

VariControl Load monitoring v1.0

1. Introduction

This application note describes how to use load monitoring with the VariControl software

2. <u>General</u>

The VariControl software version 2.96 introduces the option to set load monitoring thresholds for all drivers of each individual Vari unit i.e. Vari B, Vari BH and Vari-E depending on the Vari configuration used. Note that load monitoring for a Vari B and Vari BH is performed on each driver individually but for the Vari E the load monitoring is performed on two drivers in parallel.

3. Definitions, acronyms and abbreviations

AN	Application Note
HW	Hardware
SW	Software
LAN	Local Area Network
PC	Personal Computer
Vari B	Vari Base unit
Vari BH	Vari Base unit with extended HF response
Vari E	Vari Extender unit



4. Prerequisites

This AN describes how to set load monitoring parameters by using the VariControl software. This functionality is available from VariControl software version 2.96.

Requirements:

Install VariControl software version 2.96 on this PC. This software version does not require a license and is free to download from the Bosch Security Product Catalog website, see link: <u>https://www.boschsecurity.com/xc/en/product-catalog/</u>

Also download the two DDA libraries, one for Vari B and one for Vari BH. In total you will download three executables, see screenshot below. First run the VariControl setup and after that both Libraries setup executables.



Libraries_VARI_BH_Setup.exe
BOSCH VARI BH - DDA Libraries S
BOSCH



VariControl User v2p96 setup.exe VariControl - User version Setup Bosch

5. Connections

There are two ways to connect a PC to a Vari B or Vari BH unit:

 <u>RS-485</u> This requires the LA3-VARI-CS Vari-directional array configuration set (USB to RS-485 converter)



2. CobraNet® serial bridge

This requires the LA3-VARI-CM Vari-directional array CobraNet® module

In order to use the CobraNet® serial bridge you need to install the CobraNet® module in the Vari B or Vari BH, see picture below. Make sure that the proper firmware is loaded after a CobraNet® interface module is installed in the Vari. Download the firmware from the Bosch Security Product Catalog. There is specific CobraNet® firmware available depending on the type of Vari, Vari B or BH with or without Extenders.





Once the PC is connected to the Vari start the VariControl software. A window will open with Communication options. Select the proper communication port depending on the connection type used:

<u>RS-485</u>

Make sure that the Off-line box is not checked

ubNet 00			
Communicat	ion port		Off-line
Hardware	Normal COM port	\sim	Off-line
COM port	COM5 -> USB Serial Port (C	:OM5) ~	✓ Fast emulation
		X	Off-line config
Communicat	ion layer	Netscan	Errors
Max baud	19k2 \	Lowest address	Max. number of retries
Mode	Normal		4
Safe write	Only critical writes	/ Highest address	Block r/w check
Detect o	ld units (slow netscan)	126	CRC Verify
	Apply X Cancel		P He
• • • •	current and a second		

At the Hardware drop down select Normal COM port.

At the COM port drop down select the USB Serial Port.

Click OK and the connected Vari units will be visible in the next window.

When the Vari units are not visible click on the net update icon to check for them.

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File View Parameters Command Groups Scene Tools Utilities Options Help		



CobraNet® serial bridge

Make sure that the Off-line box is not checked

ommunication	options		>
SubNet 00			
Communica	ation port		Off-line
Hardware	Cobranet serial bridge	~	Off-line
Adapter	[0] Intel(R) Ethernet Connec	tion (2) I219-LM \sim	Fast emulation
Tx MAC	01:60:2B:FD:00:00	~	Off-line config
Rx MAC	01:60:2B:FD:00:01	~	
Communica	ation layer	Netscan	Errors
Max baud	19k2 ~	Lowest address	Max. number of retries
Mode	Normal ~		4
Safe write	Only critical writes	Highest address	Block r/w check
Detect	old units (slow netscan)	126	Verify
✓ ОК	Apply 🔀 Cancel	,	C Help

At the Hardware drop down select Cobranet® serial bridge.

Now your network connection should be selectable from the Adapter dropdown. Make sure that the Tx MAC and Rx MAC defined here are exactly the opposite as defined in the Vari by the Cobranet® Discovery tool, see previous page. Also check that the baud rates are at least the same.

Click OK and the connected Vari units will be visible in the next window.

When the Vari units are not visible click on the net update icon to check for them.

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File View Parameters Command Groups Scene Tools Utilities Options Help		



6. Load monitor

Once connected click on the Vari unit you want to set the load monitoring parameters. In the main window of the VariControl software there is an option called <u>Parameters in the menu bar</u>. When you select it click on <u>Processing > S</u>urveillance, see example below.

