







# Installation / Operation / Maintenance

Written for Engine Version 2.8.5



## Table of Contents

1	Intr	oduction6		
2	Inst	allation		7
	2.1	IP65 or IP6	58 Backplate	7
	2.2	Panel Back	< Plate	11
3	Eleo	trical Wiring	g	16
	3.1	Overview .		16
	3.2	Power Sup	oply	
	3.3	Inputs and	l Outputs	
	3.3.	1 Analo	og Inputs	
	3.3.	2 Digita	al Inputs	24
	3.3.	3 Analo	og Outputs	25
	3.3.	4 Digita	al Outputs	25
	3.3.	5 Cla-Va	al Power Converter	26
4	Scre	en Navigati	ion	
	4.1	Home Scre	een	
	4.2	Navigation	n Buttons	
	4.3	Screen Ma	ıp	
	4.3.	1 Navig	ation Examples	
	4.4	Basics		
	4.4.	1 Go Ho	ome	
	4.4.	2 Nume	eric Entry	
	4.4.	3 Alpha	a Numeric Entry	
	4.4.	4 Drop	Down Selection	41
	4.4.	5 Go Ba	ack	43
	4.4.	6 File Ex	xplorer	43
5	Init	al Power Up	ρ	44
	5.1	Select a Va	alvApp	44
	5.2	Loading a V	ValvApp	45
	5.2.	1 Loadii	ng a Standard ValveApp	45
	5.2.	2 Loadii	ng a Custom ValveApp	
	5.3	Configurat	ion Wizard	
	5.3.	1 Introc	duction Screen	50



	5.3.2	Warning Screen51
	5.3.3	Regional Settings
	5.3.4	Inputs52
	5.3.5	Outputs53
	5.3.6	Solenoid Configuration
	5.3.7	DP Metering55
	5.3.8	Hostname
6	Setup	
6	.1 Syst	em Settings57
	6.1.1	VC-22D Information57
	6.1.2	ValvApp Backup60
	6.1.3	Restore Application61
	6.1.4	Export Application61
	6.1.5	Import Application63
	6.1.6	Time & Region64
	6.1.7	Unit Management67
	6.1.8	Configure Logs
	6.1.9	Export Logs69
	6.1.10	GSM/GPRS70
	6.1.11	LAN75
	6.1.12	Remote Recopy75
	6.1.13	Modbus75
	6.1.14	Remote Access80
	6.1.15	Cloud Storage82
	6.1.16	Wireless
	6.1.17	Web Interface
	6.1.18	Security
	6.1.19	Reboot
	6.1.20	Engine Update
	6.1.21	Diagnostics to USB88
	6.1.22	Factory Reset
	6.1.23	Kernel Update90
	6.1.24	Configuration Wizard90



	6.1.25		Display Brightness	91
	6.1	26	Shutoff Screen	91
6	5.2	Valv	e Control Settings	93
	6.2	.1	DP Metering	93
	6.2	.2	PID	98
	6.2	.3	Control Curves	104
	6.2	.4	Averagers	109
	6.2	.5	Actions	110
	6.2	.6	Signal Retransmission	114
	6.2	.7	Totalizer	116
	6.2	.8	eDrive34	117
	6.2	.9	Input Settings	118
	6.2	.10	Output Settings	123
7	We	eb Inte	rface	128
7	7.1	Acce	ess the Web Interface	128
7	7.2	Navi	igating the Web Interface	128
	7.2	.1	Information Page	128
	7.2	.2	Logging Page	129
	7.2	.3	App Management Page	129
	7.2	.4	Advanced Page	130
8	Va	lve Op	eration	131
8	3.1	Setp	point Changes	131
	8.1	1	Interactive Variable	131
	8.1	2	Remote/Local Setpoint	132
8	3.2	Loca	al Input Override	134
8	3.3	Loca	al Output Override	137
9	Mo	dbus	Interface	137
10	,	VC-22[	D Start-up & Tuning Commissioning Checklist	139
1	L0.1	Insta	allation Guide	139
	10	.1.1	Installation Checklist	139
1	L0.2	Star	t-Up Guide	139
	10	.2.1	Control Valve Checklist	139
	10.	.2.2	Field Connection Checklist	



10.2.3	Solenoid Connections & Setup Checklist	140
10.2.4	Sensor Connections & Setup Checklist	140
10.2.5	Remote Setpoint Connections & Setup Checklist	140
10.2.6	Set Tuning Parameters Checklist	141
10.2.7	Transmitter Configuration sheet	142
10.3 P	ID Tuning Guide	143
10.3.1	PID Control	143
10.3.2	Deadband Tuning	144
10.3.3	Cycle Time	145
10.3.4	PID Tuning Table	145
10.4 N	on-Conformances	146
Appendix A	: Modbus Standard Mode	
A.1 0x R	egisters (Coil Table)	148
A.2 1x R	egisters (Discrete Input Table)	
A.3 3x R	egisters (Analog Input Table)	149
A.4 4x Re	egisters (Holding Table)	149
A.5 Mod	bus Override	
A.6 Data	Types	
A.7 Cla-\	al Mode (Legacy)	
A.8 Mod	bus Base Registers	
A.9 Mod	bus Topkapi Registers	
A.10 Mo	dbus Topkapi Integer Registers	176
Appendix B	: Standard ValvApp Library List	
Appendix C	: Standard ValvApp Worksheets	
C.1 131-	-low-Mag-V2.0 or 131-Flow-X144D-V2.1	
C.2 131-	_vlAltitude-L-V2.1	
C.3 131-	_vlMod-L+Mag-V2.0 or 131-LvlMod-L+144D-V2.1	
C.4 131-	_vlMod-L+X117D-V2.1	
C.5 131-	Position-X117D-V2.1	201
C.6 131-	PressureReducing-P2-V2.1	205
C.7 131-	PressureSustaining-P1-V2.1	209
C.8 133-	Flow-DP+X117D-V2.1	213
C.9 133-	Flow-P1+P2+X117D-V2.1	217



	C.10 136-LvlAlt-HLLL-Switches-V1.0	221
	C.11 136-LvlAltitude-OnOff-V1.0	225
	C.12 340-Flow-Mag-V2.1	229
	C.13 340-Flow-V2.1	233
	C.14 350-PressureSustaining-P1-V2.1	237
	C.15 350-PressureSustaining-V2.1	241
	C.16 390-PressureReducing-P2-V2.1	245
	C.17 390-PressureReducing-V2.1	249
A	Appendix D: Standard ValvApp Wiring Diagrams	253
	D.1 131-Flow-Mag-V2.1	253
	D.2 131-Flow-X144D-V2.1	254
	D.3 131-LvlAltitude-L-V2.1	255
	D.4 131-LvlMod-L+Mag-V2.1	256
	D.5 131-LvlMod-L+X117D-V2.1	257
	D.6 131-LvlMod-L+X144D-V2.1	258
	D.7 131-Position-X117D-V2.1	259
	D.8 131-PressureReducing-P2-V2.1	260
	D.9 131-PressureSustaining-P1-V2.1	261
	D.10 133-Flow-DP+X117D-V2.1	262
	D.11 133-Flow-P1+P2+X117D-V2.1	263
	D.13 136-LvlAlt-HLLL-Switches-V1.0	264
	D.14 136-LvlAltitude-OnOff-V1.0	265
	D.15 340-Flow-Mag-V2.1	266
	D.16 340-Flow-V2.1	267
	D.17 350-PressureSustaining-P1-V2.1	268
	D.18 350-PressureSustaining-V2.1	269
	D.19 390-PressureReducing-P2-V2.1	270
	D.20 390-PressureReducing-V2.1	271

## CLA-VAL VC-22D Installation, Operation, and Maintenance Manual



### 1 Introduction

The VC-22D is a fully functional standalone controller for Cla-Val electronic valves. The unit contains everything that is necessary to operate the valve with little or no configuration required by the end user. The VC-22D also comes with several communication options to make integration with a SCADA or PLC system seamless.

The controller has a display to show pertinent status information about the valve and 5 buttons for valve operation. The VC-22D also has interchangeable back plates allowing it to be easily mounted in several different scenarios. See **FIGURE 1.1** below:



Figure 1.1

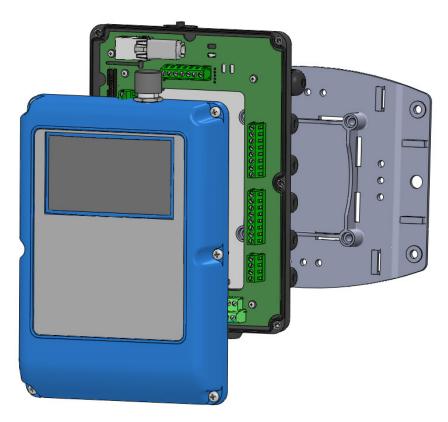


### 2 Installation

The VC-22D can be mounted to walls, pipes, panel doors, din rails, and other miscellaneous objects depending on the interchangeable backplate that's purchased.

### 2.1 IP65 or IP68 Backplate

The VC-22D can be purchased with an IP65 backplate or an IP68 backplate. The IP65 and IP68 backplates have the same form factor, however the IP68 has cable glands that offer additional water proofing. **FIGURE 2.1** shows an exploded view of the VC-22D with an IP68 backplate and universal mounting adapter (purchased separately).



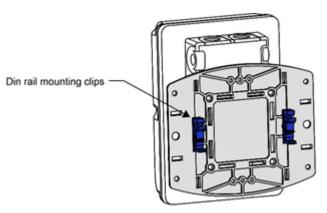


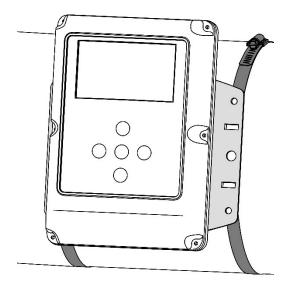
The IP65 or IP68 backplate are used for mounting the VC-22D in a non-enclosed space. IP65 backplates are good for indoor locations when heavy soaking with water is not expected. IP68 is best suited for outdoor environments or in vaults where frequent contact with water is expected.



### Installation, Operation, and Maintenance Manual

**FIGURE 2.2** shows common mounting scenarios using the IP65/68 backplate with the universal adapter bracket.





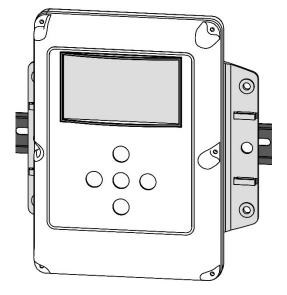
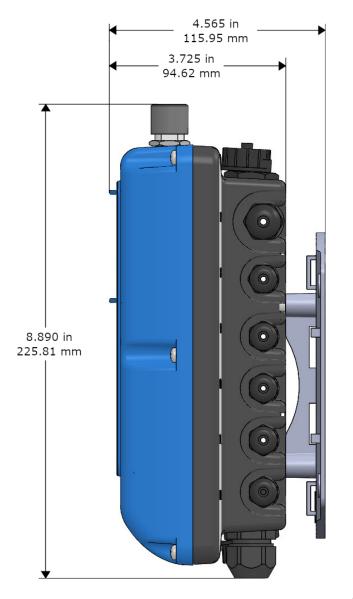


Figure 2.2



### CLA-VAL VC-22D Installation, Operation, and Maintenance Manual

FIGURE 2.3 shows the overall dimensions for the unit.



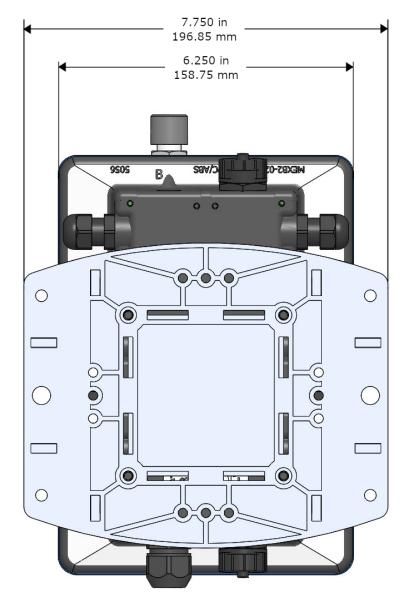


Figure 2.3



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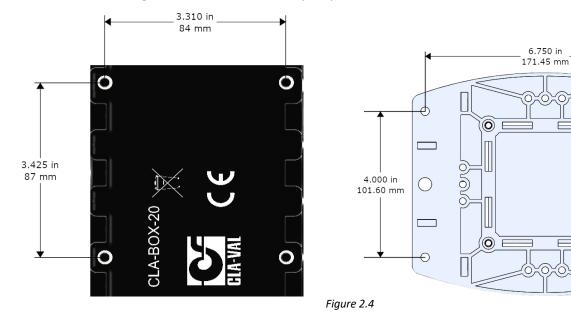
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6

C

### Installation, Operation, and Maintenance Manual

**FIGURE 2.4** shows the dimensions for each mounting hole on the IP65/68 backplates, and the dimensions for each mounting hole on the universal adapter plate.





#### 2.2 Panel Back Plate

The VC-22D can be purchased with a panel backplate which allows for easy mounting to the door of an electrical panel. **FIGURE 2.5** shows an exploded view of the VC-22D with a panel backplate.

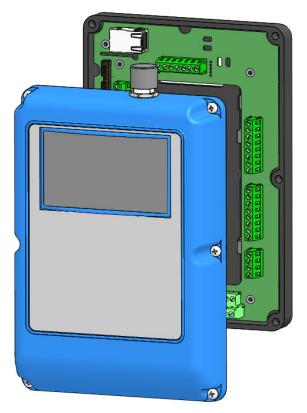
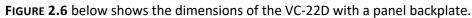


Figure 2.5



### Installation, Operation, and Maintenance Manual



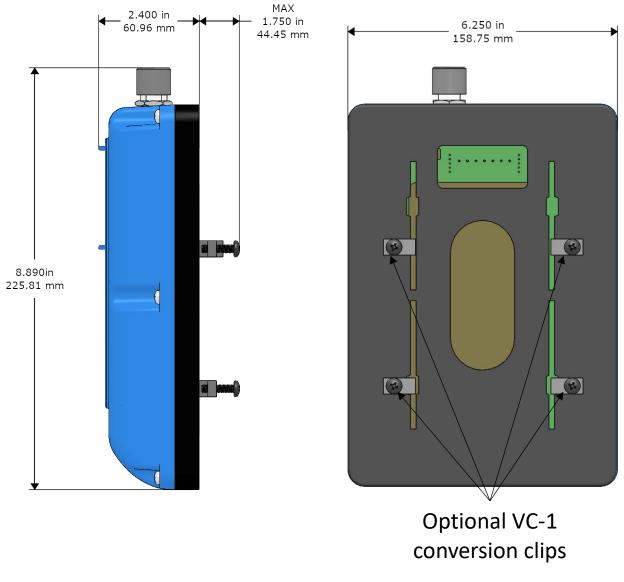


Figure 2.6



To mount the VC-22D on a control panel door, two screw holes must be drilled into the VC-22D's back panel. Two screw holes and a wireway hole must be drilled into the control panel door. See the drawing in **FIGURE 2.7** for dimensions.

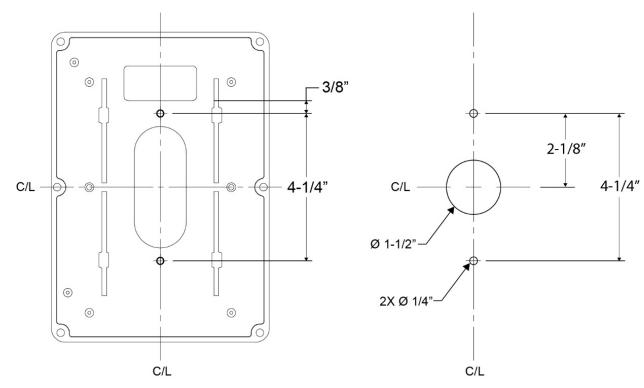




Figure 2.7



### CLA-VAL VC-22D Installation, Operation, and Maintenance Manual

Sometimes, the VC-22D has been purchased to replace a previous generation VC-1 valve controller. In these cases, it may be preferred to mount the VC-22D over the existing VC-1 panel hole. To do this, remove the existing VC-1 and use the "optional VC-1 conversion clips" to mount the VC-22D in the existing panel hole. The dimensions of the panel hole are shown in **FIGURE 2.8**. Before and after pictures are shown in **FIGURE 2.9** and **FIGURE 2.10**.

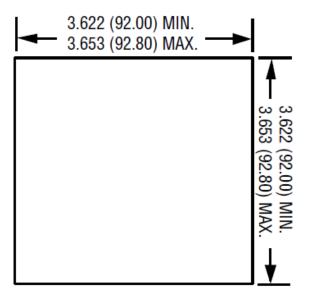


Figure 2.8



Figure 2.9



Installation, Operation, and Maintenance Manual



Figure 2.10

If replacing a VC-1, it's also likely the VC-22D must utilize the existing 120 VAC power supply and 120 VAC valve solenoids. If this is the case, an optional AC/DC panel mount power convertor may be purchased from Cla-Val. The power convertor is mounted on the back of the VC-1 conversion clips using the 4x 6-32 plastic screws as shown in **FIGURE 2.11** below. See section 3.3.4 for wiring instructions on the power convertor:



Figure 2.11



## 3 Electrical Wiring

#### 3.1 Overview

The back plate of the VC-22D contains terminals for connecting a power supply, field IO, and serial communication wires. See **FIGURE 3.1** below to identify the terminals on the back plate:

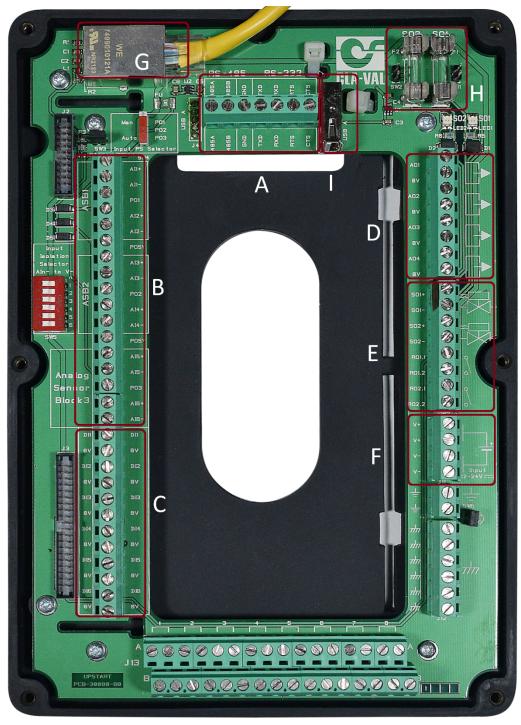


Figure 3.1



Installation, Operation, and Maintenance Manual

- A: RS232 and RS485 Modbus terminals
- B: 4-20mA analog input terminals
- C: Digital input terminals
- D: 4-20mA analog output terminals
- E: Digital output terminals (2 solid state 24 VDC sourcing outputs for solenoids, 2 dry contact relays)
- F: Power supply terminals
- G: Ethernet cable port

H: Fuse block for solenoid digital outputs (Fuse rating of 800mA 250V, included in units shipped out with engine 2.8.3 and newer)

I: Internal USB port (included in units shipped out with engine 2.8.3 and newer)

#### 3.2 Power Supply

The VC-22D is designed to be a low power controller. It can be powered from a standard power supply, solar panel, battery, or X143 generator. See **TABLE 3.1** below for the VC-22D's power supply requirements.

Allowed Power Supply Voltage	12-24 VDC	
Current Demand	300 mA at 24 VDC (steady state)	
Power Demand	36 Watts (maximum)	
Table 3.1		

The ratings provided in the **TABLE 3.1** do not account for additional demand from analog inputs, digital inputs, analog outputs, and digital outputs. To properly determine the amount of power and current supplied to the VC-22D, the user must add in additional demands from field IO.

As shown in **FIGURE 3.2**, the VC-22D comes with two sets of V+ terminals, V- terminals, and GND terminals. Either terminals may be used to power the unit, and the spare terminals have been included to provide power to an external device if desired.



### CLA-VAL VC-22D Installation, Operation, and Maintenance Manual

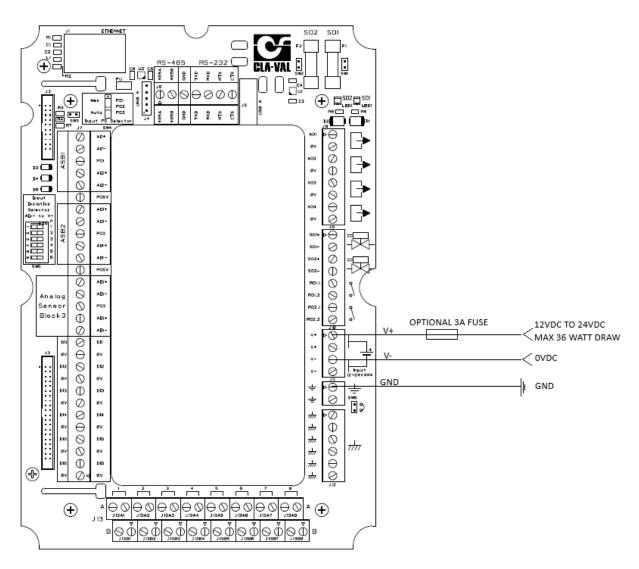


Figure 3.2

#### 3.3 Inputs and Outputs

#### 3.3.1 Analog Inputs

Each analog input can be configured in three different states as described below:

- 1. Isolated and current sinking
- 2. Non-isolated and current sinking
- 3. Non-isolated and current sourcing

Each analog input has a dip switch and three terminals. The dip switch controls whether the analog input is isolated or non-isolated. The terminals used determine whether the input is current sinking or current sourcing.



The VC-22D can work with the vast majority of 4-20mA sensors on the market because of the three configuration options stated above. The VC-22D supports two wire loop powered, two wire field powered, three wire field, and four wire 4-20mA sensors.

The following sections assist with identifying the type of analog sensor being used and how to wire it accordingly.

#### 3.3.1.1 2 Wire - Field Powered

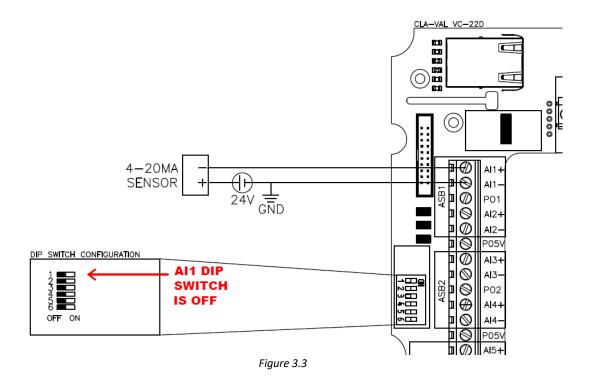
If the analog sensor meets the requirements below, it is a grounded 2 wired field powered sensor:

- 1. Sensor has two wires.
- 2. Power supply is in the field.
- 3. 4-20mA loop is grounded in the field.

The analog input should be configured as isolated and current sinking. **FIGURE 3.3** shows the dip switch position and a wiring diagram for this configuration.

Examples on two wire sensors supplied by Cla-Val which can be field powered:

- 1. X117D position transmitter.
- 2. X117C position transmitter.
- 3. X144/D flow transmitter.
- 4. X141 PT pressure transmitter.





If the analog sensor meets the requirements below, it is an ungrounded 2 wired field powered sensor:

- 1. Sensor has two wires.
- 2. Power supply is in the field.
- 3. 4-20mA loop is not grounded in the field

The analog input should be configured as non-isolated and current sinking. **FIGURE 3.4** shows the dip switch position and a wiring diagram for this configuration.

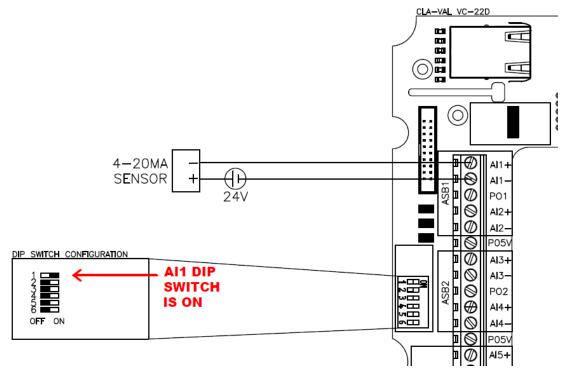


Figure 3.4



#### 3.3.1.2 2 Wire - Loop Powered

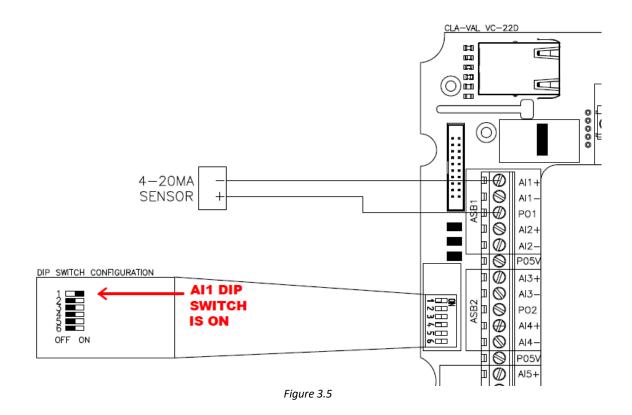
If the analog sensor meets the requirements listed below, it is a 2 wired loop powered sensor:

- 1. Sensor has two wires.
- 2. Power supply is not in the field.
- 3. 4-20mA loop is not grounded in the field

The analog input should be configured as non-isolated and current sourcing. **FIGURE 3.5** shows the dip switch position and a wiring diagram for this configuration.

Examples on two wire sensors supplied by Cla-Val which can be loop powered:

- 1. X117D position transmitter.
- 2. X117C position transmitter.
- 3. X144/D flow transmitter.
- 4. X141 PT pressure transmitter.





#### 3.3.1.3 3 Wire – Loop powered

If the analog sensor meets the requirements listed below, it is a 3 wired loop powered sensor:

- 1. Sensor has three wires.
- 2. Power supply is not in the field.
- 3. 4-20mA loop is not grounded in the field

The analog input should be configured as non-isolated and current sourcing. **FIGURE 3.5** shows the dip switch position and a wiring diagram for this configuration.

Examples on 3 wire sensors supplied by Cla-Val which can be loop powered:

1. X117H Position transmitter.

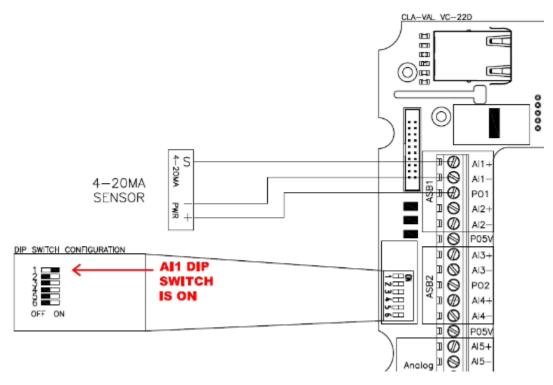
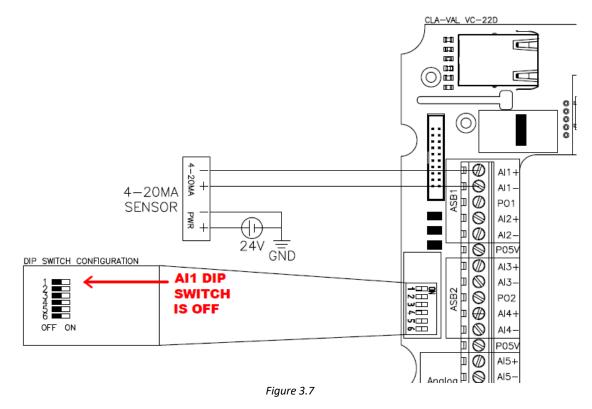


Figure 3.6



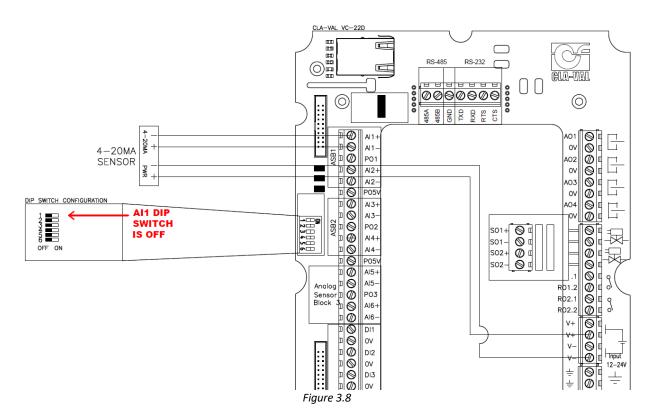
#### 3.3.1.4 4 Wire

If the 4-20mA sensor has four wires, then the analog input should be configured as isolated and current sinking. With four wire sensors, the power supply typically exists in the field and the wiring diagram provided in **FIGURE 3.** can be used.



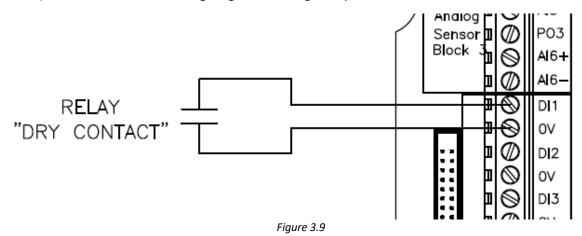


Sometimes, the four-wire sensor does not have a field power supply. In that case, the 24 VDC power can be provided by the VC-22D as shown in **FIGURE 3.** 



#### 3.3.2 Digital Inputs

The digital inputs are non-isolated and current sourcing. They must be connected to a relay ("dry contact") or NPN transistor. A wiring diagram for a digital input is shown in **FIGURE 3.**.

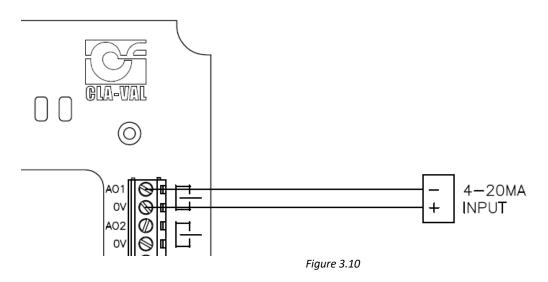




### CLA-VAL VC-22D Installation, Operation, and Maintenance Manual

#### 3.3.3 Analog Outputs

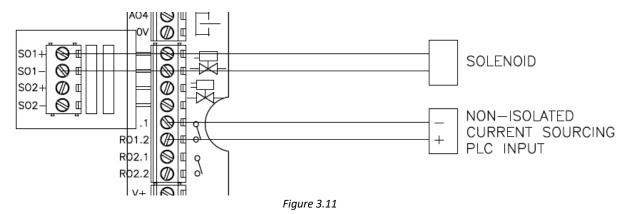
The analog outputs are non-isolated and current sourcing. They must be connected to an isolated and current sinking input on another device. A wiring diagram for an analog output is shown in **FIGURE 3.** 



#### 3.3.4 Digital Outputs

The VC-22D has solid-state relay and mechanical relay digital outputs. The solid-state relays are nonisolated and 24VDC current sourcing. They have a maximum current output of 1 amp. The mechanical relays are isolated and current sinking. They are rated for 24 VDC or 250 VAC at 6 amps maximum.

The solid-state relays are typically used for 24 VDC solenoids, and the mechanical relays are used for sending discrete output signals to other controllers. See **FIGURE 3.** wiring diagrams below digital outputs.



## CLA-VAL VC-22D Installation, Operation, and Maintenance Manual



#### 3.3.5 Cla-Val Power Converter

#### 3.3.5.1 Standard EPC Module

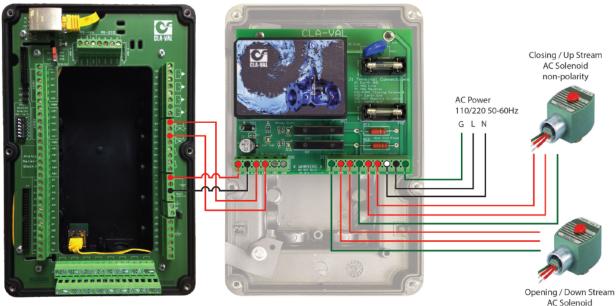
If AC solenoids are used, then an AC/DC converter must be used, and the fuse block should be removed. Cla-Val recommends our EPC module (sold separately) for AC/DC conversion. The EPC module shown in **FIGURE 3.8** does not utilize mechanical relays which extends its service life much longer than "ice cube" relays which are commonly used for AC/DC conversion. Cla-Val offers two EPC modules, our standard module, and a panel mount module. The standard EPC module is wired as shown in **FIGURE 3.8**, **FIGURE 3.8** 





Mounting Bracket Included

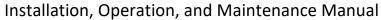




non-polarity







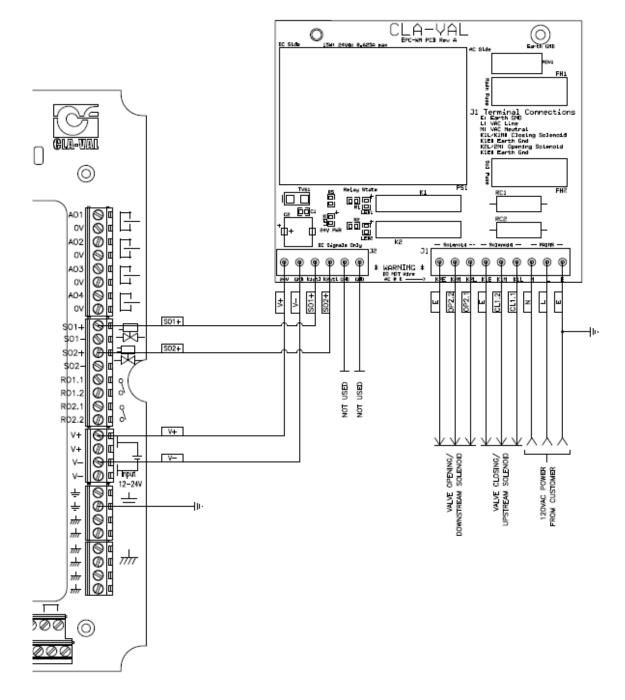


Figure 3.8



Installation, Operation, and Maintenance Manual

#### 3.3.5.2 Panel Mount EPC Module

The panel mount EPC shown in FIGURE 3.10 module is wired as shown in FIGURE 3.10, FIGURE 3.10

EPC - Panel Mount VC-22D Assembly





Mounting Hardware Included with Panel Mount VC-22D Assembly

Figure 3.9

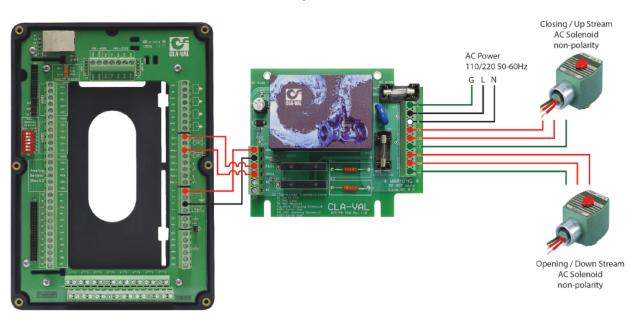
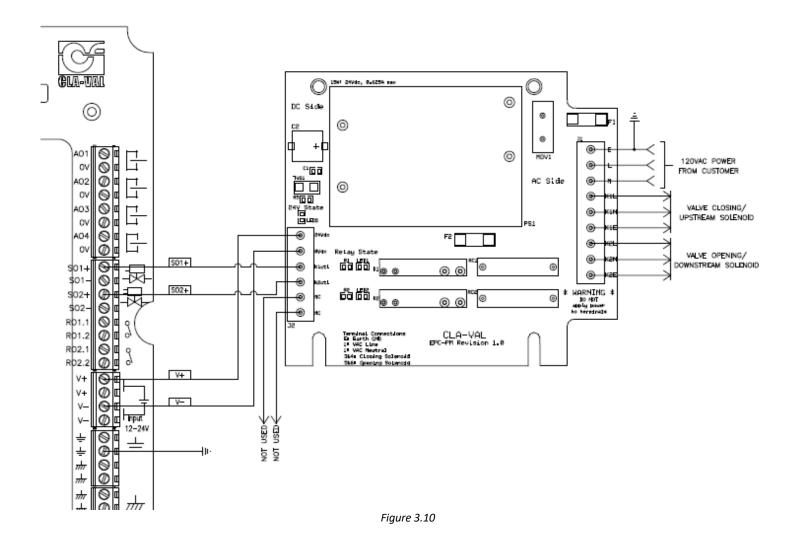


Figure 3.16







### 4 Screen Navigation

#### 4.1 Home Screen

The home screen includes a combination of graphics, text, and numeric displays providing pertinent process information for monitoring/operating a Cla-Val electronic valve. The home screen is customized for each ValvApp, but in general will include a Cla-Val valve graphic, simplified pilot system graphic, and numeric display for each input/output. An example home screen from the 131-Flow-Mag-V2.0 ValvApp is shown in **FIGURE 4.1**:

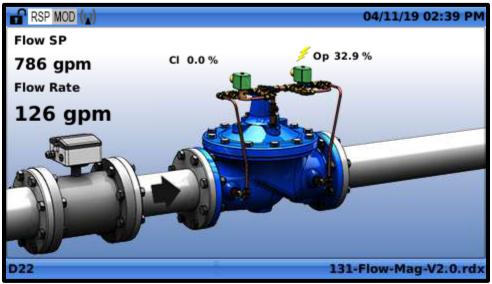
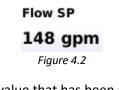


Figure 4.1

When the VC-22D unit is powered on and the boot sequence is completed, the home screen is displayed. The home screen is the starting point to navigate to all other screens.

Various color standards are used and the home screen, and those color standards are described below:

1. **Black** text is used to display inputs, outputs, and variable values that are within normal limits and have no overrides applied.



2. Green text is used to represent a value that has been assigned as a local set point (LSP) per section 8.1.2.

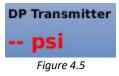




3. Blue text is used to represent a value that has been manually overridden per section 8.2 and 8.3.

Position 20.0 % Figure 4.4

4. **Red** text shows an analog input that is outside of the allowed range (below minimum or above maximum). See section 6.2.9.5 for more information.



5. Orange text shows a value that is being overridden by an action per section 6.2.5.



6. Grey text shows a value that is being overridden via Modbus per section 9.

Flow SP 23 gpm Figure 4.7

Various icons are used on the home screen and title bar. Their meaning is defined below:

- 1. 🖬 Indicates that the user is logged in and screen protection is disabled
- 2. LSP Indicates that an LSP is applied to a setpoint per section 8.1.2
- 3. **RSP** Indicates that all inputs are in RSP mode per section 8.1.2
- 4. 🚺 Indicates action 1 is enabled but not triggered
- 5. 1 Indicates action 1 is enabled and triggered
- 6. 💉 Indicates voltage is currently being output to a solenoid



#### 4.2 Navigation Buttons

The VC-22D has five buttons on the faceplate which are used to perform all navigation functions. Their names are shown in **FIGURE 4.8** below:

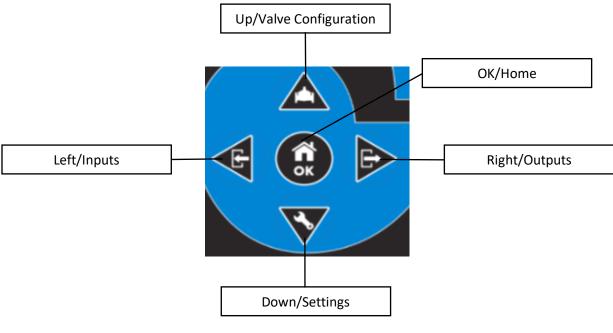


Figure 4.8

There are two types of button clicks, a short click and a long click. To issue a short click, press the button momentarily for less than 1 second. To issue a long click, press and hold the button for more than 1 second. Throughout the remainder of this manual, assume all button presses are short clicks unless otherwise stated. The graphics shown in **FIGURE 4.9** will be used to indicate short and long clicks in images:



Short Click Long Click

Figure 4.9

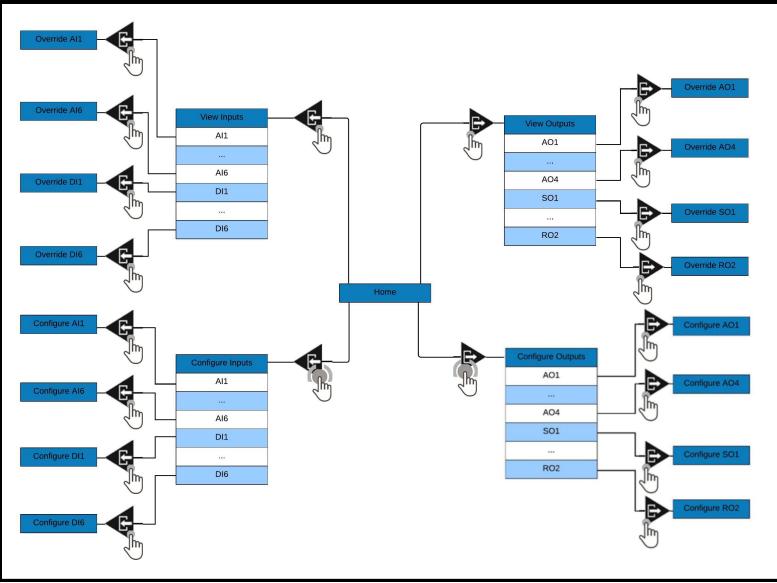


### 4.3 Screen Map

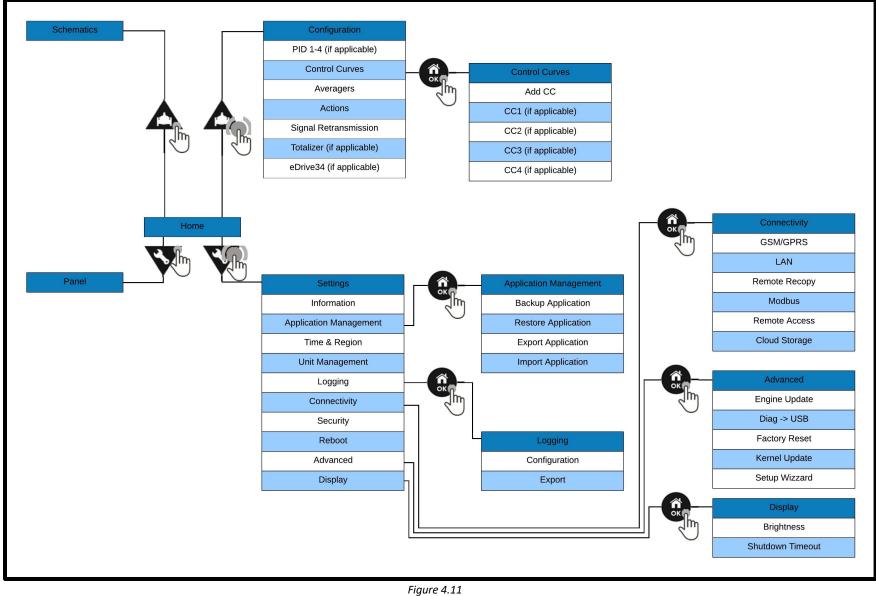
This section provides a map depicting how each screen in the VC-22D is accessed. The details of each screen's function are defined in subsequent sections. The map is split into multiple segments to reduce complexity (see **FIGURE 4.10** and **FIGURE 4.11**). The following paragraph describes how the map should be interpreted, and additional examples for clarity are provided at the end of the section.

