



Centum VP Interface Training





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PREFACE

Centum VP R6 is the latest in the line of Yokogawa's DCS CENTUM series. This document aims to give an overview of the graphical user interface of the Centum VP, highlighting the commonly used software features for monitoring and operation. The objective of this training document is to familiarize the user with the basic features of Centum VP software and enable him/her to navigate through the interface.

Note: Please zoom in the pdf to clearly view any details on the screenshots that are not otherwise visible.



GENERAL NAVIGATION

The home page of the Centum VP is depicted in the labelled screenshot below:



Figure 1: Home page of the Centum VP with each button labelled

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		4/18/0021112/37 PM 02/212222_ANDUST LER LTRMTE RDY STRT ALM 4/18/0021112/37 PM 02/212222_ANDUST LER ET MITE RDY STRT ALM		
ш		4/18/2021 91/532 PM 02/4/C504 PROCESS WTERPH ANALYZER PV = 3.9 PH LL 4/16/2021 11/37/4 BM 02/11/57 AM SILD ENV BATTERIN AL IN H		
		4/16/2021 11:27:23 AM 02X1125_AN1 BLR F.W. PUMP RUN ALLM		
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G				
		[ALM=I2.11.439(r1.8.24H) [RCV=(3.12.459(r1.8.24H) [RCV=(3.12.459(r1.8.24H)]])]))]	/IRCV=(0,0,0)/(1,8,24H) E	/T=(11,55,199)/(1,8,24H) .::
-	ዶ 🖽 🛅 🥫			∧ 🙀 (1) 9:29 AM
		Figure 2. Process alarms being displayed in the CAMS for HIS window		4/13/2021
		i igure 2. i rocess diarms being displayed in the Chins for this window		

1- Process Alarms



This button opens the window that lists down all the process alarms in reverse chronological order, as shown above.

2- System Alarms

The system alarms button opens the list of system alarms in reverse chronological order, showing the latest alarm at the top.

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	P 🗆 🗄 📒			へ 🌄 🕸 🤐 9:29 AM 4/19/2021

Figure 3: System alarms being displayed in the CAMS for HIS window

3- Operation Guide

Operator guide messages are displayed upon pressing this button, to guide the operator regarding monitoring and operation. These messages are configured by the user, like process alarms.

The process alarms, system alarms and operator guide messages can also be toggled from the list in the bottom left half of the Consolidated Alarm Management Software (CAMS for HIS) window as shown in previous screenshots. Setting filter conditions allows the selection and display of necessary alarms and events only.

Note: HIS is the acronym for Human Interface Station, which is an HMI system interfaced with the FCS (Field Control Station) of the DCS.

4- Message Monitor

The message monitor window is opened by this button.



5- Message Display Area

All the latest system and process alarms, as well as messages are displayed in this area for unhindered view.

6- Buzzer Reset

This button is used to reset the buzzer that is turned on upon occurrence of an alarm.

7- User In

Different users are defined in Centum VP and each user is given a different privilege level according to requirement. Through this button, we can login to any user by entering the username and corresponding password.

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Figure 4: User-in window that allows different users to login and exercise their corresponding privilege level

8- Overview Toolbox

This toolbox gives access to the different graphics pages used for monitoring of process parameters, as well as pages for controlling of certain parameters such as bypassing of plant securities. In addition, we can view trends of process parameters using this toolbox.

The screenshots below paint an elaborate picture of the features of overview toolbox.





Figure 5: Labelled home page with the overview toolbox open

The view tab in the browser bar gives us access to all the graphics pages configured for the plant. This includes various types of pages including those for monitoring of parameters, interlock securities, alarm windows as well as bypass of securities.

The trend tab lists groups of parameters for viewing of trends in graphical form. Ways to access trends will be covered in the "TRENDS" section of this document.

Within the view tab, an expanded view of the plant (in our case NA_PLANT) will open the list of all graphics pages. Clicking on any of the page titles in the list will open that graphic page. Shown in figures 6-11 below are some of the graphic pages configured for NNA plant.