VariC	ontrol 2.96 User version						_	×
<u>F</u> ile <u>V</u> iev	v <u>P</u> arameters <u>C</u> ommand <u>G</u> roups <u>S</u> c	ene	<u>T</u> ools <u>U</u> til	ities <u>O</u> ptions	<u>H</u> elp			
🛛 🕵 🤭	Address	*	♦ 3					
	Processing	8	<u>B</u> eam	Ctrl+Alt+B				^
	Preset configuration		<u>I</u> nput	Ctrl+Alt+I				
1	Manufacturer's ID	8	<u>V</u> olume	Ctrl+Alt+V				
VARI B	VARI extender configuration		<u>P</u> re-delay	Ctrl+Alt+P				
	Initialization registers	\mathbb{R}	EQ	Ctrl+Alt+E				
			AVC					
			<u>S</u> urveillan	ce				
			<u>O</u> ther					
								~
<								>
SubNet 0								
Starting Collectin Checking Configur	sub)-net update. Startmode = mFull g info from AN1+ compatible unit(s) at a for linked master and slave units ation of current (sub)-net fully updated	ddress	;(es) [1]					*
Comman	d Log							
Surve	illance setting		Sub	Net 00 Col	ora 19k2 (AN 1+)	Scan range 1126		.kı



The following window will open with default settings. When the General window opens click on the Load monitoring option at the bottom.

📢 Control paran	neters [Normal (preset 0) /	Standard]		_	
Beam Input	Volume Delay EQ	AVC Surveillance	Other		
Thresholds					
Low-Z	70 🛟				
Hi-Z 1	4 ‡				
Hi-Z 2	4 🗘				
Hi-Z 3	4 🛟				
Hi-Z 4	4 🗘				
Hi-Z 5	4 🛟				
Hi-Z 6	4 ‡				
Hi-Z 7	4 🗘				
Hi-Z 8	4 🗘				
Hi-Z 9	10 🗘				
Hi-Z 10	10 🗘				
Hi-Z 11	10 🗘				
Hi-Z 12	10 🗘				
Hi-Z 13	10 🛟				
Hi-Z 14	10 🛟				
Hi-Z 15	10 🛟				
Hi-Z 16	10 🛟				
	*				
General Loa	d monitoring				
		Taura Davanta			
Арріу 👗	Close Load • S	ave Presets •			U Help
VARI B (no exten	nder) V Address -> 00	01 Normal (preset 0)			

Measured load current values are evaluated against 2 thresholds, a minimum value (Hi-Z threshold) and a maximum value (Low-Z threshold). Detected values that fall outside this specified range result a failure warning on the specific channel. Low-Z evaluation indicates a possible short. Hi-Z evaluation indicates a possible loss of channel due to e.g. a broken wire.

In contrary to the LowZ threshold, there are individual HighZ thresholds for each channel. Hi-Z 1 up to and including Hi-Z 8 are the eight channels available in the Vari B and Vari BH units. Hi-Z 9 up to and including Hi-Z 12 are the four channels available in the first Vari Extender and Hi-Z 13 up to and including Hi-Z 16 are the four channels available in the second Vari Extender. Note that in the Vari Extender each channel is connected to two drivers in parallel.



The default Low-Z and the Hi-Z 1 up to and including Hi-Z 8 thresholds should not be changed.

The thresholds for the for the Vari Extenders however should be changed. The returned value for 1 driver is 14 and for 2 drivers it is 25. By default the threshold is set to 10. This means that only a load failure of both drivers will be detected. Therefor the threshold of Hi-Z 9 up to and including Hi-Z 16 should have a value between 14 and 25 in order to detect a load failure of one driver only. It is recommended to change these thresholds to 20.

Click ten times on the arrow-up sign next to the threshold value.

Control p	arameter	s [Norn	nal (pres	et 0) / 9	Standard]				—		\times
Beam In	iput Vo	olume	Delay	EQ	AVC	Surveillance	Other				
Thresho	olds										
Low-Z		70	\$								
Hi-Z 1		4	\$								
Hi-Z 2		4	‡								
Hi-Z 3		4	‡								
Hi-Z 4		4	‡								
Hi-Z 5		4	‡								
Hi-Z 6		4	‡								
Hi-Z 7		4	‡								
Hi-Z 8		4	\$								
Hi-Z 9		10	T								
Hi-Z 10		10	Spec	ify uppe	er load mon	itoring thresho	b				
Hi-Z 11		10	\$								
Hi-Z 12		10	\$								
Hi-Z 13		10	\$								
Hi-Z 14		10	\$								
Hi-Z 15		10	\$								
Hi-Z 16		10	\$								
General	Load mo	nitorino	q								
Apply	🗙 Clos	e [Load	• s	ave	Presets -				0	<u>H</u> elı
VARI B (no e	xtender)	e	Load Addre	▼ S ss -> 00	ave)1 Norm	Presets -		 	 	0	ł



Or type in the number 20.