The map uses dark blue rectangles to represent screens. Each screen's navigation icons are listed underneath the screen and are drawn as white or light blue rectangles. A line connecting two screens indicates that users can navigate from one screen to the other. The button in the middle of the line indicates what must be pressed to navigate to the connected screen.

Installation, Operation, and Maintenance Manual









Installation, Operation, and Maintenance Manual

### 4.3.1 Navigation Examples

Below are some quick examples showing how to navigate to different screens using the screen maps from **FIGURE 4.10** and **FIGURE 4.11**. Compare the examples to the screen maps to understand **FIGURE 4.10** and **FIGURE 4.11** better.

#### 4.3.1.1 Override Al2



Figure 4.12



Installation, Operation, and Maintenance Manual

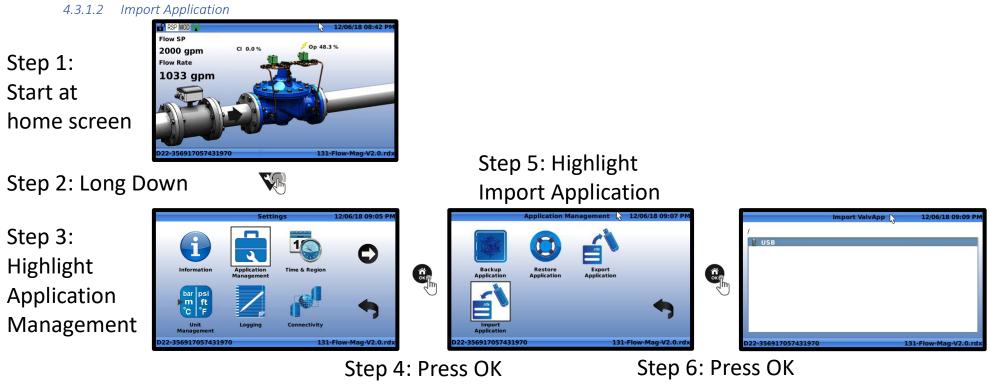


Figure 4.13



## 4.4 Basics

### 4.4.1 Go Home

To return to the home screen at any point, perform a long "OK" click. This is referred to as "going home".

### 4.4.2 Numeric Entry

Numeric entry fields allow the user to input a numeric value using the navigation keypad. To use a numeric entry field, follow the instructions below:

1. Use the "Up" and "Down" buttons to highlight a numeric entry field on a screen. When the field is highlighted, the background will turn from white to light blue as shown in **FIGURE 4.14**:

<b>a</b>	Input A	1		04/11/19 03:05 PM
Display Name	Flow SP			
Units	Flow	-	gpm	<b>•</b>
Decimal	0.00	-		
Signal Type	4-20 mA	Ŧ	1.	
4 mA = min	0.00		gpm	N.M.
20 mA = max	2000.00		gpm	8
Signal filter	70.00		%	
Lost Signal (< 3.6mA)	Keep val	ue		▼
Use as RSP/LSP	×			
Display on home page				
D22			1	131-Flow-Mag-V2.0.rdx

Figure 4.14

Press the "OK" button to begin numeric entry. The background will turn red as shown in FIGURE
 4.15:

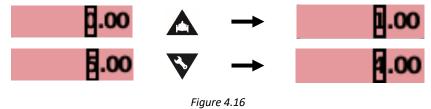


Installation, Operation, and Maintenance Manual

	Input Al1			11/30/18 05:46 PM
Display Name	Flow SP			
Units	Flow	•	gpm	<b>•</b>
Decimal	0.00	-	]	
Signal Type	4-20 mA	-	]	
4 mA = min	<b>d</b> .o	0	gpm	1 N 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
20 mA = max	2000.00		gpm	8
Signal filter	70.00		%	
Lost Signal (< 3.6mA)	Keep valu	ıe		•
Use as RSP/LSP	×			
Display on home page				
D22-356917057431970			1	31-Flow-Mag-V2.0.rdx

Figure 4.15

Use the "Up" and "Down" buttons to increase or decrease the selected digit as shown in FIGURE
 4.16:



4. Use the "Left" and "Right" buttons to select a different digit as shown in **FIGURE 4.17**:

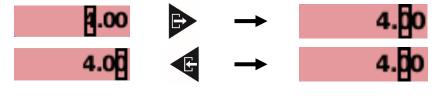
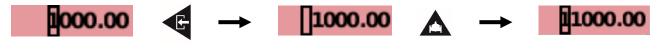


Figure 4.17

5. To add additional digits to the left, use the "Left" button as shown in **FIGURE 4.18**:





6. To accept changes, press the "OK" button.

#### 4.4.3 Alpha Numeric Entry

Alpha numeric entry fields allow the user to input text containing letters and numbers using the navigation keypad. To use an alpha numeric entry field, follow the instructions below:



Installation, Operation, and Maintenance Manual

 Use the "Up" and "Down" buttons to highlight an alpha numeric entry field. When the field is highlighted, the background color will turn from white to light blue as shown in FIGURE 4.19:

C	Input Al1			11/30/	18 06:36 PM
Display Name	Flow SP				
Units	Flow	-	gpm	<b>•</b>	
Decimal	0.00	-			
Signal Type	4-20 mA	-	)		
4 mA = min	0.00		gpm	× 🔊	
20 mA = max	2000.00		gpm	<i>8</i> N	
Signal filter	70.00		%		
Lost Signal (< 3.6mA)	Keep valu	Je		-	
Use as RSP/LSP	×				
Display on home page				(ap)	
				A	L 🖉
D22-356917057431970				131-Flow-M	lag-V2.0.rdx
	Figure 4.	19			

2. Press the "OK" button, and a screen keyboard will be displayed as shown in FIGURE 4.20:

	Display Name	04/11/19 03:07 PM
Display Name	Flow SP	
1234	56789	
a s d f		
canc		RETURN
D22	13	31-Flow-Mag-V2.0.rdx

Figure 4.20

- 3. Use the "Up", "Down", "Left", and "Right" navigation arrows to highlight individual characters on the keyboard. Once the desired character has been highlighted, press the "OK" button to add the letter to the end of the text.
- 4. To delete the character at the end of the text, highlight the "backspace" subtraction and press "OK".



## Installation, Operation, and Maintenance Manual

5. To switch between lower case and upper case, highlight the "CAPS" button and press "OK". When "CAPS" is active, the button text becomes red and alpha characters become CAPITALIZED as shown in **FIGURE 4.21**:

	Display Name	11/30/18 06:53 PM
Display Name	Flow SP	
Q W E R A S D F AP Z X Canc		P 0 0 0
D22-35691705743197	13	31-Flow-Mag-V2.0.rdx



- 6. To accept the text changes that have been entered, highlight the "RETURN" **RETURN** button and press "OK". Alternatively, a long click on the "OK" button will accept the text.
- 7. To cancel text changes that have been entered, highlight the "CANCEL" canc button and press "OK".

### 4.4.4 Drop Down Selection

Drop down fields allow the user to select one item from a list. To operate a drop down field, follow the instructions below:

1. Use the "Up" and "Down" buttons to highlight a drop down field. When the field is highlighted, the background color will turn from light gray to light blue as shown in **FIGURE 4.22**:



Installation, Operation, and Maintenance Manual

	Input Al	1		11/30/18 07:2	4 PM
Display Name	Flow SP				
Units	Flow	-	gpm	-	
Decimal	0.00	-			
Signal Type	4-20 mA	-			
4 mA = min	0.00		gpm	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
20 mA = max	2000.00		gpm	8	
Signal filter	70.00		%		
Lost Signal (< 3.6mA)	Keep valu	ıe		•]	
Use as RSP/LSP	×			(((a)))	
Display on home page					
				ANIA	
D22-356917057431970			13	31-Flow-Mag-V2.	0.rdx

Figure 4.22

2. Press the "OK" button to change the dropdown value. The background will turn red as shown in **FIGURE 4.23**:

ĥ	Input Al1			04/12	1/19 0	3:07 PM
Display Name	Flow SP				]	
Units	Flow	-	gpm	-		
Decimal	0.00	-	)			
Signal Type	4-20 mA	-	]			
4 mA = min	0.00		gpm			
20 mA = max	2000.00		gpm	<u> </u>		
Signal filter	70.00		%			
Lost Signal (< 3.6mA)	Keep valu	Je		-		
Use as RSP/LSP	×			llio	m.	-
Display on home page				10	<i>"</i>	
				43		
D22				131-Flow-	Mag-\	/2.0.rdx

Figure 4.23

Use the "Up" and "Down" arrows to navigate up and down the list items as depicted by FIGURE
 4.24:



Figure 4.24





4. To accept the selection, press the "OK" button. To cancel the selection, long click the "OK" button which will escape to the home screen without storing the change.

### 4.4.5 Go Back

Configuration pages have a "back arrow" that will take the user back to the previous screen. To use the back arrow, highlight it using the "up" and "down" buttons and then press "OK" per **FIGURE 4.25**.

D	Input Al1			11/30/18	8 08:23 PM
Display Name	Flow SP				
Units	Flow	-	gpm	•	
Decimal	0.00	-			
Signal Type	4-20 mA	-	)		
4 mA = min	0.00		gpm	1	
20 mA = max	2000.00		gpm	8	
Signal filter	70.00		%		
Lost Signal (< 3.6mA)	Keep valu	ıe		•	
Use as RSP/LSP	×				
Display on home page				((1))	
				ANIA	
D22-356917057431970			1	31-Flow-Ma	g-V2.0.rdx

Figure 4.25

#### 4.4.6 File Explorer

The VC-22D has a file explorer that's used when saving/opening files. The first screen of the file explorer is shown in **FIGURE 4.26** and allows the user to select which storage device to navigate, USB or the FTP.

/	
USB	
USB	

#### Figure 4.26

To navigate into a storage device, highlight the storage device and press the right arrow button. A screen displaying the folder structure on the storage device will be opened as shown in **FIGURE 4.27**.



Installation, Operation, and Maintenance Manual

usb:/
. Development ValvApps
. Startup ValvApps
. System Volume Information

Figure 4.27

To navigate into a folder, highlight the folder and press the right arrow button. A screen showing the contained folders and files will be displayed as shown in **FIGURE 4.28**.

131-Flow-Mag-V2.0.rdx         131-Flow-X144D-V2.0.rdx         131-LvlAltitude-L-V2.0.rdx         131-LvlMod-L+Mag-V2.0.rdx         131-LvlMod-L+X117D-V2.0.rdx         131-LvlMod-L+X144D-V2.0.rdx         131-Position-X117D-V2.0.rdx         131-PressureReducing-P2-V2.0.rdx	usb:/Development ValvApps	
	<ul> <li>131-Flow-X144D-V2.0.rdx</li> <li>131-LvlAltitude-L-V2.0.rdx</li> <li>131-LvlMod-L+Mag-V2.0.rdx</li> <li>131-LvlMod-L+X117D-V2.0.rdx</li> <li>131-LvlMod-L+X144D-V2.0.rdx</li> <li>131-Position-X117D-V2.0.rdx</li> </ul>	

Figure 4.28

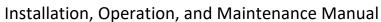
Highlight the desired file to open, or if saving, highlight any file. Press the OK button.

## 5 Initial Power Up

To prepare the VC-22D for use on a particular Cla-Valve application, the user must perform some initial startup steps after powering on a VC-22D for the first time.

## 5.1 Select a ValvApp

The VC-22D requires a program to control a Cla-Val valve, and this program is called a ValvApp. The VC-22D comes pre-loaded with a standard library of ValvApps. Standard ValvApps are intended to handle typical straightforward Cla-Val valve applications. Appendix A includes a list and description of all standard ValvApps provided in North American VC-22Ds. Review Appendix A and select a ValvApp that fits the needs of your Cla-Valve application. If your Cla-Valve application isn't covered by a standard ValvApp, contact your regional salesman. The Cla-Val factory will work with you to develop a custom ValvApp that fits your needs.





## 5.2 Loading a ValvApp

## 5.2.1 Loading a Standard ValveApp

After selecting a ValvApp from the standard library or obtaining a custom ValvApp from the Cla-Val factory, the ValvApp must be loaded into the VC-22D.

To load the ValvApp, follow the procedure below:

1. Power on the VC-22D for the first time and wait for the screen shown in **FIGURE 5.1** to appear.



Figure 5.1

- 1. If a standard ValvApp will be used, do the following:
  - a. Press "left" to load a ValvApp from the built-in library. Wait for the next screen and highlight "North America" as shown in **FIGURE 5.2**. Press "OK".

tandard ValvApps:/	
. EMEA	
📕 . North America	

Figure 5.2



b. Highlight the desired valve series (131 Series Apps for example) and press "OK" as shown in **FIGURE 5.3**.

Standard ValvApps:/North America
<ul> <li>. 131 Series Apps</li> <li>. 133 Series Apps</li> <li>. 136 Series Apps</li> <li>. 34 Series Apps</li> <li>IOCheckout-1.0.rdx</li> <li>. PC-22D Apps</li> <li>. SC-22D Apps</li> <li>. SC-22D Apps</li> </ul>



a. Highlight the desired valveApp (131-Flow-Mag-V2.1.rdx for example) and press "OK" as shown in **FIGURE 5.3**.

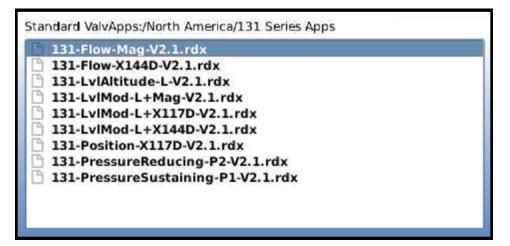


Figure 5.4





b. When prompted for confirmation, highlight "Yes" using navigation arrows and press "OK" as shown in **FIGURE 5.** 

131-Flow- 131-Flow- 131-LvIAit 131-LvIMc 131-LvIMc 131-LvIMc 131-LvIMc 131-Positi 131-Press	s:/North America/131 Series Apps
	Figure 5.5

c. Press "OK" to restart per FIGURE 5..

TPL:/North America		
131-Flow-Mag-V2.0.rdx		<u> </u>
131-Flow-X144D-V2.0.rdx	[	
131-LvlAltitude-L-V2.0.rd	<b>*</b>	
131-LvlMod-L+Mag-V2.0	QL ×	
131-LvlMod-L+X117D-V2		
131-LvlMod-L+X144D-V2	Press OK to restart	
131-Position-X117D-V2.0		
131-PressureReducing-P	OK	
131-PressureSustaining-		
133-Flow-DP+Pos-V2.0.rd		J I
133-Flow-P1+P2+X117D	V2.0.rdx	
340-Flow-Flw-V1.0.rdx		
340-Flow-V1.0.rdx		
350-PressureSustaining-P1-V1.0.rdx		
350-PressureSustaining-V		-

Figure 5.6



## 5.2.2 Loading a Custom ValveApp

- 2. If a custom ValvApp will be used, do the following:
  - a. Load the custom ValvApp provided by the Cla-Val factory onto a USB thumb drive.
  - b. Insert the USB thumb drive into the VC-22D's USB port.
  - c. Press "right" to load the ValvApp from the USB thumb drive. Wait for the next screen and highlight the custom ValvApp (131-UpstreamPressure-CSTMR.v.1.0 used for example) as shown in **FIGURE 5.4**. Press "OK".

usb:/
131-UpstreamPressure-CSTMR.v.1.0.rdx
. System Volume Information

Figure 5.4

d. When prompted for confirmation, highlight "Yes" using navigation arrows and press "OK" as shown in Figure 5.5.

usb:/ 131-UpstreamPressure-CSTMR.v.1.0.rdx . System Volum				
	Do you want to load this library?			
	<u>Y</u> es <u>N</u> o			
	Figure 5.5			





e. Press "OK" to restart per **FIGURE 5.6**.

usb:/ 131-UpstreamPressure-CSTMR.v.1.0.rdx					
. System Volume Infor					
	Press OK to restart				
	ОК				



## 5.3 Configuration Wizard

Each time the VC-22D is rebooted, the user is prompted to go through the configuration wizard. The configuration wizard allows the user to quickly configure the VC-22D settings for your specific Cla-Val valve application. Settings include date and time, engineering units, and scale of inputs/outputs. The wizard also includes prompts to test input/outputs and specify the normally open/closed state of solenoids.

Going through the configuration wizard is optional and should only be used with the ValvApps from the standard library. Unless instructed otherwise, do not go through the configuration wizard when using a custom ValvApp. This is because settings have already been adjusted for you in the custom ValvApp and changing these settings could conflict with custom programming.

A description of each configuration wizard screen is provided below.



## 5.3.1 Introduction Screen

Use this screen to enter the configuration wizard, skip the configuration wizard, or skip and prevent from being prompted in the future.

Introduction	04/22/19 01:21 PM
the wizzard to pre-configu	re the valve?
Yes	
No, not this time	
No, and don't ask me a	gain
40 seconds and countin	ng
00:40	133-Flow-DP+Pos-V2.0.rdx
	the wizzard to pre-configu Yes No, not this time No, and don't ask me a 40 seconds and countin

Figure 5.7



## 5.3.2 Warning Screen

This is an alert to let you know the configuration wizard will change outputs which will likely modulate the valve and affect other connected equipment. Be sure that the valve and other connected equipment is in a safe state before continuing.

# DANGER

## Configuration wizard will change the VC-22D outputs!

To test outputs, the configuration wizard will change analog outputs from 4mA to 20mA and toggle digital outputs on/off. This will cause connected equipment to change state. It's recommended that the cover on the Cla-Val valve be "locked" using the isolation ball valves before continuing. Take necessary precautions for other connected equipment.



Figure 5.8



## 5.3.3 Regional Settings

The regional settings allow you to specify location, time zone, and language.

/here are you located?		
North America		
Hortin America	-	
(GMT-08:00) Pacific Time (US & Can	•	
English	-	
anging the region may change DP Metering tables. Please rify.	G	
	Nex	t
09:58 133-Flow-DP+Pos	s-V2.0.	rdx
	anging the region may change DP Metering tables. Please ify.	anging the region may change DP Metering tables. Please ify. Nex

Figure 5.9

### 5.3.4 Inputs

The setup wizard will dedicate one screen to each input configured in the ValvApp. An example screen for an analog input is shown in **FIGURE 5.10**. The analog input screen can be used to set the 4-20mA scaling, verify the value currently read by the analog input, and what to do if the signal is lost. See section 6.2.9.5 for a detailed description of signal lost behaviors.

Setup Wizzard	Inputs		04/22/19 01:25 PM
*	[AI1] Flow S	P	
E 4	mA 0	gpm	
20	mA 2000	gpm	
E v	alue 1	.48 gpm	
	5.18 mA		
Lost Signa	Keep value	•	
e			
Back			Next
D22	09:54	133-Flow	w-DP+Pos-V2.0.rdx
	Figure E 10		

Figure 5.10

The digital input screens can be used to verify the value currently read by a digital input. An example is shown in **FIGURE 5.11**.



Installation, Operation, and Maintenance Manual

Setup Wizzard		Inputs	04/22/19 01:26 PM
-		[DI1] DI1	
E-			
Đ	Value		1
E			
Back			Next
D22		10:00	133-Flow-DP+Pos-V2.0.rdx

Figure 5.11

### 5.3.5 Outputs

The setup wizard has two screens for each analog output configured in the ValvApp. The first screen is used for adjusting the 4-20mA scaling as shown in **FIGURE 5.12**.

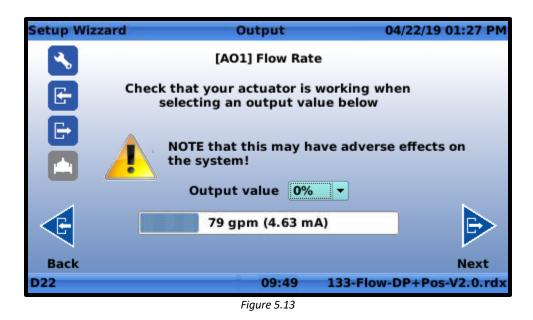
Setup Wizzard		Output	04/22/19 01:26 PM
-		[AO1] Flow Ra	ite
Œ	4 mA	0	gpm
Ð	20 mA	2000	gpm
4			₽
Back			Next
D22		10:00	133-Flow-DP+Pos-V2.0.rdx

Figure 5.12

The second screen is used for testing the analog output as shown in **FIGURE 5.13**. This screen allows an analog output value to be forced and checked with a multimeter for verification.



Installation, Operation, and Maintenance Manual



The setup wizard also has one screen for each digital output configured in the ValvApp as shown in **FIGURE 5.14**. This screen allows you to toggle the digital output on/off which is helpful when verifying solenoid wiring. When the SO1 output is being tested, the closing solenoid should be clicking open/closed. When the SO2 output is being tested, the opening solenoid should be clicking open/closed. The same test is available for RO1 and RO2 which could be connected to AC solenoids or some other equipment.



Figure 5.14

## 5.3.6 Solenoid Configuration

The solenoid configuration screen allows the user to input whether the solenoids are normally opened or normally closed as shown in **FIGURE 5.15**. The VC-22D needs to know the normal state of the solenoid so the PID algorithm understands whether voltage will open or close the solenoid. "NC" means normally closed, and "NO" means normally open. The first two characters before the slash represent the closing



Installation, Operation, and Maintenance Manual

solenoid SO1 normal state, and the second two characters after the slash represent the opening solenoid SO2 normal state.

Setup Wizzard	Regulation	04/22/19 01:28 PM
-	Regulation Out	puts
E	Output configuration:	NC / NC
F Thi	s configuration will be app locks which use the solen	plied to all PID oid outputs.
<b>P</b>		
Back		Next
D22	09:56	133-Flow-DP+Pos-V2.0.rdx
	Figure 5.15	

### 5.3.7 DP Metering

If the ValvApp has DP metering enabled, there will be two screens available to configure DP metering settings. The first screen shown in **FIGURE 5.16** is used to input the valve size, body, and seat type so flow rate can be calculated.

Setup Wizzard	DP N	letering	04/22	19 01:29 PM
<	Va	lve Type		
E-	Size	6	•	
	Body Style	100-01	-	
E	Seat Type	Std		
	DP Config	Boss-Bos	is 🔹	
•				
Back				Next
D22		09:57	133-Flow-DP+	Pos-V2.0.rdx

Figure 5.16

The second screen allows the user to specify which variables represent the inlet/outlet pressure and valve position for calculating valve flow. See **FIGURE 5.17**.



Installation, Operation, and Maintenance Manual

Setup Wizza	ard	DP Metering	04/22/19	01:29 PM
<b>S</b>		Inputs		
E	Opening source	[VAR] ValvePo	osAdj 🔻	
E	P1 or DP	[AI3] DP Trans	smitter 🔻	
	P2	UNUSED		
•				
Back				Next
D22		10:00	133-Flow-DP+Po	s-V2.0.rdx
		Figuro 5 17		

Figure 5.17

For more detailed information on the configuration of DP metering, see section 6.2.1.

#### 5.3.8 Hostname

The hostname screen allows the user to entry a user-friendly name for the VC-22D which will be used in log files and displayed on the bottom left corner of each screen. It's recommended to input a name that uniquely describes the valve being controlled. This is helpful for users so they're aware of which valve is being controlled by the VC-22D.



Figure 5.18



## 6 Setup

The VC-22D's settings are broken into the following four categories:

- 1. System settings: Accessible via "long down" from the home screen.
- 2. Valve control settings: Accessible via "long up" from the home screen.
- 3. Input settings: Accessible via "long left" from the home screen.
- 4. Output settings: Accessible via "long right" from the home screen.

## 6.1 System Settings

System settings pertain to the VC-22D's administration. Examples of system settings are time/date, IP address, display brightness, and data logging. These settings do not directly influence the way the valve is controlled, but impact how the VC-22D functions.

## 6.1.1 VC-22D Information

### 6.1.1.1 Description

Provides identification information (serial numbers and owner information), version information, system statistics (runtime), and list of pre-loaded ValvApp libraries.

#### 6.1.1.2 Navigation Path

- 1. Start at the home screen.
- 2. Long down.
- 3. Click on "Information".

### 6.1.1.3 Identification Tab Settings

-		Information	04/2	2/19 01:32 PM
Identification	Version	System Info	Libraries	
S/N (IMEI)	356917057	431970	B	cancer.
SIM (ICCID)	UNKNOWN		₿.	ΠÉ.
HostName	16in Flow	Control		
Contact				1.126.226
Location				
Order ID				
			USB Ex	port
16in Flow Cont	rol		133-Flow-DP	+Pos-V2.0.rdx
		Figure 6.1		

Figure 6.1

**S/N (IMEI):** Serial number of the VC-22D assigned by Cla-Val during manufacture of device.

**SIM (ICCID):** ID number of SIM card installed in VC-22D.





**Hostname:** Name specified by user of VC-22D that is displayed on bottom left corner of every screen and included in log files. It's recommended to input a name that uniquely describes the valve being controlled. This is helpful for users so they're aware of which valve is being controlled by the VC-22D.

**Contact:** Optional setting to specify name of person to contact in case of service related issue with valve.

Location: Optional setting to specify location valve is installed.

**Order ID:** Optional setting to specify ID of order placed to obtain VC-22D. This may be useful when an operator is calling for support on the unit.

		Information	12/0	01/23 10:50 AM
dentification	Version	System Info	Libraries	
	ine 2.8.5 nel 2.6.35	.3 Sun Aug 7 14:2	1:15 CEST 20	22
		00038AD1A129AF		
Updat	ed Jul 20	6:00:56 2019 GM	г	
R-Loader m	d5 bc08c	15a9b52c0386db7	9291ef633cc5	
Microch	hip 00.02.	13.00		
Mode	em :MOC.	000004		
16inFlowContro	ol		131-Flow	-Mag-V2.1.rdx

#### 6.1.1.4 Version Tab Settings



**Engine:** Version of engine (sometimes called firmware) that is installed on the VC-22D. The engine is responsible for running the ValvApp loaded onto the VC-22D. It controls what features are available for the ValvApp to utilize. Prior to configuring a new VC-22D, ensure the latest engine version is installed. Contact your local sales rep for a copy of the latest engine. See section 6.1.20 for an engine update procedure.

**Kernel:** Version of kernel that is installed on the VC-22D. The kernel is responsible for managing events in the VC-22D. Prior to configuring a new VC-22D, ensure the latest kernel version is installed. Contact your local sales rep for a copy of the latest kernel. See section 6.1.23 for an engine update procedure.

**R-Loader md5:** Version of software that launches the engine upon VC-22D startup.

**Modem:** Provides the model number of the cellular modem in the VC-22D. Also provides the version of firmware installed on the modem.

Microchip: Version of the microcontroller responsible for reading and writing to IO terminals.



Installation, Operation, and Maintenance Manual

### System Info Tab Settings



Figure 6.3

**Uptime:** Duration of time the VC-22D has been powered on since last shutdown.

**Load average:** The Unix style load average of the CPU at 1 minute, 5 minutes, and 15 minutes after the system started.

RAM usage: Amount of RAM used, amount of RAM free

```
6.1.1.6 Libraries Settings
```



Figure 6.4

The libraries tab shows all of the ValvApps that have been loaded onto the VC-22D. This includes standard ValvApps (located in the EMEA and North America folders) along with custom ValvApps that have been previously uploaded. If a factory reset is performed, the ValvApps shown in this tab can be



Installation, Operation, and Maintenance Manual

reloaded into the VC-22D if you follow the instructions listed in section "5.2 Loading a ValvApp" and "load from library".

### 6.1.2 ValvApp Backup

### 6.1.2.1 Description

Used to schedule automatic backups or take manual backups of the currently loaded ValvApp and store in internal memory.

#### 6.1.2.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Application Management"
- 4. Click on "Backup Application"

#### 6.1.2.3 Backup Application Settings

	ValvApp Backup	04/22/19 01:45 PM
Create and save a back	kup of the current ValvA	арр
	Backup Now	
X Automatically back	up locally every day at	23:45
ValvApp has been cl		
NOTE: can generate	up to 250 KB per trans	fer.
16in Flow Control	133-F	low-DP+Pos-V2.0.rdx
	Figure C.F.	

Figure 6.5

**Backup Now:** Clicking this button will trigger an immediate backup of the ValvApp currently running on the VC-22D. The backup will be stored in the VC-22D's non-volatile internal memory. Backups in internal memory can be restored later if necessary. See section 6.1.3.

**Automatically back up locally every day at 23:45:** Checking this box will automatically backup the ValvApp currently running on the VC-22D at 11:45PM every night. The backup will be stored in the VC-22D's non-volatile internal memory.

Automatically back up to FTP server at 23:45 if the ValvApp has been changed: This box is not applicable in North America, as it requires an FTP connection to Link2Valve. This is a European feature only.



## 6.1.3 Restore Application

### 6.1.3.1 Description

Used to restore an application that's been backed up per section 6.1.2 to the VC-22D's internal memory. The restored application automatically becomes the currently running ValvApp.

### 6.1.3.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Application Management"
- 4. Click on "Restore Application"

#### 6.1.3.3 Restore Application Settings

	Restore Backup	04/22/19 01:52 PM
2019-04-22 1352 [MAN] 13	3-Flow-DP+Pos-V2.0.rdx	
2019-04-22 1346 [MA 2019-04-22 1350 [MA	CT] 133-Flow-DP+Pos-\ N] 133-Flow-DP+Pos-\ N] 133-Flow-DP+Pos-\ N] 133-Flow-DP+Pos-\	/2.0.rdx /2.0.rdx
and the second statement of the se	N] 133-Flow-DP+Pos-\	
16in Flow Control	133	-Flow-DP+Pos-V2.0.rdx

Figure 6.6

Each ValvApp backup is prefixed with a date when the backup was taken. Find the date you wish to rollback too, highlight the corresponding file, and press "OK". After answering yes to confirmation prompts, the VC-22D will reboot and restore the selected ValvApp.

#### 6.1.4 Export Application

#### 6.1.4.1 Description

Exports the currently loaded ValvApp onto a USB thumb drive inserted in the VC-22D's USB port.

#### 6.1.4.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Application Management"
- 4. Click on "Export Application"



Installation, Operation, and Maintenance Manual

.3	Export A	pplication	Settinas
	LAPOILIA	ppncution	Settings

	Export ValvApp	04/22/19 01:54 PM
1		
USB	······	
😒 My FTP		
16in Flow Control	133	-Flow-DP+Pos-V2.0.rdx
	10.	

Figure 6.7

**USB:** Highlighting USB and pressing "OK" will allow the currently loaded ValvApp to be exported to a USB thumb drive inserted in the VC-22D's USB port. The screen shown in **FIGURE 6.8** will appear.

	Export ValvApp	04/22/19 01:54 PM
usb:/		
📕 . Development Val		
. Startup ValvApps		
16in Flow Control	1	33-Flow-DP+Pos-V2.0.rdx

Figure 6.8

The screen in **FIGURE 6.8** shows the contents saved on the inserted USB thumb drive and allows the user to save the ValvApp in a particular folder. In this example the thumb drive has a "Development ValvApps" folder and "Startup ValvApps" folder. The "System Volume Information" folder is a hidden file on the thumb drive which should be ignored. To navigate into a folder, highlight the folder and press the "right" navigation button. Once located in the desired folder, pressing the "OK" navigation button will export the ValvApp to the current location.



Installation, Operation, and Maintenance Manual

**My FTP:** This box is not applicable in North America, as it requires an FTP connection to Link2Valve. This is a European feature only.

### 6.1.5 Import Application

### 6.1.5.1 Description

Imports a ValvApp saved from an inserted USB thumb drive.

#### 6.1.5.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Application Management"
- 4. Click on "Import Application"

#### 6.1.5.3 Import Application Settings

	Import ValvApp	04/22/19 01:55 PM
1		
USB		
16in Flow Control	133	-Flow-DP+Pos-V2.0.rdx

Figure 6.9



Installation, Operation, and Maintenance Manual

Pressing "OK" with "USB" highlighted will open the screen shown in **FIGURE 6.10**. This screen shows the contents saved on the USB thumb drive. Navigate to the folder the ValvApp is stored in by highlighting the folder and pressing the "right" navigation button. Once in the correct folder, highlight the ValvApp and press "OK". After saying yes to confirmation prompts, the ValvApp will be imported and the VC-22D will be rebooted.

	Import ValvApp	04/22/19 01:55 PM
usb:/		
<ul> <li>Development V</li> <li>Startup ValvAp</li> </ul>	ps	
🣒 . System Volume	Information	
16in Flow Control	13	3-Flow-DP+Pos-V2.0.rdx

Figure 6.10

### 6.1.6 Time & Region

### 6.1.6.1 Description

Used to set the VC-22D's clock, date, time zone, and language

### 6.1.6.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Time & Region"



Installation, Operation, and Maintenance Manual

		Time & Region	04/22/19 01:5	6 PM
Time Zone	Date/Tin	ne Language		
🔲 Use U	TC on thi	s system		
	Region	North America		•
Tin	ne Zone	(GMT-08:00) Pacific Tin	me (US & Canada); Tijı	-
X Auton	natically a	adjust for Daylight Sav	ving Time	
			-	•
16in Flow C	ontrol		133-Flow-DP+Pos-V2.0	).rdx

Figure 6.11

**Use UTC on this system:** If checked, the VC-22D clock will operate on UTC time and not allow a local time zone to be entered.

**Region:** Stores the region the VC-22D is located in. This determines which time zones may be selected in the "Time Zone" field. Regions available are listed below:

- 1. Africa
- 2. Americas (refers South America only)
- 3. Asia
- 4. Europe
- 5. Middle East
- 6. North America
- 7. Oceania

**Time Zone:** Stores the time zone the VC-22D is located in. The following time zones are available for North America. In some cases, there are multiple time zones for the same hours difference from GMT. This is because different time zones have different day light savings rules, so be sure to select the appropriate location in addition to difference from GMT.

- 1. (GMT-09:00) Alaska
- 2. (GMT-08:00) Pacific Time (US & Canada)
- 3. (GMT-07:00) Mountain Tim (US & Canada)
- 4. (GMT-07:00) Chihuahua, La Pax, Mazatlan
- 5. (GMT-07:00) Arizona
- 6. (GMT-06:00) Saskatchewan
- 7. (GMT-06:00) Guadalajara, Mexico City
- 8. (GMT-06:00) Central Time (US & Canada)
- 9. (GMT-05:00) Quintana Roo, Mexico



- 10. (GMT-05:00) Eastern Time (US & Canada)
- 11. (GMT-04:00) Atlantic Time (Canada)
- 12. (GMT-03:00) Newfoundland

**Automatically adjust for Daylight Saving Time:** The VC-22D has been programmed with the daylight savings calendar for each time zone listed above. If this box is checked, the VC-22D will use the built-in calendar to shift the system clock 1 hour for daylight savings.

		Time & I	Region	04/22/1	9 01:57 PM
Time Zone	Date/Time	Language			
	Date 04	/22/19			
	Time 01	:57:01 PM			
× Use	e NTP for au	tomatic tim	e updates		
NTE	server nt	p.link2valve	s.com		
					-
16in Flow C	ontrol		1	33-Flow-DP+P	os-V2.0.rdx

Figure 6.12

**Date:** Specifies the VC-22D's system date.

**Time:** Specifies the VC-22D's system time.

**Use NTP for automatic time updates:** This box is not applicable in North America, as it requires an NTP connection to Link2Valve. This is a European feature only.

NTP server: Specifies an NTP server to have the VC-22D synchronize time with.

**Manual NTP sync:** (see **FIGURE 6.13**) If clicked, this button forces the VC-22D to immediately synchronize time the specified NTP server.



Figure 6.13



Installation, Operation, and Maintenance Manual

### .5 Language Tab Settings

		Time & R	tegion	04/22/19 01:57 PM
Time Zone	Date/Time	Language		
Date/Tim		USA MM/DD/YY 12	hr (am/pm)	
UL	anguage	English	•	
		e language v to the home p	vill be applied bage	
				1
16in Flow C	ontrol		133-Fic	w-DP+Pos-V2.0.rdx
		Figure	2 6.14	

rigure 0.1

Date/Time Format: Specify the style of Date/Time format that's preferred. The following options exist:

- 1. USA (MM/DD/YY 12hr (am/pm)
- 2. UK & Europe (DD/MM/YY 24hr)

**UI Language:** Specify the language used on the user interface. Options are listed below:

- 1. English
- 2. Spanish
- 3. French

**Import Language Pack:** (see **FIGURE 6.15**) If clicked, a language pack from a USB thumb drive can be imported which allows a language not included above to be implemented on the user interface.



#### 6.1.7 Unit Management

#### 6.1.7.1 Description

Used to specify the engineering units for each unit type (e.g. pressure, flow, volume, ...) in the VC-22D. This forces the same engineering unit to be applied for a given value type (e.g. all pressure values are in psi, all flow is in gpm, all volume is in gallons, ...). **Going through unit management should only be done with the ValvApps from the standard library. Unless instructed otherwise, do not go through the configuration wizard when using a custom ValvApp.** This is because settings have already been adjusted for you in the custom ValvApp, and changing these settings could conflict with custom programming.



Installation, Operation, and Maintenance Manual

### 6.1.7.2 Unit Management Settings

	04/22/19 01:58 PM
	Unit 📩
psi	
gpm	
mg	
%	
Any	
Any	÷
	gpm mg % Any

Figure 6.16

Each unit type (pressure, flow, volume, ...) that the VC-22D supports is listed on the unit management screen in the left-hand column. The right-hand column specifies the engineering unit associated with the corresponding unit type. To allow different units for a given unit type, set the unit to "Any". To force a given unit type to a particular unit, select the desired unit.

### 6.1.8 Configure Logs

### 6.1.8.1 Description

Used to enable/disable periodic logging of variable values and specify frequency of logging.

#### 6.1.8.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Logging"
- 4. Click on "Configuration"



		-		
2	Logaina	Configu	iration	Cattinga
)	Louumu	Comu	παιιοπ	Settings

(y) 🗞	Log Ser	ver Co	onfiguration	04/22/19 01:58 PM
General				
Lo	gging enabled			
	Log interval	5	min	
FTP Tr	ansfer interval	30	min	
	Log format	V 1.0	•	
				•
16in Flow Cor	itrol		133-F	ow-DP+Pos-V2.0.rdx

Figure 6.17

**Logging enabled:** When checked, the VC-22D will write every variable value to a CSV file in memory at the specified logging interval.

Log interval: The number of minutes the VC-22D waits before logging variable values again.

**FTP Transfer interval:** This setting is not applicable in North America, as it requires an FTP connection to Link2Valve. This is a European feature only.

**Log format:** Specifies the format of the CSV file the VC-22D will create when logging data. There are two options available:

- 1. Legacy
- 2. V 1.0

It's recommended to always use V 1.0 because it provides more information than the legacy format. Do not use legacy unless requested by Cla-Val.

### 6.1.9 Export Logs

### 6.1.9.1 Description

Used to export a log file of variable values and a system log file detailing actions, errors, and warnings stored by the VC-22D.

#### 6.1.9.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Logging"
- 4. Click on "Export"

Installation, Operation, and Maintenance Manual



Figure 6.18

This screen specifies how far back in time the exported log files will go. After selecting a duration option, pressing the "OK" button or clicking the right arrow brings up a file explorer which specifies where on the USB thumb drive the log files will be saved.

### 6.1.10 GSM/GPRS

6.1.9.3

Export Settings

#### 6.1.10.1 Description

Used to connect the VC-22D controller through GSM/GPRS network through Cla-Val cloud or FTP servers.

#### 6.1.10.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "GSM/GPRS"

### 6.1.10.3 GSM/GPRS settings

To use cellular network functionality, ensure that a valid SIM card is inserted in the cover part of the electronic controller.

When the "GSM/GPRS" icon is selected, as shown below in FIGURE 6.15.



Installation, Operation, and Maintenance Manual

The "GPRS" Tab provides general information about the cellular network connectivity, the icon 💙

shows successful connection between SIM card and the controller, and the icon *shows* failed cellular connection.

(y) 🗞 👘	GPRS/GSM Connectivity			11/30/2	23 11:56 AM		
GPRS	GPRS Setup	Monitor [ON]	GSM	Advanced	Operator		
	GPRS Status	GPRS activ	/e		~		
	IP address 166.203.187.69						
GP	RS Gateway	10.64.64.6	4				
	GPRS DNS	107.77.78.	57				
	Operator	AT&T (CAT-	M1)				
Si	Signal quality -63 dBm (11/30/23 10:49 AM)						
D22		ceOR	Flow+DPM+	CRA34-v2.5.	REV001.rdx		

Figure 6.19

The "**GPRS Setup**" tab allows the user to choose between the CLA-VAL cloud servers (default) or custom FTP server as shown in **FIGURE 6.15**.

\*\*note: custom FTP server information is provided via cellular provider of the SIM card.