Figure 6: Graphic page showing a drawing of the plant equipment along with live process parameters

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>	2-P9	A PLANT STARTUP LINE A	×			
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		Trend	HNO3 LINI	E "A" STARTUP PAR	AMETERS	
⊞		U02TT104A	02FI305A	02PI205A	02-K-0001A	02FFI304A
NAME		887 ° c	PV 17826 m3/h	^{PV} 6.15	6103	10.6
				rto/cmz		KAIIO
		02FFIC301A PV 9160 m3/h	02FFXY301A PV * SV	02FFXY301A PV 71900 m3/h	02F/302A PV 9666 Nm3/h	02Fl303A PV 75372 Nm3/h
		SV 9131 m3/h MV 33.9 %	9131.3	SV 1.27 MV 9131.3 m3/h		
		02HIC601A	02HIC602A	02LIC403A	02LIC426A	02LIC428A
				PV 40 %	PV 55 %	PV 19.1 %
		MV 100.0 %	MV 54.0 %	sv 40 %	sv 55 %	sv 19.1 %
				MV 12.0 %	MV 36.1 %	MV 47.0 %
		02AIC504	02PI209	02TI105A	02FQ-306A	02TI102-8A
G)		2.3 PH	39.3 Kg/cm2	003 °	347923.7 m3	PV 27.9 °c
_	Ready					

Figure 7: Graphic page showing main startup parameters of the entire plant for easy monitoring. The trend button on top left would open the trends of each of these parameters



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		02PALL223A	02PALL225A	02HSA610A	02PALL226A	02UA755A	02PDAHH222A	02VSHHCTA	02XSHH152	02XSHH150	02XSHH151	
		02PDAH227A	02PDAH228A	02TAH118A			02FYAS317A	02PALL230A	02-VT-130	02-VT-132	02-VT-134	
		02LAL442A	02PAL229A	02TAL118A	02PAL224A		02FYAS317AL	02-XT-150	02-VT-131	02-VT-133	02-VT-135	
NAME						02TAH120-129A		02-XT-151	02-XT-152	02ZSC428A	02ZSC701A	
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		02PAH203A	02LAHH403A	02LAH404A	02FFAH304A	U02T	Г104A	02FFAL304A	02TAHH104A	02TALL104A	02PAHH211A	
		02LAH402A	02LAH403A	02LAH428A	02PAH205A	888	°c	02TAH103A	02TAH104	02LAHH431A	02PAH211A	
		02LAL402A	02LAL403A	02LAL428A	02PAL205A	0255	13042	02TAL103A	02TAL104	02LAH431A	02LAL431A	
		02ZSC403A	02ZSC301A	02ZSC702A	02ZSO703A	10.6	RATTO	02ZSO601A	02ZSC602A	02ZSO603A	02ZSC604A	
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		02FAL309A	02FAL310A	02LAH426A	02TAH110A	02TAH111A	02-1112	02LAH407A	02LAL411A	02LAL415A	02LAH409A	
			02CAH506A	02LAL426A	02PAL202A	02TAL108A	02-1152 02FAL316A	02LAL407A			02LAL409A	
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		02PAL204A	021AH106	02LAH423	02PAH212 02PAL212	6103	rpm		02AAM504	02LAH421	02047564	
_		02-EMG-SUP	UZLAL434	02LAL423	BFW TANK	020FY	AS317A			UZLAL4Z1	02LAH412A	
G		Emergency Bus Bar		02250704		1205	mmH20				UZLAH416A	
-	Ready											
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Figure 8: Alarm window graphic page showing alarm status of major parameters



Figure 9: Custom graphic page showing vibrations taken from Bently Nevada BN3500



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>	is1_1A IS1_1 A IS1_1 LINE A GRAPHIC X		
÷	LINE A IS-1.1	00102012	NH3-AIR RATIO CONTROL
⊞	NEI TATI (GEORGI) UMISAGUELA E	02VS301A	VALVE SHUTDOWN
NAME		12VS702A	AIR MIXER SHUTDOWN
		2VS703A	NH3 GAS TO ATM VLV
	AMORILA AIR RATIO HI UZPFAHJOJA TO SEC	-XI-1106A -XI-1146A	PROCESS WATER FUMPS SWITCH OFF
	COLLING MATERY LOPIALL309A COLLING MATERY LOPIALL309A COLLING MATERY LOPIAL STREAM STR	-XI-1109A -XI-1149A	ACID CONDENSATE FUMPS SWITCH OFF
	IA SUPERLY FREES 02PALL204A TO TO TO 10 SEC 02 NRG EXADORATOR 02LAH404A TO TO TO 10 SEC 02	-XI-1108A -XI-1148A	BLEACHER PUMPS SWITCH OPP
	BOLLER DRIM 02LAH427A	-XI-1107A	PROCESS ACID PUMP OFF
	NH3 SEPARATOR LEVEL IN 021AH403A B		
		02VS428A 02VS403A	NH3 EVAPORATOR LEVEL CONTROL VALVE NH3 SEPARATOR LEVEL VLV SKUTDOWN
G			
	Ready		

Figure 10: Graphic page showing status of interlock securities at NA Plant

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NAME						
	02TAL	L104A AND 02FFAL304A	COMPRESSOR			
		DEFEATS	SHUT DOWN VALVES			
		02B01A OFF	02B08A OFF			
			02PSLL223A,26,30			
		NH3 TRIP	02FYAS317A DEFEATS			
		02B07A OFF	02B10A OFF			
6						
-	Ready				9:47 #	AM

Figure 11: Graphic showing MOS (Manual Override System) Status for some security defeats. The boardmen can turn the defeats on or off as required, by pressing the buttons on this page.