70 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 20 ‡							
70 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 4 ‡ 20 ‡							
4 \$ 4 \$ 4 \$ 4 \$ 4 \$ 4 \$ 4 \$ 4 \$ 4 \$ 4 \$							
4 ÷ 4 ÷ 4 ÷ 4 ÷ 4 ÷ 4 ÷ 4 ÷							
4 ÷ 4 ÷ 4 ÷ 4 ÷ 4 ÷							
4 ¢ 4 ¢ 4 ¢ 4 ¢ 4 ¢ 20 ¢							
4 ‡ 4 ‡ 4 ‡ 4 ‡ 20 ‡]						
4 ‡ 4 ‡ 4 ‡ 20 ‡							
4 ‡ 4 ‡ 20 ‡							
4 ‡ 20 ‡							
20 🌲	-						
10 💲							
10 💲	6						
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	10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷	10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷	10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷ 10 ÷	$ \begin{array}{c} 10 \\ \hline \end{array} $	$ \begin{array}{c} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\$	$ \begin{array}{c} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\$	$ \begin{array}{c} 10 \\ \hline \end{array} $

On the bottom of the window the word "Modified" is shown once the value is changed.



Once all thresholds are changed the Load monitoring window looks like this:

Beam	Input	Volume	Delay	EQ	AVC	Surveillance	Other	
Low	sholds -Z	70) ±					
Hi-Z	1	4	4 2					
Hi-Z	2	4	4 ‡					
Hi-Z	2.3	4	4 ‡					
Hi-Z	4	4	4 ‡					
Hi-Z	2 5	4	4 ‡					
Hi-Z	2 6	4	4 ‡					
Hi-Z	.7	4	4 ‡					
Hi-Z	8 8	4	4 ‡					
Hi-Z	2.9	20) ‡					
Hi-Z	10	20) ‡					
Hi-Z	11	20) ‡					
Hi-Z	12	20) ‡					
Hi-Z	13	20) ‡					
Hi-Z	2 14	20) ‡					
Hi-Z	15	20) ‡					
Hi-Z	16	20) ‡					
Gene	ral load	monitorin	a					
Jene								
Appl	y 🗙 (Close	Load	• Sa	ive	Presets -		() <u>H</u> e
ARI B (r	no extend	ler) 🗸	Addre	ss -> 00	1 Neu	mal (preset 0)		

Go to the General Surveillance window by clicking on "General" at the bottom of this window.



Make sure that the check box "Load monitoring enabled" is selected.

📢 Control parameters [Normal (preset 0) /	Standard]			×
Beam Input Volume Delay EQ	AVC	Surveillance Other		
Network activity monitoring Auto-release enabled On Release time 2550 \$ s Emergency preset Select on network time-out Use control voltage input Select on logic High V Preset index 7 \$ Standby Standby enabled Time 2550 \$ s Back-up supply monitoring Lower 20,0 \$ V Upper 28,0 \$ V Pilot detect Grace time 10,0 \$ s	External fa DSP ru Amplif Load(s) Firmwa Pilot ta Microp Tempee DSP st Extend Digital Contro Extern Load n Pilot ta Pilot ta Microp Pilot ta Back-u	lure relay / LED mask nning er(s) re communication ne all inputs none ature protection stage 1 nture protection stage 2 atus ter(s) detection input board detection input board detection input board detection a DC back-up supply e control mask nonitoring enabled one 1 detection enabled oto switching enabled one 2 detection enabled one front' LED on power-up up supply monitoring on		
General Load monitoring				
Apply Close Load	Save	Presets -	0 <u>H</u>	<u>i</u> elp
VARI B (no extender) VARI B (no extender)	001 Norm	al (preset 0)		

Check the Pilot detect Grace time. This time should be 2 seconds or more. If AVC is not used, any value >2 can be chosen without consequences. Default this time is set to 10 seconds.