<b>U)</b> K	GPRS/GS			nectivity	11/30/	23 11:55 AM
GPP	GPRS Setup	GPRS Setup Monitor			Advanced	Operator
		Setup	Custo	om	-	
		APN				
	User	name				
	Pas	sword				
	SMS (	Centre				
	Use external m	nodem				
( <u>w</u> ) «	Connected: IP add	dress 10	56.203	.187.69	Q	-
022		c	eORF	ow+DPM+	CRA34-v2.5.	REV001.rd>

Figure 6.20



Installation, Operation, and Maintenance Manual

As custom FTP server information fields are filled to setup connection, once refresh button is chosen the following screen shows as in **FIGURE 6.15** 

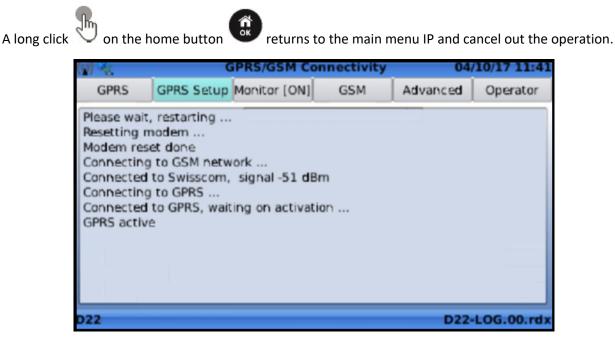


Figure 6.21

The "**Monitor [ON]**" tab allows the user to choose a method of testing the network connection validity and to restart the communication modem as shown in **FIGURE 6.22.** 

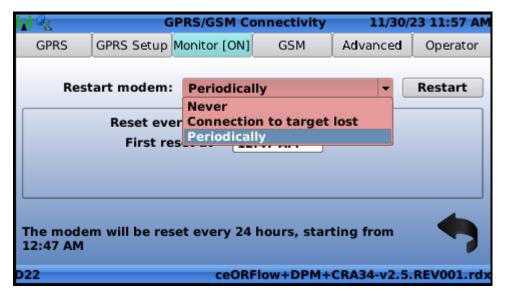


Figure 6.22

The restart modem option are as follows:

1. "Never": The Modem will not restart.



 "Connection to target lost": designate a known IP address "ping target" to target the modem to check at a regular interval defined in "interval(min)". if communication fails after a number of unsuccessful attempts defined in "retry count", the communication is considered lost. And the modem will restart.

\*\*note: make sure that the target is a valid IP address that is constantly active. Use the "test" button to check if connection to target can be made.

3. "**Periodically**": reboot the communication modem periodically as defined in "reset every (h)" field starting at the time set in "First reset at".

"GSM": this screen provides information regarding the network signal quality, as shown below in FIGURE 6.23.

(u) 🗞 👘	G	iPRS/GSM Co	onnectivity	11/30/2	23 11:57 AM
GPRS	GPRS Setup	Monitor [ON]	GSM	Advanced	Operator
Connected	i to: AT&T (C	AT M1)		10	0%
RSSI: 25 Neighbour	ring cells: 0	Signal strength <b>75 %</b>			
					0%
D22		ceORF	low+DPM+	CRA34-v2.5.	REV001.rd>

Figure 6.23

"Advanced": this screen provides advanced information regarding cellular network connectivity, shown in **FIGURE 6.15** 

(J) 🗞 👘	G	GPRS/GSM Co	onnectivity	11/30/2	23 12:01 PM
GPRS	GPRS Setup	Monitor [ON]	GSM	Advanced	Operator
Cell ID 87C5910	RSRP -9	2000 da	all shares and shares and	WR Idbm	
022		ceORI	Flow+DPM+	CRA34-v2.5.	REV001.rdx





Installation, Operation, and Maintenance Manual

"Operator": this screen provides a list of operators available in the area, automatic mode means best operator selected by default or select a preferred operator, shown in **FIGURE 6.15** 

( <u>)</u> ) 🗞 👘		GPRS/GSM Con	nectivity	11/30/2	23 12:03 PM
GPRS	GPRS Setup	Monitor [ON]	GSM	Advanced	Operator
Preferre	d operator is:				
	T-Mobile (CA	Г М1) 1) - connected	l, rssi = 24	(signal stre	ngth 77%]
•		*****			
•			(	€ 🗸	

Figure 6.25



### 6.1.11 LAN 6.1.11.1 Description

Used to set the IP address, subnet mask, DNS IP address, and gateway address for the VC-22D.

#### 6.1.11.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "LAN"

#### 6.1.11.3 LAN Settings

6	1	P Configuration (eth0)	02/15/19 05:08 PM
	IP address	192.168.1.120	
	Subnet mask	255.255.255.0	
D	NS IP address	192.168.1.1	
Gat	eway address	192.168.1.1	
DNS se parame DNS se	rver, concern ti ters are set au	meters, with the exceptio he wired LAN only. Wirele tomatically on connectior T be on your LAN unless t	ss 🐂
D22		131-Flo	w+Reducing-V1.0.rdx

Figure 6.26

IP Address: TCP/IP address of the VC-22D

Subnet mask: Subnet mask of the TCP/IP address

DNS IP address: Address of the DNS server the VC-22D sends requests too

**Gateway address:** Address of the gateway the VC-22D sends network traffic too that is not on the VC-22D's subnet

#### 6.1.12 Remote Recopy

#### 6.1.12.1 Description

This setting is not applicable in North America, as it requires a cellular connection. This is a European feature only.

#### 6.1.13 Modbus

#### 6.1.13.1 Description

Used to configure Modbus communication parameters for Modbus TCP/IP, Modbus RS485, and Modbus RS232. Also provides a register map for internal variables.

Installation, Operation, and Maintenance Manual



#### 6.1.13.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "Modbus"

#### 6.1.13.3 General Tab Settings

		1.3	Modbus	08/3	31/19 1	L2:07 AM
0	General	TCP/IP	R5485	RS232	0	Quit
	Modbus I/O r	mapping sche	eme Standar	d 🔹		
	Modbu	s TCP/IP enab	oled 🗙			
	Modbu	is RS485 enab	oled 🗌			
	Modbu	s RS232 enab	oled 🗌			
						•
D22-	35371909221	3469		131-Flow	-Mag-	V2.0.rdx

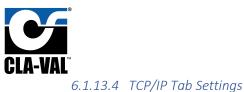
Figure 6.27

**Modbus I/O mapping scheme:** Specifies whether the VC-22D will use "Standard" or "Cla-Val" Modbus register mapping. "Standard" was introduced in engine 2.5.0 and is the recommend scheme. "Cla-Val" has been left for backwards compatibility. See section 9 for a detailed description of each scheme.

Modbus TCP/IP enabled: Allows VC-22D to receive and respond to Modbus TCP/IP requests.

Modbus RS485 enabled: Allows VC-22D to receive and respond to Modbus RS485 requests.

Modbus RS232 enabled: Allows VC-22D to receive and respond to Modbus RS485 requests.



Installation, Operation, and Maintenance Manual

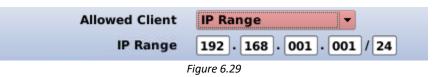
		м	odbus	04/2	2/19 (	02:00 PM
0	TCP/IP	RS485	RS232	Variable Ma		Quit
	Modbus T	CP/IP enabled				
		IP Port No	502			
		Allowed Client	All	•	•]	
	Allo	wed Interface	All		•]	
	Override	Timeout (sec)	OFF			
	IEEE Flo	at word order	MSW:LSV	N - (		
					<b>DU</b> D	
16in	Flow Contro			133-Flow-DP	+Pos	V2.0.rd
		F	igure 6.28	and the best south of the		

Modbus TCP/IP enabled: Allows VC-22D to receive and respond to Modbus TCP/IP requests.

**IP Port No:** Displays the port that the VC-22D listens for Modbus TCP/IP requests on. This is not user adjustable. Devices communicating to VC-22D must always use port 502.

**Allowed Client:** Specifies which devices the VC-22D is allowed to listen and respond too via Modbus TCP/IP. This is to prevent unauthorized devices from communicating with VC-22D. The dropdown has three options:

- 1. All: The VC-22D will respond to Modbus requests from any device.
- 2. **IP Range:** The VC-22D will only respond to Modbus requests that come from devices with an IP address in a specified range. If this option is selected, a text box appears below the setting allowing the user to enter the allowed IP address range as shown in **FIGURE 6.**.



3. **Single Client:** The VC-22D will only respond to Modbus requests that come from a device with a user specified IP address. If this option is selected, a text box appears below the setting allowing the user to enter the allowed IP address as shown in **FIGURE 6.**.





**Allowed Interface:** Specifies which physical connection the VC-22D will listen for Modbus requests on. This is to further prevent unauthorized access by restricting the number of communication pathways into the VC-22D. The dropdown has three options:

- 1. All: The VC-22D will listen to and respond to Modbus TCP/IP requests from the cell modem and Ethernet port.
- 2. **Ethernet:** The VC-22D will listen to and respond to Modbus TCP/IP requests from the Ethernet port only. Requests coming in through the cell modem will be ignored.
- 3. **GPRS:** The VC-22D will listen to and respond to Modbus TCP/IP requests from the cell modem only. Requests coming in through the Ethernet port will be ignored. This is a European feature only, as the cell modem is not operational in North America.

**Override Timeout (sec):** The number of seconds the VC-22D will wait without receiving a Modbus TCP/IP request before clearing all Modbus overrides and reverting registers back to original values. See section 9 for more information on the Modbus override. A value of 0 will disable the Override Timeout functionality.

**IEEE Float word order:** Specifies if the first word in a two word IEEE 754 float is the high ordered word (MSW) or the low ordered word (LSW). This specifies the register "endianness" for IEEE 754 encoded registers.

			Modbus	04/22	/19	02:00 PM
0	TCP/IP	RS485	RS232	Variable Map	0	Quit
	Mo	85485 enabled odbus Address Speed (baud)	. 1	<b>•</b>		
	Override	Timeout (sec)	OFF			
	IEEE Flo	at word order	MSW:LSW	v 🚽		
	Run as M	odbus master		Debu		•
16in	Flow Contro	ļ.		133-Flow-DP+	Pos	-V2.0.rdx

6.1.13.5 RS485 Tab Settings

Figure 6.31

Modbus RS485 enabled: Allows VC-22D to receive and respond to Modbus RS485 requests.

Modbus Address: Address that the VC-22D responds to Modbus RS485 requests on.

**Line Speed (baud):** Baud rate of the VC-22D's RS485 interface. Options are 4800, 9600, 19200, 38400, 57600, and 115200. Note, the VC-22D uses 8 data bits, no parity, 1 stop bit, and no flow control for the remainder of the RS485 serial settings.



### Installation, Operation, and Maintenance Manual

**Override Timeout (sec):** The number of seconds the VC-22D will wait without receiving a Modbus RS485 request before clearing all Modbus overrides and reverting registers back to original values. See section 9 for more information on the Modbus override. A value of 0 will disable the Override Timeout functionality.

**IEEE Float word order:** Specifies if the first register in a two register IEEE 754 float is the high ordered byte (MSW) or the low ordered byte (LSW). This specifies the register "endianness" for IEEE 754 encoded registers.

**Run as Modbus master:** When checked, this switches the Modbus RS485 from a server to a client. This is only used when the VC-22D is connected to other Cla-Val products (like the 34 series actuator) via Modbus RS485.

			Modbus	04/22	2/19	02:01 PM
0	TCP/IP	RS485	RS232	Variable Map	0	Quit
	Modbus F	S232 enabled				
	Mo	dbus Address	; 1			
	Line	Speed (baud)	9600	•		
Override Timeout (sec)		OFF				
		Flow Contro	Disabled	-		
	IEEE Flo	at word order	MSW:LSW	1 🔹		
				(Lebu		
16in F	low Contro	1		133-Flow-DP+	Pos	-V2.0.rdx
			5' 6.22			

6.1.13.6 RS232 Tab Settings

Figure 6.32

Modbus RS232 enabled: Allows VC-22D to receive and respond to Modbus RS232 requests.

Modbus Address: Address that the VC-22D responds to Modbus RS232 requests on.

Line Speed (baud): Baud rate of the VC-22D's RS232 interface. Options are 4800, 9600, 19200, 38400, 57600, and 115200.

**Override Timeout (sec):** The number of seconds the VC-22D will wait without receiving a Modbus RS485 request before clearing all Modbus overrides and reverting registers back to original values. See section 9 for more information on the Modbus override. A value of 0 will turn off the Override Timeout functionality.

**Flow Control:** Enables or disables hardware level RTS/CTS hardware control. Note, the VC-22D uses 8 data bits, no parity, and 1 stop bit for the remainder of the RS232 serial settings.



Installation, Operation, and Maintenance Manual

**IEEE Float word order:** Specifies if the first register in a two register IEEE 754 float is the high ordered byte (MSW) or the low ordered byte (LSW). This specifies the register "endianness" for IEEE 754 encoded registers.



			Modbus			04/22	/19 0	2:01 PM
0	TCP/IP	RS485	RS2	32	Var	iable Map	0	Quit
-	Name	Min	Max	Blo	c 1	Bloc 2	E	Bloc 3
DPf Valv Valv	stCurv MFlow vePosAdj vPosAdj P_ON	0.00 0.00 0.00 0.00 0.00	1.00 2000.00 100.00 1000.00 1.00	4040 4040 4040 4040 4040	2 4 6	42400 42402 42404 42406 42408	44 44 44	400 401 402 403
	_011		1.00					
16in I	Flow Contro	1			133-	Flow-DP+	Pos-	V2.0.rd

Figure 6.33

The variable provides a read only view of the VC-22Ds variables and corresponding Modbus addresses. Each variable gets a Modbus address in the three Modbus blocks (see section 9 for more information on Modbus blocks). The minimum and maximum value of each variable is also displayed.

### 6.1.14 Remote Access

### 6.1.14.1 Description

Used to enable/disable the VNC protocol to the VC-22D. The VNC protocol allows a remote computer (Windows or Linux) to view the VC-22D's display and click buttons on it. This is very similar to Microsoft's Remote Desktop protocol.

### 6.1.14.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "Remote Access"



Installation, Operation, and Maintenance Manual

6.1.14.3	Remote	Access	Settinas
0.1.14.5	Nemole	ALLESS	Settings

VNC Rer	note Access	04/22/19 02:02 PM
VNC enabled IP Port No	5900	
Password	cla-val	
Allowed Client		•
Allowed Interface	All	<b></b>
		•
16in Flow Control	133-	Flow-DP+Pos-V2.0.rdx

Figure 6.34

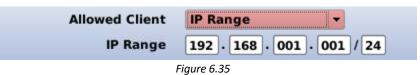
VNC enabled: Allows communication to the VC-22D via the VNC protocol.

**IP Port No:** Specifies the port number the VC-22D listens for VNC traffic on. This port number is fixed at 5900 and cannot be changed by the user.

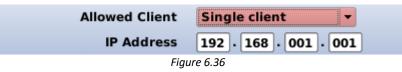
Password: The password required when establishing a VNC connection to the VC-22D.

**Allowed Client:** Specifies which devices the VC-22D is allowed to listen and respond too via VNC. This is to prevent unauthorized devices from communicating with VC-22D. The dropdown has three options:

- 1. All: The VC-22D will respond to VNC requests from any device.
- 2. **IP Range:** The VC-22D will only respond to VNC requests that come from devices with an IP address in a specified range. If this option is selected, a text box appears below the setting allowing the user to enter the allowed IP address range as shown in **FIGURE 6.**.



3. **Single Client:** The VC-22D will only respond to VNC requests that come from a device with a user specified IP address. If this option is selected, a text box appears below the setting allowing the user to enter the allowed IP address as shown in **FIGURE 6.**.





### Installation, Operation, and Maintenance Manual

**Allowed Interface:** Specifies which physical connection the VC-22D will listen for Modbus requests on. This is to further prevent unauthorized access by restricting the number of communication pathways into the VC-22D. The dropdown has three options:

- 1. All: The VC-22D will listen to and respond to Modbus TCP/IP requests from the cell modem and Ethernet port.
- 2. **Ethernet:** The VC-22D will listen to and respond to Modbus TCP/IP requests from the Ethernet port only. Requests coming in through the cell modem will be ignored.
- 3. **GPRS:** The VC-22D will listen to and respond to Modbus TCP/IP requests from the cell modem only. Requests coming in through the Ethernet port will be ignored. This is a European feature only, as the cell modem is not operational in North America.

#### 6.1.15 Cloud Storage

#### 6.1.15.1 Description

This setting will allow the user to connect to a private FTP server "custom", or to the CLA-VAL servers ("CLA-VAL link2valves") or to switch it off, then configure all the settings necessary to access FTP server.

#### 6.1.15.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "connectivity"
- 4. Click on "cloud storage"

If a connection to the CLA-VAL servers is desired, a valid registration email address is required as shown below.

(y) 🗞 👘		Cloud Storage	12/02/23 08:00 AM
Configure	Test		
	Setup	Cla-Val Link2Valves	•
Ser	ver name	https://link2valves.com	
Reset ce Registrati	rtificates   on e-mail	Reset	
			Register
16inFlowCo	ntrol		131-Flow-Mag-V2.1.rdx

Figure 6.37



Installation, Operation, and Maintenance Manual

To connect to a custom FTP server required fields must be filled with custom FTP server information as shown in figure **FIGURE 6.38**.

(y) 🗞 👘		Cloud Storage	12/02/23 08:25 AM
Configure	Test		
	Setup	Custom	
Ser	ver name	ftp.cla-val.ch7	
U	ser name		
1	Password		
Targ	et Folder	16inFlowControl	),
Extended	Timeouts		
Sync inter	val (min)	720	- 7
16inFlowCo	ntrol	4	131-Flow-Mag-V2.1.rdx

Figure 6.38

"Test" tab allows the user to check the connection to the FTP server setup, click on the **I** icon to run the test again, as shown in **FIGURE 6.39.** 

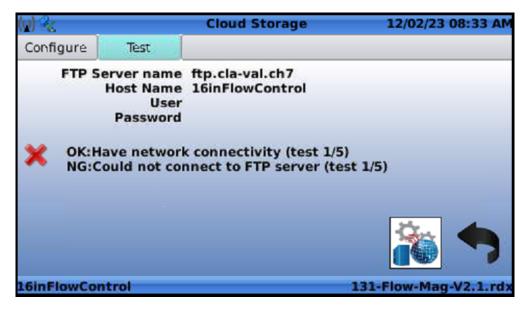


Figure 6.39



### Installation, Operation, and Maintenance Manual

### 6.1.16 Wireless

#### 6.1.16.1 Description

The wireless capabilities of the VC-22D allow the user to control a wireless LAN that may be broadcasted from the VC-22D with the use of a USB WiFi adapter. Use of the WiFi adapter will allow access to the Web Interface along with a VNC Connection (no Modbus). The wireless LAN capability has been provided to make on-site support and start-up more user friendly but is not intended for operational use. The adapter helps eliminate the need for a long Ethernet cable or use of a laptop in a confined space.

To obtain a USB WiFi adapter for the VC-22D, contact your local Cla-Val sales representative. While there are many USB WiFi adapters available on the market, it's best to obtain one from Cla-Val to ensure the WiFi adapter is compatible with the VC-22D.

The wireless setting will not be visible in the system settings unless the VC-22D was booted with a USB WiFi adapter already plugged in. To ensure the wireless setting is visible, insert the USB WiFi adapter into the VC-22D's USB port, and then, perform a reboot of the VC-22D.

\*\*note: Please ensure VC-22D engine version is 2.8.0 or above (check via long-down from home screen - > Information -> short-right to version tab), refer to section 6.1.20 for engine update.

\*\*note: To obtain a USB WiFi adapter for the VC-22D, please order p/n "**89611129E DONGLE, VC-22D WIFI**" from the Costa Mesa Factory.

#### 6.1.16.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "Wireless"

#### 6.1.16.3 Wireless Settings

		Wireless Connectivity	06/12/19 01:31 PM
Bluetooth	WiFi		
WiFi	enabled	× (w)	
WiFi /	AP name	16in Flow Control	
1	WPA key	00001970	
IP	address	10.255.255.1	
			0 5
16in Flow Co	ontrol	1	33-Flow-DP+Pos-V2.0.rdx



Installation, Operation, and Maintenance Manual

**WiFi Enabled:** Checking this box will allow the VC-22D to broadcast the WiFi signal. If this box is unchecked, the signal will not be broadcast.

**WiFi AP Name:** Displays the name of the WiFi LAN that will be displayed to other computers browsing local WiFi networks.

\*\*note: the wifi AP Name just takes the controller's name. If it needs to be changed, it can be done starting at the homescreen -> long down -> information -> hostname.

**WPA Key:** Displays the passcode that's required for another computer to join the WiFi LAN.

**IP Address:** Displays the IP address of the VC-22D on the WiFi network.

### 6.1.17 Web Interface

#### 6.1.17.1 Description

Used to enable/disable the web interface for the VC-22D which allows for remote upload/download of files to the VC-22D via a web browser.

#### 6.1.17.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Connectivity"
- 4. Click on "Web Interface"

#### 6.1.17.3 Web Interface Settings

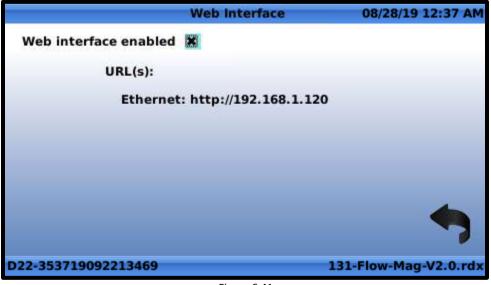


Figure 6.41

Web interface enabled: Checking this box enables the web interface

URL Ethernet: Lists the URL to use for accessing the web interface from a browser



### Installation, Operation, and Maintenance Manual

### 6.1.18 Security

#### 6.1.18.1 Description

Allows the user to specify a password that must be entered to obtain access to critical settings.

#### 6.1.18.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Security"

#### 6.1.18.3 Security Settings

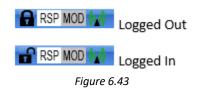
3	Access Code	04/22/19 02:04 PM
Password:	0 * * *	
16in Flow Control	133-F	low-DP+Pos-V2.0.rdx

Figure 6.42

This screen allows the user to specify a log in password. By default, no password is set and the user is always considered logged in. After specifying a password, the user will be prompted to login with the password before accessing any of the following screens:

- 1. System settings (long down)
- 2. Valve control settings (long up)
- 3. Input settings (long left)
- 4. Output settings (long right)

Once logged in, the user will remain logged in until 20 minutes of inactivity. The login status is depicted with a padlock icon on the top bar of the VC-22D's display (see **FIGURE 6.** below):



To remove the password, go to the security settings and enter "000000" as the password.





Installation, Operation, and Maintenance Manual

#### 6.1.19 Reboot

6.1.19.1 Description

Reboots the VC-22D.

### 6.1.19.2 Navigation Path

- 1. Start from the home screen
- 2. Long down
- 3. Click on "Reboot"



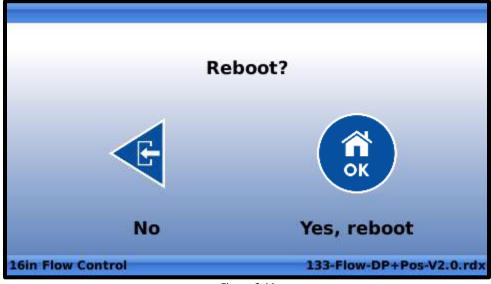


Figure 6.44

The reboot screen will ask for confirmation before initiating the reboot. If you press the left navigation button, the reboot is cancelled. If you press the OK navigation button, the VC-22D is rebooted.

### 6.1.20 Engine Update

### 6.1.20.1 Description

Used to update the engine software on the VC-22D and adds any new features attached with every engine.

\*\*note: to check the current version installed on the VC-22D controller, navigate via: start from the home screen -> long down -> information -> short right -> engine.

\*\*note: engine updates should be done in order, to avoid any software malfunction.

Engine order is as follows:

1.7.0, 1.7.1.9, 1.7.2.6, 1.8.0.3, 1.8.1, 1.8.4, 1.9.0, 2.0.0, 2.0.1, 2.1.0, 2.2.0, 2.3.1, 2.4.0, 2.5.0, 2.5.2, 2.6.0, 2.70, 2.8.0, 2.8.2, 2.8.3, 2.8.5 (all found in Engine Archive .zip)

\*\*note: Please refer to Cla-Val website for most up to date engine releases.

Installation, Operation, and Maintenance Manual



#### 6.1.20.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Advanced"
- 4. Click on "Engine Update"

#### 6.1.20.3 Engine Update Settings

	Update R-Engine	04/22/19 02:05 PM
1		
USB		
16in Flow Control	133	-Flow-DP+Pos-V2.0.rdx
	Figure 6.45	

The engine update screen shows a file explorer which can be used to navigate to an engine update file. Selecting an engine update file and pressing "OK" will prompt for confirmation. Saying yes to the confirmations will update the engine and reboot the VC-22D.

#### 6.1.21 Diagnostics to USB

#### 6.1.21.1 Description

Used to export log files about the VC-22Ds errors and warnings to a USB thumb drive.

#### 6.1.21.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Advanced"
- 4. Click on "Diag->USB"



Installation, Operation, and Maintenance Manual

6.1.21.3	Diagnostics	to	USB	Settings	
----------	-------------	----	-----	----------	--

	Export Diagnostics	04/22/19 02:06 PM
1		
USB		
Se My FTP		
	122	
16in Flow Control	133-	Flow-DP+Pos-V2.0.rdx

Figure 6.46

The diagnostics to USB screen shows a file explorer that allows the user to select a location to export diagnostic files too. The diagnostic files will include traces of software faults that have occurred.

#### 6.1.22 Factory Reset

#### 6.1.22.1 Description

Used to remove the currently running ValvApp and return all settings in the VC-22D to factory default. The VC-22D will require a new ValvApp to be loaded before it is operational again.

#### 6.1.22.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Advanced"
- 4. Click on "Factory Reset"

#### 6.1.22.3 Factory Reset Settings

			×
? Are you sur	e? Use <restore> to</restore>	return to the origin	nal configuration
	Yes	No	
	Figure		

Figure 6.47

The factory reset screen is just a confirmation prompt. Clicking "Yes" will revert the VC-22D back to its factory default state and reboot the controller. Clicking "No" will cancel the factory reset.

Installation, Operation, and Maintenance Manual



#### 6.1.23 Kernel Update

6.1.23.1 Description

Used to update the VC-22D's kernel software.

#### 6.1.23.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Advanced"
- 4. Click on "Kernel Update"

#### 6.1.23.3 Kernel Update Settings

	Update Kernel	04/22/19 02:06 PM
1		
USB		
16in Flow Control	12	3-Flow-DP+Pos-V2.0.rdx
Tom Flow Control	15.	5-FIGW-DF+F05-V2.0.Tux

Figure 6.48

The kernel update screen shows a file explorer which can be used to navigate to a kernel update file. Selecting a kernel update file and pressing "OK" will prompt for confirmation. Saying yes to the confirmations will update the kernel and reboot the VC-22D.

#### 6.1.24 Configuration Wizard

#### 6.1.24.1 Description

Launches the configuration wizard. See section 5.3 for more information about the configuration wizard.

#### 6.1.24.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Advanced"
- 4. Click on "Configuration Wizard"



Installation, Operation, and Maintenance Manual

6.1.24.3 Configuration Wizard Settings



Figure 6.49

The configuration wizard icon opens a prompt which allows the user to run the configuration wizard.

#### 6.1.25 Display Brightness

#### 6.1.25.1 Description

Allows the user to adjust the backlighting on the VC-22D display.

#### 6.1.25.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Display"
- 4. Click on "Brightness"

#### 6.1.25.3 Display Brightness Settings

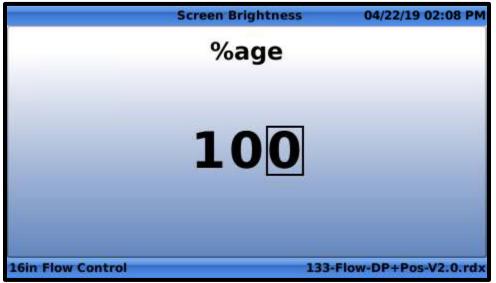


Figure 6.50

The display brightness screen has a single percentage value. Setting 100% increases the display to maximum brightness, setting 0% decreases the display to minimum brightness.

#### 6.1.26 Shutoff Screen

#### 6.1.26.1 Description

Allows the user to specify how long the screen remains on after no navigation keys have been pressed.

Installation, Operation, and Maintenance Manual



#### 6.1.26.2 Navigation Path

- 1. Start at the home screen
- 2. Long down
- 3. Click on "Display"
- 4. Click on "Shutoff"

### 6.1.26.3 Shutoff Screen Settings

	Screen Shutdown	04/22/19 02:08 PM
	minutes	
	5	
16in Flow Control	1	133-Flow-DP+Pos-V2.0.rdx



The shutoff screen setting specifies how long the screen will remain on after no navigation keys have been pressed. Setting this value to 0 forces it to remain on indefinitely. By default, the setting is 0.



Installation, Operation, and Maintenance Manual

### 6.2 Valve Control Settings

Valve control settings impact how the VC-22D operates the valve. Examples of valve control settings are PID gains, actions that trigger outputs based on inputs, and retransmission of input signals.

#### 6.2.1 DP Metering

#### 6.2.1.1 Description

Cla-Val has "CV-Lift" data on our valves which allows the flow rate through the valve to be calculated based on pressure differential and valve position. The "CV-Lift" data changes based on valve size, valve shape, flow direction, and seat type (standard or anti-cavitation).

The VC-22D comes with a preloaded library of CV-Lift data for the most common valves. The DP metering settings allow the user to specify which "CV-Lift" data to use (based on valve size, valve shape, and seat type). It also allows the user to specify which IO points are monitoring pressure differential and valve position.

The DP metering is only enabled in certain ValvApps and cannot be enabled by the user. The user must choose a ValvApp from the standard library that has DP metering enabled or contact a Cla-Val representative to get a custom ValvApp.

Once the ValveApp is loaded to controller whether the app is loaded from a standard library or custom app the controller will pop up a notification to setup the DP Metering configuration at the home screen of the initial start up process of the controller as shown in **FIGURE 6..** 



Figure 6.52

#### 6.2.1.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "DP Metering"



Installation, Operation, and Maintenance Manual

.3	Val	ve	Tab	Setting.	S
.0			100	Secting	-

	D	P M	etering		12/	/05/2	23 09:00 AM
Valve	Manage Table		Input	Out	put		Back
Meteri	ng DP descript	ion				_	
	DP Ta	ble	North Am	erica	•		
	s	ize	1.5		-	inc	hes
Body Style		100-01		-			
	Seat Ty	/pe	Std		-		
	DP Con	fig	Boss-Boss		•		
Flow dire	ection as instal	led	Normal		•		
E	nable reverse fl	ow					
16inFlowContr	ol	iran	d-River-Va	veApp-	Sus	t+R	ed-V2.5.rdx
		Fig	ure 6.53				

Metering DP description: Field to enter a user-friendly description of the DP metering function.

**DP Table:** Specifies which library the "CV-Lift" data will come from. The options are listed below:

- 1. EMEA: Allows "CV-Lift" data for European valve sizes to be selected on the next tab
- 2. North America: Allows "CV-Lift" data for our North American valve sizes to be selected on the next tab.
- **3. Specific:** Allows "CV-Lift" data to be selected for custom valves that have been specially loaded into a custom ValvApp per customer request.

**Size:** Specifies the valve size. Includes all common valve sizes for Cla-Valve.

**Body Style:** Specifies the body style. The options are 100-01 (Full Port Globe Valve) and 100-20 (Reduce Port Globe Valve)

Seat Type: Specifies the seat type. Whether it's a standard seat or anti cavitation seat "KO".

**DP Config:** Specifies whether the pressure is measured at the valve's boss inspection ports or the pipes inspection ports.

**Flow direction as installed:** Specifies whether the flow direction of the valve is installed in normal or reverse direction.

**Enable reverse flow:** Configures the ability to calculate flow in reverse flow direction if tab to be selected.

When this box is checked, in the case of a pressure reversal, P2>P1 or negative DP, the VC-22D will automatically switch to the opposite direction curve and continue to calculate flow.

(ie. "Flow direction as installed" is set to Normal, flow calculation will switch to using Reverse curve if P2>P1 or DP is negative).

\*\* note: If a Reverse curve does not exist for the selected valve, a warning screen will pop up and the



Installation, Operation, and Maintenance Manual

Normal direction curve will still be used.

#### 6.2.1.4 Manage Table Settings

Manage table tab settings allows to change and configure and apply contant gain to the current table or the ability to directly edit the current table.

DP	Metering	12/05/	23 09:28 AM
Manage Table	Input	Output	Back
	estant Cala		
Cor	istant Gain		
Edit	Coefficients		
al âr	and-River-Va	lveApp-Sust+R	ed-V2.5.rd>
	Manage Table	Import DPM Table Constant Gain Edit Coefficients	Manage Table Input Output Import DPM Table Constant Gain Edit Coefficients

Figure 6.54

**Import DPM Table:** allows the option to import a new or custom ValveFlow table via USB as shown in **FIGURE 6.** 

	Import DPM Table	12/05/23 09:41 AM
1		
USB		
16inFlowControl	irand-River-Valve	App-Sust+Red-V2.5.rdx

Figure 6.55

**Constant Gain:** applies a constant gain in which it will be applied to all ValveFlow coefficients for the currently selected valve, if a valve is changed the gain will reset back to 1, shown below in **FIGURE 6.56**.



Installation, Operation, and Maintenance Manual

	D	P Metering	12/05/	23 09:48 AM
Valve	Manage Table	Input	Output	Back
coefficient		tly selected v this gain will l	ed to all valve f alve. If you cha be reset to 1.0 .0000	
16inFlowContr	ol	and-River-V	alveApp-Sust+R	S rdv

Figure 6.56

**Edit coefficients:** Specified to generate a custom table directly on the VC-22D by applying a gain to individual points along the curve. You will be able to see current Opening % and calculated flow. If the system is operational, you can either enter a measured flow rate or select a reference flow rate input if used as shown in **FIGURE 6.57**.

	D	P Metering		12/05/2	23 09:52 AM
Valve	Manage Table	Input	Outp	out	Back
Opening 5% 10% 15% 20% 25% 30% 35% 40%	Gain 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Normal Opening Flow Measured flow inp None Measured flow	▼ 100 % I/s	You ma gain in the left system operati	y enter the the table to or, if the
45%	1.0000 -	Apply gain xx	x %		
16inFlowCont	rol	irand-River-Va	lveApp-9	Sust+R	ed-V2.5.rdx

Figure 6.57



Installation, Operation, and Maintenance Manual

	D	P Mete	ring	02/28/3	L9 04:32 PM
General	Valve	In	put	Output	Back
Opening					
	S	Source	[AI2] F	osition	-
	Current	Value	0.4 %		
DP					
	P1	or DP	[AI3] L	Ipstream Press	ure 🔻
		P2	[AI4] [	ownstream Pre	ssure 🔻
	Differential Pre	essure	63.71 p	osi	
D22			133-FI	ow-P1+P2+X11	7D-V2.0.rdx
		Figure	6.58		

**Source:** Specifies the analog input or interactive variable that reports the valve's position.

**P1 or DP:** Specifies the analog input or interactive variable that reports the valve's upstream pressure or the differential pressure (inlet pressure – outlet pressure). If the source chosen is a differential pressure, leave the "P2" setting blank.

**P2:** Specifies the analog input or interactive variable that has the valve's downstream pressure. Leave this field blank if a differential pressure (inlet pressure – outlet pressure) is specified in "P1".

**Differential Pressure:** Displays the differential pressure being calculated from the "P1 or DP" and "P2" sources.

	D	P Metering	12/05/	23 10:14 A
Valve	Manage Table	Input	Output	Back
	Output	[VAR] DPMFlor	N	-
On inp	ut signal loss	Do nothing		
	Current Flow	290 gpm		
Ma	aximum Flow	1759 gpm		
[	Set Ma	ximum Output	Value	
FlowContro	ol	133-Fi	ow-P1+P2+X11	7D-V2.1.r
		Figure 6.59		

#### 6.2.1.6 Output Tab Settings





### Installation, Operation, and Maintenance Manual

**Output:** Specifies the analog output or interactive variable that DP metering writes calculated flow too.

On Input Signal Loss: Specifies two options of how the controller would react on loss of signal.

- **1. Default Value:** Specifies the calculated flow that's outputted when the valve position or pressure values are out of range (i.e. the input wiring is disconnected).
- 2. Do Nothing: signal loss would show up on the home screen of the controller.

Current Flow: Displays the current flow calculated by the DP metering function.

Maximum Flow: Displays the largest possible flow the DP metering function will output.

**Set Maximum Output Value:** Clicking this button updates the scaling on the output so it's 20mA value is equal to Maximum Flow

#### 6.2.2 PID

#### 6.2.2.1 Description

The VC-22D provides a proportional, integral, and derivative (PID) function which will send output signals to maintain a user specified setpoint.

#### 6.2.2.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on the PID icon

#### 6.2.2.3 General Tab Settings

				PID 1		03/07	/19 (	9:48 AM
0	General	Input	t [	Output	Adju	stment	0	Back
	PID Des	cription	Flow	Control				
		PID Type	Flow				-	
	PID Cycle e	every (s)	1.00	Signa	al loss	Lock P	ositio	on 🔻
	PI	D Status	On				-	
022				122.5	low D1	. D2 . V1	170	V2 0 54
D22				133-F	IOW-P1	+P2+X1	1/0-	v2.0.ra

Figure 6.60

**PID Description:** User friendly description of the PID function. This is useful when multiple PID functions are enabled.

**PID Type:** Specify what the PID should be controlling. Available options are listed below:



Installation, Operation, and Maintenance Manual

- 1. Analog (4-20 mA current)
- 2. Flow
- 3. Pressure
- 4. Level
- 5. % (valve position)

**PID Cycle every (s):** The number of seconds between each PID cycle. Each time a cycle is executed, the PID function adjusts its outputs to maintain a setpoint. The lower this number, the more frequent output adjustments will be. The default value of 1 second is adequate for almost all circumstances.

**Signal loss:** Specifies the behavior of the PID function when the setpoint signal or feedback signal is lost (e.g. the 4-20 mA signal is broken, or the Modbus communication fails). The options are listed below:

- 1. Lock position: Solenoids are closed to trap water on the valve's cover and lock its position
- 2. No action: PID treats lost signal as a real signal, and continues trying to control valve
- 3. Open 100%: PID forces solenoids to open valve completely
- 4. Close 100%: PID forces solenoids to close valve completely

PID Status: Specifies whether the PID is enabled. Allowed options are listed below:

- 1. Conditional: Specifies that the PID may be enabled/disabled based on the value of a variable
- 2. On: Forces the PID to always be enabled
- 3. Off: Forces the PID to always be disabled

			PID 1	12/05	5/23 11:16 AI
)[	General	Input	Output	Adjustment	C Back
S	etpoint —	~ ~ ~		^	
		Source	[AI1] Flow	SP	-
		Current Value	462 gpm	(	Override
	Ramp	ing (gpm/min)	OFF		
	Display	on home page			
F	eedback —				
	Is Inlet P.	Source	[VAR] DPM	Flow	-
		Current Value	289 gpm	_ (	Override
in	FlowControl		133-F	low-P1+P2+X1	17D-V2.1.rd
			Figure 6.61		

6.2.2.4 Input Tab Settings

**Setpoint Source:** Specifies the analog input or interactive variable that holds the setpoint value. The setpoint is the target the PID function is controlling too (e.g. the amount of flow desired or the amount of pressure desired.)

Setpoint Current Value: Displays the current value of the selected setpoint.



**Setpoint Override:** When pressed, allows the user to enter a setpoint value directly without using an analog input or interactive variable.

**Setpoint Ramping:** Specifies the ramping rate for setpoint changes. If set to off, setpoint ramping is disabled. Use ramping to prevent sudden changes in valve position when the setpoint value is changed abruptly. The larger the ramping value, the slower the valve will respond to setpoint changes. To understand how setpoint ramping works, consider the following example:

Assume the setpoint value is changed from 2,000 gpm to 1,000 gpm and the ramping is 500 gpm/min. The PID function will gradually change it's internal setpoint from 2,000 gpm to 1,000 gpm over a period of two minutes (i.e. a 1,000 gpm change made at 500 gpm/min takes 2 minutes).

**Display on home screen:** Allows the display of the ramping value on the home screen to track ramped value.

**Feedback Source:** Specifies the analog input or variable that holds the feedback value. The feedback is the measured value that the PID function is controlling (e.g. the value from a flowmeter or pressure meter).

**Feedback Is Inlet P.:** Specifies if the feedback source is an inlet pressure transducer. This tells the PID function to reverse its direction. When unchecked, the PID function will open the valve whenever feedback is below setpoint and close the valve whenever feedback is above setpoint. When checked, the PID function does the opposite. The valve is closed whenever feedback is below setpoint and opened whenever feedback is above setpoint.

Feedback Current Value: Displays the current value of the feedback setpoint.

**Feedback Override:** When pressed, allows the user to enter a feedback value directly without using an analog input or interactive variable.

				PID 1		12/05	/23 1	12:19 P
0	General	l	nput	Output	Adjust	ment	0	Back
	Output T	ype	NC / N	c				-
Valve Closing			[501]	[SO1] Closing Solenoid				
	Cycle Time	(s)	5		Output Lin	nit (%)	10	0.0
	Valve Open	ing	[SO2] Opening Solenoid 🔹					
	Cycle Time	(s)	5		Output Lin	nit (%)	10	0.0
ſ	Zero Setpoin	nt Cle	osure –					
	Enabled			Setpoint <	40.00	g	pm	
			F	eedback <	40.00	g	pm	
6in	FlowControl			133	-Flow-P1+F	P2+X1	17D-	V2.1.rd
				Figure 6.62				

### 6.2.2.5 Output Tab Settings



Installation, Operation, and Maintenance Manual

The PID function can send outputs in many ways to accommodate various solenoid configurations and non-solenoid controls.

For solenoid configurations, the VC-22D sends pulse width modulation signals. A pulse width modulation signal is a series of repeated cycles. During each cycle, an electrical pulse is sent for a portion of the cycle, and then no signal is sent for the remainder of the cycle.

For non-solenoid controls, the VC-22D can send a 4-20mA signal or write a number to a variable that represents how much valve actuation is required to maintain setpoint.