We can locate any parameter on the process diagram of the plant and view additional details of that specific tag number such as its faceplate, tuning parameters, related process alarms and trend. We can access these features by right-clicking on any tag in the diagram as shown in the figure below.



Figure 12: Right-clicking on any tag number on the process diagram shows options for additional information regarding the tag's parameter



Figure 13: The faceplate as opened through the right-click menu (left) and the different features of the faceplate labelled in detail (right)



The boardman has the option to manually adjust certain parameters such as the mode, SV or MV from the faceplate. For this purpose, certain buttons on the faceplate come in handy. The procedure for doing this is depicted in figures 14-16 below.



Figure 14: By pressing the diamond symbol button below, we can change the mode of the loop



Figure 15: Click on SV window on the faceplate to open the window where you can enter desirable SV value in the DATA field (left) or click on SV pointer to open the window where you can increase or decrease SV value in small steps (right). SV value is only adjusted when loop is in automatic mode.





Figure 16: Click on MV window on the faceplate to open the window where you can enter desirable MV value in the DATA field (left) or click on MV pointer to open the window where you can increase or decrease MV value in small steps (right). MV value is only adjusted when loop is in manual mode. Manual adjustment of MV value is frequently used for stroke checking of control valves.

The tuning view is another important feature accessible through the right-click menu on any tag in the process diagram. The details of this window are shown in the figures below.



Figure 17: A tuning parameters window showing tuning parameter values along with the faceplate and trend graphs of PV (process value), SV (setpoint value) and MV (manipulated value)



Т	oolbar	of Tuning View		
	•/\n+ +/\n+ \	r 🛧 💦 🚺 🚾		
Outputs the image of the Tuning view currently displayed. Acknowledges alarm	+∕∿ + /\/+	Reduce/Enlarge in direction of time-axis (horizontal direction)		Calls up Operation Mark Assignment dialog box.
generated in function block that is displayed. When pressed,	***	Reduce/Enlarge data axis display scale.	.	Calls up a Control Drawing_view.
tuning trend data continues to be collected even when the Tuning view is closed; and		Change to primary direct_block mode.	RAW	Calls up a dialog box to display raw data.
displayed when the Tuning view is called up the next	<u>:</u>	Change mode to alarm off mode to suppress alarms.		
time ing trend pauses /Resume updating display.	CAL	Change the data status to calibration mode		

Figure 18: Information about the buttons on toolbar of tuning view

9- Preset Menu Toolbox

The present menu toolbox can be configured to contain certain functions that can be simply called by a preset menu.

10- Tool Button Toolbox

102FI302B NH3 FLOW TO AOR PV = 9460 M3/H HI Recover	4/19/2021 9	:41 AM	Yokogawa 🔶
	421-		Se offuser (S1)
God Button Over Operation <p< td=""><td></td><td></td><td></td></p<>			
Function Name Command History			
Process Alarm O AL-SL			
Block01 Group01 0 TG0101A-SL			
system status verview o 330-sit. Biechol Genumoli o D TGGRIDA -SM			
NH3 RUW TO ADR 0 02F302A-SC			
H.P.STEAM BLR DRUM FW. O 02F1314A-SC			
PRIMARY AIR TO AOR 0 0251303A -SC			
Bickel Groups O TGO1624-5M			
NHS SEPTIR I/U NIP ESO O DOLIGUIS I UN S			
Process Name O AL 025/11A SL			
TURBINE SPEED XMTR O 025/711A TUN -SA			
TURBINE SPEED XMTR 0 025711A-SC			
LINE A HNO3 PROCESS 1/2 0 2-P1-A -SL			
System Alarm Message 0. SA -SL			
Operator Guide Message 0.0.05-SL			
Figure 19: Overview of the Tool Button Toolbox			





The tool button toolbox contains many useful tools categorized into four main categories: view operation, call view, window control and builder. The call view category contains some important functions from the operational perspective that will be discussed here. Window control contains some general tools regarding resizing and orientation of windows within Centum VP whereas the builder contains functions pertinent to design and editing of graphic windows.

Note: If at any point you do not know what function a specific button in Centum VP performs, simply place the cursor over the button to view its name.