7. Load failure

When load monitoring is enabled a load failure will be shown in the Properties window. In the main window of the VariControl software there is an option called <u>T</u>ools in the menu bar. Select this option and click on <u>S</u>tatus properties or press F5, see example below.



The Properties window will pop up. Click on Loads at the bottom of the window to check if there are any load failures. Once all indicators are green there are no failures.

ailure	Status	Extra	AVC	Levels	Page 0	Page 1 Page 2 Page 3 Page	ge 4			
Gene	ral failure	2								
DSP	running			۲		Microphone	۲			
DSP	o status			۲		Temperature protect 1	٢			
Amp	olifier(s)			٢		Temperature protect 2	۲			
Loa	d(s)			٢		Reserved 🎯				
Firm	nware cor	nmunicati	on	۲		Extender(s) detection	٢			
Res	erved			۲		Digital input board detection 🛛 📀				
Pilo	t tone ma	ain input		۲		Control input non-default				
Pilo	t tone se	condary ir	nput	۲		External DC back-up supply	٢			
Res	erved			۲						
Res	erved			۲						
Load	impedan	ce failure								
Loa	d channe	11		۲		Load channel 9	۲			
Loa	d channe	12		۲		Load channel 10	٢			
Load channel 3						٢				
Loa	d channe	14		۲		Load channel 12	۲			
Loa	d channe	15		۲		Load channel 13	٢			
Loa	d channe	16		۲		Load channel 14	٢			
Loa	d channe	17		٢		Load channel 15	٢			
Loa	d channe	18		٢		Load channel 16	٢			
DSP	Amplif	iers Loa	ds Co	mmunicati	on					
Appl		lose	Pene	at 50	an		Он			



If for example the first extender has a load failure on channel 10 that channel will have a red indicator, see picture below.

ailure	Status	Extra	AVC	Levels	Page 0	Page 1	Page 2	Page 3	Page 4		
Gene	ral failure										
DSP	running			٢		Micropho	ne			0	
DSP	status			۲		Temperature protect 1 🛛 📀					
Amp	olifier(s)			۲		Temperature protect 2				٢	
Loa	d(s)			۲		Reserved				٢	
Firm	ware con	nmunicati	on	۲		Extender(s) detectio	on		٢	
Res	erved			۲		Digital in	put board	l detectio	n	٢	
Pilo	t tone ma	in input		۲		Control in	nput non-	default		٢	
Pilo	t tone see	condary ir	put	۲		External D)C back-u	p supply		٢	
Res	erved			۲							
Res	erved			٢							
Load	impedan	ce failure								_	
Loa	d channe	11		۲		Load char	nnel 9			0	
Loa	d channe	12		۲	Load channel 10					۲	
Load channel 3						Load channel 11					
Load channel 4						Load channel 12					
Load channel 5						0					
Load channel 6					🕽 🛛 Load channel 14 📢						
Loa	d channe	17		٢	Load channel 15						
Loa	d channe	18		٢		Load chai	nnel 16			٢	
DSP	Amplif	iers Loa	ds Co	mmunicati	on						
Appl	y 🗙 c	lose	Repea	it Sc	an					0 <u>H</u> e	



Once a load failure is detected in any Vari Extender and the load monitor threshold is set to 20 it indicates that at least one driver has a failure. In order to check if both drivers have a failure the threshold value should be set to 10 again. In the picture below the threshold for channel 10 is changed to 10.

📢 Control param	eters [Normal (pre	set 0) / S	Standard]					×	
Beam Input	Volume Delay	EQ	AVC	Surveillance	Other				
Thresholds									
Low-Z	70 💲								
Hi-Z 1	4 ‡								
Hi-Z 2	4 ‡								
Hi-Z 3	4 ‡								
Hi-Z 4	4 🗘								
Hi-Z 5	4 ‡								
Hi-Z 6	4 ‡								
Hi-Z 7	4 ‡								
Hi-Z 8	4 🗘								
Hi-Z 9	20 🗘								
Hi-Z 10	10 -								
HI-2 11	20 +								
Hi-7 13	20 +								
Hi-7 14	20 +								
Hi-Z 15	20 1								
Hi-Z 16	20 ‡								
General Load	d monitoring								
Apply X	Apply X Close Load Vresets V								
VARI B (no exten	der) – Addre	ess -> 00)1 Norm	al (preset 0)				.:	

Once this value is set to 10 return to the Properties window and check the indicator of the channel which had a failure again, in this example check channel 10. If the indicator is still red it means that both drivers have a failure. If the indicator has turned green it means that only one driver has a failure.