**Output Type:** Specifies the type of outputs the PID function will send. The list of available output types is below:

- 1. **NC / NC:** Send pulse width modulated (PWM) signals to closing and opening solenoids. Assumes both solenoids are normally closed.
- 2. **NO / NO:** Send PWM signals to closing and opening solenoids. Assumes both solenoids are normally opened.
- 3. **NO / NC:** Send PWM signals to closing and opening solenoids. Assumes the closing solenoid is normally opened and opening solenoid is normally closed.
- 4. **NC / NO:** Send PWM signals. Assumes the closing solenoid is normally closed and opening solenoid is normally opened.
- 5. Linear 4-20 mA: Send a 4-20 mA signal to an analog output.
- 6. **Linear -> VAR:** Send a numerical value to a variable.

If one of the first four options in the list above is specified for output type, then the following configuration parameters are available:

**Valve Closing:** Specifies the digital output wired to the closing solenoid. Options are SO1, SO2, RO1, or RO2.

**Valve Closing Cycle Time:** Specifies the number of seconds for a PWM cycle on the closing solenoid. The higher the number, the slower the solenoid is pulsed which results in the valve actuating faster. For almost all applications, the default 5 second cycle time is adequate.

**Valve Closing Output Limit:** Specifies the max portion of the PWM cycle the closing solenoid may be pulsed for.

**Valve Opening:** Specifies the digital output wired to the closing solenoid. Options are SO1, SO2, RO1, or RO2.

**Valve Opening Cycle Time:** Specifies the number of seconds for a PWM cycle on the opening solenoid. The higher the number, the slower the solenoid is pulsed which results in the valve actuating faster. For almost all applications, the default 5 second cycle time is adequate.

**Valve Opening Output Limit:** Specifies the max portion of the PWM cycle the opening solenoid may be pulsed for.



If "Linear 4-20 mA" option in the output type list is selected, then the following configuration parameters are available:

Output Type	Linear 4-20 mA	-
Physical Output	[AO1] Flow Rate	-
	particular and a second se	

Figure 6.63

**Physical Output:** Specifies the analog output channel that the PID function will output a 4-20 mA signal on.

If "Linear -> VAR" option in the output type list is selected, then the following configuration parameters are available:

Output Type	Linear -> VAR
Output	[ValvPosAdj] ValvPosAdj

Figure 6.64

**Output:** Specifies the variable that the PID function will output a number too.

**Zero Setpoint Closure Enabled:** Enabled by default, the PID will force the valve to go drip tight closed whenever the setpoint and feedback are less than 2% of full scale. To force the valve to be drip tight closed, the VC-22D will hold the closing solenoid open and the opening solenoid closed.

**Zero Setpoint Closure Setpoint:** The value that setpoint must be less than for drip tight closure to be activated.

**Zero Setpoint Closure Feedback:** The value that the feedback must be less than for drip tight closure to be activated.

6.2.2.6	Adjustment Tab Settin	igs
---------	-----------------------	-----

			PID 1	03	/08/19 09:33 AM
0	Output	Adjustment	Zoning	R/T View	C Back
	Zo	ne Number 🔋	▼ Flo	2000 gpm	
	Closing	speed (%)	50.0	6 <u>.</u>	
	Opening	speed (%)	<b>50.0</b> 18 15 12	00	<u></u>
	Deadb	and (gpm)	10.00	00 in 00 in 00 in	<u></u>
	I	Integral (s)	OFF	0 L	-
	De	rivative (s)	OFF DP	MFlow	Zoom
				52 gpm	
D22			133-	Flow-P1+P2+	X117D-V2.0.rd
			Figure 6.65		



Installation, Operation, and Maintenance Manual

**Zone Number:** Indicates the zone that the remaining parameters are associated with. See section 6.2.2.7 for description of PID zones.

**Closing/Opening Speed (%):** The PID function has a proportional gain for closing the valve, and a separate proportional gain for opening the valve. The closing proportional gain is calculated from the closing speed. The larger the closing speed, the larger the closing proportional gain. The opening speed works the same way.

**Deadband:** Specifies the amount of error that's required before the PID loop will pulse solenoids. For example, if the deadband is 10 gpm and the current flow is within 10 gpm of setpoint, then the PID function will keep both solenoids closed to lock water on the cover. This setting prevents the PID from constantly pulsing solenoids when the feedback is close to setpoint and does not require much adjustment anyway.

**Integral:** Specifies the amount of integral gain the PID function uses. The higher the number, the smaller the integral gain. If integral gain is necessary (which is very unlikely), then start with a high number around 250 and decrease the number as required to increase response.

**Derivative:** Specifies the derivate gain the PID function uses. The higher the number, the smaller the derivative gain. If derivative gain is necessary (which is very unlikely), then start with a high number around 250 and decrease the number as required to increase response.

			PID 1	03/0	08/19 1	1:05 AM
0	Input	Output	Adjustment	Zoning	0	Back
		Number	of zones: 1	•		
	[VAR] DPM	1Flow	• 0 - 260	62 gpm		
	;	Zone 1: 🚺	to [260	62		
D22				w-P1+P2+X		

### 6.2.2.7 Zoning Tab Settings

Figure 6.66

The PID function incorporates zoning, which allows the PID parameters to be changed automatically based on a source value (either a variable or input). Up to 4 zones can be created, and each zone is given a range (minimum and maximum value). If the source value is within a zone's range, then the zone is activated. The PID parameters associated with that zone are then used by the PID function.

This capability is used when the PID function needs to actuate the valve more aggressively in certain circumstances, but not others. For instance, sometimes a large valve needs a fast opening speed when



### Installation, Operation, and Maintenance Manual

it's position is less than 10% but needs a slow opening speed when it's position is greater than 10%. In this case, two zones could be created that use the valve position as a source. The first zone would have a fast opening speed and would have a range of 0-10%. The second zone would have a slow opening speed and would have a range of 10%-100%.

**Number of Zones:** Specifies the number of zones the PID function has. Allowed values are 1-4. The number selected here determines the number of zone minimum and maximum text boxes visible below.

**Zone Source:** Specifies the variable or input for the zone source.

Zone # Minimum Value: Minimum value of zone range

Zone # Maximum Value: Maximum value of zone range

#### PID 1 03/08/19 11:52 AM Output Adjustment Zoning **R/T View** Back 942 Error 24000 90 20000 75 Total Action 53.7 16000 60 12000 45 8000 30 4000 15 0 0 -4000 -15 -8000 -30 2 -45 -12000 -60 -16000 -75 20000 -90 24000 2000 1056 53.8 FB Error 133-Flow-P1+P2+X117D-V2.0.rd)

#### 6.2.2.8 R/T View Tab Settings

Figure 6.67

This tab displays a real time graph of the PID's setpoint (blue line), feedback (brown line), output (green line), and error (red line). This tab is useful when analyzing performance of the PID's tuning parameters.

### 6.2.3 Control Curves

#### 6.2.3.1 Description

The control curves function allows the user to draw a curve on an XY graph which correlates a source value to a destination value. In other words, the control curve takes an input and returns a corresponding output according to a relationship the user specifies.

#### 6.2.3.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "Control Curves"
- 4. Click on an existing control curve, or click on "Add CC"



Installation, Operation, and Maintenance Manual

3	General	Tab Settings

			Cont	trol Curve 1	(	)3/08/19	12:13 PM
0	General	Activat	ion	In/Out	Adjustm	ent 🖸	Back
	CC Des	cription	Flov	w Calibration	^		
	co	Status	Con	ditional		-	
	Activ	ve when	Alw	ays	-		
D22				133-Fie	ow-P1+P2	+X1170	-V2.0.rdx

Figure 6.68

CC Description: User friendly description of the control curve

**CC Status:** Specifies how the control curve will be enabled/disabled. Allowed options are listed below:

- 1. Conditional: Allows the user to define a condition for enabling the control curve
- 2. On: Control curve is always enabled
- 3. Off: Control curve is always disabled
- 4. Calendar: Allows the user to enable the control curve based off calendar days
- 5. Period: Allows the user to enable the control curve based off calendar days within a particular date range.

If conditional is specified for CC status, then the following parameter is available:

Active when: Allows the user to define the condition for enabling the control curve. The drop down contains an always option, in which case the control curve is always enabled, and contains a list of all variables.

If a variable from the active when dropdown is selected, the following additional parameters become available:

Active when	[AI1] Flow SP	<b>▼</b> = <b>▼</b>
	Figure 6.69	

**Condition:** Specifies a value and how the variable must relate (i.e. =, <, >) to the value for the condition to be true.



Installation, Operation, and Maintenance Manual

#### 6.2.3.4 Activation Tab Settings

		Cont	Control Curve 1		8/19 04:28 PM
0	General	Activation	In/Out	Adjustment	Back
	Day of the we	ek —			
	Monday 🗌	Tuesday 📃 🛝	Wednesday	Thursday	Friday 🗌
S	aturday 🗌	Sunday			
F	Month of the	year			1
	January	Apri	I 🖸 🛛	July 🗌 🛛 O	ctober 🗌
	February	May	/ 🗌 🛛 Aug	just 🗌 Nov	ember 🗌 💧
	March	June	e 🗌 Septem	ber Dec	ember 🗌 🛛
D22			133-FI	ow-P1+P2+X1	17D-V2.0.rdx

Figure 6.70

The activation tab is only enabled if CC Status is set to "Calendar" or "Period" on the general tab.

**Day of the week:** Specify the day of the week that control curve will be enabled.

If the CC Status is set to "Calendar", then the following setting is visible as shown in FIGURE 6.

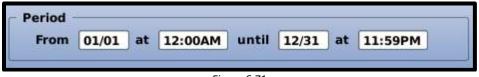
**Month of the year:** Specify the month of the year that the control curve will be enabled. (Only visible if CC Status is set to "Calendar")

Note, for the control curve to be enabled the current date must satisfy both the day of week and month of year conditions.

If the CC Status is set to "Period", then the following setting is visible as shown in FIGURE 6.

**Period:** Specify the date range that the control curve will be enabled. (Only visible if CC Status is set to "Period")

Note, for the control curve to be enabled the current date must satisfy both the day of week and period conditions.



#### Figure 6.71



Installation, Operation, and Maintenance Manual

3.5	In/Out Tab Settings	
-----	---------------------	--

		Cont	trol Curve 1	03/08/19 04		4:34 PM	
0	General	Activation	In/Out	Adjustment	0	Back	
ſ	Input						
		Source	[AI2] Positio	n		-	
	c	urrent Value	16.6 %				
	Output						
		Destination	[VAR] ValvePosAdj 👻				
	Apply o	lefault value	0.0	On invalid i	nput		
				On CC disal	oled		
	c	urrent Value	16.6 %	0	verrid	le	
-						0	
D22	2		133-F	ow-P1+P2+X	17D-	V2.0.rdx	
1000			A STORE STORE				



Input Source: Specifies the input or variable that will be used to select the destination value.

Input Current Value: Displays the current value of the selected input source.

**Output Destination:** Specifies the output or variable that will hold the destination value.

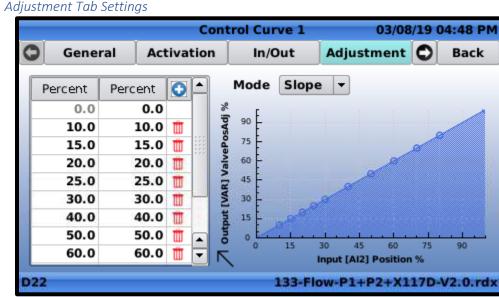
**Apply default value:** If the "On invalid input" checkbox is checked, the specified value will be written to the destination if the input source value is invalid. If the "On CC disabled" checkbox is checked, the specified value will be written to the destination if the control curve is disabled.

**Current Value:** Displays the current value of the destination.

**Override:** If pressed, allows the user to specify a value that gets written to the destination regardless of source value.



Installation, Operation, and Maintenance Manual





This page correlates the source value to a destination value. The left column in the table is the source value, and the right column is the destination value. Pressing the "+" button in the upper right corner of the table adds a new row, and the user can specify a destination value associated with a new source value. Pressing the trash can icon of any row deletes the row. The graph to the right of the table shows the source values on the horizontal axis and the corresponding values on the vertical axis.

**Mode:** There are two options available, "slope" and "step". If "step" is selected, a linear interpolation is performed to estimate the destination value if source value is between two rows. If "step" is selected, no interpolation is performed. The destination value outputted is from the row that has the source value closest too but lower than the current source value.



### 6.2.3.7 *R/T View Tab Settings*





The R/T View tab shows a graph with destination values on the vertical axis and source values on the horizontal access. The graph also indicates the current source value and corresponding destination value that is being outputted.

### 6.2.4 Averagers

### 6.2.4.1 Description

Takes a moving average of an input/variable and outputs the result to another variable. The time frame of the moving average is user adjustable.

#### 6.2.4.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "Averages"
- 4. Click on "Averager #"

#### 6.2.4.3 Configure Tab Settings

		Averager 1	03/1	1/19 10:	54 AM
General	Configure				
Aver	ager is enable	d 🕱			
	Nam	e AVG1			
	Inpu	t [AI1] Flow SP	-	gpm	
	Min - Ma	x 0 - 2000 gpm			
	Output Variabl	e [VAR] AVG1		gpm	•
	Min - Ma	x 0 - 2000 gpm			
A	veraging perio	d 1 hours 🔻			
Display	y on home pag	e 🗌			
22		133-Flow-F	P1+P2+X	117D-V2	0.rdx

Figure 6.75

**Averager is enabled:** If checked, an internal variable is created, and the moving average of the specified input is logged to the internal variable.

Name: Specifies the name of the internal variable that holds the moving average.

**Input:** Specifies the input or variable that is averaged.

Input Min – Max: Displays the minimum and maximum value of the input.

Output Variable: Displays the name of the internal variable that holds the moving average.

**Output Units:** Units to use when writing average to output variable.

**Output Min – Max:** Displays the minimum and maximum value of the output.





**Averaging Period:** Specifies how far back in history the average will be taken over (e.g. If 1 hour is specified, the moving average is always taken over the past 1 hour.)

**Display on home page:** If checked, the average value will be displayed at the bottom of the home page.

6.2.4.4 General Tab Settings

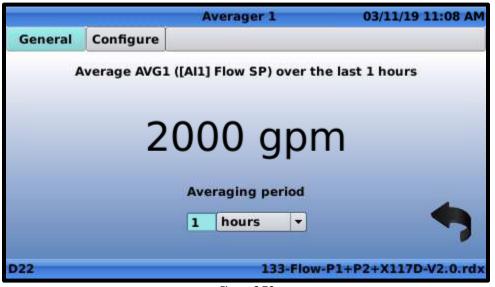


Figure 6.76

The general tab displays the current average and has a shortcut to change the averaging period that available on the configure tab as well. See section 6.2.4.3 for more information.

#### 6.2.5 Actions

#### 6.2.5.1 Description

Actions allow the user to define conditions, and then specify an action the VC-22D will take if the conditions are met. For example, actions can be used to force a solenoid open if a particular analog input is below a certain value.

#### 6.2.5.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "!Actions!"



Installation, Operation, and Maintenance Manual





Figure 6.77

There are four action tabs, one for each available action. Each tab has the same configuration parameters described below.

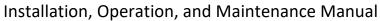
Description: User friendly description of the action

**!A! Enabled/Disabled:** Clicking this button enables/disables the action. When the action is disabled, it will not write anything to the specified output even if the conditions are met. The button says "!A! Enabled" when the action is enabled and "!A! Disabled" when disabled.

**Condition 1/2:** Summarizes conditions that trigger the action on or off. When the action is triggered on, it sends a value to a specified output/variable. When the action is triggered off, it stops sending that value. Highlighting the condition and pressing "OK" opens the page described in the section 6.2.5.3.1.

**AND/OR:** The AND/OR dropdown specifies whether one or both conditions must be true to trigger the action on. If "AND" is selected, both conditions must be true. If "Or" is selected, only one condition must to true.

**Output:** Specifies what is written to an output or variable when the action is triggered on or off. Highlighting the output and pressing "OK" opens the page described in section 6.2.5.3.2.



6.2.5.3.1	Condition Screen

	Condi	tion 1	03/1	1/19 01:02 F
Condition				
C1 ON when				
[Al1] Flow SP	₹ <	value -	•	-
	50	Hys	it. 5	gpm
C1 OFF when >= 55	5 gpm			
				-
		100 51-00		
2		133-Flow	-P1+P2+X	117D-V2.0.r



This page defines what range of values an input or variable must have for the action to be triggered on/off. The leftmost dropdown specifies the input or variable. The middle dropdown menu specifies whether that value must be greater than, equal too, or less than a comparison value. The rightmost dropdown specifies the source of the comparison value (input, variable, or user specified value). The hysteresis textbox specifies the distance between the "trigger on" value and "trigger off" value. Using a hysteresis prevents the action from being triggered on/off frequently.

If the rightmost dropdown is set to "-value-", then an additional text box appears allowing the user to enter a specified value.

		Action	08/27/19 07:19 P
Value to ap	ply		
Output	[SO1] Closi	ng Solenoid 🔫	
Value ON	100	%	
Value OFF	Restore pre	evious value 🔹	
Delay Optio	ons		
Activation	delay (s) 0	Deactivation d	elay (s) 0
Min. dur	ation (s) 0		
	Dne-shot 🗌		
2-35371909	2213469		131-Flow-Mag-V2.0.rd

#### 6.2.5.3.2 Output Screen





Installation, Operation, and Maintenance Manual

**Output:** Specifies the output or variable that is written too.

Value On: Specifies the value that's written to the output.

Value Off: Specifies what is written when the action is triggered off. There are three options:

- 1. No action: Output value is left unchanged when action is triggered off
- 2. Restore previous value: Output is returned to value that held before action was triggered on
- 3. Set value to: A new textbox appears, and output is set equal to the value in the new textbox when the action is triggered off.

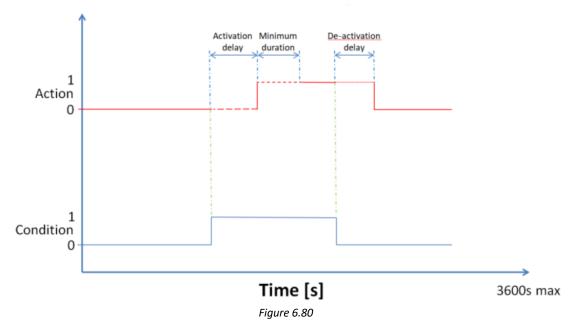
**One-Shot:** When one-shot is disabled, the action becomes active when the conditions are true and becomes inactive when the conditions are false (after appropriate delays). When one-shot is enabled, the action becomes active when the conditions are true, and then deactivates after a time delay.

When one-shot is disabled, the following settings are visible. See **FIGURE 6.** for a visual depiction of the settings.

Activation Delay: Specifies the number of seconds the conditions must be true before the action will activate.

**Deactivation Delay:** Specifies the number of seconds the conditions must be false before the action will de-activate.

**Min. Duration:** Specifies the minimum number of seconds the action will be held on for after it becomes active.



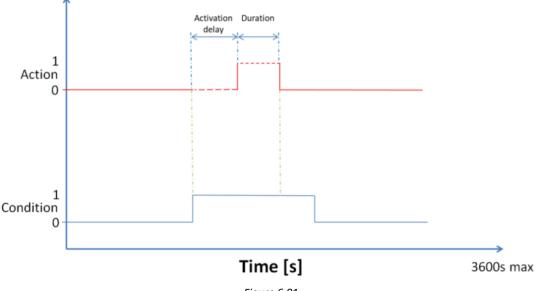
When one-shot is enabled, the following delay options are visible. See **FIGURE 6.** for a visual depiction of the settings.

Activation Delay: Setting works the same as when One-Shot box is unchecked.



# Installation, Operation, and Maintenance Manual

Duration: Specifies the number of seconds the action will remain active after conditions are met





#### 6.2.6 Signal Retransmission

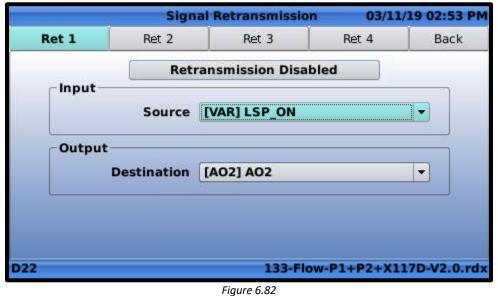
#### 6.2.6.1 Description

Signal retransmission reads the value in a specified input or variable and writes it to an analog output.

#### 6.2.6.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "Signal Retrans"

#### 6.2.6.3 Signal Retransmission Settings





# Installation, Operation, and Maintenance Manual

There are four signal retransmission tabs, one for each available signal retransmission. Each tab has the same configuration parameters described below.

**Retransmission Enabled/Disabled:** Clicking this button enables/disables the signal retransmission. When the retransmission is disabled, it will not write anything to the specified output. The button says "Retransmission Disabled" when the action is enabled and "Retransmission Disabled" when disabled.

**Input Source:** Specifies the input or variable whose value will be sent via an analog output.

**Output Destination:** Specifies the analog output that will be written too.



### 6.2.7 Totalizer

### 6.2.7.1 Description

The totalizer continually tracks the total volume of water that's flowed through the valve by monitoring the current flow rate. The total volume can be outputted to a variable or analog output.

The totalizer function is only enabled in certain ValvApps and can be created by users through the VC-22D controller, the user can choose any standard or custom ValveApp and add a totalizer if required.

#### 6.2.7.2 Navigation Path

- 1. Start at the home screen
- 2. Long up
- 3. Click on "Totalizer #"

#### 6.2.7.3 Totalizer Settings

1	Edit Totalizer 1		12/05/23	12:55 PM
Description	TOTALIZER 1			
Source	[DI2_F] Flow		•	
Output	[VAR] Volume		•	
Active when	ALWAYS	-		
Current Value	10.0 m3			
Last reset	08/24/18 02:57 AM			
Reset	0.0	Apply	]	
Display on home page				
16inFlowControl			A-LAGUNIA	-V3.0.rdx

Figure 6.83

Description: User friendly description of the Totalizer

**Source:** Specifies the analog input or variable that has the current flow rate through the valve

Output: Specifies the variable or analog output that the total volume is written too

Active when: Allows the totalizing function to be paused when a certain condition is met

Current Value: Displays the total volume being written to the output currently

Last reset: Date and time the totalizer was last reset

Reset: Value that the total value will be reset to when the apply button is clicked

Display on Home Screen: Ability to add the totalizer value to home screen



### 6.2.7.4 Adding a totalizer

The VC-22D allows the ability to add a totalizer using the VC-22D controller in a user-friendly manner, if a standard or custom ValveApp which included a totalizer, user is able to add, edit, remove any created totalizers, as shown below in **FIGURE 6**.

	Totalizer	Access	12/05/23 01:03 PM
2102 Totalizer 1	2102 Totalizer 2	2100 Add Totalizer	
			•
16inFlowControl		L	A-LAGUNIA-V3.0.rd>

Figure 6.84

\*\*note: If the totalizer is set to be retransmitted, user must ensure that an analog output is added and configured for Volume, refer to section 6.2.10.4.

#### 6.2.8 eDrive34

#### 6.2.8.1 Description

Allows a 34 series actuator to be configured through the VC-22D. The 34 series actuator must be connected to the VC-22D over an RS485 cable. The eDrive34 function in the VC-22D offers the same capabilities of the Windows based eDrive software but does not require a laptop or special orange connecting cable.

The eDrive34 function will only be available in the ValvApp if a 34 series actuator is probably connected to the VC-22D at the time the VC-22D powers on. After the actuator is first connected to the VC-22D, the VC-22D must be rebooted before the eDrive34 function is visible.

#### 6.2.8.2 Navigation

- 1. Start at the home screen
- 2. Long up
- 3. Click on "eDrive32"

#### 6.2.8.3 eDrive34 Settings

See series 34 actuator documentation for eDrive configuration instructions.



### 6.2.9 Input Settings

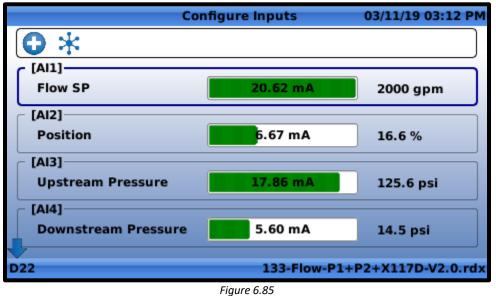
### 6.2.9.1 Description

The input settings show the current electrical signal being received on each analog/digital input and allow configuration changes to be made (e.g. input names, engineering units, and scaling).

### 6.2.9.2 Navigation Path

- 1. Start at the home screen
- 2. Long left

#### 6.2.9.3 Configure Input Settings



The configure inputs screen shows the number of milliamps being received by each analog input. It also shows the engineering value associated with the milliamp signal. Scrolling to the bottom of the page shows the on/off state of each digital input. Pressing short up or down changes which input is highlighted.

**Analog Input:** Highlighting an analog input as shown in **FIGURE 6.** and pressing short left opens the "configure analog input settings" screen (see section 6.2.9.5).

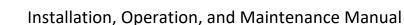


Figure 6.86

**Digital Input:** Highlighting a digital input as shown in **FIGURE 6.** and pressing short left opens the "configure digital input settings" screen (see section 6.2.9.6).



Figure 6.87





### 6.2.9.4 Adding inputs

Clicking the icon shown in **FIGURE 6.** allows the user to add an unused analog/digital input channel. Newly added inputs can be used in places like actions, signal retransmission, remapping, or be displayed on the home screen. When the add input icon is clicked, a new screen appears as shown in **FIGURE 6.**. The screen shows a list of spare analog/digital inputs, and selecting one adds the input to the "configure input settings" screen.



Input	Preconfigure	ed Name
AI5	AI5	
AI6	AI6	
DI1_C	DI1_C	
DI1_F	DI1_F	
DI2	DI2	
DI2_C	DI2_C	
DI2_F	DI2_F	-
DI3	DI3	

Recopy Input: Clicking the icon shown in FIGURE 6. allows the user to copy the value of one

analog/digital input to another. See section 6.2.9.7.





Installation, Operation, and Maintenance Manual

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
<b>f</b>	Input Al	1			03/11/	19 03	:15 PM
Display Name	Flow SP						
Units	Flow	-	gpm	-			
Decimal	0	-			-		
Signal Type	4-20 mA	-	]				
4 mA = min	0		gpm		1		
20 mA = max	2000		gpm		<b>1</b>		
Signal filter	70.00		%				
Lost Signal (< 3.6mA)	Keep val	Je		-			
Use as RSP/LSP	×				llos		-
Display on home page					- All		
					AN SIA		
D22		13	3-Flow-	P1+P	2+X11	7D-V2	2.0.rdx



Display Name: User friendly name of the analog input

Units: Specifies the engineering units associated with the scaled value

Decimal: Number of decimal places to display on the screen when showing the value of the analog input

Signal Type: Always fixed at 4-20mA. Indicates the following input is for an analog signal.

4 mA = min: Specifies the scaled value that is represented by a 4 mA signal

20 mA = max: Specifies the scaled value that is represented by a 20 mA signal

**Signal Filter:** Specifies how much noise will be filtered out of the analog signal. The higher the number, the more noise removed. An analog signal with a high filter will change slower as well.

**Lost Signal (< 3.6 mA):** Specifies what will occur if the analog signal drops below 3.6 mA (which normally occurs if the signal wires are disconnected. The allowed options are:

- 1. Do nothing: Continue calculating the scaled value based on the milliamp signal. (e.g. If the signal is 3.2 mA, interpolate the scaled value based on the 4 mA min and 20 mA max scaled values.)
- 2. Keep value: Keep the value that existed in the analog input just before the signal was lost
- 3. Default value: Revert to a default value. A new textbox appears to the right which allows the user to specify the default value.

**Use as RSP/LSP:** By checking this box, the analog input becomes a setpoint and the user can then toggle the input between remote setpoint (RSP) and local setpoint (LSP) mode. See section 8.1.2 for a description of RSP/LSP mode.

**Display on home page:** By checking this box, the value of the analog input will be displayed at the bottom of the home screen.



# Installation, Operation, and Maintenance Manual

Checkbox Icon: Clicking the icon shown in FIGURE 6.92 saves changes and navigates back to the configure inputs screen.



Trashcan Icon: Clicking the icon shown in FIGURE 6. cancels any changes and navigates back to the configure inputs screen.



**Configure Remote Recopy:** The icon shown in **FIGURE 6.** is not applicable to North America, as it requires a cellular connection. This is a European feature only.



Configure min/max milliamps: Clicking the icon shown in FIGURE 6. opens the page shown in FIGURE 6.



G	Calibration	03/11/19 03:37 PM
Custom Scaling		
Flow SP		
2000 gpm	20.00 mA Acquire HI	]
	20.62 mA	
0 gpm	4.00 mA Acquire LO	
		1
D22	133-Flow-P1	+P2+X117D-V2.0.rdx
	Figure 6.96	

Figure 6.96



# Installation, Operation, and Maintenance Manual

The custom scaling screen shown in **FIGURE 6.** allows the minimum and maximum milliamp range to be changed. This is useful for cases when the analog input ranges from 0-25mA instead of 4-20mA. Parameters on the screen are described below:

Max Milliamps: Specifies the maximum allowed milliamps on the analog input.

**Acquire HI:** Clicking this button reads the current milliamps received on the analog input and writes that value to the Max Milliamps text box.

**Minimum Milliamps:** Specifies the minimum allowed milliamps on the analog input.

**Acquire LO:** Clicking this button reads the current milliamps received on the analog input and writes that value to the Min Milliamps text box.

If custom scaling changes are made, the "4 mA = min" field on the configure inputs screen is updated with the new minimum milliamps and the "20 mA = max" field is updated with the new maximum milliamps.



ត	DI1 Digital	03/12/19 07:26 AM
Display Name	DI1	
Use as RSP/LSP		
Display on home page		
D22	133-Flow	-P1+P2+X117D-V2.0.rdx

Figure 6.97

Display Name: User friendly description of the digital input.

**Use as RSP/LSP:** By checking this box, the digital input becomes a setpoint and the user can then toggle the input between remote setpoint (RSP) and local setpoint (LSP) mode. See section 8.1.2 for a description of RSP/LSP mode.

**Display on home page:** By checking this box, the value of the analog input will be displayed at the bottom of the home screen.



Installation, Operation, and Maintenance Manual

Recopy 1		Input Recopy	03/12/	19 07:51 /
кесору з		Recopy 3	Recopy 4	Back
– Sou		Recopy Disabled	1	
300	[AI2] Position			
Des	tination			
	[AI5] AI5			-



Recopy input is used when an input is wired to a channel on the VC-22D that is different than what the ValvApp is expecting (e.g. the position feedback is wired to Al2 but the ValvApp is reading Al5 for position feedback). If it's too difficult to change the wiring, the recopy input feature will allow the user to continually copy the value from Al2 to Al5. There are four tabs on this screen, one for each available remap. Each tab has the same parameters, and a description of each parameter is below:

**Recopy Disabled:** Clicking this button enables/disables the input remap. When the remap is disabled, it will no longer copy the value of the source input to the destination input. The button says "Recopy Enabled" when it's enabled, and "Recopy Disabled" when it's disabled.

**Source:** Specifies the source of the value being copied. All inputs are listed in the source dropdown.

**Destination:** Specifies the destination that the source value is being copied too. Only inputs with the same engineering units and scaling as the source are available in the destination dropdown.

### 6.2.10 Output Settings

#### 6.2.10.1 Description

The output settings show the current electrical signal being sent on each analog/digital output and allow configuration changes to be made (e.g. output names, engineering units, and scaling).

#### 6.2.10.2 Navigation Path

- 1. Start at the home screen
- 2. Long right



Installation, Operation, and Maintenance Manual

### 6.2.10.3 Configure Output Settings

Configure Outputs	03/12/19 08:29
0 gpm	4.00 mA
1	
0.0 %	0.00 %
100.0 %	100.00 %
122 Ela	w-P1+P2+X117D-V2.0.1
	0 gpm 1 0.0 % 100.0 %

Figure 6.99

The configure outputs screen shows the number of milliamps being sent by each analog output. It also shows the engineering value associated with the milliamp signal. Scrolling to the bottom of the page shows the on/off state of each digital output. Pressing short up or down changes which input is highlighted.

**Analog Output:** Highlighting an analog output as shown in **FIGURE 6.** and pressing short right opens the "configure analog input settings" screen (see section 6.2.10.5).



rigure 0.100

**Digital Output:** Highlighting a digital output as shown in **FIGURE 6.** and pressing short right opens the "configure digital output settings" screen (see section 6.2.10.6).

[RO1]		
Relay Out	1	

Figure 6.101



# 6.2.10.4 Adding Outputs

Clicking the Shown to the top left of the configure outputs screen in **FIGURE 6.** allows the user to add an unused analog/digital output channel. Newly added outputs can be used in places like actions, signal retransmission, or be displayed on the home screen. When the add output icon is clicked, a new screen appears as shown in **FIGURE 6.**. The screen shows a list of spare analog/digital outputs, and selecting one adds the input to the "Activate Output Setting" screen.

	Configure Outputs	12/06/23 05:47 AM
0		
[A01]		
CRL-34 CMD	116.6 l/s	5.70 mA
- [AO2]		
CRD-34 CMD	46.9 psi	9.06 mA
[AO3]		
Total Retrans	10.0 m3	4.00 mA
- [SO1]		
Latching Solenoid	1.0 %	1.00 %
6inFlowControl		LA-LAGUNIA-V3.0.rd

Figure 6.102

AO4 AO4 RO1 RO1 RO2 RO2		Preconfigured Name
	AO4	
RO2 RO2	RO1	
	RO2	
SO2 SO2	SO2	
502		RO1 RO2



\*\*note: once an output is selected and added to controller will refer back to the analog outputs screen in which where the new added output will be showing to be configured.



Installation, Operation, and Maintenance Manual

6.2.10.5	Configure .	Analog	Output
----------	-------------	--------	--------

ſ	Output AO1				03/12/19 08:34 AI		
<b>Display Name</b>	Flow Rate	e					
Units	Flow	-	gpm	-			
Decimal	0	-			-		
Signal Type	4-20 mA	-					
4mA =	0		g	pm			
20mA =	2000		g	pm			
Default value	0		9	pm			
Ramping	OFF		0	/min	i		
Display on home page						1	
							)
22		13	B-Flow-P	1+P	2+X117	D-V2.0	.rd

Figure 6.104

Display Name: User friendly name of the analog output

Units: Specifies the engineering units associated with the scaled value

**Decimal:** Number of decimal places to display on the screen when showing the value of the analog output

Signal Type: Always fixed at 4-20mA. Indicates the following output is for an analog output.

4 mA = min: Specifies the scaled value that is represented by a 4 mA signal

20 mA = max: Specifies the scaled value that is represented by a 20 mA signal

Default value: Specifies the value used for the analog output before the VC-22D writes a value to it.

**Ramping:** Ramping causes the analog output to gradually change from a previous value to a current value. The ramping number specifies the amount the output will change per minute. A larger number causes the output to change slower. Specifying "Off" or 0 removes all ramping, and the analog output changes from previous value to current value immediately.

**Display on home page:** By checking this box, the value of the analog output will be displayed at the bottom of the home screen.



Installation, Operation, and Maintenance Manual

6.2.10.6	Configure	Digital	Output
----------	-----------	---------	--------

6	Output	S01	08/28/19	12:28 AM
Display Name	Closi	ng Solenoid		
Туре	PWM			
Cycle Time	5	sec		
Default Value	0	%		
Display on home page				
Power optimisation				
				•
D22-353719092213469			1-Flow-Mag	-V2.0.rdx

Figure 6.105

Display Name: User friendly description of digital output

Type: Specifies if digital output is on/off or PWM. See section 6.2.2.5 for description of PWM.

- 1. **Digital output:** changes the digital output to a dry contact in which can be used for a secondary action by the controller.
- 2. **PWM:** pulse width modulation in which pulses are sent to digital outputs for proper control.
- 3. Latching Output (1/0): send one pulse for a latching output to activate or de-activate a latching solenoid , 1 = 12-24VDC+ , 0 = 12-24VDC-.

**Cycle Time:** This setting is only available when Type is set to PWM. This specifies the PWM cycle time. See section 6.2.2.5 for more details.

Default Value: Value outputted before VC-22D writes a value to digital output.

**Display on home page:** By checking this box, the value of the analog output will be displayed at the bottom of the home screen.

**Power optimization:** When unchecked, the VC-22D will send a continuous high voltage signal whenever the output is active. When checked, the VC-22D will send a continuous high voltage followed by a series of high frequency pulses. This feature is intended to be used when the digital output is connected to a solenoid. The continuous signal actuates the solenoid and then the high frequency pulses maintain the position. This allows less power to be sent to the solenoid which reduces solenoid temperature. By default, the setting is disabled. This feature has only been validated on solenoids attached to Cla-Val's sold in the European market. It is recommended to keep this feature disabled unless told to enable it by a Cla-Val representative.



# 7 Web Interface

The VC-22D has a web interface which allows for basic administrative tasks like uploading new ValvApps or downloading log files via a web browser. The web interface can be enabled/disabled using the VC-22D display per section 6.1.17.3. The following sub sections detail how to access the web interface and navigate within it.

All information available on the web interface is also available directly via the VC-22D's display. The web interface simply provides an alternative means of accessing/configuring some of the VC-22D settings.

# 7.1 Access the Web Interface

Connect a computer to the VC-22D via an Ethernet cable. Ensure the computer is on the same IP subnet as the VC-22D (see section 6.1.11.3). Open the computer's internet browser and go to the VC-22D's URL (see section 6.1.17.3).

# 7.2 Navigating the Web Interface

The VC-22D's web interface consists of a navigation bar on the left hand side that lists each page of the interface. The home page is the "Information" page which is shown in **FIGURE 7.1** and described in a following section.

🖷 🖅 Web Engine - Informativ X + 🗸 — 🗆 X								×	
$\leftarrow$ $\rightarrow$ $\circlearrowright$ $\widehat{\mathbf{a}}$	ش         ن         192.168.1.120/information.php         ن         ل         <								
🛩 Wrike 🜰 OneDrive 🔯	『Wrike 🔌 OneDrive 🔝 SharePoint ☆ Doc Retrieval System ☆ ISO Process 🦳 MSDS Search 📓 Dayforce ☆ Shiva ☆ Every Cloud 🖸 Concur 醇 Outlook Web App								
Web-Engine	=								
	Identification		^	Version	^	System Info		^	
	S/N IMEI	353719092213469		Engine	2.5.0	Uptime	0 days, 17h 46m		
APP. MGMT	SIM ICCID	UNKNOWN		Kernel	2.6.35.3 Wed Nov 28 16:18:38 CET 2018	Load average	2.78 2.95 3.04		
X ADVANCED	Host Name	D22-353719092213469		R-Loader md5	31d39aaaac3c995f3243625f4a258f02	RAM usage	66100K used, 56076K free		
	Contact			Modem	GL865-QUAD-V3: 16.01.141		Export Information		
		Edit		Microchip	00.02.12.00				
	Order ID								
	© 2019 Cla-Val								v0.1

Figure 7.1

### 7.2.1 Information Page

The "Information" page is shown in **FIGURE 7.1**. It provides general status information about the VC-22D. All information displayed on this page can also be found on the "Information" screen of the VC-22D (see section 6.1.1).



7.2.2 Logging Page

🖶 🖅 🖂 Web Engine - L	Logging $\times$ + $\vee$					-		×
$\leftarrow$ $\rightarrow$ O $\textcircled{a}$	() 192.168.1.120/logging.php				□ ☆	r∕≡	l e	÷ …
🛩 Wrike 🜰 OneDrive 🔢	SharePoint ☆ Doc Retrieval System ☆	7 ISO Process 🔤 MSDS Search 🔠 Dayforce 슜 Shiva ☆	7 Every C	loud 🖸 Concur 🧕 Outlook Web	App			
Web-Engine	=							
	Configuration		^	Export				^
	Logging enabled			Chose the log files to export:	<ul> <li>Log files for the last 24 hours</li> <li>Log files for the last 7 days</li> </ul>			
АРР. МБМТ	Loggging Interval	5 minutes Edit			<ul> <li>Log files for the last 7 days</li> <li>Log files for the last 30 days</li> <li>All log files</li> </ul>			
X ADVANCED	Transfer Interval	30 minutes			Ø			
		Edit			Export Log files			
	© 2019 Cla-Val							v0.1

Figure 7.2

The logging page displays the same settings available on the "Configure Logs" screen (see section 6.1.8) and "Export Logs" screen (see section 6.1.9) of the VC-22D display. Logging can be disabled, the frequency of logging can be adjusted, and the log files for a particular time frame can be downloaded from the controller to your computer.



🖷 \land 🖂 Web Engine -	Applicatic $\times$ + $\vee$		- 🗆 X
$\leftarrow$ $\rightarrow$ O $\Leftrightarrow$	① 192.168.1.120/app_mgmt.php		
🛩 Wrike 🜰 OneDrive 🔯	SharePoint ☆ Doc Retrieval System ☆ ISO Process	- MSDS Search 📓 Dayforce 🛧 Shiva 🛧 Every Cloud 🖸 Concur 📴 Outlook Web App	
Web-Engine	=		
	Backup Application	Restore Application	Import Application
	Create and save backup of the current ValvApp		Browse
APP. MGMT	<ul> <li>Automatically back up locally every day at 23:45</li> <li>Automatically back up to FTP server</li> </ul>	Restore Application Export Application	Import Application
X ADVANCED	Attomatically back up to FIP server at 2345 if the ValApp has been changed. NOTE: can generate uo to 250 KB per transfer. Backup Now		
	© 2019 Cla-Val		v0.1

Figure 7.3

The app management page provides the same capabilities available on the backup, restore, export, and import application screens of the VC-22D (see sections 6.1.2 - 6.1.5). The page allows a backup of the current ValvApp to be saved to the VC-22D's permanent storage. It also allows a ValvApp that's been



Installation, Operation, and Maintenance Manual

previously backed up in the VC-22D's storage to be restored. Additionally, the current ValvApp can be exported to the computer or imported from the computer.

