Module contains software that stores user entered data. All data entered by the user is stored in non-volatile storage on the system running the software.

NON-VOLATILE STORAGE

The Network Module uses non-volatile storage to store all configuration information.

AUTHENTICATION DATA

- Passwords used for managing the software are stored as a one way bcrpyt hash.
- Passwords that the user enters are not returned to the customer. (They are 'write only' from a user perspective)

NETWORK TRANSPORT SECURITY

- The product generates a random SSH RSA 2048-bit private host key the first time the product starts up.
- The product has a randomly generated RSA 2048-bit private key configured by the factory. This key is used to generate a HTTPS certificate the first time the product boots up.
- The user may upload a custom HTTPS certificate and private key.
 - The HTTPS certificate should use a SHA-256 signature.
 - The private key should be RSA 2048-bit or prime256v1 (SECP256R1).
 - Other private key types may work, but performance may be negatively impacted if greater private key sizes are used: RSA 3072-bit, RSA 4096-bit; ECC curves: SECP192R1, SECP224R1, SECP256R1, SECP384R1, SECP521R1, SECP192K1, SECP224K1, SECP256K1, BP256R1, BP384R1, BP512R1, CURVE25519.
- The product uses TLS 1.2 to communicate with HTTPS browser clients.
- Secure communication cipher negotiation with HTTPS clients uses these Cipher Suites:
 - Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
 - Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
 - Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
 - Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
 - Cipher Suite: TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca9)
 - Cipher Suite: TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca8)
 - Cipher Suite: TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 (0x009e)
 - Cipher Suite: TLS_DHE_RSA_WITH_AES_256_GCM_SHA384 (0x009f)

NETWORK CONFIGURATION DATA

Network Configuration, including Static IP addresses and addresses obtained by DHCP are exposed on a "Settings" page, to aid in network management of the product.

SECURE BOOT PROTECTION

- The product uses industry standard code signature algorithms to protect firmware booted by the device.
- A signature block is appended to the bootloader.
- The signature block contains a signature of the bootloader and the RSA 3072-bit public key.
- A digest of the RSA 3072-bit public key is stored in a write-once eFuse (which cannot be read or written to after being set) and used to verify the signature block.
- The public key signature is verified against the signature block and a digest of the bootloader to establish authenticity and integrity of the bootloader.
- The bootloader continues the chain of trust by verifying the authenticity and integrity of the application executable, by applying the same algorithm as used by the ROM bootloader to load the bootloader.

FIRMWARE UPDATE PROTECTION

- The product uses industry standard cryptography to verify a firmware update package, to establish authenticity and integrity.
- The package contains a manifest that describes items contained in the package payload.
- The items are described as a chunk size and a SHA256 hash of each sub-item and the payload container in the package.
- The manifest is hashed using SHA256 and signed using an RSA 4096 bit key.
- The package contains the signature of the hash of the manifest.
- The package contains a payload container holding the sub-items.
- The signature of the payload is verified before parsing the content of the manifest or the payload.

OTHER FEATURES

The product includes a real-time clock and a capacitor that maintains time for a short amount of time when no power is applied. When combined with NTP, accurate timestamps on logs are provided.

Troubleshooting

FAULTS

When a fault is active the user will also see an exclamation point in the left sidebar and in the active faults menu of the settings page

Fault	Troubleshooting		
Hardware Failure (0)	Contact Panduit support		
Network module system status indicator 2 flash error code			
Power over limit (1)	Power from the Network Module to the AVT is over the limit.		
	Check AVT connection to the Network Module for proper termination.		
Settings files reset to factory defaults(2)	Expected if new unit or user initiated a factory reset, do nothing in this case		
	If repeatedly occurs replace unit		
Data received from AVT was	 Check AVT connection to the Network Module 		
unable to be processed (3) Timeout while communicating with AVT (4)	 Check that the AVT and Network module termination resistor switches are positioned to the right (factory default) when facing the port. Refer to document no. B21148 (VeriSafe Network Module Installation Requirements Manual under the System Overview Section) 		
	 Move AVT connection cable away from possible noise sources 		
	 Ensure the Network Module and AVT have the latest firmware installed. This can be checked on the Network Module Settings Page. 		
SD card error (5)	Contact Panduit for support around SD Card errors and possibly reseating or replacing the SD Card.		
SD card full (6)	download logs (if necessary) and then delete logs from the web interface. restart the unit and confirm the system is able to log.		
Stale Time (7)	Check NTP server can be reached from device location		
Time not set (8)	Set time using the settings page (set time button or NTP time setup)		
Could not load custom certificate(9)	Check that the certificate was generated properly and upload again.		

CLEARING FAULTS

The user has the ability to clear active faults (see **Settings Page** under the **Active Faults** section). If the network module determines the fault is still active it will repopulate. To verify a fault has been cleared restart the network module.