Three important buttons under call view are system, process alarms and historical report. Process alarms performs the same function as discussed earlier i.e., it opens the CAMS for HIS to list down the process alarms. The other two buttons are discussed as follows:

<u>System</u>

The system feature is a useful tool to monitor and check the health of the entire network, including the FCS and SCS (ESD) controllers, engineering workstation and all HIS, and the intra-network communication between each pair of devices. Figures 20-22 show how to navigate through the system tool.



Figure 20: The system status overview window showing the different stations in the network. You may double-click on any station to open its detailed information page





Figure 21: The station status display showing the details of FCS0101 controller including status of its CPUs and PSUs etc. Double-clicking the CPU/PSU opens the detail of further breakdown of the equipment. The system status button opens the window shown in Fig 20 whereas the network status button opens the window shown in Fig 22.



Figure 22: The network status display window showing the communication status between each pair of stations in the network.



Historical Report

The historical report button opens a detailed report showing all alarms that occurred in reverse chronological order.



Figure 23: Historical Report in the CAMS for HIS

11- Name Input Toolbox

The name input toolbox is used to search any tags or windows by name. It is a convenient way to search your required tag. When you call the tag, its faceplate opens. This process is shown in Fig 24-25.



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чф́ч Ш NAME	Cell Cell Norme Input 22UC4034 ○ Default Station Information				
6	Window History Function Name Command History 0 UNR A HNO3 PROCESS 2/2 0 2+22-4-51. Sypessi 561 Line 0 024-1-51. Main Make/Remore bypass 00 1-31. O Paces Alam 0.4-1-51. Main Make/Remore bypass 00 1-31. System Status Oenview 0.02-1-51. Block01 Group 01 O T0001014-51. Block01 Group 01 0 T0001014-51. D02100104-55. Block01 Group 02 D0701014-52. HVB 200W T0 AGR 0.02110104-52. O 02110104-55. Block01 Group 02 D07010124-55. Block01 Group 02 0 T0010124-52. O 02110204-55. HVB 29787. VI. NOFESD 0.02120104-54. HVB 298778. VI. NOFESD 0.02120104-54. C HVB 2977114-52. UNR 4140107900225. UNR 20111-54. UNR 41401714-55. UNR				

Figure 24: Calling a tag using the name input toolbox.



Figure 25: After calling a tag using the name input toolbox, its faceplate opens. Upon right-clicking on the faceplate, the same menu opens as the one on the process diagram. This menu can be used to access tuning parameters, process alarms and trend.

12- Windows History Toolbox

The windows history toolbox is used to display the history of user and system actions in the Centum VP as shown in Fig 5.

17 | Page



TRENDS

There are three main ways to open the real-time trend for a specific plant parameter, which are explained as follows:

- i) **Through Graphic Page:** One way is to find the desired tag number on the process diagram graphic page accessed through the overview toolbox under the view tab. Right-clicking on the tag will show a menu as depicted in Fig 12. The trend option can be clicked to view the corresponding trend.
- ii) By Calling Faceplate in Name Input Toolbox: Using the name input toolbox, we can call the faceplate of the desired tag. Right-clicking on the faceplate will show a menu as depicted in Fig 25. The trend option can be clicked to view the corresponding trend.
- iii) Through Trend Tab in Overview Toolbox: The trend tab in the overview toolbox contains customized groups of plant parameters whose trends are grouped together as per operational requirement. Clicking on any of the parameters in these groups opens the corresponding faceplate, through which we can access the group of trends. The details are shown in the following figures.



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-ţ	Overview V Tend V Rec01901			
()	Image: Command History System Name Message 0.54.34. Operator Guide Message 0.63.43. Popers Rame Message 0.64.34. Bypass Bit Line A 0.62.3-1.54. Main Make/Remove bypass 0.13.4. LINE A HNO3 PROCESS 1/2 0.29.1-8.54. System Statu Convervie 0.50-54. New bypass procedure 0.NW, BYRASS 54. TEST OTST-54. CONTRO_CROUP 0.CONTRO_CROUP Defeat 0.81.LIABA_D-54. PNNE1 TA MOS STATUS 0.NA, MOS,A-SL.			
				へ 🌄 中) 9:34 AM 4/19/2021

Figure 26: The trend tab in the overview toolbox contains groups of parameters whose trends can be viewed together.

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	421-	Se offuser (S1)

Figure 217: Clicking any parameter from the group in the trend tab opens its faceplate. Right-clicking on the faceplate and selecting trend from the menu opens the trend window for the group. This contains the trends of all parameters in the group.



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The different features in the trend window are explained in the figures below.