7.2.4 Adva	anced Page				
🖷 \land 🖂 Web Engine -	Advancec $\times$ + $\vee$				- 🗆 X
$\leftrightarrow$ $\rightarrow$ $\circlearrowright$ $\Uparrow$	① 192.168.1.120/advanced.php			L	t & L & …
🛩 Wrike 🔺 OneDrive 🔯	SharePoint 🔥 Doc Retrieval System 🔥 ISO Process 🔤	MSDS Search 灎 Dayforce ☆ Shiva ☆	Every Cloud 🖸 Concur 🧕 Outlook Web A	Арр	
Web-Engine	=				
	Engine Update	Diag->USB	^	Reboot	^
	Browse		20	•	
APP. MGMT	Update Engine		Export Diag	Reboot	
X ADVANCED					
	© 2019 Cla-Val				v0.1

Figure 7.4

The advanced page provides the same capabilities as available on the reboot, engine update, and diagnostics to USB screens of the VC-22D (see sections 6.1.19 - 6.1.21). This page allows for the VC-22D engine to be updated via a file stored on the computer, diagnostics files to be uploaded to the computer, and the VC-22D to be rebooted.



# 8 Valve Operation

The valve can be fully controlled using just the VC-22D's navigation buttons and display. The following sections described how to do valve control operations like setpoint changes and input/output overrides.

# 8.1 Setpoint Changes

A setpoint is considered to be any value that the user specifies and the VC-22D uses as a target for valve control. Examples of setpoints include flow rate setpoints, tank level setpoints, valve position setpoints, and downstream/upstream pressure setpoints. Setpoints are what operators specify to ensure the valve operates as required.

Setpoints are stored in the VC-22D as interactive variables, analog inputs, or digital inputs.

### 8.1.1 Interactive Variable

Interactive variables can be changed locally using the VC-22D display and navigation buttons. To change an interactive variable, do the following:

1. Starting from the home screen, press short down and wait for the interactive variable screen to be displayed as shown in **FIGURE 8.1**.

6	Panel	03/12/19 09:53 AM
CustCurve	False	▼
[VAR] DPMFlow	0 gp	m
[VAR] P2Offset	0.0 ps	i
Flow SP	2000 gp	m RSP LSP
D22	133-Flow-P1	+P2+X117D-V2.0.rdx

Figure 8.1



Installation, Operation, and Maintenance Manual

2. Highlight the interactive variable to be changed and press "OK". Enter the desired value as shown in **FIGURE 8.2**.

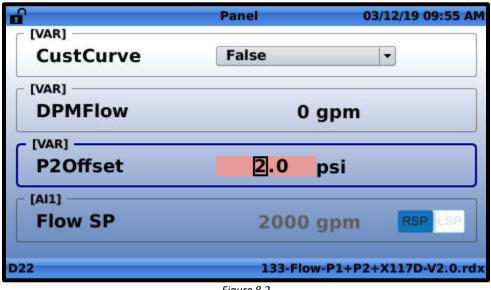


Figure 8.2

### 8.1.2 Remote/Local Setpoint

If a setpoint is being transmitted remotely as an analog or digital input, it's useful to be able to override the remote setpoint with a local setpoint. To enable a local override of a remote setpoint, follow the instructions in section 6.2.7 and check "Use as RSP/LSP". Once this box is checked, the input then gets listed in the interactive variable list and can be changed like an interactive variable. To change a setpoint with RSP/LSP enabled, do the following:

1. Starting from the home screen, press short down and wait for the interactive variable screen to be displayed as shown in **FIGURE 8.3**.

ſ	Panel	03/12/19 09:53 AM
	······	
CustCurve	False	<b>_</b>
[VAR]		
DPMFlow	0 gp	om
_ [VAR]		
P2Offset	0.0 ps	i
_ [AI1]		
Flow SP	2000 gp	om RSP LSP
D22	133-Flow-P	1+P2+X117D-V2.0.rdx

Figure 8.3



Installation, Operation, and Maintenance Manual

2. Use the up and down navigation buttons to highlight the input to be changed as shown in **FIGURE 8.4**.

Panel	03/12/19 10:03 AM
False	<b>•</b>
0	gpm
1.0	psi
2000	gpm RSP LSP
133-Eloy	w-P1+P2+X117D-V2.0.rd
	False 0 1.0 2000

Figure 8.4

Use the left and right navigation buttons to highlight the "RSP/LSP" graphic as shown in FIGURE
 8.5.

<b>1</b>	Panel	03/12/19 10:05 AM
[VAR]		
CustCurve	False	+
[VAR]		
DPMFlow	0 gp	m
_ [VAR]		
P2Offset	1.0 ps	i
- [AI1]		
Flow SP	2000 gp	m RSP LSP
D22	133-Flow-P1	+P2+X117D-V2.0.rdx

Figure 8.5

4. Press "OK" so the "LSP" is highlighted in green as shown in **FIGURE 8.6**.



Installation, Operation, and Maintenance Manual

6	Panel	03/12/19 10:07 AM
- [VAR]		
CustCurve	False	•
[VAR]		
DPMFlow	0 g	Ipm
[VAR]		
P2Offset	1.0 p	si
C [AI1]		
Flow SP	0 g	IPM RSP LSP
D22	133-Flow-	P1+P2+X117D-V2.0.rdx
	Figure 8.6	

5. Use the left and right navigation buttons to highlight the numerical value and press "OK". Enter the desired numerical value as shown in **FIGURE 8.7**.

Ĵ	Panel	03/12/19 10:10 AM
[VAR]		
CustCurve	False	-
[VAR]		
DPMFlow	0	gpm
[VAR]		
P2Offset	1.0	psi
- [AI1]		
Flow SP	300	gpm RSP LSP
022	133-Flow	v-P1+P2+X117D-V2.0.rd
	Figure 8.7	

To remove the local override, follow the procedure above but change the "RSP/LSP" graphic to "RSP". The value will then revert back to the remote setpoint.

# 8.2 Local Input Override

At times, it's useful to override an input or output signal going to or from the VC-22D. Overriding inputs is generally needed when a sensor is either malfunctioning or not wired yet, but the valve still needs to be controlled. The user can override an input with an approximate value that should be coming from the sensor.



To override an input, do the following:

1. From the home screen, press short left and wait for the input values screen to appear as shown in **FIGURE 8.8**.

Mart Costs	uts 03/12/1	9 10:44 A
Flow SP	2000 gpm	RSP
[AI2]		
Position	16.6 %	_
_ [AI3]		
Upstream Pressure	125.4 psi	
- [AI4]		
Downstream Pressu	re 14.5 psi	
7		
22	133-Flow-P1+P2+X117	/D-V2.0.rd

Figure 8.8

2. Use the up and down navigation buttons to highlight the input to be overridden as shown in **FIGURE 8.9**.

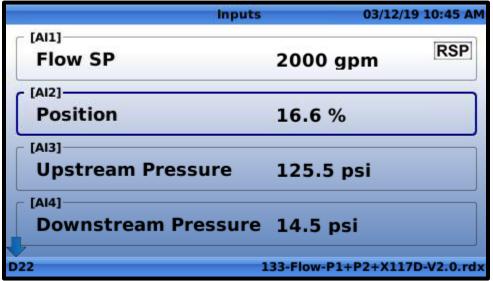


Figure 8.9



- Installation, Operation, and Maintenance Manual
- 3. Press short left and wait for the override screen to appear as shown in FIGURE 8.10.



Figure 8.10

4. Press "OK" and input the desired value as shown in **FIGURE 8.11**.

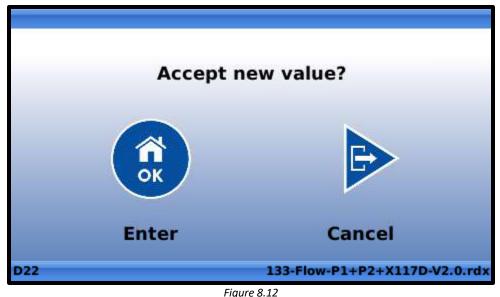


Figure 8.11

5. Press "OK" and wait for the screen shown in **FIGURE 8.12** to be displayed. Confirm the change by pressing "OK" or press the right navigation button to cancel.



Installation, Operation, and Maintenance Manual



#### 5----

### 8.3 Local Output Override

Overriding outputs is typically necessary when testing solenoids on the valve. Outputs are overridden using a similar procedure for inputs. To get to the output values screen, press short right. Then highlight the output to override and press short right again. Reference the input override procedure in section 8.2 for additional instructions.

# 9 Modbus Interface

The VC-22D has a Modbus server. It supports Modbus TCP/IP and Modbus RTU. The device's Ethernet port can be used for Modbus TCP/IP communications, and the RS232 and RS485 ports are available for Modbus RTU communications. Both Modbus TCP/IP and RTU can be used simultaneously. **However, at no point should the Modbus client send requests to the VC-22D faster than 1 per second. Sending requests faster than 1 per second results in undefined behavior.** 

The Modbus registers hold the VC-22D's inputs, outputs, and variable values. It also stores status bits for each IO point that indicate if a 4-20mA sign is out of range, a local override is enabled, an alarm is active, etc. Modbus clients can read these registers to monitor the VC-22D. A client can also place individual inputs and outputs in an override mode, and then overwrite the VC-22D's input/output value. Override mode is beneficial for clients that need to send a setpoint or sensor value to the VC-22D.

The VC-22D Modbus server can operate using one of two mapping schemes, "Standard" or "Cla-Val". "Standard" is the newest scheme and was introduced with engine 2.5.0. It organizes the registers in a way that is consistent with most other industrial control devices. "Cla-Val" is a legacy scheme that was used prior to engine 2.5.0 and has been left as an option in new engines for backwards compatibility. The "standard" scheme is recommended and is enabled by default in new VC-22Ds. VC-22Ds that are upgraded from a previous engine will maintain whatever mode the server was in before the upgrade.

Shown in table below is the VC-22D Modbus addresses map for all inputs/outputs.



# Installation, Operation, and Maintenance Manual

\*\*note: For additional Modbus detailed information, please refer to Appendix A.

Modbus	Input	Description	Data	Access	I/O	Comments
			Туре		Mapping	
40007 Bit 0	Al1	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address43000/43001
40007 Bit 1	AI2	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address43002/43003
40007 Bit 2	AI3	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address43004/43005
40007 Bit 3	AI4	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI4 Input to use Modbus Address43006/43007
40007 Bit 4	AI5	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address43008/43009
40007 Bit 5	AI6	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address43010/43011
40008 Bit 0	DI1	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1	DI2	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2	DI3	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3	DI4	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4	DI5	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5	DI6	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
					,	
41000	DI1	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41001	DI2	Digital Input	Word	Read/Write	DI2	Register Holds/Reads DI2 Value
41002	DI3	Digital Input	Word	Read/Write	DI3	Register Holds/Reads DI3 Value
41003	DI4	Digital Input	Word	Read/Write	DI4	Register Holds/Reads DI4 Value
41004	DI5	Digital Input	Word	Read/Write	DI5	Register Holds/Reads DI5 Value
41005	DI6	Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
41006	SO1	Digital Output	Word	Read	SO1	Monitory Purposes (Optional)
41007	SO2	Digital Output	Word	Read	SO2	Monitory Purposes (Optional)
41008	RO1	Digital Output	Word	Read	SO3	Monitory Purposes (Optional)
41009	RO2	Digital Output	Word	Read	SO4	Monitory Purposes (Optional)
43000/43001	Al1	Analog Input	Int 32	Read/Write	Al1	Register Holds/Reads AI1 Value x100 for Two Implied Decimals
43002/43003	AI2	Analog Input	Int 32	Read/Write	AI2	Register Holds/Reads AI2 Value x100 for Two Implied Decimals
43004/43005	AI3	Analog Input	Int 32	Read/Write	AI3	Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007	AI4	Analog Input	Int 32	Read/Write	AI4	Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009	AI5	Analog Input	Int 32	Read/Write	AI5	Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011	AI6	Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037	A01	Analog Output	Int 32	Read	A01	Monitory - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039	AO2	Analog Output	Int 32	Read	A02	Monitory - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041	A03	Analog Output	Int 32	Read	A03	Monitory - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043	A04	Analog Output	Int 32	Read	A03 A04	Monitory - Register Holds AO4 Value x100 for Two Implied Decimals
	7.04					

Table 9.1



# 10 VC-22D Start-up & Tuning Commissioning Checklist

# 10.1 Installation Guide

Refer to VC-22D IOM (Appendix C) for field wiring, if a custom ValveApp refer to ValveApp worksheet.

### 10.1.1 Installation Checklist

Note: Ensure power is OFF to Control Panel and Breakers Flipped to OFF (Green)

- □ Verify location of mounted panel according to all local and federal regulations
- □ Verify solenoids orientation and voltage
- □ Ensure hubs or fittings with the same environmental rating match enclosure used
- □ Verify Wiring of solenoid(s) to the panel as required
- □ Verify Wiring of transmitter(s) to panel as required
- □ Verify Wiring of remote setpoint(s) to panel as required
- □ Verify Wiring of retransmission(s) as required
- □ Verify Wiring of alarm contact(s) as required
- □ Verify that correct terminal wiring connections have been made
- □ Confirm incoming power matches panel's designed limit
- □ Ensure incoming power is connected to devices using correct polarity
- □ Insure Cla-Val Cover is locked
- □ Following all local and federal codes, connect the power to the panel

### 10.2 Start-Up Guide

#### 10.2.1 Control Valve Checklist

- Ensure control valve installed in a Confined Space Area
- □ Ensure control valve installed in proper flow direction
- Ensure air is bled from main valve cover via bleed screw
- □ Isolate any hydraulic bypass present from main valve
- Ensure proper connections of pilot installed if exists
- □ Manually stroke main valve open and closed via by-pass ball valves
- Adjust any speed controls, restriction fittings if exists based on site conditions
- □ Ensure ability to flow water to set hydraulic pilots if exists

#### 10.2.2 Field Connection Checklist

\*\*note: Ensure power is OFF to Control Panel and Breakers Flipped to OFF (Green)

- □ Verify power supply wiring to Control Panel power terminals
- □ Verify wiring of opening/closing solenoids to open/close solenoid terminals on control panel
- □ Verify field sensor(s) wiring to corresponding terminals on control panel
- □ Verify setpoint(s) wiring, if exists to terminals on the control panel
- □ Verify digital input(s) wiring, if exists to terminals on the control panel
- □ Verify alarm(s)/indicator(s), output(s), wiring if exists to terminals on the control panel
- □ Restore power & flip breakers ON (Red)
- □ Ensure VC-22D power is ON
- □ Verify correct ValveApp is installed to VC-22D prior next steps



### 10.2.3 Solenoid Connections & Setup Checklist

- □ Verify valve mounted opening/closing solenoid orientation (NC/NO, etc.)
  - Navigate via: Long up > PID > Output
- $\hfill\square$  Ensure valve is closed by locking cover in position during testing
- □ Verify opening/closing solenoid operation and Setup (Override solenoid(s))
  - Navigate Via: long right > SO1, SO2 > home button > change value
  - Override the value of SO1 via home button click and changing value of SO1 to "50" to energize, an override "0" for SO1 will de-energize the solenoid.
  - Override the value of SO2 via home button click and changing value of SO2 to "50" to energize, an override "0" for SO1 will de-energize the solenoid.
  - Ensure solenoid clicks 50% of the cycle time, E.g: 5 (Sec) Cycle time, Solenoid will energize 2.5 (Sec).
- □ Unlock valve cover and verify main valve operation via valve mounted solenoid(s)
  - Navigate Via: long right > SO1, SO2 > home button > change value
  - Override the closing solenoid to "50" and ensure closure of valve
  - Override the opening solenoid to "50" and ensure opening of valve

### 10.2.4 Sensor Connections & Setup Checklist

- □ Verify sensor(s) connections by ensuring signal is being received
  - Navigate Via: Long left > Analog inputs
  - Locate "Analog Inputs"; value(s) should NOT be near zero as there is a signal present. Value should range between 4-20 mA
  - Sensors out of range may show less than 4 mA, verify Dip Switch orientation
- □ Verify sensor(s) Calibration zero & Span if other than 4-20 mA to be used
  - Navigate Via: Long left > Analog input > Override value
  - Override input to 4mA, it should be equal to "zero calibration" value
  - Override input to 20 mA, it should be equal to "Span Calibration" value
- □ Verify sensor(s) limits and units
  - Navigate Via: Long left > Analog input > Short left
  - Set "4mA = min value", set to minimum range of sensor
  - Set "20mA = max value", set to maximum range of sensor
  - Toggle units button till correct units are displayed

#### 10.2.5 Remote Setpoint Connections & Setup Checklist

- □ Verify remote sensor(s) connections and ensure signal is being received
  - Navigate Via: Long left > Analog inputs > RSP
  - Confirm correct Scaling of signals
  - Analog signal should not be near zero if signal is present, value should range between 4-20 mA.

- □ Verify calibration of remote setpoint(s) zero & Span
  - Navigate Via: Long left > analog inputs > RSP
  - Have remote system send a 4mA signal to VC-22D
  - Locate analog inputs in VC-22D it should be equal to 4 mA
  - Have remote system send a 20mA signal to VC-22D
  - Locate analog inputs in VC-22D it should be equal to 20 mA
  - If not, Send a 4 mA, calibrate low, send 20 mA, Calibrate high.

### 10.2.6 Set Tuning Parameters Checklist

- □ Set tuning parameters to default values as per tuning guide
  - Navigate Via: Long up > PID
- □ Verify valve specifications for DP Metering if exists and ensure flow reading
  - Navigate Via: Long up > DP Metering
- □ Ensure tuning parameters adjusted per tuning guide
- □ Perform process control checkout
  - Control main valve via remote setpoint
  - Allow main value to reach setpoint within +/- deadband
- □ Verify actions enable current conditions and set correct outputs
  - Navigate Via: Long up > Actions > Enable/Disable
- □ Verify valve specifications for DP Metering if exists and ensure flow reading
  - Navigate Via: Long up > DP Metering > Valve
- □ Verify valve modulates in correct direction when Feedback > Setpoint & Feedback > Setpoint
- □ Verify drip tight closure is correct If flow control application exists
- □ Verify all contingencies, "How should the valve react in loss of signal"



Installation, Operation, and Maintenance Manual

10.2.7 Transmitter Config	guration sheet
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	Transmitter cor	nfiguration		
Transmitter:	Transmitter:	Trai	Transmitter:	
Analog Zero	Analog Zero	Ana	log Zero	
Analog Span	Analog Span	Ana	log Span	
Max Limit	Max Limit	Max	< Limit	
Min Limit	Min Limit	Min	Min Limit	
Units	Units	Uni	ts	
Transmitter:	Transmitter:	Trai	nsmitter:	
Analog Zero	Analog Zero	Ana	log Zero	
Analog Span	Analog Span	Ana	log Span	
Max Limit	Max Limit	Max	Max Limit	
Min Limit	Min Limit	Min	Min Limit	
Units	Units	Uni	Units	
L	Control Confi	guration		
Process control	Process control	Pro	cess control	
Closing speed	Closing speed	Clos	Closing speed	
Opening speed	Opening speed	Оре	Opening speed	
Deadband	Deadband	Dea	Deadband	
SO1 Cycle time	SO1 Cycle time	SO1	SO1 Cycle time	
Output Limit %	Output Limit %	Out	Output Limit %	
SO2 Cycle time	SO2 Cycle time	SO2	SO2 Cycle time	
Output Limit %	Output Limit %	Out	put Limit %	
I	Setup Config	uration		
Opening solenoid orientation	n Normally Closed	Normally Open	Normally Open	
Closing solenoid orientation	Normally Closed	Normally Open	Normally Open	
Failure Mode	Fail open Fail Close		Fail Last	



### 10.3 PID Tuning Guide

### 10.3.1 PID Control

Cla-Val Controller "VC-22D" uses proportional–integral–derivative controller (PID), a control loop mechanism employing feedback, A PID controller continuously calculates an error value as the difference between a desired setpoint (SP) and a measured Process Variable (PV), and applies correction based on proportional, integral, and derivative terms.

Proper tuning of a PID Controller will steadily and precisely drive the (PV) towards the (SP), with least amount of overshoot over the Setpoint.

Note that Too high Proportional Gain will cause overshoot, and too low Proportional Gain will cause a slow response to the Valve.

The following table presents proportional Gain Values and the equivalent closing and opening percentage "%" in the VC-22D PID control.

Navigate Via: Long up > PID > Adjustment > Closing speed (%)/Opening speed (%). The VC-22D mostly requires Proportional value tuning while integral and derivative are rarely used.

Percentage P	Gain P
25	.413
50	1
70	1.976
75	2.425
80	3.08
85	4.143
87	4.762
88	5.11
90	6.35
91	6.97
92	7.87
93	9.29
94	10.309
95	12.93

Table 10.1 Proportional % VS Proportional Gain.



Installation, Operation, and Maintenance Manual

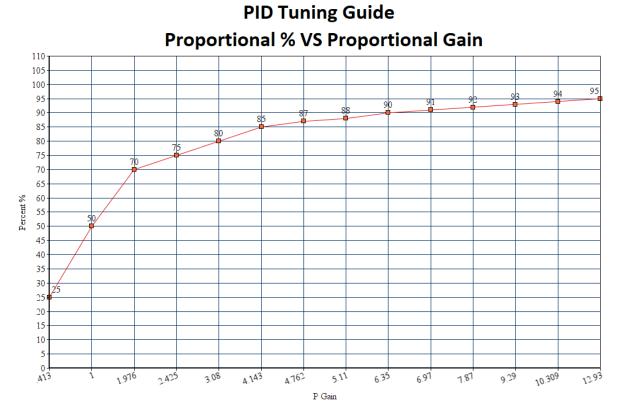
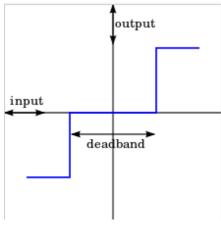


Figure 1. Proportional % VS Proportional Gain.

### 10.3.2 Deadband Tuning

Deadband can be used in control systems to prevent oscillation or repeated activation / deactivation cycles as shown in figure [2], tuning a deadband is very important to prevent continuous pulsing to the solenoids which will reduce the solenoid life cycle.

For example: If Setpoint (SP): 50, and Deadband: 5, controller will settle for setpoint at a process value between 45 and 55.





#### 10.3.3 Cycle Time

Solenoids are controlled by VC-22D using Pulse Width Modulation "PWM", and the solenoid is controlled based on a fixed cycle time.

Adjusting the cycle time will result in faster/slower opening/closing of the valve, the smaller the cycle time the better.

For example: If cycle time is: 5 sec , and solenoid energized at :50%, on time will be 2.5 sec and off time will be 2.5 sec.

#### 10.3.4 PID Tuning Table

Shown in table [2], the default and proper values of PID tuning configuration for each valve size,

Default PID Values:				
Valve Size (in/mm)	Closing Speed (%)	Opening Speed (%)	Deadband (%)	Cycle time (Sec)
1/25	50	50	3	2
1.25/32	50	50	3	2
1.5/40	50	50	3	2
2/50	50	50	3	2
2.5/65	50	50	3	2
3/80	50	50	3	2
4/100	75	75	5	5
6/150	75	75	5	5
8/200	75	75	5	5
10/250	75	75	5	5
12/300	75	75	5	5
14/350	75	75	5	5
16/400	75	75	5	7
18/450	85	85	5	7
20/500	85	85	5	7
24/600	87	87	5	7
30/650	87	87	5	7
36/900	87	87	5	7

Table 2. PID tuning Default values.

\*\*note: If valve shows a slow response start with increasing closing and opening speeds.

\*\*note: Increasing of Closing Speed and opening Speed can be in 5% increments, e.g.: 50,55, 60, etc.

\*\*note: If after increasing closing and opening speeds, valve still shows slow response, set closing and opening speeds to default values according to table above and increment Cycle time by 1 (sec) increments, e.g.: 5, 6, 7, etc.

\*\*note: If Valve is too fast start by decreasing closing and opening speeds by 5% decrements, e.g.: 75, 70, 65, etc.



Installation, Operation, and Maintenance Manual

\*\*note: If after decreasing closing and opening speeds, valve is faster than expected, set closing and opening speeds to default values according to the table above and decrease cycle time by 1 (sec), e.g.: 5, 4, 3, etc.

\*\*note: Smaller Deadband values will keep pulsing both solenoids which will cause damage to solenoids and shorten lifecycle.

### 10.4 Non-Conformances

\*\*note: Any Non-conformances must be filled in the following table:

	Non-Conformances				
NC Number	Description	Corrected	Corrected by		



Installation, Operation, and Maintenance Manual

By signing below, the inspector signifies that:

- 1. The inspection is complete
- 2. All non-conformances, if any, have been corrected
- 3. Wiring matches engineering drawings

Control Panel Serial Number	
Job Site Reference	
Name	
Date	
Signature	



### Appendix A: Modbus Standard Mode

Per the Modbus specification, the Modbus registers are broken into four primary tables:

- 1. Ox registers (Coil Table)
- 2. 1x registers (Discrete Input Table)
- 3. 3x registers (Analog Input Table)
- 4. 4x registers (Holding Table)

### A.1 Ox Registers (Coil Table)

The coils table provides the energized status of each digital output on the VC-22D. The following table describes the supported Modbus function codes and registers for the coils table:

Supported Function Codes			
O1 Read Coils			
Starting Register	Function	Data Type	Access
00000	SO1 Value Bit Read		Read Only
00001	SO2 Value	Bit	Read Only
00002	RO1 Value Bit Re		Read Only
00003	RO2 Value	Bit	Read Only

Digital outputs may be configured in digital mode or PWM mode, and that effects the value stored in the corresponding register. See section 6.2.10.6 for a description of digital mode and PWM mode. When the output is in digital mode, a register value of 1 means the output is energized, and a register value of 0 means the output is de-energized. When the output is in PWM mode, a register value of 1 means the output is sending a PWM signal greater than 0, and a register value of 0 means the output is de-energized.

### A.2 1x Registers (Discrete Input Table)

The discrete inputs table indicates the signal being received by each digital input. The following table describes the supported Modbus function codes and registers for the discrete inputs table:

	Supported Function Codes				
02 Read Dis	crete Inputs				
Starting Register	er Function Data Type Access		Access		
10000	DI1 Value	DI1 Value Bit Read			
10001	DI2 Value Bit Read O		Read Only		
10002	DI3 Value	Bit	Read Only		
10003	DI4 Value	Bit	Read Only		
10004	DI5 Value Bit Read Only		Read Only		
10005	DI6 Value Bit Read O		Read Only		



A register value of 1 means the digital input is detecting a closed circuit. A register value of 0 means the digital input is detecting an open circuit.

### A.3 3x Registers (Analog Input Table)

The input table indicates the analog signal being received by each digital input. The following table describes the supported Modbus function codes and registers for the analog inputs table:

Supported Function Codes				
04 Read Inp	O4 Read Input Register			
Starting Register	Function	Data Type	Access	
30000	AI1 Value	Float	Read Only	
30002	AI2 Value	Float	Read Only	
30004	AI3 Value	Float	Read Only	
30006	AI4 Value	Float	Read Only	
30008	AI5 Value	Float	Read Only	
30010	AI6 Value	Float	Read Only	
30012	DI1_C Value	Float	Read Only	
30014	DI2_C Value	Float	Read Only	
30016	DI3_C Value	Float	Read Only	
30018	DI4_C Value	Float	Read Only	
30020	DI5_C Value	Float	Read Only	
30022	DI6_C Value	Float	Read Only	
30024	DI1_F Value	Float	Read Only	
30026	DI2_F Value	Float	Read Only	
30028	DI3_F Value	Float	Read Only	
30030	DI4_F Value	Float	Read Only	
30032	DI5_F Value	Float	Read Only	
30034	DI6_F Value Float		Read Only	

The value stored in the registers is identical to the engineering value displayed on the VC-22D display. The value will be scaled, filtered, and any overrides will be applied. If a loss of signal exists, the loss of signal value will be stored in the registers.

### A.4 4x Registers (Holding Table)

The holding table contains registers that provide status information about inputs and outputs, allow Modbus override values to be written to inputs and outputs, and allow ValvApp specific variables to be modified. The following table describes the supported Modbus function codes and registers for the holding table:

### Supported Function Calls

- 03 Read Holding Registers
- 06 Write Single Registers



16 Write Multiple Registers			
Starting Register		Info	
40000	Function	Analog input out of range (OOR) status	
	Data Type	Word	
	Access	Read Only	
	Description	Each bit represents out of range status of an analog input. 1 means OOR active, 0 means OOR inactive. Bit 0 = AI1 OOR Status Bit 1 = AI2 OOR Status  Bit 5 = AI6 OOR Status	
		Bits 6-15 are unused and always 0	
40001	Function	Digital counter input out of range (OOR) status	
	Data Type	Word	
	Access	Read Only	
	Description	Each bit represents out of range status of a digital counter input. 1 means OOR active, 0 means OOR inactive. Bit 0 = DI1_C OOR Status Bit 1 = DI2_C OOR Status  Bit 5 = DI6_C OOR Status Bits 6-15 are unused and always 0	
40002	Function	Digital frequency input out of range (OOR) status	
	Data Type	Word	
	Access	Read Only	
	Description	Each bit represents out of range status of a digital frequency input. 1 means OOR active, 0 means OOR inactive. Bit 0 = DI1_F OOR Status Bit 1 = DI2_F OOR Status  Bit 5 = DI6_F OOR Status Bits 6-15 are unused and always 0	
40003	Function	Analog input local override (LOVR) status	
	Data Type	Word	
	Access	Read Only	



	_	
	Description	Each bit represents LOVR status of an analog input. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = AI1 OOR Status Bit 1 = AI2 OOR Status  Bit 5 = AI6 OOR Status
		Bit 5 = Alb OOR Status Bits 6-15 are unused and always 0
40004	Function	Digital input local override (LOVR) status
10001	Data Type	Word
	Access	Read Only
	Description	Each bit represents LOVR status of a digital input. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = DI1 OOR Status Bit 1 = DI2 OOR Status  Bit 5 = DI6 OOR Status Bits 6-15 are unused and always 0
40005	Function	Digital counter input local override (LOVR) status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents LOVR status of a digital counter input. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = DI1_C OOR Status Bit 1 = DI2_C OOR Status  Bit 5 = DI6_C OOR Status Bits 6-15 are unused and always 0
40006	Function	Digital frequency input local override (LOVR) status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents LOVR status of a digital frequency input. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = DI1_F OOR Status Bit 1 = DI2_F OOR Status  Bit 5 = DI6_F OOR Status Bits 6-15 are unused and always 0
40007	Function	Analog input Modbus override command
	Data Type	Word
	Access	Read-Write





	Description	Each bit represents Modbus override command of an analog input. 1 means override active, 0 means override inactive. Bit 0 = Al1 Override Status Bit 1 = Al2 Override Status  Bit 5 = Al6 Override Status Bits 6-15 are unused and always 0
40008	Function	Digital input Modbus override command
	Data Type	Word
	Access	Read-Write
	Description	Each bit represents Modbus override command of a digital input. 1 means override active, 0 means override inactive. Bit 0 = DI1 Override Status Bit 1 = DI2 Override Status  Bit 5 = DI6 Override Status Bits 6-15 are unused and always 0
40009	Function	Digital counter input Modbus override command
	Data Type	Word
	Access	Read-Write
	Description	Each bit represents Modbus override command of a digital counter input. 1 means override active, 0 means override inactive. Bit 0 = DI1_C Override Status Bit 1 = DI2_C Override Status  Bit 5 = DI6_C Override Status Bits 6-15 are unused and always 0
40010	Function	Digital frequency input Modbus override command
	Data Type	Word
	Access	Read-Write
	Description	Each bit represents Modbus override command of a digital frequency input. 1 means override active, 0 means override inactive. Bit 0 = DI1_F Override Status Bit 1 = DI2_F Override Status  Bit 5 = DI6_F Override Status Bits 6-15 are unused and always 0
40011	Function	Analog output local override (LOVR) status
	Data Type	Word
		Read Only





	Description	Each bit represents LOVR status of an analog output. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = AO1 OOR Status Bit 1 = AO2 OOR Status Bit 2 = AO3 OOR Status Bit 3 = AO4 OOR Status Bits 4-15 are unused and always 0
40012	Function	Digital output local override (LOVR) status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents LOVR status of a digital output. 1 means LOVR active, 0 means LOVR inactive. Bit 0 = SO1 OOR Status Bit 1 = SO2 OOR Status Bit 2 = RO1 OOR Status Bit 3 = RO2 OOR Status Bits 4-15 are unused and always 0
40013	Function	Analog output alarm status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents alarm status of an analog output. 1 means alarm active, 0 means alarm inactive. Bit 0 = AO1 Alarm Status Bit 1 = AO2 Alarm Status Bit 2 = AO3 Alarm Status Bit 3 = AO4 Alarm Status Bits 4-15 are unused and always 0
40014	Function	Digital output alarm status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents alarm status of a digital output. 1 means alarm active, 0 means alarm inactive. Bit 0 = SO1 Alarm Status Bit 1 = SO2 Alarm Status Bit 2 = RO1 Alarm Status Bit 3 = RO2 Alarm Status Bits 4-15 are unused and always 0
40015	Function	Analog output recopy status
	Data Type	Word
	Access	Read Only





	Description	Each bit represents recopy status of an analog output. 1 means recopy active, 0 means recopy inactive. Bit 0 = AO1 Recopy Status Bit 1 = AO2 Recopy Status Bit 2 = AO3 Recopy Status Bit 3 = AO4 Recopy Status Bits 4-15 are unused and always 0
40016	Function	Digital output recopy status
	Data Type	Word
	Access	Read Only
	Description	Each bit represents recopy status of a digital output. 1 means recopy active, 0 means recopy inactive. Bit 0 = SO1 Recopy Status Bit 1 = SO2 Recopy Status Bit 2 = RO1 Recopy Status Bit 3 = RO2 Recopy Status Bits 4-15 are unused and always 0
40017	Function	Analog output Modbus override command
	Data Type	Word
	Access	Read-Write
	Description	Each bit represents Modbus override command of an analog output. 1 means override active, 0 means override inactive. Bit 0 = AO1 Override Status Bit 1 = AO2 Override Status Bit 2 = AO3 Override Status Bit 3 = AO4 Override Status Bits 4-15 are unused and always 0
40018	Function	Digital output Modbus override command
	Data Type	Word
	Access	Read-Write
	Description	Each bit represents Modbus override command of a digital output. 1 means override active, 0 means override inactive. Bit 0 = SO1 Override Status Bit 1 = SO2 Override Status Bit 2 = RO1 Override Status Bit 3 = RO2 Override Status Bits 4-15 are unused and always 0
41000	Function	DI1 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write



	Description	This register is only used when channel is
	P	configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
41001	Function	DI2 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write
	Description	This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this
		register are ignored.
41002	Function	DI3 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write
	Description	This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
41003	Function	DI4 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write
	Description	This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
41004	Function	DI5 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write
	Description	This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
41005	Function	DI6 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write
	Description	This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
41006	Function	SO1 Modbus Override Value (Discrete)
	Data Type	Word
	Access	Read-Write



Description         This register is only used when channel is configured for PWM, any values written to this register are ignored.           41007         Function         S02 Modbus Override Value (Discrete)           Data Type         Word           Access         Read-Write           Description         This register is only used when channel is configured in discrete on/off mode. If channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.           41008         Function         R01 Modbus Override Value (Discrete)           Data Type         Word           Access         Read-Write           Description         This register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.           41009         Function         R02 Modbus Override Value (Discrete)           Data Type         Word           Access         Read-Write           Description         This register is only used when channel is configured for PWM, any values written to this register are ignored.           41009         Function         R02 Modbus Override Value (Discrete)           Data Type         Word           Access         Read-Write           Description         This register is only used when channel is configured in discrete on/off mode. If channel is			
Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is register are ignored.41008FunctionRO1 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured for PWM, any values written to this register are ignored.41008FunctionRO1 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccess		Description	configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.
AccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41008FunctionR01 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionR02 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register are ignored.41009FunctionR02 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is 	41007	Function	SO2 Modbus Override Value (Discrete)
DescriptionThis register is only used when channel is configured for PWM, any values written to this register are ignored.41008FunctionRO1 Modbus Override Value (Discrete) Data TypeAtcessRead-WriteDescriptionThis register is only used when channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete) Data Type41009FunctionRO2 Modbus Override Value (Discrete) Data Type41009FunctionRO2 Modbus Override Value (Discrete) Data TypeAtcessRead-Write DescriptionDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloat AccessAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloat AccessAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override		Data Type	Word
41008FunctionRo1 Modbus Override Value (Discrete)41008FunctionR01 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRo2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured for PWM, any values written to this register are ignored.42000FunctionAlt Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, WC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, <br< td=""><td></td><td>Access</td><td>Read-Write</td></br<>		Access	Read-Write
Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the		Description	configured in discrete on/off mode. If channel is configured for PWM, any values written to this
AccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002ExcessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register of hardwired signal. If corresponding Modbus override is set to 0	41008	Function	RO1 Modbus Override Value (Discrete)
DescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this r		Data Type	Word
Configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.41009FunctionRO2 Modbus Override Value (Discrete)Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionA11 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionA12 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionA12 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Access	Read-Write
Data TypeWordAccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override Value42002FunctionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.42002FunctionAl2 Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.42002FunctionAl2 Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Description	configured in discrete on/off mode. If channel is configured for PWM, any values written to this
AccessRead-WriteDescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override Value42003FunctionAl2 Modbus Override Value42004FunctionAl2 Modbus Override ValuebescriptionIf corresponding Modbus override the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.	41009	Function	RO2 Modbus Override Value (Discrete)
DescriptionThis register is only used when channel is configured in discrete on/off mode. If channel is configured for PWM, any values written to this register are ignored.42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override Value42004FunctionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Data Type	Word
42000FunctionAl1 Modbus Override Value42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override Value42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Access	Read-Write
42000FunctionAl1 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override Value42002FunctionAl2 Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, vC-22D will use this register value instead of hardwired signal value.42002FunctionAl2 Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, vC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Description	configured in discrete on/off mode. If channel is configured for PWM, any values written to this
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAccessRead-WriteData TypeFloat AccessAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.	42000	Function	Al1 Modbus Override Value
DescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Data Type	Float
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.42002FunctionAl2 Modbus Override ValueData TypeFloat AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Access	Read-Write
Data TypeFloatAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.	42002	Function	AI2 Modbus Override Value
Description If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Data Type	Float
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Access	Read-Write
		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
	42004	Function	-



	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42006	Function	Al4 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42008	Function	AI5 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42010	Function	AI6 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42012	Function	DI1_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.



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42014	Function	DI2_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42016	Function	DI3_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42018	Function	DI4_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42020	Function	DI5_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42022	Function	DI6_C Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be



		ignored. Reads will provide the scaled hardwired signal value.
42024	Function	DI1_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42026	Function	DI2_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42028	Function	DI3_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42030	Function	DI4_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42032	Function	DI5_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus



		override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42034	Function	DI6_F Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42036	Function	AO1 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42038	Function	AO2 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42040	Function	AO3 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42042	Function	AO4 Modbus Override Value
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of



		hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42044	Function	SO1 Modbus Override Value (PWM)
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42046	Function	SO2 Modbus Override Value (PWM)
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42048	Function	RO1 Modbus Override Value (PWM)
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42050	Function	RO2 Modbus Override Value (PWM)
	Data Type	Float
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
42052	Function	Vbatt Battery Level
	Data Type	Float
	Access	Read Only



	Description	Provides the voltage of the VC-22D's internal
	Description	battery.
	42052	– 42499: Unused, always 0
42500	Function	VAR 1
	Data Type	Float
	Access	Read-Write
	Description	Allows the value of the corresponding ValvApp variable to be read or written too.
42502	Function	VAR 2
	Data Type	Float
	Access	Read-Write
	Description	Allows the value of the corresponding ValvApp variable to be read or written too.
42998	Function	VAR N
	Data Type	Float
	Access	Read-Write
	Description	Allows the value of the corresponding ValvApp variable to be read or written too.
43000	Function	Al1 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43002	Function	AI2 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43004	Function	AI3 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus



		override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43006	Function	Al4 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43008	Function	AI5 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43010	Function	AI6 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43012	Function	DI1_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43014	Function	DI2_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of



		hardwired signal. If corresponding Modbus
		override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43016	Function	DI3_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43018	Function	DI4_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43020	Function	DI5_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43022	Function	DI6_C Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be
		ignored. Reads will provide the scaled hardwired signal value.
43024	Function	<b>C</b>
43024	Function Data Type	signal value.



DescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43026FunctionD12 F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43028FunctionD13_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43028FunctionD14_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.43030FunctionD14_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired <th></th> <th></th> <th></th>			
Data TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be 		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43028FunctionDI3_F Modbus Override ValueData TypeInteger AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be 	43026	Function	DI2_F Modbus Override Value
AccessFunctionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43028FunctionDI3_F Modbus Override Value43028FunctionDI3_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDI4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.43032FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modb		Data Type	Integer
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43028FunctionDI3_F Modbus Override Value43028FunctionDI3_F Modbus Override ValueAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDI4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal value.43030FunctionDI4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override Value43034FunctionDI5_F Modbus Override value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.		Access	Read-Write
Data TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDi4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override Value43032FunctionDI5_F Modbus Override ValueAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override ValueDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDI4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired 	43028	Function	DI3_F Modbus Override Value
DescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionD14_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionD15_F Modbus Override ValueData TypeIntegerAccessRead-WriteData TypeIntegerAccessRead-WriteData TypeIntegerAccessRead-WriteData TypeIntegerAccessRead-WriteData TypeIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal. If corresponding Modbus override is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionD16_F Modbus Override Value		Data Type	Integer
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43030FunctionDI4_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override Value43034FunctionDI5_F Modbus Override Value43034FunctionDI5_F Modbus Override Value43034FunctionDI5_F Modbus Override Value		Access	Read-Write
Data TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, 	43030	Function	DI4_F Modbus Override Value
DescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Data Type	Integer
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43032FunctionDI5_F Modbus Override ValueData TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034Function		Access	Read-Write
Data TypeIntegerAccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
AccessRead-WriteDescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value	43032	Function	DI5_F Modbus Override Value
DescriptionIf corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Data Type	Integer
VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.43034FunctionDI6_F Modbus Override Value		Access	Read-Write
43034 Function DI6_F Modbus Override Value		Description	VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired
Data Type Integer	43034	Function	
		Data Type	Integer



,	Λορος	Read-Write
	Access	
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43036	Function	AO1 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43038	Function	AO2 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43040	Function	AO3 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43042	Function	AO4 Modbus Override Value
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be
		ignored. Reads will provide the scaled hardwired signal value.