Warranty

PANDUIT LIMITED PRODUCT WARRANTY

- 1. Limited Product Warranty. For purposes of this Limited Product Warranty, "Panduit products" mean all Panduit-branded products that Panduit sells. Unless a different time period is set forth in the Panduit product manual, user guide or other product documentation, Panduit warrants that the Panduit product, and each part or component of the Panduit product, will comply with Panduit's published specifications and will be free from defects in material and workmanship for a period of 1 year from the date of invoice from Panduit or its authorized distributor, not to exceed 18 months from the original date of shipment from Panduit's facility.
- 2. Firmware. Unless otherwise provided in a separate license agreement, and subject to the limitations for third-party products set forth below, Panduit warrants that any firmware contained in any Panduit products, when used with Panduit-specified hardware and when installed properly, will perform in accordance with the Panduit published specifications for a period of 1 year from the date of invoice from Panduit or its authorized distributor, not to exceed 18 months from the original date of shipment from Panduit's facility. Any exceptions to this 1 year warranty period will be identified in the Panduit product manual, user guide or other product documentation. Panduit does not warrant that the operation of the firmware will be uninterrupted or error-free, or that the functions contained therein will meet or satisfy Buyer's intended use or requirements. Any warranties, if any, that Panduit provides for any standalone software that Panduit sells will be stated in the applicable End User License Agreement.
- 3. Remedies. Panduit's sole and exclusive obligation and Buyer's exclusive remedy under this warranty is Panduit's repair or replacement of the defective Panduit product. Panduit shall have sole discretion as to which of these remedies Panduit will provide to Buyer. Buyer requested on-site warranty service is not covered and will be at Buyer's sole expense, unless authorized in writing by Panduit in advance of the commencement of the on-site warranty service. Panduit has the right to either examine the Panduit products where they are located or, in its sole discretion, issue shipping instructions for return of the product. Where applicable, Buyer must return the defective product, part or component, transportation prepaid to Panduit's customer service department accompanied by Panduit's Return Material Authorization. If Panduit confirms that there is a defect that is covered by this warranty, the repaired or replaced Panduit product will be warranted for the remainder of the warranty period applicable to the originally shipped Panduit product, or for a period of 90 days from the date of shipment to Buyer, whichever is longer.
- 4. No Warranty for Third-Party Products. Panduit makes no representations and disclaims all warranties of any kind, express or implied relative to any third-party product or services, including any third-party software or firmware, which may be incorporated into a Panduit product and/or resold or sublicensed by Panduit. To the extent any warranties extended to Panduit by the third-party manufacturer are transferable, Panduit will transfer such warranties to Buyer and any enforcement of such third-party warranties shall be between the Buyer and the third-party. Panduit does not warrant the compatibility of the Panduit products with the products of other manufacturers or Buyer's application except to the extent expressly represented in Panduit's published specifications or written quotation.
- 5. Exclusions. Before using, Buyer shall determine the suitability of the Panduit product for his intended use and Buyer assumes all risk and liability whatsoever in connection therewith. The warranties contained herein shall not apply to any Panduit products that have been subjected to misuse, neglect, improper storage, handling, installation or accidental damage or modified or altered by persons other than Panduit or persons authorized by Panduit. In addition, the firmware warranty does not cover any defects resulting from Buyer-supplied firmware or unauthorized interfacing, operation outside of the environmental specifications for the products, or improper or inadequate site preparation or maintenance by Buyer. Panduit products are not designed, intended or authorized to be used in medical applications or as components in medical devices that are used to sustain or support human life. Should Buyer purchase or use a Panduit product for any such unintended or unauthorized medical application, Buyer shall indemnify and hold Panduit harmless from any liability or damage whatsoever arising out of the use of Panduit products in such medical applications.
- 6. LIMITATION ON LIABILITY. THE WARRANTIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE WARRAN-TIES. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANT-ABILITY OR FITNESS FOR ANY PARTICULAR USE ARE DISCLAIMED. TO THE EXTENT PERMITTED BY LAW, IN NO EVENT SHALL PANDUIT BE LIABLE FOR ANY LOSS OR DAMAGES ARISING FROM ANY PANDUIT PRODUCT WHETHER DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR SPECIAL, INCLUDING WITHOUT LIMITATION ANY CLAIM FOR LOSS OF DATA, LOSS OF ACTUAL OR ANTICIPATED REVENUE, PROFITS OR SAVINGS.
- 7. General. This Limited Product Warranty applies to the Panduit products only and not to any combination or assembly of the Panduit products. Nothing in this Limited Product Warranty shall be construed to provide Buyer with a warranty for any system implementation using Panduit products. The Panduit Certification Plus System Warranty is available for projects that are installed by Panduit Certified Installers, meet various requirements and are registered with Panduit in accordance with the terms of the Panduit Certification Plus System Warranty.