Figure 28: The trend window along with its different features explained



Figure 29: The pen assignment feature in the trend window allows us to customize the group of parameters whose trends we want on display. We can choose parameters from different blocks of second, minute or hour trends.



There are two options for reading long term data in parameter trends. One option is to select the corresponding data file for display. (In our case at NNA, each file contains the trend for a 3-hour window). The second option is to specify the date and time in the 'set time' option of the 'read long-term data' button for the start and end of the required trend. The process is explained through figures 30-32.

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		5 02FFI304A.PV	NH3/AIR RATIO	10.6	0.0	14.0										
		6 02FFXY301A.MV	NH3-AIR RATIO CTRL	9171 m3/h	0	2000										
		7 02FFIC301A.SV	NH3-AIR FLOW CONTROL	9171 m3/h	0	2000										
		8 02FFIC301A.MV	NH3-AIR FLOW CONTROL	33.0 %	0.0	100.0										
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Figure 30: The 'read long-term data' button has two options: to select a file or to set the required time and date specification.



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	6 02FF	-XYJULA.MV	NHS-AIR RATIO CTRL	9179 m3/	h	0 12000									
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Figure 31: Choosing the 'selecting the file' option opens a tab to browse for the required file. In our case at NNA, a backup of the trends is taken every 3 hours.



Figure 32: Choosing the 'date specification' in the 'set time' option of 'read long-term data' button allows us to specify start date and time as well as end date and time for the trend.



BYPASSING SECURITIES

Note: This section is specific to New Nitric Acid plant since the graphic pages discussed here for bypassing securities are customized for the said plant. The procedure for any other plant would be similar if bypassing of securities is implemented in a congruent manner.

There are two ways to access the graphic page for bypassing plant securities. One way is to call the graphic page by its name using the name input toolbox, whereas the second way is to access the graphic page under the view tab in the overview toolbox. The process is explained in the figures below.

Keep in mind that these tripping securities have been implemented in ESD, and DCS only provides a user interface to toggle them. Any action taken to bypass or put in service a security is subsequently communicated to the ESD.



Figure 33: Accessing the make/remove bypass page using the view tab in overview toolbox



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ම	Window History Command History A Function Name Command History A NH3 SEPTR UV. INFTESD 0.02L-603A -5C. C LNRA HN03 PROCESS 22 0.22-2A -9. Bypass int line A 0.02A -1.5L. Main Make/Remove bypass 0.013-8L. Process Alarm 0.A -5L. Biock01 GroupD1 T GOIDIA-5L. Biock03 GroupD1 T GOIDIA-5L. Biock03 GroupD1 T GOIDIA-5M. HH3 FROV TO AOR 0.02H02A -5C. H+95TAME IREDWILE VLO CONTROL O COFFICIOIA -SC. PRIMARY AR TO AOR 0.02H02A -5C. HH3 SEPTR UV. INP TESD O COLLEGIDIA -SM. HH3 SEPTR UV. INP TESD O COLLEGIDIA TUN + FORCES ALIR 0.02H02A -5C. HH3 SEPTR UV. INP CESD O TO TOGUA -SM. HH3 SEPTR UV. INP TESD O COLLEGIDIA TUN + FORCES ALIR O.02H12A -5C. UNALME. SPEED XMTR O.02H12A -5C. UNALME SEED XMTR O.02H11A -5C. UNALME. SPEED XMTR O.02H11A -5C. U.N. H450A FROCESS 12. V.2.4-4.				

Figure 34: Accessing the main make/remove bypass page from the name input toolbox. As evident in Fig 33, the name for the concerned page starts with the number '01' and so it can be called by this number from the name input toolbox.



Figure 35: The main make/remove bypass page. Double click on the line for which you have to make or remove security bypass.



);	$\ddot{\alpha}$ $\ddot{\alpha}$ (a) O2FI302B NH3 FLOW TO AOR PV = 9460 M3/H HI Recover							
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		Press the ON button	of faceplate for MAKE By	An indication DONE	will appear infront of that tag.			
NAME				• • • •				
		'Remove Bypass' Double cli	ck the desired Tag. Th	ne facenlate of that tag will anne	ar on your screen			
		<u>Remove Dypass</u>		The indication now	will disappear of that to a			
		Press the OFF button	of faceplate for REMOVE	BYPASS. The Indication UNIC	will disappear of that tag.			
			EALL 200A	EALL 240A				
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		FYAS317A	LAH404A	TAHH104A	LAHH403A			
		PAH203A	PAHH211A	PALL226A	LALL403A			
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Figure 36: The page containing tags for which we can make or remove security bypass. The instructions for doing so are mentioned on the graphic page.