	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43046	Function	SO2 Modbus Override Value (PWM)
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43048	Function	RO1 Modbus Override Value (PWM)
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43050	Function	RO2 Modbus Override Value (PWM)
	Data Type	Integer
	Access	Read-Write
	Description	If corresponding Modbus override bit is set to 1, VC-22D will use this register value instead of hardwired signal. If corresponding Modbus override is set to 0, writes to the register will be ignored. Reads will provide the scaled hardwired signal value.
43052	Function	Vbatt Battery Level
	Data Type	Integer
	Access	Read Only
	Description	Provides the voltage of the VC-22D's internal battery.
	43054	-43499: Unused, always 0
43500	Function	VAR 1
	Data Type	Integer
	Access	Read-Write



Installation, Operation, and Maintenance Manual

	Description	Allows the value of the corresponding ValvApp variable to be read or written too.
43502	Function	VAR 2
	Data Type	Integer
	Access	Read-Write
	Description	Allows the value of the corresponding ValvApp variable to be read or written too.
43998	Function	VAR N
	Data Type	Integer
	Access	Read-Write
	Description	Allows the value of the corresponding ValvApp variable to be read or written too.

### A.5 Modbus Override

The VC-22D includes a Modbus override capability for inputs and outputs. An external device can put a particular input or output into Modbus override. When an input is in Modbus override, the ValvApp reads a Modbus override value instead of the input channel. When an output is in Modbus override, the output sends a Modbus override value instead of what the ValvApp dictates.

To put an input or output channel in Modbus override, the Modbus override command bit must be turned on. Each channel has its own override command bit stored in the 4x holding table. Once the channel is in Modbus override, an override value must be written. Each channel has its own Modbus override value register in the 4x holding table as well. The addresses for the override command bits and override value registers can be found in the table in section A.4.

For the sake of clarity, consider an example. If an external device is attempting to override the analog input 3 channel, the following steps must be performed:

- 1. Turn on Modbus override bit for AI3
  - a. Use function code 6 to write value 4 to register 40007
- 2. Write Modbus override value for AI3
  - a. If sending a float is preferred, use function code 16 to write the override value to registers 42004-42005
  - b. If sending an integer is preferred, use function code 16 to write the override value to registers 43004-43005

To disable the Modbus override for a channel, turn off the Modbus override command bit. The Modbus override value register will then revert back to the value physically measured on the channel for inputs, or the value the ValvApp dictates for outputs.

#### A.6 Data Types

The VC-22D supports four different data types when storing values in Modbus registers.



#### A.6.1 Bit

The bit data type represents a single on/off value as a 0 or 1.

#### A.6.2 Word

The word data type holds 16 bits in a single register.

#### A.6.3 Float

The float data type is used to hold numeric values with decimal places. The value is encoded in Modbus registers per the IEEE 754 32 bit standard. Because floats require 32 bits, the value is stored in two adjacent registers. The most significant bits are stored in the lower addressed register and the least significant bits are stored in the higher addressed register (i.e. Motorola format).

#### A.6.4 Integer

The integer data type is used to hold numeric values without decimal places. The value is encoded in Modbus registers using a signed 32 bit integer standard. The 32 bits are stored in two adjacent registers, with the most significant bits stored in the lower addressed register and the least significant bits stored in the higher addressed register (i.e. Motorola format).

Because integers cannot encode decimal points directly, an implied decimal point has included in every integer register. When the VC-22D stores a value in a Modbus register using the integer data type, it always multiples the number by 10. For example, the number 123.4 is stored as 1234. When reading a value from a Modbus register, the client should always divide the number by 10 first.

### A.7 Cla-Val Mode (Legacy)

This section describes interfacing with the Modbus server in the VC-22D when operating in the "Cla-Val" scheme. This is a legacy scheme and is not recommended for use with new VC-22D installations. The new "Standard" scheme was introduced in engine version 2.5.0 and the "Cla-Val" scheme continues to be included in new engine releases for backwards compatibility.

The "Cla-Val" scheme has three sets of registers that store the same values but in slightly different ways. The first set is called "Base" and holds all information as IEEE 754 floats. The second set is called "Topkapi" and holds all information as IEEE 754 floats, but the Modbus override works slightly different. The final section is called "Topkapi-Integer" and works just like "Topkapi" but stores information as 16 bit integers.

### A.8 Modbus Base Registers

The Modbus base registers start at 40000 and go to 40311. When reading/writing to Modbus base registers, the following function codes are supported:

- 03: Read multiple holding registers
- 16: Write multiple holding registers

Each IO point uses 3 Modbus registers. The first register is the status/control word, and the second two registers are the IO point value.

#### A.8.1 Register Map

The table below depicts every Modbus register in the base set.



Starting Register	Va	lue	Data Type
40000	A14	Status/Control	Word
40001	All	Scaled Input Value	IEEE 754
40003	412	Status/Control	Word
40004	AI2	Scaled Input Value	IEEE 754
40006	412	Status/Control	Word
40007	AI3	Scaled Input Value	IEEE 754
40009		Status/Control	Word
40010	AI4	Input Value (Scaled)	IEEE 754
40012		Status/Control	Word
40013	AI5	Input Value (Scaled)	IEEE 754
40015		Status/Control	Word
40016	AI6	Input Value (Scaled)	IEEE 754
40018-40099	Unus	ed (Read as all zeros)	
40100	DI1	Status/Control	Word
40101	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754
40103	DI1 C	Status/Control	Word
40104	 (Counter Value)	Input Value (Scaled)	IEEE 754
40106	DI1 F	Status/Control	Word
40107	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
40109	DI2	Status/Control	Word
40110	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754
40112	DI2 C	Status/Control	Word
40113	 (Counter Value)	Input Value (Scaled)	IEEE 754
40115	DI2 F	Status/Control	Word
40116	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
40118	DI3	Status/Control	Word
40119	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754
40121	DI3_C	Status/Control	Word
40122	 (Counter Value)	Input Value (Scaled)	IEEE 754
40124	DI3 F	Status/Control	Word
40125	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
40127	DI4	Status/Control	Word
40128	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754
40130	DI4 C	Status/Control	Word
40131	(Counter Value)	Input Value (Scaled)	IEEE 754
40133	DI4 F	Status/Control	Word
40134	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
40136	DI5	Status/Control	Word
40137	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754



Installation, Operation, and Maintenance Manual

Starting Register	Va	lue	Data Type
40139	DI5_C	Status/Control	Word
40140	(Counter Value)	Input Value (Scaled)	IEEE 754
40142	DI5_F	Status/Control	Word
40143	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
40145	DI6	Status/Control	Word
40146	(Digital State 1/0)	Input Value (0=Off, 1=On)	IEEE 754
40148	DI6_C	Status/Control	Word
40149	(Counter Value)	Input Value (Scaled)	<b>IEEE 754</b>
40151	DI6_F	Status/Control	Word
40152	(Counter Value/time span)	Input Value (Scaled)	<b>IEEE 754</b>
40154-40199	Un	used (Read as zero)	
40200	AO1	Status/Control	Word
40201	AUI	Input Value (Scaled)	IEEE 754
40203	AO2	Status/Control	Word
40204	AUZ	Input Value (Scaled)	<b>IEEE 754</b>
40206	AO3	Status/Control	Word
40207	AUS	Input Value (Scaled)	<b>IEEE 754</b>
40209	101	Status/Control	Word
40210	AO4	Input Value (Scaled)	<b>IEEE 754</b>
40212-40299	Unused (Read as all zeros)		
40300		Status/Control	Word
40302	SO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	IEEE 754
40303		Status/Control	Word
40305	SO2	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	IEEE 754
40306		Status/Control	Word
40308	RO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	IEEE 754
40309		Status/Control	Word
40311	RO2	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	IEEE 754

#### A.8.2 Status Control Word

Each bit in the status/control word holds status information about the IO point, or allows an override to be applied. See the table below for a definition of each bit:



Installation, Operation, and Maintenance Manual

Bit #	Description	Applicability	Access	
0	Signal lost or out of range	AI's and DI_F's only	Read Only	
1	Local override applied (see section 8.2 and 8.3)	All IO points	Read Only	
2	Action active (see section 6.2.5)	AO's, SO's, and RO's only	Read Only	
3	Retrans active (see section 6.2.6)	AO's, SO's, and RO's only	Read Only	
4	Not used, alw	ays O		
5	Not used, alw	ays O		
6	Not used, alw	Not used, always 0		
7	Not used, alw	Not used, always 0		
8	Not used, always 0			
9	Not used, always 0			
10	Not used, always 0			
11	Not used, alw	ays O		
12	Not used, alw	ays O		
13	Not used, always 0			
14	Clear Modbus override	All IO points	Write Only	
15	Activate Modbus override	All IO points	Read/Write	
	Table 10.1	·		

Some of the bits in **TABLE 10.1** are not applicable for all IO points (e.g. bit 0 only is relevant for Al's and DI\_F's). The bit will always be zero when it's not applicable to the current IO point.

### A.8.3 IO Point Value

The second 2 registers hold the value for the IO point as an IEEE 754 float. The most significant byte is stored in the lower addressed register (i.e. Motorola format). The IO point value is read only when the Modbus override is off and read/write when the Modbus override is on.

The IO point value stored in the Modbus registers is identical to the value displayed on the VC-22D display. The value will be scaled, filtered, and any overrides will be applied. If a loss of signal exists, the loss of signal value will be stored in the IO point value registers.

### A.8.4 Modbus Override

To enable the Modbus override for a particular IO point, one simultaneous transaction must write a 1 to bit 15 of the status/control word and write an override value to the IO point value registers. This is done by issuing Modbus function code 16 with values for the status/control word and IO point value as follows:

- Status/Control Word = 32768 (that's 1000 0000 0000 0000 in binary)
- IO Point Value = Override value encoded as IEEE 754 float

Each time a new override value is issued, bit 15 of the status/control word must be set to 1 again. If an override value is issued without setting bit 15 to 1, the override will not be applied.

To disable the Modbus override, a 0 must be written to bit 15 of the status/control word. The IO point value register will then revert back to the current value measured on the IO channel.



### A.9 Modbus Topkapi Registers

The Modbus Topkapi registers start at 42000 and go to 42307. When reading/writing to Modbus Topkapi registers, the following function codes are supported:

- 03: Read multiple holding registers
- 06: Write single register
- 16: Write multiple holding registers

Each IO point uses at least 2 Modbus registers. The first register is the status/control word, and the remaining registers are the IO point value.

#### A.9.1 Register Map

The table below depicts every Modbus register in the Topkapi set.

Starting Register	Va	lue	Data Type
42000	AI1	Status/Control	Word
42001	AII	Scaled Input Value	IEEE 754
42003	A12	Status/Control	Word
42004	AI2	Scaled Input Value	IEEE 754
42006	A12	Status/Control	Word
42007	AI3	Scaled Input Value	IEEE 754
42009	A1.4	Status/Control	Word
42010	AI4	Input Value (Scaled)	IEEE 754
42012	A1E	Status/Control	Word
42013	AI5	Input Value (Scaled)	IEEE 754
42015	A1C	Status/Control	Word
42016	AI6	Input Value (Scaled)	IEEE 754
42018-42099	Unus	sed (Read as all zeros)	
42100	DI1	Status/Control	Word
42101	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42102	DI2	Status/Control	Word
42103	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42104	DI3	Status/Control	Word
42105	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42106	DI4	Status/Control	Word
42107	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42108	DI5	Status/Control	Word
42109	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42110	DI6	Status/Control	Word
42111	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
42112-42119	Unus	sed (read as all zeros)	
42120	DI1_C	Status/Control	Word



Starting Register	Va	lue	Data Type
42121	(Counter Value)	Input Value (Scaled)	IEEE 754
42123	DI2_C	Status/Control	Word
42124	(Counter Value)	Input Value (Scaled)	IEEE 754
42126	DI3_C	Status/Control	Word
42127	(Counter Value)	Input Value (Scaled)	IEEE 754
42129	DI4_C	Status/Control	Word
42130	(Counter Value)	Input Value (Scaled)	IEEE 754
42132	DI5_C	Status/Control	Word
42133	(Counter Value)	Input Value (Scaled)	IEEE 754
42135	DI6_C	Status/Control	Word
42136	(Counter Value)	Input Value (Scaled)	IEEE 754
42138-42139	Unus	sed (read as all zeros)	
42140	DI1_F	Status/Control	Word
42141	(Counter Value/time span)	Input Value (Scaled)	<b>IEEE 754</b>
42143	DI2_F	Status/Control	Word
42144	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
42146	DI3_F	Status/Control	Word
42147	(Counter Value/time span)	Input Value (Scaled)	IEEE 754
42149	DI4_F	Status/Control	Word
42150	(Counter Value/time span)	Input Value (Scaled)	<b>IEEE 754</b>
42152	DI5_F	Status/Control	Word
42153	(Counter Value/time span)	Input Value (Scaled)	<b>IEEE 754</b>
42155	DI6_F	Status/Control	Word
42156	(Counter Value/time span)	Input Value (Scaled)	<b>IEEE 754</b>
42158-42199	Uni	used (Read as zero)	
42200	AO1	Status/Control	Word
42201	AUI	Input Value (Scaled)	<b>IEEE 754</b>
42203	AO2	Status/Control	Word
42204	AUZ	Input Value (Scaled)	<b>IEEE 754</b>
42206	AO3	Status/Control	Word
42207	AUS	Input Value (Scaled)	IEEE 754
42209	AO4	Status/Control	Word
42210	AU4	Input Value (Scaled)	IEEE 754
42212-42299	Unus	ed (Read as all zeros)	
42300		Status/Control	Word
42301	SO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42302	SO2	Status/Control	Word



Installation, Operation, and Maintenance Manual

Starting Register	Va	lue	Data Type
42303		Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42304		Status/Control	Word
42305	RO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42306		Status/Control	Word
42307	RO2	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42308-42399	Unused (Read as all zeros)		

#### A.9.2 Status Control Word

Each bit in the status/control word holds status information about the IO point, or allows an override to be applied. See the table below for a definition of each bit:

Bit #	Description	Applicability	Access	
0	Modbus override active	All IO points	Read/Write	
1	Signal lost/out of range	Al's and DI_F's only	Read Only	
2	Local override applied	All IO points	Read Only	
3	Alarm active	AO's, SO's, and RO's only	Read Only	
4	Recopy active	AO's, SO's, and RO's only	Read Only	
5	Not used, alw	ays 0		
6	Not used, always 0			
7	Not used, always 0			
8	Not used, always 0			
9	Not used, always 0			
10	Not used, always 0			
11	Not used, alw	ays O		
12	Not used, alw	ays O		
13	Not used, always 0			
14	Not used, always 0			
15	Not used, always 0			
	Table 10.2			

Some of the bits in **TABLE 10.2** are not applicable for all IO points (e.g. bit 1 only is relevant for Al's and DI\_F's). The bit will always be zero when it's not applicable to the current IO point.

#### A.9.3 IO Point Value

The remaining registers hold the value for the IO point. Al's, AO's, DI\_F's, and DI\_C's use 2 registers and store the value as an IEEE 754 float. The most significant byte is stored in the lower addressed register



### Installation, Operation, and Maintenance Manual

(i.e. Motorola format). DI's, SO's, and RO's use 1 register and store the value as a word. The IO point value is read only when the Modbus override is off and read/write when the Modbus override is on.

The IO point value stored in the Modbus registers is identical to the value displayed on the VC-22D display. The value will be scaled, filtered, and any overrides will be applied. If a loss of signal exists, the loss of signal value will be stored in the IO point value registers.

#### A.9.4 Modbus Override

To enable the Modbus override for a particular IO point, a 1 must be written to bit 0 of the status/control word. The VC-22D will then accept override values written to the IO point value register. This is different from the base Modbus registers because a 1 does not need to be written to the override bit every time a new override value is issued.

The Modbus override can be enabled using function code 06 or 16 that writes 1 to the status/control word. An override value can then be written to the IO point value register in the same write or subsequent writes.

To disable the Modbus override, write a 0 to bit 0 of the status/control word. The IO point value register will then revert back to the value physically measured on the IO channel.

### A.10 Modbus Topkapi Integer Registers

The Modbus Topkapi registers use two ranges of addresses. The first range starts at 42300 and goes to 42399, and the second range starts at 44000 and goes to 44299. When reading/writing to Modbus Topkapi registers, the following function codes are supported:

- 03: Read multiple holding registers
- 06: Write single register
- 16: Write multiple holding registers

Each IO point uses 2 Modbus registers. The first register is the status/control word and the second register is the IO point value stored as a 16-bit integer.

#### A.10.1 Register Map

The table below depicts every Modbus register in the Topkapi set.

Starting Register	Value		Data Type
44000	AI1	Status/Control	Word
44001	AII	Scaled Input Value	Integer 16
44003	A12	Status/Control	Word
44004	AI2	Scaled Input Value	Integer 16
44006	AI3	Status/Control	Word
44007		Scaled Input Value	Integer 16
44009	A14	Status/Control	Word
44010	Al4	Input Value (Scaled)	Integer 16
44012	AI5	Status/Control	Word
44013	AIS	Input Value (Scaled)	Integer 16



Starting Register	Va	lue	Data Type
44015	A1C	Status/Control	Word
44016	Al6	Input Value (Scaled)	Integer 16
44018-44099	Unus	ed (Read as all zeros)	
44100	DI1	Status/Control	Word
44101	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44102	DI2	Status/Control	Word
44103	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44104	DI3	Status/Control	Word
44105	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44106	DI4	Status/Control	Word
44107	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44108	DI5	Status/Control	Word
44109	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44110	DI6	Status/Control	Word
44111	(Digital State 1/0)	Input Value (0=Off, 1=On)	Integer 16
44112-44119	Unus	sed (read as all zeros)	
44120	DI1 C	Status/Control	Word
44121	(Counter Value)	Input Value (Scaled)	Integer 16
44123	DI2_C	Status/Control	Word
44124	(Counter Value)	Input Value (Scaled)	Integer 16
44126	DI3 C	Status/Control	Word
44127	(Counter Value)	Input Value (Scaled)	Integer 16
44129	DI4_C	Status/Control	Word
44130	(Counter Value)	Input Value (Scaled)	Integer 16
44132	DI5 C	Status/Control	Word
44133	(Counter Value)	Input Value (Scaled)	Integer 16
44135	DI6_C	Status/Control	Word
44136	(Counter Value)	Input Value (Scaled)	Integer 16
44138-44139	Unus	sed (read as all zeros)	
44140	DI1_F	Status/Control	Word
44141	(Counter Value/time span)	Input Value (Scaled)	Integer 16
44143	DI2_F	Status/Control	Word
44144	_ (Counter Value/time span)	Input Value (Scaled)	Integer 16
44146	DI3_F	Status/Control	Word
44147	(Counter Value/time span)	Input Value (Scaled)	Integer 16
44149	DI4_F	Status/Control	Word
44150	_ (Counter Value/time span)	Input Value (Scaled)	Integer 16
44152	DI5_F	Status/Control	Word
44153	(Counter Value/time span)	Input Value (Scaled)	Integer 16



Starting Register	Va	lue	Data Type
44155	DI6_F	Status/Control	Word
44156	(Counter Value/time span)	Input Value (Scaled)	Integer 16
44158-44199	Un	used (Read as zero)	
44200	A01	Status/Control	Word
44201	AUI	Input Value (Scaled)	Integer 16
44203	402	Status/Control	Word
44204	AO2	Input Value (Scaled)	Integer 16
44206	AO3	Status/Control	Word
44207	AU3	Input Value (Scaled)	Integer 16
44209	AO4	Status/Control	Word
44210	A04	Input Value (Scaled)	Integer 16
44212-44299	Unus	ed (Read as all zeros)	
42300		Status/Control	Word
42301	SO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42302		Status/Control	Word
42303	SO2	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42304		Status/Control	Word
42305	RO1	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42306		Status/Control	Word
42307	RO2	Input Value (PWM: Scaled 0-100% Digital: 0=Off, 1=On)	Integer 16
42308-42399	Unus	ed (Read as all zeros)	



### A.10.2 Status Control Word

Each bit in the status/control word holds status information about the IO point, or allows an override to be applied. See the table below for a definition of each bit:

Bit #	Description	Applicability	Access	
0	Modbus override active	All IO points	Read/Write	
1	Signal lost/out of range	Al's and DI_F's only	Read Only	
2	Local override applied	All IO points	Read Only	
3	Alarm active	AO's, SO's, and RO's only	Read Only	
4	Recopy active	AO's, SO's, and RO's only	Read Only	
5	Not used, alw	ays O		
6	Not used, always 0			
7	Not used, always 0			
8	Not used, always 0			
9	Not used, always 0			
10	Not used, always 0			
11	Not used, alw	ays O		
12	Not used, alw	ays O		
13	Not used, always 0			
14	Not used, always 0			
15	Not used, always 0			
	Table 10.3			

Some of the bits in **TABLE 10.2** are not applicable for all IO points (e.g. bit 1 only is relevant for Al's and DI\_F's). The bit will always be zero when it's not applicable to the current IO point.

### A.10.3 IO Point Value

The second register holds the value for the IO point. Any decimal places in the IO point will be stored using an implied decimal place in the IO point register. For example, if the variable has 2 decimal places and the number for the IO point is 96.52, then the register will have value 9652. If the variable has 1 decimal place and the number of the IO point is 12.3, then the register will have value 123. See section 6.2.9.5 to configure number of decimal places associated with the IO point. The IO point value is read only when the Modbus override is off and read/write when the Modbus override is on.

The IO point value stored in the Modbus register is identical to the value displayed on the VC-22D display. The value will be scaled, filtered, and any overrides will be applied. If a loss of signal exists, the loss of signal value will be stored in the IO point value register.

#### A.10.4 Modbus Override

To enable the Modbus override for a particular IO point, a 1 must be written to bit 0 of the status/control word. The VC-22D will then accept override values written to the IO point value register. This is different from the base Modbus registers because a 1 does not need to be written to the override bit every time a new override value is issued.



#### Installation, Operation, and Maintenance Manual

The Modbus override can be enabled using function code 06 or 16 that writes 1 to the status/control word. An override value can then be written to the IO point value register in the same write or subsequent writes.

To disable the Modbus override, write a 0 to bit 0 of the status/control word. The IO point value register will then revert back to the value physically measured on the IO channel.



Installation, Operation, and Maintenance Manual

# Appendix B: Standard ValvApp Library List

The VC-22D comes with a standard library containing 17 ValvApps. The table below lists each standard ValvApp and includes a brief description. Appendix B includes a worksheet for each ValvApp which details each IO point and programming logic for the ValvApp. Appendix C includes an electrical wiring diagram for each ValvApp.

When looking for a standard ValvApp, first review the description of each ValvApp and find one that seems appropriate to your Cla-Valve application (pressure reducing, pressure sustaining, flow control, ...). Then, review the ValvApp's worksheet and electrical schematic for the ValvApp you chose. Make sure the ValvApp worksheet and electrical drawing include the same IO points that your Cla-Valve application has, and make sure the logic fits your needs.

Name	Description
131-Flow-Mag-V2.1	Valve Series: 131
	Maintains a flow rate based on user entered setpoint. ValvApp requires an analog input from a flowmeter. The home screen graphically shows flowmeter as a mag meter upstream of the valve.
	Note: This is the same ValvApp as 131-Flow-X144D-V2.0, but graphics show mag meter instead of X144D flowmeter.
131-Flow-X144D-V2.1	Valve Series: 131
	Maintains a flow rate based on user entered setpoint. ValvApp requires an analog input from a flowmeter. The home screen graphically shows an X144D flowmeter inserted into the valve's sensing port.
	Note: This is the same ValvApp as 131-Flow-Mag-V2.0, but graphics show X144D flowmeter instead of mag meter.
131-LvlAltitude-L-V2.1	Valve Series: 131
	Controls a fill valve to maintain tank level. If tank level is above a user entered setpoint, the valve goes full closed. If the tank level is below a user entered setpoint, the valve goes full open. This ValvApp requires an analog input from a level transducer.





131-LvlMod-L+Mag-V2.1	Valve Series: 131
	Controls a fill valve to maintain tank level. If tank level is above a user entered setpoint, the valve goes full closed. If the tank level is below a user entered setpoint, the valve maintains a flow rate into the tank. As the tank level drops, the flow rate is increased. ValvApp requires analog inputs from a level transducer and flowmeter. The home screen graphically shows flowmeter as a mag meter upstream of the valve.
	Note: This is the same ValvApp as 131-LvlMod-L+X144D-V2.0, but
	graphics show X144D flowmeter instead of mag meter.
131-LvlMod-L+X117D-V2.1	Valve Series: 131
	Controls a fill valve to maintain tank level. If tank level is above a user entered setpoint, the valve goes full closed. If the tank level is below a user entered setpoint, the valve is opened to a certain position to fill the tank. As the tank level drops, the valve position will be increased. ValvApp requires a level transducer analog input and position transmitter analog input.
131-LvlMod-L+X144D-V2.1	Valve Series: 131
	Controls a fill valve to maintain tank level. If tank level is above a user entered setpoint, the valve goes full closed. If the tank level is below a user entered setpoint, the valve is modulated to maintain a flow rate into the tank. The emptier the tank, the higher the flow rate used to fill the tank. ValvApp requires a level transducer analog input and flowmeter analog input. The home screen graphically shows an X144D flowmeter inserted into the valve's sensing port.
	Note: This is the same Valuan as 121 Jul Med L Mag V2.0 but
	Note: This is the same ValvApp as 131-LvlMod-L+Mag-V2.0, but
	graphics show X144D flowmeter instead of mag meter.
131-Position-X117D-V2.1	Valve Series: 131 Maintains a valve position specified by a user setpoint. ValvApp requires a position transmitter analog input.
131-PressureReducing-P2-V2.1	Valve Series: 131
Č	
	Reduces the downstream pressure to match a user setpoint. ValvApp
	requires a downstream pressure transmitter analog input.
131-PressureSustaining-P1-V2.1	Valve Series: 131
	Sustains an upstream pressure to match a user setpoint. ValvApp requires an upstream pressure transmitter analog input.



133-Flow-DP+Pos-V2.1	Valve Series: 133
	Calculates the flow rate based on the valves differential pressure and position. Modulates the valve to maintain a user entered flowrate setpoint. ValvApp requires analog inputs from a DP meter and position transmitter.
133-Flow-P1+P2+X117D-V2.1	Valve Series: 133
	Calculates the flow rate based on the valves differential pressure and position. Modulates the valve to maintain a user entered flowrate setpoint. ValvApp requires analog inputs from an upstream pressure transmitter, downstream pressure transmitter, and position transmitter.
136-LvlAltitude+HLLL-Switch-	Valve Series: 136
V2.1	Provides water level control in a tank based for a single solenoid valve using a high-level limit switch and low-level limit switch.
136-LvlAltitude-OnOff-V2.1	Valve Series: 136
	Provides a standard altitude control in a tank for a single solenoid valve using a analog level transmitter.
340-Flow-Flw-V2.1	Valve Series: 340
	Actuates a motor operated pilot which modulates a valve to maintain a flow rate. The flow rate is a user adjustable setpoint. ValvApp requires analog inputs from the motor's position feedback and flowmeter. The flowmeter is not used for control, only for monitoring.
340-Flow-V2.1	Valve Series: 340
	Actuates a motor operated pilot which modulates a valve to maintain a flow rate. The flow rate is a user adjustable setpoint. ValvApp requires an analog input from the motor's position feedback.
350-PressureSustaining-P1-V2.1	Valve Series: 350
	Actuates a motor operated pilot which modulates a valve to sustain an upstream pressure. The upstream pressure is a user adjustable setpoint. ValvApp requires analog inputs from the motor position feedback and upstream pressure transmitter. The upstream pressure transmitter is not user for control, only monitoring.
350-PressureSustaining-V2.1	Valve Series: 350
	Actuates a motor operated pilot which modulates a valve to sustain an upstream pressure. The upstream pressure is a user adjustable setpoint. ValvApp requires an analog input from the motor position



	feedback. The upstream pressure transmitter is not user for control, only monitoring.
390-PressureReducing-P2-V2.1	Valve Series: 390
	Actuates a motor operated pilot which modulates a valve to reduce a downstream pressure. The downstream pressure is a user adjustable setpoint. ValvApp requires analog inputs from the motor position feedback and downstream pressure transmitter. The downstream pressure transmitter is not user for control, only monitoring.
390-PressureReducing-V2.1	Valve Series: 390
	Actuates a motor operated pilot which modulates a valve to reduce a downstream pressure. The downstream pressure is a user adjustable setpoint. ValvApp requires an analog input from the motor position feedback.



Installation, Operation, and Maintenance Manual

Appendix C: Standard ValvApp Worksheets

C.1 131-Flow-Mag-V2.0 or 131-Flow-X144D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

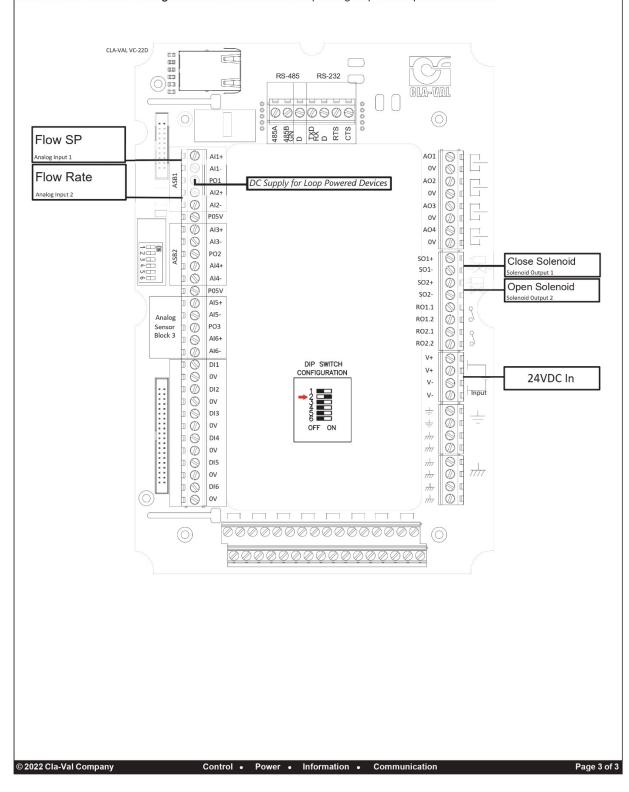
Information		Reset	t Form	Configuration:	/C-22D
*Project Name N/A		*то	day's Date	12/19/22	
*Cla-Val Representive N/A		Project Comp	letion Date		
Control Valve Model Number 1 2 1		Custome	r Approval		_
Control Valve Model Number (if known) 131			Signature		
Valve Regulation (If more than 2 PID's are require	ed, specify in logic on pag	ge 2)			
PID 1 - Valve Regulation *Solenoid C	onfig NC / NC (P.F. Lock)	PID 2 - Valve F	Regulation	PID Selection	Node
*Control Type Flow *Signal	Loss Lock Valve	Control Type		Signal	Loss
Deadband (+/-) Ram	ping	Deadband (+/-)		Ran	nping
DP Metering (133 Valve)					
DP Metering Pressure Measurement	IP1+P2			Output	
Size Body Style	Seat	Units		Output Scaling	
Totalizer					
	11	2			
Totalizer Reset	Units	Ouput	_	Output Scaling	
Analog Inputs (4-20mA) 6 Available					
*Analog Input #1 (Typically reserved for control set	point signal)	Scaling	Signal	Powered by Controller	
Name Flow SP	Units gpm	<b>4mA =</b> 0 gpm	20mA =	2,000 gpm	Decimal 0
*Analog Input #2 (Typically reserved for control fee	dback signal)	Scaling	🖌 Signal	Powered by Controller	
Name Flow Rate	Units gpm	<b>4mA =</b> 0 gpm	20mA =	2,000 gpm	Decimal 0
Analog Input #3		Scaling	Signal	Powered by Controller	
Name	Units	4mA =	20mA =		Decimal
Analog Input #4		Scaling	Signal	Powered by Controller	
Name	Units	4mA =	20mA =		Decimal
Analog Input #5		Scaling	Signal	Powered by Controller	
Name	Units	4mA =	20mA =		Decimal
Analog Input #6		Scaling	Signal	Powered by Controller	
Name	Units	4mA =	20mA =		Decimal
Digital Inputs 6 Available	_				
Digital Input 1 Name	Digital Input 2	Name		Digital Input 3 Nan	ne
Purpose	Purpose	_	_	Purpose	_
Digital Input 4 Name	Digital Input 5	Name		Digital Input 6 Nan	ne
Purpose	Purpose			Purpose	
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Analo	og Outputs (4-20mA) Note: Analog Output	ts are sourced wi	th controller powe	r.			
L A	Analog Output #1			Scaling			
- I	Name	Units		4mA =	20mA =	Decimal	
	Anglen Ordered #0			Scaling			
	Analog Output #2 Name	Units		4mA =	20mA =	Decimal	
· ·	Name	Units		4114 -	20114 -	Decimal	
	Analog Output #3			Scaling			
1	Name	Units		4mA =	20mA =	Decimal	
	Analog Output #4			Scaling			
	Name	Units	_	4mA =	20mA =	Decimal	
Solen	noid Outputs						
	*Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Outpu		for solenoids used on a 1	a powered solid state output typically reserved 31 or 133 series valve. The output can be con-	
	Name Close Solenoid Default: Closing Solenoid		Name Open S Default: O	olenoid Ipening Solenoid	figured as PWM (default) or Discrete ON/OFF. If configured as discrete, a value of 0 represents an open circuit, and 1 a closed circuit.		
Relay	y Output						
	Relay Output #1 (RO1)		Relay Output #	2 (RO2)	Note: RO1 and RO2 are	configured as dry contact mechanical relays	
	Name		Name			These outputs are configured as Discrete presents an open circuit, and 1 a closed circuit.	
Actio	ons/Alarms						
	Action #1						
	Name	Describe					
	Additional Comments						
	A. //						
	Action #2	Describe	_				
	Name Additional Comments	Describe					
	Action #3						
	Name	Describe					
	Additional Comments						
	Action #4						
	Name	Describe					
	Additional Comments						
Comr	munication						
	GSM/GPRS Modbus TC	P/IP	Modbus	RTU (RS485/RS232)		specification page for register mapping and fer to manual for more details.	
*Cont	trol Logic (Please specify all control logi	ic using sketche		Attach additional shee			
	alvApp provides a standard flow control fun					ed. If the flow drops below the SP, the	
	will modulate open.						
	nd AI3 have been added into this program, ev ld by landing signal cables on these IO point				erve as spare IO points so ac	dditional functionality can be added in	
the ner	id by failding signal cables on these to point	s and configuring	g actions in the v	C-22D.			
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#### Installation, Operation, and Maintenance Manual





# Installation, Operation, and Maintenance Manual

0007 Bit 1 Flo 0007 Bit 2 Sp	Project Name: Date:					
0007 Bit 0 Flo 0007 Bit 1 Flo 0007 Bit 2 Sp						
0007 Bit 0 Flo 0007 Bit 1 Flo 0007 Bit 2 Sp	put	Description	Data Type	Access	I/O Mappin	g Comments
10007 Bit 1 Flo 10007 Bit 2 Sp	ow SP	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
	ow Rate	Analog Input Modbus Override			N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
	pare	Analog Input Modbus Override			N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005
40007 Bit 3	-	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
0007 Bit 4	-	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5	-	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
10008 Bit 0 Sp	Dare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
0008 Bit 2	21	Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
0008 Bit 3		Digital Input Modbus Override			N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
0008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
10008 Bit 5		Digital Input Modbus Override			N/A	Overrides Hardwire DI6 Input to use Modbus Address 41004
1000 Sp	pare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
1000	-	Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
1001		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
1002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
1003		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
1005			Word	Read/Write		Register Holds/Reads DI6 Value
		Digital input	Word	iteau/ write	010	Register Holds/Reads Dio Value
1006 Cld	lose Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
1007 Op	pen Solenoid	Digital Output	Word	Read	S02	Monitory Purposes (Optional)
1008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
1009	-	Digital Output	Word	Read	R02	Monitory Purposes (Optional)
3000/43001 FK	ow SP	Analog Input	Int 32	Read/Write	AI1	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	ow Rate	Analog Input	Int 32	Read/Write		Register Holds/Reads AI2 Value x100 for Two Implied Decimals
	pare	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
3006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
3008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
3010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads AI6 Value x100 for Two Implied Decimals
3036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
3038/43039			Int 32	Read	AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
3040/43041		Analog Output	Int 32	Read	A03	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
3042/43043		Analog Output	Int 32	Read	A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals

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ModBus Register Mappin



C.2 131-LvlAltitude-L-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

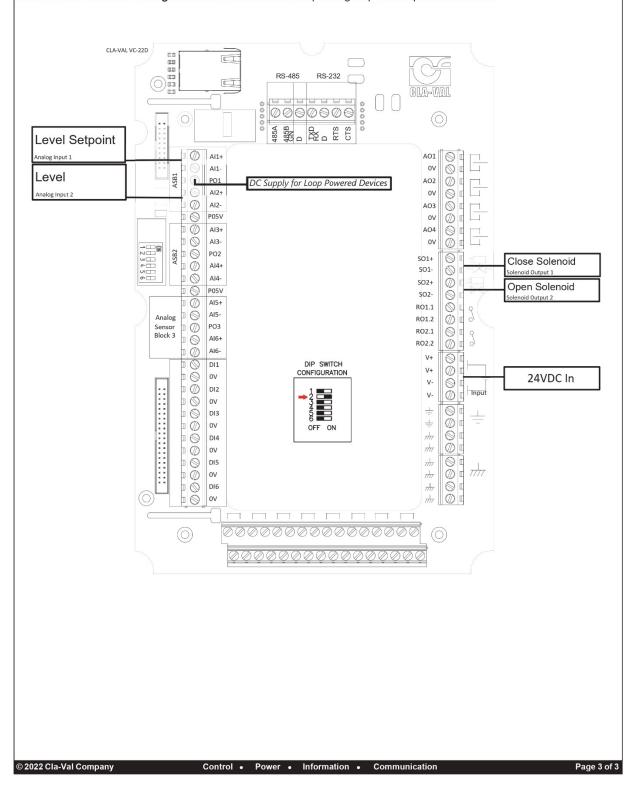
Information			Reset Form	Configuration:	VC-22D		
*Project Name N/A			*Today's Date	12/19/22			
*Cla-Val Representive N/A		Proj	ect Completion Date				
Control Valve Model Number 1 2 1			Customer Approval				
(if known) 131			Signature				
Valve Regulation (If more than 2 PID's are required	d, specify in logic on page	ə 2)					
PID 1 - Valve Regulation *Solenoid Co	onfig NC / NC (P.F. Lock)	PID	2 - Valve Regulation	PID Selection	Mode		
*Control Type Level - Altitude *Signal I	Loss Lock Valve	Con	trol Type	Signa	al Loss		
Deadband (+/-) Ram	ping	Deadb	oand (+/-)	Ra	Imping		
DP Metering (133 Valve)							
DP Metering Pressure Measurement	P1+P2 DPT			Outpu	ıt		
Size Body Style	Seat	_	Units	Output Scaling	g		
Totalizer							
Totalizer Reset	Units	Ouput	_	Output Scaling	9		
Analog Inputs (4-20mA) 6 Available							
*Analog Input #1 (Typically reserved for control setp	oint signal)	Scaling	Signal I	Powered by Controlle	er		
Name Level Setpoint	Units ft	<b>4mA =</b> 0 ft	20mA =	20 ft	Decimal 0.00		
*Analog Input #2 (Typically reserved for control feed	(back signal)	Scaling	🖌 Signal I	Powered by Controlle	r		
Name Level	Units ft	<b>4mA =</b> 0 ft	20mA =	20 ft	Decimal 0.00		
Analog Input #3		Scaling	Signal F	Powered by Controlle	r		
Name	Units	4mA =	20mA =		Decimal		
Analog Input #4		Scaling	Signal F	Powered by Controlle	r		
Name	Units	4mA =	20mA =		Decimal		
Analog Input #5		Scaling	Signal F	Powered by Controlle	r		
Name	Units	4mA =	20mA =	_	Decimal		
		Scaling	Signal 6	Powered by Controlle			
Analog Input #6	Units	4mA =	20mA =	owered by controlle	Decimal		
Name	Units	4111A -	2011A -		Decimal		
Digital Inputs 6 Available							
Digital Input 1 Name	Digital Input 2 N	lame		Digital Input 3 Na	ime		
Purpose	Purpose			Purpose			
Digital Input 4 Name	Digital Input 5 N	lame		Digital Input 6 Na	ime		
Purpose	Purpose			Purpose			
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Analog Outputs (4-2	20mA) Note: Analog Outputs are source	ced with	h controller power	t		
Analog Output #	1			Scaling		
Name	U	nits	_	4mA =	20mA =	Decimal
Analog Output #	2			Scaling		
Name		nits	-	4mA =	20mA =	Decimal
		into				
Analog Output #			_	Scaling		- 10 C
Name	U	nits		4mA =	20mA =	Decimal
Analog Output #4	4			Scaling		
Name	U	nits		4mA =	20mA =	Decimal
Solenoid Outputs						
Solenoid Output	ut #1 (SO1)		Solenoid Outpu	t #2 (SO2)	Note: SO1 and SO2 are a	a powered solid state output typically reserved
Name Close S			Name Open Se		for solenoids used on a 13	31 or 133 series valve. The output can be con- or Discrete ON/OFF. If configured as discrete, a
Default: Cl	losing Solenoid		Default: O	pening Solenoid	value of 0 represents an o	pen circuit, and 1 a closed circuit.
Relay Output		_				
Relay Output #1	1 (RO1)	_	Relay Output #2	2 (RO2)	typically used for alarms.	configured as dry contact mechanical relays These outputs are configured as Discrete
Name			Name		ON/OFF, a value of 0 repr	resents an open circuit, and 1 a closed circuit.
Actions/Alarms		_				
Action #1						
Name Additional Comment		cribe				
	-					
Action #2						
Name		cribe				
Additional Comment	3					
Action #3						
Name	Des	cribe				
Additional Comment	ts					
Action #4						
Name	Des	cribe				
Additional Comment	ts					
Communication						
GSM/GPRS	Modbus TCP/IP		Modbus I	RTU (RS485/RS232)	Note: See ModBus implementation. Ref	specification page for register mapping and fer to manual for more details.
*Control Logic (Plea	ase specify all control logic using sk	etches	s diagrams etc	. Attach additional she	ets if necessary)	
	standard level altitude control. If the l	_			•	a low setpoint, the valve goes full
open.						
	added into this program, even though al cables on these IO points and confi				serve as spare IO points so ad	ditional functionality can be added in
	interactive variables to switch solenoi	0 0				
		al	Devuer			D
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#### Installation, Operation, and Maintenance Manual





# Installation, Operation, and Maintenance Manual

	Project Name:	N/A	Cla-Val			
	Date:					
Modbus	Input	Description	Data Type			ng Comments
40007 Bit 0	Level Setpoint	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Level	Analog Input Modbus Override			N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
40007 Bit 2	Spare	Analog Input Modbus Override Analog Input Modbus Override			N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override Analog Input Modbus Override			N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4 40007 Bit 5		Analog Input Modbus Override Analog Input Modbus Override			N/A N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009 Overrides 4-20mA AI6 Input to use Modbus Address 43010/43011
40007 BIt 5		Analog input Modbus Override	BIC	Write	IN/A	Overrides 4-20mA Al6 input to use Modbus Address 43010/43011
10008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41000
40008 Bit 2		Digital Input Modbus Override			N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override			N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override			N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
		· ·				
41000	Spare	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
11004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
41006	Close Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007	Open Solenoid	Digital Output	Word		S02	Monitory Purposes (Optional)
41008		Digital Output	Word		R01	Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
43000/43001	Level Setpoint	An also a la sust	Int 32	Deed (Matulae	414	Desister Helds (Deside Ald Males at 00 for Two locality of Designals
43000/43001	Level	Analog Input Analog Input	Int 32	Read/Write Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals Register Holds/Reads Al2 Value x100 for Two Implied Decimals
43004/43005	Spare	Analog Input	Int 32	Read/Write		Register Holds/Reads Al3 Value x100 for Two Implied Decimals
43006/43005		Analog Input	Int 32	Read/Write		Register Holds/Reads Al4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads Al5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads Als Value x100 for Two Implied Decimals
+3010/+3011		Analog mpat	1110 52	Ready Write	A10	Register Holds/Reads Alo Valde X100 for Two Implied Decimals
43036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32		A02	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32		A03	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32		A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals

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ModBus Register Mapping



C.3 131-LvlMod-L+Mag-V2.0 or 131-LvlMod-L+144D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

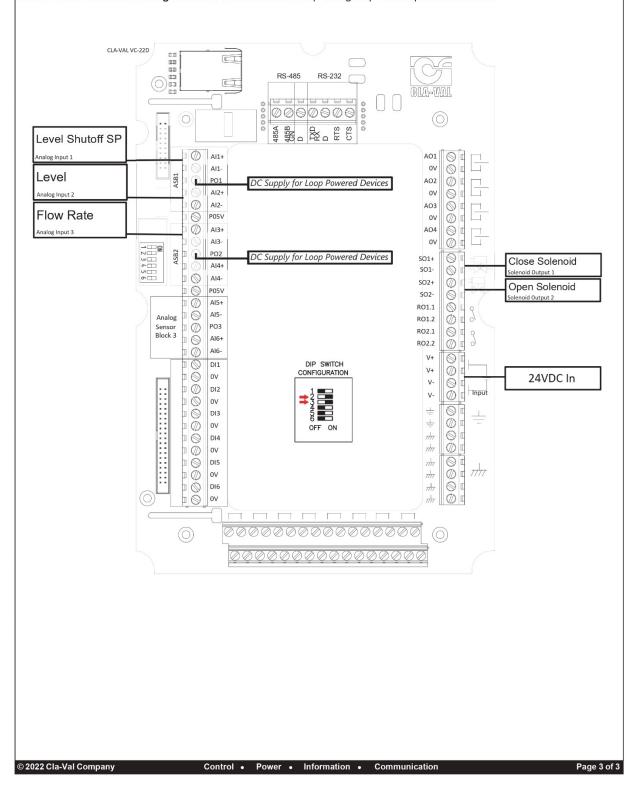
Information				Reset Form	Configuration:	VC-22D
*Project Name	N/A			*Today's Date	12/19/22	
*Cla-Val Representive	N/A		Pro	ject Completion Date		
Control Valve Model Number	121			Customer Approval		
(if known)				Signature		
Valve Regulation (If more than	2 PID's are required, spe	cify in logic on page	e 2)			
PID 1 - Valve Regulation	*Solenoid Config	NC / NC (P.F. Lock)		2 - Valve Regulation	PID Selection	Mode
*Control Type Level - Modul	ating *Signal Loss	Lock Valve	Cor	ntrol Type	Signa	al Loss
Deadband (+/-)	Ramping		Dead	band (+/-)	Ra	amping
DP Metering (133 Valve)						
DP Metering Pressure	OP1+P2 Measurement	2			Outpu	ıt
	/ Style	Seat		Units	Output Scalin	g
Totalizer						
_						
Totalizer Reset	Unit	ts	Ouput		Output Scalin	g
Analog Inputs (4-20mA) 6 Avai	lable					
Analog Input #1 (Typically re-	served for control setpoint sig	gnal)	Scaling	Signal	Powered by Controlle	ŧr
Name Level Shutoff SP	Uni	its ft	<b>4mA =</b> 0 ft	20mA =	20 ft	Decimal 0.00
Analog Input #2 (Typically re-	served for control feedback s	ignal)	Scaling	🖌 Signal	Powered by Controlle	er
Name Level	Uni	its ft	<b>4mA</b> = 0 ft	20mA =	20 ft	Decimal 0.00
Analog Input #3			Scaling	🖌 Signal	Powered by Controlle	r
Name Flow Rate	Uni	its gpm	<b>4mA =</b> 0 gp	om 20mA =	2,000 gpm	Decimal 0
Analog Input #4			Scaling	Signal	Powered by Controlle	r
Name	Uni	its	4mA =	20mA =		Decimal
Analog Input #5			Scaling	Signal	Powered by Controlle	r
Name	Uni	its	4mA =	20mA =		Decimal
Analog Input #6			Scaling	Signal	Powered by Controlle	r
Name	Uni	its	4mA =	20mA =		Decimal
Digital Inputs 6 Available		_				
Digital Input 1 Name		Digital Input 2	lame		Digital Input 3 Na	ame
Purpose		Purpose			Purpose	
Digital Input 4 Name		Digital Input 5	lame		Digital Input 6 Na	ame
Purpose		Purpose			Purpose	
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Anal	og Outputs (4-20mA) Note: Analog Output	s are sourced wi	th controller powe	r.		
	Analog Output #1			Scaling		
	Name	Units		4mA =	20mA =	Decimal
	Analog Output #2			Scaling	_	
	Name	Units		4mA =	20mA =	Decimal
	Analog Output #3			Scaling		
	Name	Units		4mA =	20mA =	Decimal
	Analog Output #4			Scaling		-
	Name	Units		4mA =	20mA =	Decimal
Sole	noid Outputs					
	*Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Outpu	ıt #2 (SO2)	Note: SO1 and SO2 are	a powered solid state output typically reserved
	Name Close Solenoid		Name Open S		for solenoids used on a	31 or 133 series valve. The output can be con- or Discrete ON/OFF. If configured as discrete, a
	Default: Closing Solenoid		Default: C	pening Solenoid	value of 0 represents an	open circuit, and 1 a closed circuit.
Rela	y Output					
	Relay Output #1 (RO1)		Relay Output #	2 (RO2)		configured as dry contact mechanical relays These outputs are configured as Discrete
	Name		Name			presents an open circuit, and 1 a closed circuit.
Actio	ons/Alarms					
	Action #1					
	Name	Describe				
	Additional Comments					
	Action #2					
	Name Additional Comments	Describe				
	Action #3					
	Name	Describe				
	Additional Comments					
	Action #4		_			
	Name Additional Comments	Describe				
Com	munication					
	GSM/GPRS Modbus TC	P/IP	Modbus	RTU (RS485/RS232)		s specification page for register mapping and efer to manual for more details.
*Con	ntrol Logic (Please specify all control logic	c using sketche	es, diagrams, etc	c. Attach additional shee	ets if necessarv)	
	valvApp provides standard level altitude contr	-				the high setpoint, the valve controls
flow in adjuste	nto the tank. The flow rate is directly proporti ed in the field to prevent the flow from exceed ed in the field to prevent the flow from getting	onal to the diffe ling a certain va	rence between cu lue regardless of	nrrent level and high setpo how empty the tank is. A	int. A maximum flow rate s minimum flow rate setpoin	etpoint has been included which can be
	as been added into this program, even though			ything. This serves as a s	pare IO point so additional t	functionality can be added in the field
by lan	ding signal cables on this IO point and config	uring actions in	the VC-22D.			
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#### Installation, Operation, and Maintenance Manual





# Installation, Operation, and Maintenance Manual

0007 Bit 0 L 0007 Bit 1 L 0007 Bit 2 F	Project Name: Date:	N/A				
40007 Bit 0 L 40007 Bit 1 L 40007 Bit 2 F						
40007 Bit 1 L 40007 Bit 2 F	nput	Description	Data Type	Access	I/O Mappin	g Comments
40007 Bit 2 F	Level Shutoff SP	Analog Input Modbus Override	Bit		N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
	Level	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 3	Flow Rate	Analog Input Modbus Override	Bit		N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
		Analog Input Modbus Override			N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
		Analog Input Modbus Override			N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41000
		Digital Input Modbus Override			N/A	Overrides Hardwire DI3 Input to use Modbus Address 41001
		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41002
1000001010		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41005
		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
	Spare	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
41006	Close Solenoid	Digital Output	Word	Read	501	Monitory Purposes (Optional)
	Open Solenoid	Digital Output	Word		S02	Monitory Purposes (Optional)
41007		Digital Output	Word		R01	Monitory Purposes (Optional)
41008		Digital Output	Word		R01	Monitory Purposes (Optional)
		0.8.1.0.0.0.0				
	Level Shutoff SP	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	Level	Analog Input	Int 32	Read/Write		Register Holds/Reads AI2 Value x100 for Two Implied Decimals
43004/43005	Flow Rate	Analog Input	Int 32	Read/Write	AI3	Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43037		Analog Output	Int 32		A01 A02	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32		A02 A03	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43042/43041		Analog Output	Int 32		A03	Monitory Purposes (Optional) - Register Holds AO3 value x100 for Two Implied Decimals
13042/43043		Charlos Gatpat	111. 52	nead	A04	intentery rangeous (optional) register notability rande into the implied beennab

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ModBus Register Mapping



Installation, Operation, and Maintenance Manual

C.4 131-LvlMod-L+X117D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

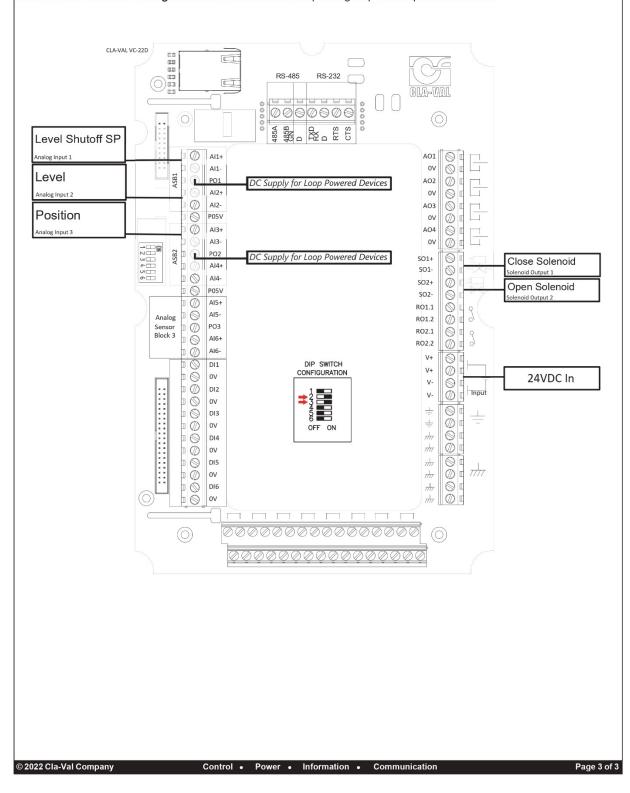
Information			Reset Form	Configuration:	VC-22D
*Project Name N/A			*Today's Date	12/19/22	
*Cla-Val Representive $N/A$		Proj	ect Completion Date		
Control Valve Model Number			Customer Approval		
(if known) 131			Signature		
Valve Regulation (If more than 2 PID's are required	d, specify in logic on page	ə 2)			
PID 1 - Valve Regulation *Solenoid Co	onfig NC / NC (P.F. Lock)	PID	2 - Valve Regulation	PID Selection	Mode
*Control Type Level - Modulating *Signal I	Lock Valve	Con	trol Type	Signa	al Loss
Deadband (+/-) Ram	ping	Deadb	oand (+/-)	Ra	amping
DP Metering (133 Valve)					
DP Metering Pressure Measurement	P1+P2 DPT			Outpu	ıt
Size Body Style	Seat	_	Units	Output Scaling	g
Totalizer					
Totalizer Reset	Units	Ouput	_	Output Scaling	g
Analog Inputs (4-20mA) 6 Available					
Analog Input #1 (Typically reserved for control setp	oint signal)	Scaling	Signal	Powered by Controlle	er
Name Level Shutoff SP	Units ft	<b>4mA =</b> 0 ft	20mA =	20 ft	Decimal 0.00
Analog Input #2 (Typically reserved for control feed	lback signal)	Scaling	🖌 Signal	Powered by Controlle	er
Name Level	Units ft	<b>4mA =</b> 0 ft	20mA =	20 ft	Decimal 0.00
Analog Input #3		Scaling	🖌 Signal F	Powered by Controlle	r
Name Position	Units %	4mA = 0 %	20mA =	100 %	Decimal 0.0
Analog Input #4		Scaling	Signal F	Powered by Controlle	r
Name	Units	4mA =	20mA =		Decimal
Analog Input #5		Scaling	Signal F	Powered by Controlle	r
Name	Units	4mA =	20mA =	_	Decimal
Analog Input #6		Scaling	Signal F	Powered by Controlle	r
Name	Units	4mA =	20mA =	_	Decimal
Digital Inputs 6 Available					
Digital Input 1 Name	Digital Input 2 N	lame		Digital Input 3 Na	ame
Purpose	Purpose			Purpose	
Digital Input 4 Name	Digital Input 5 N	lame		Digital Input 6 Na	ame
Purpose	Purpose			Purpose	
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Analog Outputs (4-20mA) Note: Analog Output	its are sourced wit	h controller power.		
Analog Output #1		Scaling		
Name	Units	4mA =	20mA =	Decimal
		Sealing		
Analog Output #2		Scaling		
Name	Units	4mA =	20mA =	Decimal
Analog Output #3		Scaling		
Name	Units	4mA =	20mA =	Decimal
Analog Output #4		Scaling		
Name	Units	4mA =	20mA =	Decimal
Solenoid Outputs				
*Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Output #2 (SO2)		e a powered solid state output typically reserved 131 or 133 series valve. The output can be con-
Name Close Solenoid Default: Closing Solenoid		Name Open Solenoid Default: Opening Solenoid	figured as PWM (defau	It) or Discrete ON/OFF. If configured as discrete, a n open circuit, and 1 a closed circuit.
Relay Output		Delauli. Opening Sciencia		
Relay Output #1 (RO1)		Relay Output #2 (RO2)	Note: RO1 and RO2 a	re configured as dry contact mechanical relays
Name		Name	typically used for alarm	is. These outputs are configured as Discrete epresents an open circuit, and 1 a closed circuit.
Actions/Alarms		nume		
Action #1	Describe			
Additional Comments	Describe			
Action #2				
Name	Describe			
Additional Comments				
Action #3				
Name	Describe			
Additional Comments	Describe			
Action #4				
Name	Describe			
Additional Comments				
Communication				
GSM/GPRS Modbus T	CP/IP	Modbus RTU (RS485/RS232)		us specification page for register mapping and Refer to manual for more details.
*Control Logic (Please specify all control log	ic usina sketche	s. diagrams. etc. Attach additional she	ets if necessarv)	
This ValvApp provides standard level altitude con	trol. If the level is	above a high setpoint, the valve goes full	l closed. If the level is below	
into the tank. The position is directly proportional adjusted in the field to prevent the position from e				
adjusted in the field to prevent the position from g				
DI1 has been added into this program, even thoug			spare IO point so additional	functionality can be added in the field
by landing signal cables on this IO point and confi	guring actions in	the vC-22D.		
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#### Installation, Operation, and Maintenance Manual





#### Installation, Operation, and Maintenance Manual

Date:  SP Analog Input Modbus Override Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Bit Bit	Write Write Write Write Write Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	Comments Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001 Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003 Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005 Overrides 4-20mA Al4 Input to use Modbus Address 43008/43009 Overrides 4-20mA Al5 Input to use Modbus Address 43008/43009 Overrides 4-20mA Al6 Input to use Modbus Address 43008/43009 Overrides Hardwire D11 Input to use Modbus Address 41000 Overrides Hardwire D12 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D14 Input to use Modbus Address 41002 Overrides Hardwire D14 Input to use Modbus Address 41003
SP Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Digital Input Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Bit Bit	Write Write Write Write Write Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al 1 Input to use Modbus Address 43000/43001 Overrides 4-20mA Al 2 Input to use Modbus Address 43000/43003 Overrides 4-20mA Al 3 Input to use Modbus Address 43006/43005 Overrides 4-20mA Al 4 Input to use Modbus Address 43006/43007 Overrides 4-20mA Al 6 Input to use Modbus Address 43006/43007 Overrides 4-20mA Al 6 Input to use Modbus Address 43006/43001 Overrides 4-20mA IN 6 Input to use Modbus Address 43006/43011 Overrides Hardwire D1 Input to use Modbus Address 43000 Overrides Hardwire D1 Input to use Modbus Address 41000 Overrides Hardwire D1 Input to use Modbus Address 41000 Overrides Hardwire D1 Input to use Modbus Address 41001 Overrides Hardwire D1 Input to use Modbus Address 41002
Analog input Modbus Override Analog input Modbus Override Analog input Modbus Override Analog input Modbus Override Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Bit Bit	Write Write Write Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003 Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005 Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007 Overrides 4-20mA Al6 Input to use Modbus Address 43006/43009 Overrides 4-20mA Al6 Input to use Modbus Address 43008/43009 Overrides Hardwire D11 Input to use Modbus Address 43000 Overrides Hardwire D12 Input to use Modbus Address 41000 Overrides Hardwire D13 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D43 Input to use Modbus Address 41003 Overrides Hardwire D43 Input to use Modbus Address 41003
Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Bit Bit	Write Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43006/43005 Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007 Overrides 4-20mA Al5 Input to use Modbus Address 43008/43009 Overrides 4-20mA Al6 Input to use Modbus Address 43001/43011 Overrides Hardwire D12 Input to use Modbus Address 41000 Overrides Hardwire D13 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D13 Input to use Modbus Address 41003
Analog Input Modbus Override Analog Input Modbus Override Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Word	Write Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007 Overrides 4-20mA Al5 Input to use Modbus Address 43008/43009 Overrides 4-20mA Al6 Input to use Modbus Address 4300/43011 Overrides 4-20mA Al6 Input to use Modbus Address 41000 Overrides Hardwire D12 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D13 Input to use Modbus Address 41003
Analog Input Modbus Override Analog Input Modbus Override Digital Input Digital Input Digital Input	Bit Bit Bit Bit Bit Bit Bit Bit Bit Word	Write Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al5 Input to use Modbus Address 43008/43009 Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011 Overrides Hardwire D11 Input to use Modbus Address 41000 Overrides Hardwire D13 Input to use Modbus Address 41001 Overrides Hardwire D13 Input to use Modbus Address 41002 Overrides Hardwire D13 Input to use Modbus Address 41003
Analog Input Modbus Override Digital Input Digital Input	Bit Bit Bit Bit Bit Bit Bit Word	Write Write Write Write Write Write	N/A N/A N/A N/A N/A N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011 Overrides Hardwire DI1 Input to use Modbus Address 41000 Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002 Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Digital Input Digital Input Digital Input	Bit Bit Bit Bit Bit Bit Word	Write Write Write Write Write	N/A N/A N/A N/A N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000 Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002 Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Digital Input Digital Input	Bit Bit Bit Bit Bit Word	Write Write Write Write	N/A N/A N/A N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002 Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Digital Input Digital Input	Bit Bit Bit Bit Bit Word	Write Write Write Write	N/A N/A N/A N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002 Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Digital Input Digital Input Digital Input Digital Input	Bit Bit Bit Bit Word	Write Write Write	N/A N/A N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002 Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Digital Input Digital Input Digital Input	Bit Bit Bit Word	Write Write	N/A N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
Digital Input Modbus Override Digital Input Modbus Override Digital Input Digital Input Digital Input Digital Input	Bit Bit Word	Write	N/A	
Digital Input Modbus Override Digital Input Digital Input Digital Input Digital Input	Bit			Overrides Hardwire DI5 Input to use Modbus Address 41004
Digital Input Digital Input				Overrides Hardwire DI6 Input to use Modbus Address 41005
Digital Input Digital Input				
Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
		Read/Write		Register Holds/Reads DI2 Value
Digital Input		Read/Write		Register Holds/Reads DI3 Value
		Read/Write		Register Holds/Reads DI4 Value
Digital Input		Read/Write		Register Holds/Reads DI5 Value
Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
d Digital Output	Word	Read	S01	Monitory Purposes (Optional)
d Digital Output				Monitory Purposes (Optional)
Digital Output				Monitory Purposes (Optional)
				Monitory Purposes (Optional)
				Register Holds/Reads AI1 Value x100 for Two Implied Decimals
Analog Input	Int 32	Read/Write	AI2	Register Holds/Reads AI2 Value x100 for Two Implied Decimals
Analog Input	Int 32	Read/Write	AI3	Register Holds/Reads AI3 Value x100 for Two Implied Decimals
Analog Input	Int 32	Read/Write	AI4	Register Holds/Reads AI4 Value x100 for Two Implied Decimals
Analog Input	Int 32	Read/Write	AI5	Register Holds/Reads AI5 Value x100 for Two Implied Decimals
Analog Input	Int 32	Read/Write	Al6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
Angles Output	1-+ 22	Deed	4.01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
				Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
				Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
				Monitory Purposes (Optional) - Register Holds AOS Value x100 for Two Implied Decimals
Analog Output	Int 32	кеао	AU4	Monitory Purposes (Optional) - Register Holds A04 Value x100 for Two Implied Decimais
	Digital Output SP Analog Input Analog Input Analog Input Analog Input Analog Input	Pigital Output Word SP Analog Input Int 32 Analog Output	Digital Output         Word         Read           SP         Analog Input         Int 32         Read/Write           Analog Output         Int 32         Read/Write           Analog Output         Int 32         Read           Analog Output         Int 32         Read	Digital Output         Word         Read         R02           SP         Analog Input         Int 32         Read/Write AI           Analog Input         Int 32         Read/Write AIS           Analog Input         Int 32         Read/Write AIS           Analog Output         Int 32         Read AV/rite AIS           Analog Output         Int 32         Read AV/rite AIS           Analog Output         Int 32         Read AO1           Analog Output         Int 32         Read AO2           Analog Output         Int 32         Read AO3           Analog Output         Int 32         Read AO3           Analog Output         Int 32         Read AO4

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ModBus Register Mapping



Installation, Operation, and Maintenance Manual

C.5 131-Position-X117D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

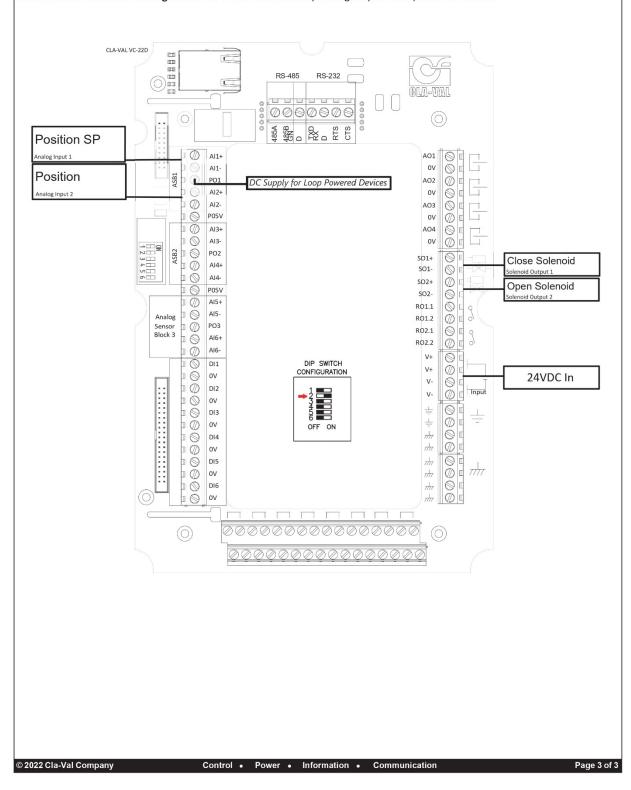
Information			Reset Form	Configuration:	/C-22D		
*Project Name N/	A		*Today's Date	12/19/22			
*Cla-Val Representive N/	A	Proj	ect Completion Date				
Control Valve Model Number 1	21	_	Customer Approval				
(if known)	31		Signature		_		
Valve Regulation (If more than 2 PID's are required, specify in logic on page 2)							
PID 1 - Valve Regulation	PID Selection I	Mode					
*Control Type Valve Position	*Signal Loss Lock Valve	Con	trol Type	Signal	Loss		
Deadband (+/-)	Ramping	Dead	oand (+/-)	Ran	nping		
DP Metering (133 Valve)							
DP Metering Pressure Me	easurement ODPT			Output			
Size Body St	Ŭ	_	Units	Output Scaling			
Totalizer							
Totalizer Reset	Units	Ouput		Output Scaling			
Analog Inputs (4-20mA) 6 Availabl	le						
Analog Input #1 (Typically reserv	red for control setpoint signal)	Scaling	Signal	Powered by Controller			
Name Position SP	Units %	<b>4mA =</b> 0 %	20mA =	100 %	Decimal 0.0		
Analog Input #2 (Typically reserved)	ed for control feedback signal)	Scaling	Signal	Powered by Controller			
Name Position	Units %	<b>4mA</b> = 0 %	20mA =	100 %	Decimal 0.0		
Analog Input #3		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #4		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #5		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =	_	Decimal		
Analog Input #6		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
	enno		Louist		Beennar		
Digital Inputs 6 Available							
Digital Input 1 Name	Digital Input	2 Name		Digital Input 3 Nan	ne		
Purpose	Purpose			Purpose			
Digital Input 4 Name	Digital Input	5 Name		Digital Input 6 Nan	ne		
Purpose	Purpose			Purpose			
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Analog Outputs (4-20mA) Note: Analog Outputs and	e sourced w	ith controller powe	r.		
Analog Output #1			Scaling		
Name	Units		4mA =	20mA =	Decimal
			Scaling		
Analog Output #2	Units		4mA =	20mA =	Decimal
Name	Units		411A -	2011A -	Decimal
Analog Output #3			Scaling		
Name	Units		4mA =	20mA =	Decimal
Analog Output #4			Scaling		
Name	Units	_	4mA =	20mA =	Decimal
Solenoid Outputs					
Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Outpu		for solenoids used on a 13	powered solid state output typically reserved 1 or 133 series valve. The output can be con-
Name Close Solenoid Default: Closing Solenoid		Name Open S Default: O	olenoid pening Solenoid		or Discrete ON/OFF. If configured as discrete, a pen circuit, and 1 a closed circuit.
Relay Output					
Relay Output #1 (RO1)		Relay Output #	2 (RO2)		onfigured as dry contact mechanical relays
Name		Name			These outputs are configured as Discrete esents an open circuit, and 1 a closed circuit.
Actions/Alarms					
Action #1					
Name	Describe				
Additional Comments					
Action #2 Name	Describe				
Additional Comments	Describe				
Action #3		_			
Name	Describe	2			
Additional Comments					
Action #4					
Name	Describe	•			
Additional Comments					
Communication					
GSM/GPRS Modbus TCP/I	5	Modbus	RTU (RS485/RS232)		specification page for register mapping and er to manual for more details.
*Control Logic (Please specify all control logic us	ina sketch	es diagrams etr	Attach additional sh		
This ValvApp provides a standard position control fund	_				e closed. If the position drops below
the SP, the valve will modulate open.			<u>^</u>		<b>^</b>
DI1 and AI3 have been added into this program, even t the field by landing signal cables on these IO points and				e serve as spare IO points so ad	ditional functionality can be added in
and field by failing signal cubics on these to points and	a configuri	g detions in the v	0 220.		
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#### Installation, Operation, and Maintenance Manual





#### Installation, Operation, and Maintenance Manual

	Project Name:	N/A	N/A						
	Date:								
Modbus	Input	Description	Data Type			g Comments			
40007 Bit 0	Position SP	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001			
40007 Bit 1	Position	Analog Input Modbus Override			N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003			
40007 Bit 2	Spare	Analog Input Modbus Override			N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005			
40007 Bit 3		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007			
40007 Bit 4		Analog Input Modbus Override			N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009			
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011			
10008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000			
40008 Bit 1		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001			
40008 Bit 2		Digital Input Modbus Override			N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002			
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003			
40008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004			
40008 Bit 5		Digital Input Modbus Override			N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005			
41000	Spare	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value			
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value			
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value			
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value			
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value			
1005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value			
41006	Close Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)			
41007	Open Solenoid	Digital Output	Word	Read	S02	Monitory Purposes (Optional)			
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)			
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)			
10000 (10001	D		1						
43000/43001		Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals			
43002/43003		Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals			
43004/43005	Spare	Analog Input	Int 32	Read/Write Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals			
43006/43007		Analog Input	Int 32			Register Holds/Reads Al4 Value x100 for Two Implied Decimals			
43008/43009		Analog Input	Int 32	Read/Write	AIS	Register Holds/Reads AI5 Value x100 for Two Implied Decimals			
43010/43011		Analog Input	Int 32	Read/Write	Alb	Register Holds/Reads Alb Value x100 for Two Implied Decimals			
43036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals			
43038/43039		Analog Output	Int 32	Read	AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals			
43040/43041		Analog Output	Int 32	Read	AO3	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals			
43042/43043		Analog Output	Int 32		AO4	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals			
43010/43011 43036/43037 43038/43039 43040/43041 43042/43043	            	Analog Input Analog Output Analog Output Analog Output Analog Output	Int 32 Int 32 Int 32 Int 32	Read/Write Read Read Read	AI6 AO1 AO2 AO3	Register Holds/Reads Al6 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied D Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied D Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied D			

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ModBus Register Mapping



C.6 131-PressureReducing-P2-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

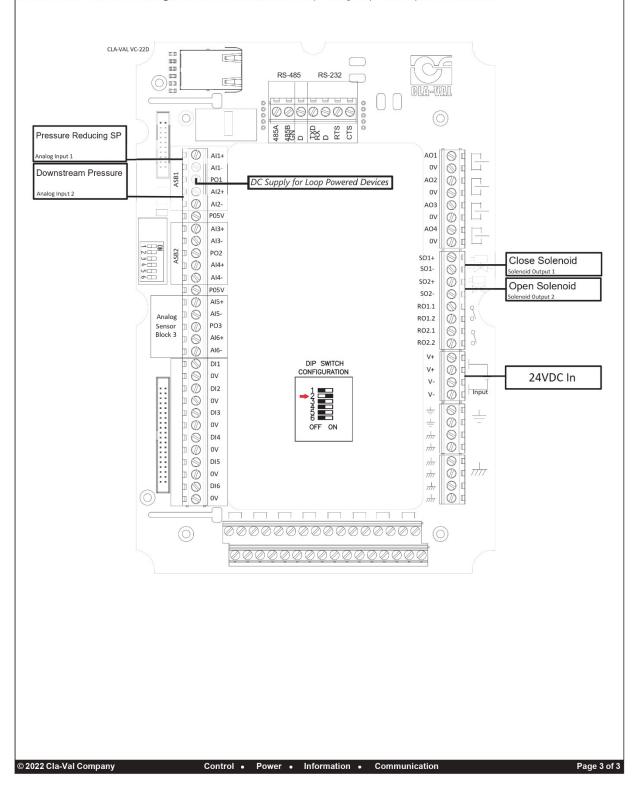
Information			Reset Form	Configuration: V	/C-22D		
*Project Name N/A			*Today's Date	12/19/22			
*Cla-Val Representive N/A		Proje	ect Completion Date				
Control Valve Model Number 1 2 1			Customer Approval				
(if known) 131			Signature		_		
Valve Regulation (If more than 2 PID's are required, specify in logic on page 2)							
PID 1 - Valve Regulation *Solence	oid Config NC / NC (P.F. Lock)	PID	2 - Valve Regulation	PID Selection M	lode		
*Control Type Pressure Reducing *Si	gnal Loss Lock Valve	Cont	rol Type	Signal	Loss		
Deadband (+/-)	Ramping	Deadb	and (+/-)	Ram	iping		
DP Metering (133 Valve)							
DP Metering Pressure Measuremen				Output			
Size Body Style	Seat		Units	Output Scaling			
Totalizer							
Totalizer Reset	Units	Ouput		Output Scaling			
Analog Inputs (4-20mA) 6 Available							
*Analog Input #1 (Typically reserved for contro	ol setpoint signal)	Scaling	Signal	Powered by Controller			
Name Pressure Reducing SP	Units psi	<b>4mA =</b> 0 psi	20mA =	290 psi	Decimal 0.0		
Analog Input #2 (Typically reserved for control	ol feedback signal)	Scaling	🖌 Signal	Powered by Controller			
Name Downstream Pressure	Units psi	<b>4mA =</b> 0 psi	20mA =	290 psi	Decimal 0.0		
Analog Input #3		Scaling	Signal I	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #4		Scaling	Signal I	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #5		Scaling	Signal I	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #6		Scaling	Signal I	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
		-					
Digital Inputs 6 Available		_					
Digital Input 1 Name	Digital Input 2	Name		Digital Input 3 Nam	le		
Purpose	Purpose			Purpose			
Digital Input 4 Name	Digital Input 5	Name		Digital Input 6 Nam	ie		
Purpose	Purpose			Purpose			
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Anal	og Outputs (4-	20mA) Note: Analog Outputs a	re sourced wi	th controller powe	r.		
	Analog Output i	¥1			Scaling		
	Name		Units		4mA =	20mA =	Decimal
					Scaling		
	Analog Output a	72	Unito			20m A =	Decimal
	Name		Units		4mA =	20mA =	Decimal
	Analog Output i	¥3			Scaling		
	Name		Units		4mA =	20mA =	Decimal
	Analog Output #	¥4			Scaling		
	Name		Units		4mA =	20mA =	Decimal
Sole	noid Outputs						
	*Solenoid Out	out #1 (SO1)		Solenoid Outpu	ıt #2 (SO2)		a powered solid state output typically reserved 131 or 133 series valve. The output can be con-
	Name Close	Solenoid Closing Solenoid		Name Open S	olenoid pening Solenoid	figured as PWM (default	t) or Discrete ON/OFF. If configured as discrete, a open circuit, and 1 a closed circuit.
Rela	y Output						
	Relay Output #	\$1 (RO1)		Relay Output #	2 (RO2)	Note: RO1 and RO2 are	e configured as dry contact mechanical relays
	Name			Name	- (=)	typically used for alarms	s. These outputs are configured as Discrete presents an open circuit, and 1 a closed circuit.
Actio	ons/Alarms						
	Action #1						
	Name		Describe				_
	Additional Commer	nts	20001180				
Ш	Action #2			_			
	Name Additional Commen	nte	Describe				
	Additional Commen	10					
	Action #3						
	Name		Describe				
	Additional Comme	nts					
	Action #4						
	Name		Describe				
	Additional Comme	nts	Desembe				
	_						
Com	munication						
	GSM/GPRS	Modbus TCP/	IP	Modbus	RTU (RS485/RS232)	Note: See ModBu implementation. R	s specification page for register mapping and efer to manual for more details.
*Cor	trol Logic (Ple	ease specify all control logic u	sing sketche	es, diagrams, etc	c. Attach additional shee	ets if necessary)	
		s a standard pressure reduction the SP, the valve will modulate		131 series valve.	If the outlet pressure rise	es above the SP, the valve w	rill modulate closed. If the outlet
DI1 at	d AI3 have been	added into this program, even	though they a	are currently not u	used for anything. These s	serve as spare IO points so a	additional functionality can be added in
		nal cables on these IO points an				1 F 00 0	.,
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#### Installation, Operation, and Maintenance Manual





# Installation, Operation, and Maintenance Manual

			Cla-Val	VC-22D Mod	lbus Addre	sses
	Project Name: Date:	N/A				
Modbus	Input	Description	Data Type	Access	I/O Mappi	ng Comments
40007 Bit 0	Pressure Reducina SP	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Downstream Pressure	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
40007 Bit 2	Spare	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit		N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override	Bit		N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override	Bit		N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write		Register Holds/Reads DI6 Value
			11010	The second second	0.0	
41006	Close Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007	Open Solenoid	Digital Output	Word		S02	Monitory Purposes (Optional)
41008		Digital Output	Word		R01	Monitory Purposes (Optional)
41009		Digital Output	Word		R02	Monitory Purposes (Optional)
11005		Digital Output	Word	neuu	1102	Monitory ruppices (optional)
43000/43001	Pressure Reducing SP	Analog Input	Int 32	Read/Write	Δ11	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003	Downstream Pressure	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
43004/43005	Spare	Analog Input	Int 32	Read/Write		Register Holds/Reads Al3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads Al4 Value x100 for Two Implied Decimals
43008/43009			Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads Al6 Value x100 for Two Implied Decimals
15010/15011		- Indiog mput	III JL	field, write	140	
43036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039			Int 32		AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041			Int 32		AO3	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32		A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
13012/13013		- Indiag output	IIIC SE	incud i	/10 /	

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ModBus Register Mapping



C.7 131-PressureSustaining-P1-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

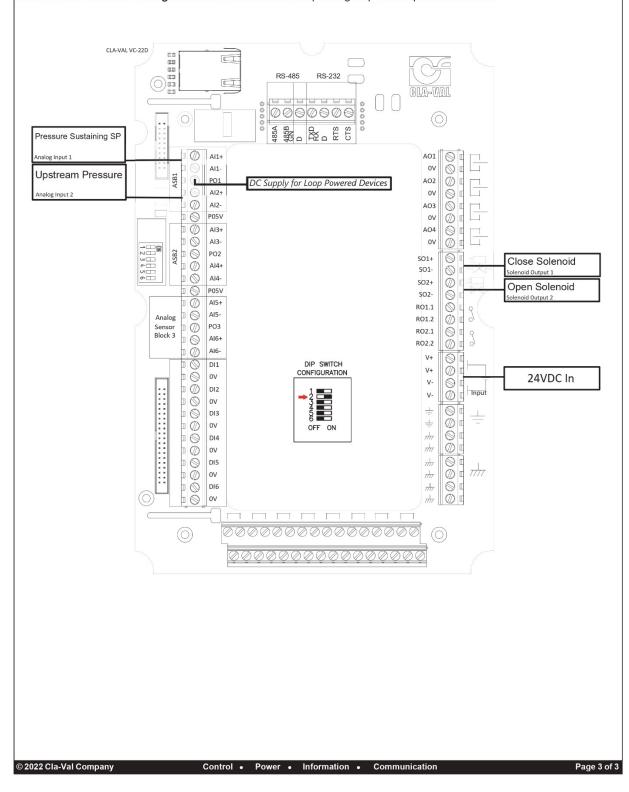
Information			Reset Form	Configuration:	/C-22D			
*Project Name N/A			*Today's Date	12/19/22				
*Cla-Val Representive N/A		Project	Completion Date					
Control Valve Model Number 1 2 1		Cu	istomer Approval					
(if known)			Signature					
Valve Regulation (If more than 2 PID's are required, specify in logic on page 2)								
PID 1 - Valve Regulation *Solenoid Co	onfig NC / NC (P.F. Lock)	PID 2 -	Valve Regulation	PID Selection	Node			
*Control Type Pressure Sustaining *Signal	Loss Lock Valve	Control	Туре	Signal	Loss			
Deadband (+/-) Ram	ping	Deadban	d (+/-)	Ran	nping			
DP Metering (133 Valve)								
DP Metering Pressure Measurement	P1+P2 DPT			Output				
Size Body Style	Seat	Un	its	Output Scaling				
Totalizer								
Totalizer Reset	Units	Ouput		Output Scaling				
Analog Inputs (4-20mA) 6 Available								
*Analog Input #1 (Typically reserved for control set	oint signal)	Scaling	Signal	Powered by Controller				
Name Pressure Sustaining SP	Units psi	<b>4mA =</b> 0 psi	20mA =	290 psi	Decimal 0.0			
*Analog Input #2 (Typically reserved for control feed	lback signal)	Scaling	🖌 Signal	Powered by Controller				
Name Upstream Pressure	Units psi	<b>4mA =</b> 0 psi	20mA =	290 psi	Decimal 0.0			
Analog Input #3		Scaling	Signal F	Powered by Controller				
Name	Units	4mA =	20mA =		Decimal			
Analog Input #4		Scaling	Signal F	Powered by Controller				
Name	Units	4mA =	20mA =		Decimal			
Analog Input #5		Scaling	Signal F	Powered by Controller				
Name	Units	4mA =	20mA =		Decimal			
Analog Input #6		Scaling	Signal F	Powered by Controller				
Name	Units	4mA =	20mA =		Decimal			
Digital Inputs 6 Available								
Digital Input 1 Name	Digital Input 2 N	ame		Digital Input 3 Nan	ne			
Purpose	Purpose		_	Purpose				
Digital Input 4 Name	Digital Input 5 N	ame		Digital Input 6 Nan	ne			
Purpose	Purpose			Purpose				
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Anal	og Outputs (4-20mA)	Note: Analog Outputs are source	d with contro	ller power.					
	Analog Output #1			5	Scaling				
	Name	Un	its		4mA =	2	0mA =		Decimal
					Scaling				
	Analog Output #2	Un	ite	Ì		2	0mA =	_	Decimal
	Name	Un	its		4mA =	2	oma –	_	Decimal
	Analog Output #3			5	Scaling				
	Name	Un	its	_	4mA =	2	0mA =		Decimal
	Analog Output #4			5	Scaling				
	Name	Un	its	_	4mA =	2	0mA =	_	Decimal
	noid Outputs		_						
	*Solenoid Output #1 (S		<u> </u>	Solenoid Output #2 (SO2) Name Open Solenoid Default: Opening Solenoid					solid state output typically reserved eries valve. The output can be con-
	Name Close Solenoid Default: Closing Sole		Name				figured as PWM (default) or Discrete ON/OFF. If configured as discrete value of 0 represents an open circuit, and 1 a closed circuit.		
Relay	/ Output			,					
	Relay Output #1 (RO1)	)	Relay	Output #2	(RO2)		Note: RO1 a	nd RO2 are configured	as dry contact mechanical relays
	Name		Name	_		_	typically used ON/OFF, a va	d for alarms. These outp alue of 0 represents an	uts are configured as Discrete open circuit, and 1 a closed circuit.
Actic	ons/Alarms								
	Action #1								
	Name	Desci	ribe						
	Additional Comments								_
	Action #2	Dura	-11						
	Name Additional Comments	Desc	ribe						
	Action #3								
	Name	Desc	ribe						
	Additional Comments								
	Action #4								
	Name	Desc	ribe						
	Additional Comments								_
Com	munication								
	GSM/GPRS	Modbus TCP/IP		lodbus R	TU (RS485/RS	232)		See ModBus specificatio entation. Refer to manu	n page for register mapping and al for more details.
*Con	trol Logic (Please spe	cify all control logic using ske	tches, diagr	rams, etc.	Attach addition	al sheets if ne	cessary)		
	alvApp provides a standa below the SP, the valve w	ard pressure sustaining function vill modulate closed.	for a 131 ser	ries valve.	If the inlet press	ure rises above	the SP, the	valve will modulat	te open. If the inlet pressure
DI1 an	d AI3 have been added in	nto this program, even though th	hey are curre	ntly not us	ed for anything.	These serve as	spare IO po	oints so additional t	functionality can be added in
the field	ld by landing signal cable	es on these IO points and config	uring actions	s in the VC	-22D.				
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40007 Bit 0 Pr 40007 Bit 1 Ur 40007 Bit 2 Sr	Project Name:	N/A				
40007 Bit 0 Pr 40007 Bit 1 Ur 40007 Bit 2 Sr	Date:					
40007 Bit 1 Ur 40007 Bit 2 Sr	put	Description	Data Type			g Comments
40007 Bit 2 Sr	ressure Sustaining SP	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
	pstream Pressure	Analog Input Modbus Override			N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 3 I	pare	Analog Input Modbus Override			N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
		Analog Input Modbus Override			N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5	-	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0 Sc	pare	Digital Input Modbus Override	Dit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A N/A	Overrides Hardwire DI2 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
		Digital Input Modbus Override			N/A N/A	Overrides Hardwire DI3 input to use Modbus Address 41002
40008 Bit 3 40008 Bit 4		Digital Input Modbus Override		Write Write	N/A N/A	Overrides Hardwire DI3 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
10008 BIL 5	-	Digital input woubus override	ы	write	IN/A	Overrides Hardwire Die input to use wiodbus Address 41005
41000 Sc	pare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41000		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002	-		Word	Read/Write		Register Holds/Reads DI2 Value
41003	-		Word	Read/Write		Register Holds/Reads DI4 Value
41004	-	Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005	-		Word	Read/Write		Register Holds/Reads DI6 Value
11005		Digital input	Word	neudy write	010	negater holds/neuda bio value
41006 Cl	lose Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
	pen Solenoid		Word		S02	Monitory Purposes (Optional)
41008	-	Digital Output	Word		R01	Monitory Purposes (Optional)
41009	-	Digital Output	Word	Read	R02	Monitory Purposes (Optional)
	ressure Sustaining SP	Analog Input	Int 32	Read/Write	Al1	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	pstream Pressure	Analog Input	Int 32	Read/Write		Register Holds/Reads AI2 Value x100 for Two Implied Decimals
	pare	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007	-	Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009	-		Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011	-	Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037	-		Int 32		A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039	-		Int 32		AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041	-		Int 32		A03	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043	-	Analog Output	Int 32	Read	AO4	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals



Installation, Operation, and Maintenance Manual

C.8 133-Flow-DP+X117D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

Information				Reset Form	Configuration:	VC-22D				
*Project Name	N/A			*Today's Date	12/19/22					
*Cla-Val Representive	N/A		Pro	ject Completion Date						
Control Valve Model Number	133			Customer Approval	1					
(if known)	155			Signature		_				
Valve Regulation (If more than	Valve Regulation (If more than 2 PID's are required, specify in logic on page 2)									
PID 1 - Valve Regulation	*Solenoid Config N	C / NC (P.F. Lock)		0 2 - Valve Regulation	PID Selection	n Mode				
*Control Type Flow	*Signal Loss Lo	ock Valve	Cor	ntrol Type	Sign	al Loss				
Deadband (+/-)	Ramping		Dead	lband (+/-)	R	amping				
DP Metering (133 Valve)										
DP Metering Pressure	OP1+P2 Measurement ODPT				Outp	ut Analog Out 1				
	y Style	Seat	_	Units gpm	Output Scalin	ng				
Totalizer										
_	11-24-									
Totalizer Reset	Units		Ouput		Output Scalin	ng				
Analog Inputs (4-20mA) 6 Avai	lable									
Analog Input #1 (Typically re	served for control setpoint sign	al)	Scaling	Signal	Powered by Controll	er				
Name Flow Setpoint	Units	gpm	<b>4mA =</b> 0 g	pm 20mA =	2,000 gpm	Decimal 0				
Analog Input #2 (Typically re	served for control feedback sig	nal)	Scaling	🖌 Signal	Powered by Controll	er				
Name Valve Position	Units	; %	4mA = 0 %	20mA =	= 100 %	Decimal 0.0				
Analog Input #3			Scaling	🖌 Signal	Powered by Controlle	ər				
Name DP Transmitter	Units	psi	4mA = 0 ps	si 20mA =	= 100 psi	Decimal 0.0				
Analog Input #4			Scaling	Signal	Powered by Controlle	er				
Name	Units		4mA =	20mA =		Decimal				
Analog Input #5			Scaling	Signal	Powered by Controlle	er				
Name	Units	_	4mA =	20mA =		Decimal				
			Scaling		Powered by Controlle	ar				
Analog Input #6	Units		4mA =	20mA =		Decimal				
Nume	Units		1004	20114		Decimar				
Digital Inputs 6 Available										
Digital Input 1 Name		Digital Input 2 N	lame		Digital Input 3 N	ame				
Purpose		Purpose			Purpose					
Digital Input 4 Name		Digital Input 5 N	lame		Digital Input 6 N	ame				
Purpose		Purpose			Purpose					
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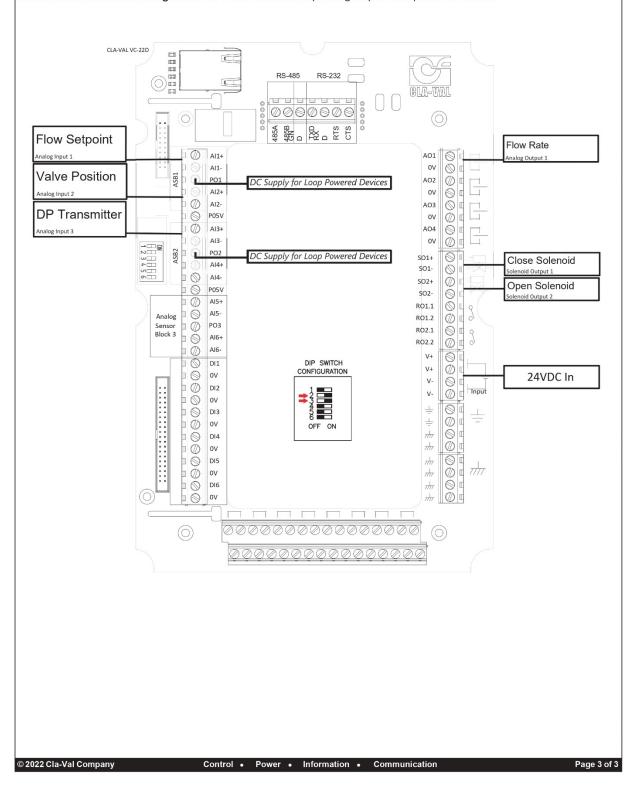




Anal	og Outputs (4-20mA) Note: Analog Outputs are	e sourced w	ith controller powe	er.					
	Analog Output #1			Scaling					
	Name Flow Rate	Units	gpm	<b>4mA =</b> 0 gpm	20mA =	2,000 gpm	Decimal 0		
	Anglen Output #0			Scaling					
	Analog Output #2	Unite			20mA =	_	Desimal		
	Name	Units		4mA =	2011A -		Decimal		
	Analog Output #3			Scaling					
	Name	Units		4mA =	20mA =		Decimal		
	Analog Output #4			Scaling					
	Name	Units		4mA =	20mA =		Decimal		
Sole	noid Outputs								
	*Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Outpu		Note: SO1 and SO2 are a powered solid state output typicall, for solenoids used on a 131 or 133 series valve. The output c				
	Name Close Solenoid Default: Closing Solenoid		Name Open S Default: C	Solenoid Dpening Solenoid	figured as value of 0	figured as PWM (default) or Discrete ON/OFE. If configured as discrete, a value of 0 represents an open circuit, and 1 a closed circuit.			
Rela	y Output			, ,					
	Relay Output #1 (RO1)		Relay Output #	2 (RO2)			red as dry contact mechanical relays		
	Name		Name			typically used for alarms. These outputs are configured as Discrete ON/OFF, a value of 0 represents an open circuit, and 1 a closed circuit.			
Actio	ons/Alarms								
	Action #1								
	Name	Describe							
	Additional Comments						_		
Ш	Action #2	D	_						
	Additional Comments	Describe	2						
	Action #3								
	Name	Describe	•						
	Additional Comments								
	Action #4								
	Name	Describe	2						
	Additional Comments								
Com	munication								
	GSM/GPRS Modbus TCP/IF	•	Modbus	RTU (RS485/RS232)		e: See ModBus specific ementation. Refer to ma	ation page for register mapping and anual for more details.		
*Control Logic (Please specify all control logic using sketches, diagrams, etc. Attach additional sheets if necessary)									
This ValvApp provides a standard flow control function for a 133 series valve. If th flow rises above the SP, the valve will modulate closed. If the flow drops below the SP, the valve will modulate open.									
DII and AI3 have been added into this program, even though they are currently not used for anything. These serve as spare IO points so additional functionality can be added in the field by landing signal cables on these IO points and configuring actions in the VC-22D.									
A custom control curve has been added to this program which allows the position transmitter to be pseudo calibrated in the field. This exists to allow the DP Metering to be adjusted to match a mag meter in the field.									
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

	Project Name:	N/A				
	Date:					
	Input	Description	Data Type			g Comments
	Flow Setpoint	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Valve Position	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
	DP Transmitter	Analog Input Modbus Override			N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
10008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
10008 Bit 5		Digital Input Modbus Override			N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
41000	Spare	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write	DI3	Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write	DI4	Register Holds/Reads DI4 Value
11004		Digital Input	Word	Read/Write	DI5	Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
11000	Close Solenoid					
41006 41007	Open Solenoid	Digital Output	Word	Read	S01 S02	Monitory Purposes (Optional)
41007	Open Solenoid	Digital Output	Word	Read	R01	Monitory Purposes (Optional)
		Digital Output		Read	R01 R02	Monitory Purposes (Optional)
11009		Digital Output	Word	Read	KU2	Monitory Purposes (Optional)
43000/43001	Flow Setpoint	Analog Input	Int 32	Read/Write	Al1	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003	Valve Position	Analog Input	Int 32	Read/Write	AI2	Register Holds/Reads Al2 Value x100 for Two Implied Decimals
	DP Transmitter		Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write	AI5	Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads AI6 Value x100 for Two Implied Decimals
	Flow Rate	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32	Read	AO3	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32	Read	AO4	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals

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Installation, Operation, and Maintenance Manual

C.9 133-Flow-P1+P2+X117D-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all "Required fields have been filled out prior to submittal.

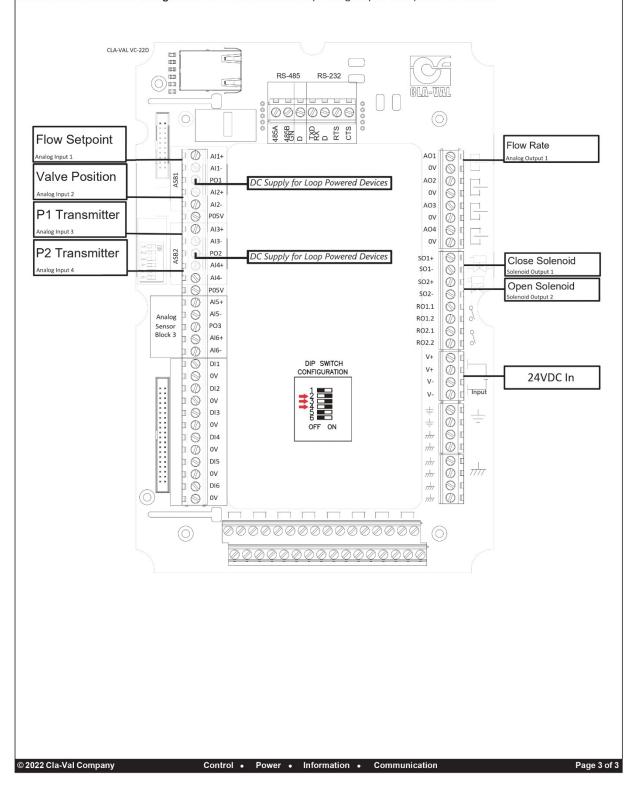
Information				Reset Form	Configuration:	VC-22D		
*Project Name	N/A			*Today's Date	12/19/22			
*Cla-Val Representive	N/A		Pro	oject Completion Date				
Control Valve Model Number	122			Customer Approval				
(if known)	133			Signature				
Valve Regulation (If more than	2 PID's are required, spec	ify in logic on page	e 2)					
PID 1 - Valve Regulation	*Solenoid Config N	IC / NC (P.F. Lock)		D 2 - Valve Regulation	PID Selection	Mode		
*Control Type Flow	*Signal Loss L	ock Valve	Co	ontrol Type	Signa	al Loss		
Deadband (+/-)	Ramping		Dead	dband (+/-)	Ra	amping		
DP Metering (133 Valve)								
DP Metering Pressure	OP1+P2 Measurement				Outpu	It Analog Out 1		
	y Style	Seat	_	Units gpm	Output Scaling	g		
Totalizer								
		_						
Totalizer Reset	Units	5	Ouput		Output Scalin	g		
Analog Inputs (4-20mA) 6 Available								
Analog Input #1 (Typically re	served for control setpoint sign	nal)	Scaling	Signal	Powered by Controlle	ŧr		
Name Flow Setpoint	Unit	s gpm	<b>4mA =</b> 0 g	.pm <b>20mA</b> =	2,000 gpm	Decimal 0		
Analog Input #2 (Typically re	served for control feedback sig	gnal)	Scaling	🖌 Signal	Powered by Controlle	ər		
Name Valve Position	Unit	<b>s</b> %	4mA = 0 %	6 20mA =	= 100 %	Decimal 0.0		
Analog Input #3			Scaling	🖌 Signal	Powered by Controlle	r		
Name P1 Transmitter	Unit	<b>s</b> psi	<b>4mA =</b> 0 p	si 20mA =	= 290 psi	Decimal 0.0		
Analog Input #4			Scaling	🖌 Signal	Powered by Controlle	r		
Name P2 Transmitter	Unit	<b>s</b> psi	<b>4mA =</b> 0 p	usi 20mA =	= 290 psi	Decimal 0.0		
Analog Input #5			Scaling	Signal	Powered by Controlle	r		
Name	Unit	s	4mA =	20mA =		Decimal		
Analog Input #6			Scaling	Signal	Powered by Controlle	r		
Name	Unit	e .	4mA =	20mA =	_	Decimal		
					-			
Digital Inputs 6 Available								
Digital Input 1 Name		Digital Input 2 N	lame		Digital Input 3 Na	ame		
Purpose		Purpose			Purpose			
Digital Input 4 Name		Digital Input 5 N	lame		Digital Input 6 Na	ame		
Purpose		Purpose			Purpose			
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Anal	og Outputs (4-20mA) Note: Analog Outputs an	e sourced w	ith controller powe	or.		
	Analog Output #1			Scaling		
	Name Flow Rate	Units	gpm	<b>4mA =</b> 0 gpm	<b>20mA =</b> 2,000 gpm	Decimal 0
	Apples Output #2			Scaling		
	Analog Output #2 Name	Units		4mA =	20mA =	Decimal
	Name	Units		4004	20114 -	Decimar
	Analog Output #3			Scaling		
	Name	Units		4mA =	20mA =	Decimal
	Analog Output #4			Scaling		
	Name	Units		4mA =	20mA =	Decimal
	noid Outputs					
	*Solenoid Output #1 (SO1)	$\checkmark$	Solenoid Outpu		for solenoids used on a 131 or	vered solid state output typically reserved 133 series valve. The output can be con-
	Name Close Solenoid Default: Closing Solenoid		Name Open S Default: C	Solenoid Dpening Solenoid	figured as PWM (default) or Di value of 0 represents an open	iscrete ON/OFF. If configured as discrete, a circuit, and 1 a closed circuit.
Rela	y Output					
	Relay Output #1 (RO1)		Relay Output #	2 (RO2)		igured as dry contact mechanical relays
	Name		Name			se outputs are configured as Discrete nts an open circuit, and 1 a closed circuit.
Actio	ons/Alarms					
	Action #1					
	Name	Describe				
	Additional Comments					
	A // _ //0					_
	Action #2 Name	Describe				
	Additional Comments	Describe	•			
	Action #3					
	Name	Describe	•			
	Additional Comments					
	Action #4					
	Name	Describe	•			
	Additional Comments					
Com	munication					
	GSM/GPRS Modbus TCP/I	2	Modbus	RTU (RS485/RS232)	Note: See ModBus spec implementation. Refer to	sification page for register mapping and manual for more details.
*Cor	ntrol Logic (Please specify all control logic us	ina sketch	es, diagrams, etc	c. Attach additional sheet		
	/alvApp provides a standard flow control function	0	, ,			the flow drops below the SP, the
	will modulate open.					
	nd AI3 have been added into this program, even t eld by landing signal cables on these IO points and				rve as spare IO points so additi	onal functionality can be added in
	tom control curve has been added to this program set which can be adjusted in the field. This exists					an interactive variable for P1 and
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

	Project Name:	N/A				
	Date:					
Modbus	Input	Description	Data Type			g Comments
40007 Bit 0	Flow Setpoint	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Valve Position	Analog Input Modbus Override			N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
40007 Bit 2	P1 Transmitter	Analog Input Modbus Override			N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005
40007 Bit 3	P2 Transmitter	Analog Input Modbus Override			N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override Analog Input Modbus Override			N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	BIT	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override	Bit		N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override	Bit		N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
41000	Spare	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
1006	Close Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007	Open Solenoid	Digital Output	Word		S02	Monitory Purposes (Optional)
41008		Digital Output	Word		R01	Monitory Purposes (Optional)
41009		Digital Output	Word		R02	Monitory Purposes (Optional)
43000/43001	Flow Setpoint	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003	Valve Position	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
43004/43005	P1 Transmitter	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007	P2 Transmitter	Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037	Flow Rate	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32		A01	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32		A03	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32		A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
13012/13013		rinding output	Incor	licud	/10/1	

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C.10 136-LvIAlt-HLLL-Switches-V1.0

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all "Required fields have been filled out prior to submittal.

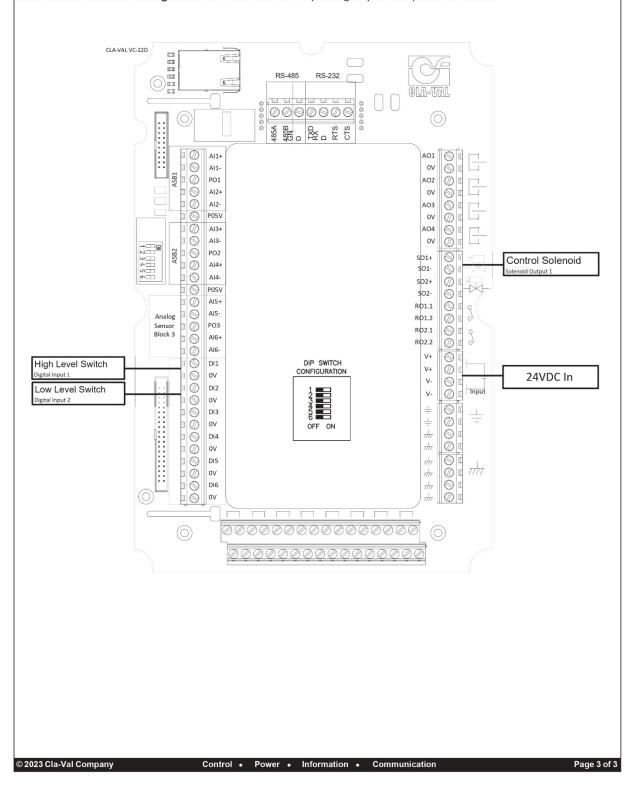
Information			Reset Form	Configuration:	/C-22D		
*Project Name N/A			*Today's Date	3/14/23			
*Cla-Val Representive N/A		Proj	ect Completion Date				
Control Valve Model Number 1 2 6			Customer Approval				
(if known) 136			Signature		_		
Valve Regulation (If more than 2 PID's are require	d, specify in logic on page	ə 2)					
PID 1 - Valve Regulation *Solenoid Co	onfig	PID	2 - Valve Regulation	PID Selection I	Mode		
*Control Type *Signal	_oss	Con	trol Type	Signal	Loss		
Deadband (+/-) Ram	ping	Deadb	oand (+/-)	Ran	nping		
DP Metering (133 Valve)							
DP Metering Pressure Measurement	P1+P2 DPT			Output			
Size Body Style	Seat	_	Units	Output Scaling			
Totalizer							
Totalizer Reset	Units	Ouput		Output Scaling			
Analog Inputs (4-20mA) 6 Available							
*Analog Input #1 (Typically reserved for control setp	oint signal)	Scaling	Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
*Analog Input #2 (Typically reserved for control feed	back signal)	Scaling	Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #3		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #4		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #5		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #6		Scaling	Signal F	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Digital Inputs 6 Available		_					
✓ Digital Input 1 Name High Level Switch	🖌 Digital Input 2 N	lame Low Leve	el Switch	Digital Input 3 Nan	ne		
Purpose	Purpose			Purpose			
Digital Input 4 Name	Digital Input 5 N	lame		Digital Input 6 Nan	ne		
Purpose	Purpose			Purpose			
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Analog Outputs (4-20mA) Note: Analog Outputs	are sourced wi	th controller power.		
Analog Output #1		Scaling		
Name	Units	4mA =	20mA =	Decimal
		Scaling		
Analog Output #2	11		00 0	Desired
Name	Units	4mA =	20mA =	Decimal
Analog Output #3		Scaling		
Name	Units	4mA =	20mA =	Decimal
Analog Output #4		Scaling		
Name	Units	4mA =	20mA =	Decimal
Solenoid Outputs				
Solenoid Output #1 (SO1)		Solenoid Output #2 (SO2)	for solenoids used on a	e a powered solid state output typically reserved 131 or 133 series valve. The output can be con-
Name Control Solenoid Default: Closing Solenoid		Name Default: Opening Solenoid		t) or Discrete ON/OFF. If configured as discrete, a open circuit, and 1 a closed circuit.
Relay Output		, .		
Relay Output #1 (RO1)		Relay Output #2 (RO2)		e configured as dry contact mechanical relays
Name		Name		s. These outputs are configured as Discrete presents an open circuit, and 1 a closed circuit.
Actions/Alarms				
Action #1				
Name	Describe			
Additional Comments				
Action #2				
Additional Comments	Describe			
Action #3				
Name	Describe			
Additional Comments				
Action #4				
Name	Describe			
Additional Comments				
Communication				
GSM/GPRS Modbus TCI	P/IP	Modbus RTU (RS485/RS232)		as specification page for register mapping and Refer to manual for more details.
*Control Logic (Please specify all control logic	using sketche	es, diagrams, etc. Attach additional she	eets if necessary)	
This ValvApp provides standard level control for sin closed. If the level is below the low level switch, the			hes. If the level is above the	high level switch, the valve goes full
This ValvApp provides an interactive variable to co	_		NO (Energiza to Class)	
This ValvApp also provides interactive variables to	configure the E	ngn Level and Low Level Switches as N	J OI NO.	
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#### Installation, Operation, and Maintenance Manual





## Installation, Operation, and Maintenance Manual

	Project Name:	N/A				
	Date:					
Modbus	Input	Description	Data Type	Access	I/O Mappin	g Comments
40007 Bit 0		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 2		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
10008 Bit 0	High Level Switch	Digital Input Modbus Override	Di+	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1	Low Level Switch	Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIA Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41005
40008 Bit 4		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
40008 BIT 5		Digital input widdbus Override	ыс	Write	N/A	Overrides Hardwire Die Input to use wiodbus Address 41005
41000	Hiah Level Switch	Digital Input	Word	Read/Write		Register Holds/Reads DI1 Value
41001	Low Level Switch	Digital Input	Word	Read/Write	DI2	Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write	DI4	Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write	DI5	Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write	DI6	Register Holds/Reads DI6 Value
11006	Control Solenoid	Digital Output	Word	Read	501	Monitory Purposes (Optional)
41006	Control Solenoid	Digital Output			S01	
41007 41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
		Digital Output	Word	Read		Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
43000/43001		Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003		Analog Input	Int 32	Read/Write	AI2	Register Holds/Reads AI2 Value x100 for Two Implied Decimals
43004/43005		Analog Input	Int 32	Read/Write	AI3	Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write	AI4	Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write	AI5	Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037		Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	A01 A02	Monitory Purposes (Optional) - Register Holds AOI Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32	Read	A02 A03	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32	Read	A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
		Analog Output	1111.32	Reau	A04	monitory rangeses (optional) - negister riolas nov value x100 for rivo implied becimais

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C.11 136-LvlAltitude-OnOff-V1.0

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all \*Required fields have been filled out prior to submittal.

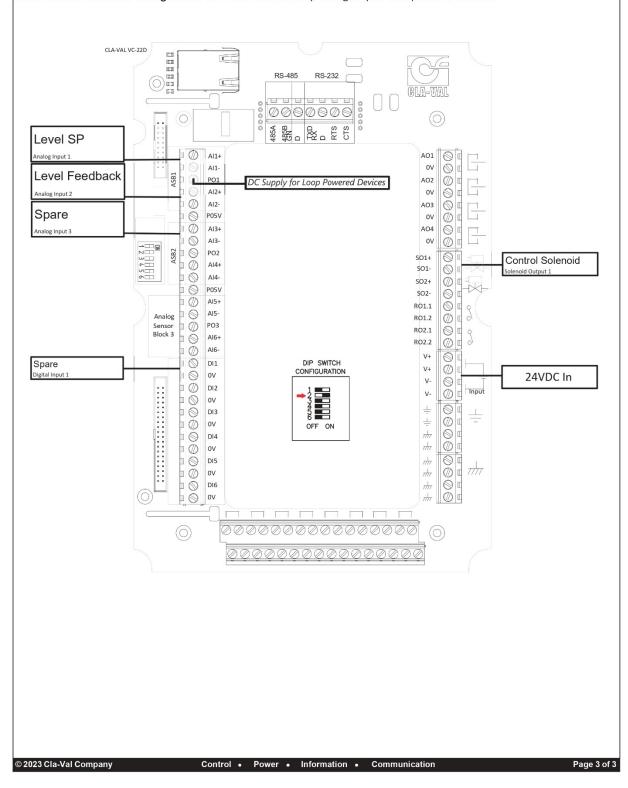
Information				Reset Form	Configuration:	VC-22D	
*Project Name	N/A			*Today's Date	3/14/23		
*Cla-Val Representive	N/A		Proj	ject Completion Date			
Control Valve Model Number				Customer Approva	1		
(if known)	150		-	Signature	•		
Valve Regulation (If more than .	2 PID's are required, speci	fy in logic on pag	je 2)				
PID 1 - Valve Regulation	*Solenoid Config		PID	2 - Valve Regulation	PID Selection	Mode	
*Control Type	*Signal Loss		Con	trol Type	Sign	al Loss	
Deadband (+/-)	Ramping		Deadl	band (+/-)	Ra	amping	
DP Metering (133 Valve)							
DP Metering Pressure	OP1+P2 Measurement ODPT				Outpu	ıt	
	/ Style	Seat		Units	Output Scalin	g	
Totalizer							
Totalizer Reset	Units		Ouput		Output Scalin	9	
Analog Inputs (4-20mA) 6 Avai	able						
Analog Input #1 (Typically rea	served for control setpoint signa	al)	Scaling	Signa 🗌	Powered by Controlle	er	
Name Level SP	Units	ft	<b>4mA =</b> 0	20mA =	20	Decimal 0.00	
*Analog Input #2 (Typically res	served for control feedback sigr	nal)	Scaling	🖌 Signa	Powered by Controlle	er	
Name Level Feedback	Units	ft	<b>4mA</b> = 0	20mA =	= 20	Decimal 0.00	
Analog Input #3			Scaling	Signal	Powered by Controlle	r	
Name Spare	Units		4mA =	20mA =	-	Decimal	
Analog Input #4			Scaling	Signal	Powered by Controlle	r	
Name	Units		4mA =	20mA :	-	Decimal	
Analog Input #5			Scaling	Signal	Powered by Controlle	r	
Name	Units		4mA =	20mA :	-	Decimal	
Analog Input #6			Scaling		Powered by Controlle	r	
Name	Units		4mA =	20mA :		Decimal	
		1					
Digital Inputs 6 Available							
Digital Input 1 Name Spare		Digital Input 2	Name		Digital Input 3 Na	ame	
Purpose		Purpose			Purpose		
Digital Input 4 Name		Digital Input 5	Name		Digital Input 6 Na	ame	
Purpose		Purpose			Purpose		
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Analog Outputs (4-20mA) Note: Analog Outputs are	sourced wi	th controller powe	r.		
Analog Output #1			Scaling		
Name	Units		4mA =	20mA =	Decimal
			Scaling		
Analog Output #2	Units		4mA =	20mA =	Decimal
Name	Units		4116	20114 -	Decimal
Analog Output #3			Scaling		
Name	Units		4mA =	20mA =	Decimal
Analog Output #4			Scaling		
Name	Units		4mA =	20mA =	Decimal
Solenoid Outputs					
Solenoid Output #1 (SO1)		Solenoid Outpu	ıt #2 (SO2)	for solenoids used on a 13	a powered solid state output typically reserved 31 or 133 series valve. The output can be con-
Name Control Solenoid Default: Closing Solenoid		Name Default: O	pening Solenoid		or Discrete ON/OFF. If configured as discrete, a open circuit, and 1 a closed circuit.
Relay Output	_				
Relay Output #1 (RO1)		Relay Output #	2 (RO2)		configured as dry contact mechanical relays
Name		Name			These outputs are configured as Discrete resents an open circuit, and 1 a closed circuit.
Actions/Alarms					
Action #1					
Name	Describe				
Additional Comments					
Action #2 Name	Describe				_
Additional Comments	Describe				
Action #3		_			
Name	Describe				
Additional Comments					
Action #4					
Name	Describe				
Additional Comments					
Communication					
GSM/GPRS Modbus TCP/IP		Modbus	RTU (RS485/RS232)		specification page for register mapping and fer to manual for more details.
*Control Logic (Please specify all control logic usin	ng sketche	es, diagrams. etc	c. Attach additional she	ets if necessarv)	
This ValvApp provides standard level altitude control fo	-				losed. If the level is below a low
setpoint, the valve goes full open.					
DI1 and AI3 have been added into this program, even the the field by landing signal cables on these IO points and				serve as spare IO points so ad	lditional functionality can be added in
This ValvApp provides an interactive variables to switch	U			ze to Close".	
		8			
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

Modbus	Project Name:	N/A	Cla-Val			
Modbus	Date:					
	Input	Description	Data Type	Access	I/O Mappi	ng Comments
	Level SP	Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Level Feedback	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
	Spare	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
		5		11.110		
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
10000 0100		Signal inpact incased overline				overnaes naravine bio input to use mousus nauress 11005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41000		Digital Input	Word	Read/Write		Register Holds/Reads DI Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41005		Digital Input	Word	Read/Write	DIG	Register Holds/Reads DI6 Value
	Control Solenoid			0.1		
41006	Control Solenoid	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	S02	Monitory Purposes (Optional)
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
	Level SP	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	Level Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads AI2 Value x100 for Two Implied Decimals
	Spare	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037		Analog Output	Int 32	Read	AO1	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32	Read	AO3	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32	Read	AO4	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals

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Installation, Operation, and Maintenance Manual

C.12 340-Flow-Mag-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all \*Required fields have been filled out prior to submittal.

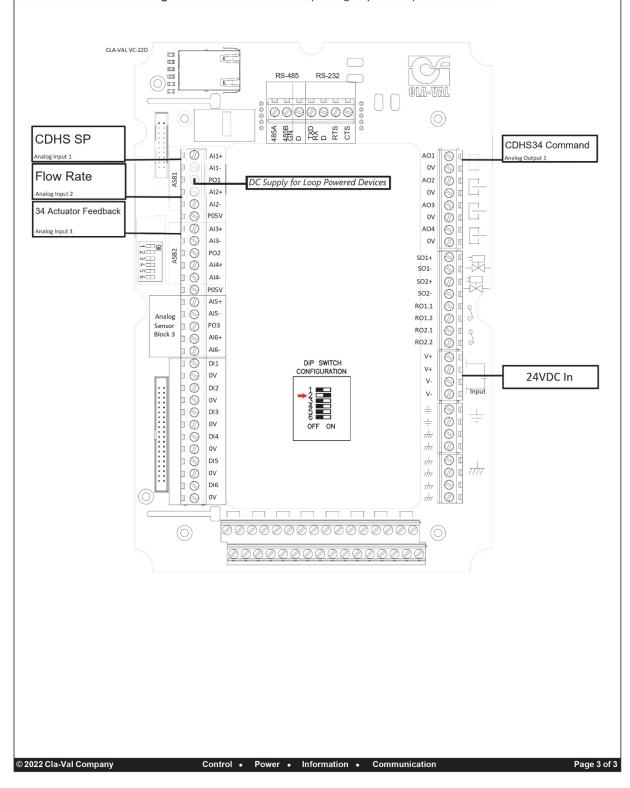
Information				Reset For	m	Configuration:	VC-22D
*Project Name	N/A			*Today'	s Date	12/19/22	
*Cla-Val Representive			Pro	oject Completion	n Date		
Control Valve Model Number (if known)	240			Customer Ap	proval		
(if known)	340			Sig	nature		
Valve Regulation (If more than	2 PID's are required, s	pecify in logic on pa	ge 2)				
PID 1 - Valve Regulation	*Solenoid Config	g	PII	D 2 - Valve Regu	lation	PID Selection	n Mode
*Control Type	*Signal Loss	s	Co	ntrol Type		Sign	al Loss
Deadband (+/-)	Ramping	9	Dead	dband (+/-)		R	amping
DP Metering (133 Valve)							
DP Metering Pressure	Measurement ODPT	P2 r				Outp	ut
	y Style	Seat		Units		Output Scalin	g
Totalizer					6 		
Totalizer Reset	Ui	nits	Ouput		-	Output Scalir	lg
Analog Inputs (4-20mA) 6 Avai	lable						
Analog Input #1 (Typically re-	served for control setpoint	signal)	Scaling		Signal F	Powered by Controll	er
Name CDHS SP	U	Inits	<b>4mA =</b> 4 n	nA 2	:0mA =	20 mA	Decimal 0.00
Analog Input #2 (Typically re-	served for control feedback	k signal)	Scaling	Z	Signal F	Powered by Controll	er
Name Flow Rate	U	nits gpm	<b>4mA =</b> 0 g	.pm 2	:0mA =	2,000 gpm	Decimal 0
Analog Input #3			Scaling		Signal P	owered by Controll	er
Name 34 Actuator Feedbac	k U	nits	<b>4mA</b> = 4 m	nA 2	0mA =	20 mA	Decimal 0.00
Analog Input #4			Scaling		Signal P	owered by Controll	ər
Name	U	Inits	4mA =	2	:0mA =		Decimal
Analog Input #5			Scaling		Signal P	owered by Controll	er
Name	U	Inits	4mA =	2	:0mA =		Decimal
Analog Input #6			Scaling		Signal P	owered by Controll	er
Name	U	Inits	4mA =	2	:0mA =		Decimal
Digital Inputs 6 Available		_	_		_		
Digital Input 1 Name		Digital Input 2	Name			Digital Input 3 N	ame
Purpose		Purpose				Purpose	
Digital Input 4 Name		Digital Input 5	Name			Digital Input 6 N	ame
Purpose		Purpose				Purpose	
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Analog Outputs (4-20mA) Note: Analog Outputs a	are sourced wi	ith controller powe	r.					
Analog Output #1			Scaling					
Name CDHS34 Command	Units		<b>4mA =</b> 4 mA	20mA =	20 mA	Decimal 0.00		
			Scaling					
Analog Output #2	Units		4mA =	20mA =	_	Desimal		
Name	Units		4111A -	20111A -	_	Decimal		
Analog Output #3			Scaling					
Name	Units		4mA =	20mA =		Decimal		
Analog Output #4			Scaling					
Name	Units		4mA =	20mA =	_	Decimal		
Solenoid Outputs								
*Solenoid Output #1 (SO1)		Solenoid Outpu	ıt #2 (SO2)	for solence	Note: SO1 and SO2 are a powered solid state output typically reserved for solenoids used on a 131 or 133 series valve. The output can be con-			
Default: Closing Solenoid		Name Default: C	pening Solenoid			Discrete ON/OFF. If configured as discrete, a n circuit, and 1 a closed circuit.		
Relay Output								
Relay Output #1 (RO1)		Relay Output #	2 (RO2)	Note: RC	1 and RO2 are con	figured as dry contact mechanical relays		
Name		Name				ese outputs are configured as Discrete ents an open circuit, and 1 a closed circuit.		
Actions/Alarms								
Action #1								
Name	Describe							
Additional Comments								
Action #2		_						
Name Additional Comments	Describe	2						
Action #3								
Name	Describe	•						
Additional Comments								
Action #4								
Name	Describe							
Additional Comments								
Communication								
GSM/GPRS Modbus TCP/	IP	Modbus	RTU (RS485/RS232)			cification page for register mapping and to manual for more details.		
*Control Logic (Please specify all control logic u	ising sketche	es, diagrams, etc	c. Attach additional shee	ets if necessary	1)			
This ValvApp provides a standard open loop flow cor actuator. The 34 series actuator is calibrated to move t								
DI1 has been added into this program, even though it landing signal cables on this IO point and configuring			ng. This serves as a spare	IO point so add	litional function	ality can be added in the field by		
A flow offset interactive variable has been included.	This may be a	djusted in the fiel	d if the 34 series actuator	feedback and co	ommand do not	match each other.		
© 2022 Cla Val Composition	Control	Dame	la fa maa a fi a maa a			<u></u>		
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

	Project Name:	N/A	Cla-Val			
	Date:	IN/A				
Modbus	Input	Description	Data Type	Access	I/O Mappin	ng Comments
	CDHS SP	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Flow Rate	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 2	34 Actuator Feedback	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI6 Input to use Modbus Address 43010/43011
	-					
	Spare	Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4	==	Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41000		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DIS Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write		Register Holds/Reads DIS Value
1003		Digital Input	Word	Reau/ Write	010	Register Holus/Reaus Dio Value
41006		Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	S02	Monitory Purposes (Optional)
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
	·					
	CDHS SP	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	Flow Rate	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
	34 Actuator Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	A16	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
43036/43037	CDHS34 Command	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	A01 A02	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32	Read	A02	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43041		Analog Output	Int 32	Read	A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
+3042/43043		Analog Output	1111.52	Neau	A04	monitory raiposes (optional) - negister notes not value x100 for two implied becimals

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Installation, Operation, and Maintenance Manual

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all \*Required fields have been filled out prior to submittal.

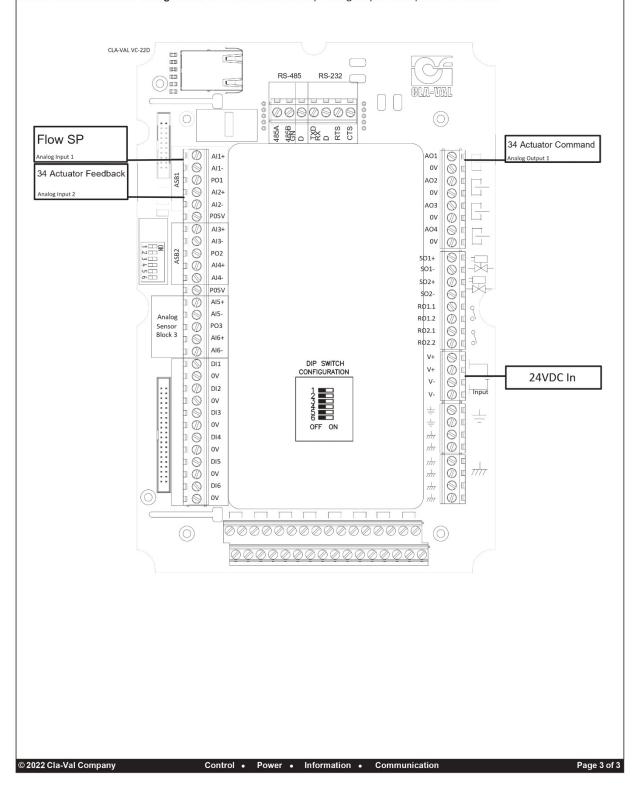
Information			Reset Form	Configuration: V	/C-22D		
*Project Name	N/A		*Today's Date	12/19/22			
*Cla-Val Representive	N/A		Project Completion Date				
Control Valve Model Number (if known)	240		Customer Approval				
(if known)	340	_	Signature		_		
Valve Regulation (If more than 2	2 PID's are required, specify	in logic on page 2)					
PID 1 - Valve Regulation	*Solenoid Config		PID 2 - Valve Regulation	PID Selection M	Node		
*Control Type	*Signal Loss		Control Type	Signal	Loss		
Deadband (+/-)	Ramping	D	eadband (+/-)	Ram	iping		
DP Metering (133 Valve)							
DP Metering Pressure	OP1+P2 Measurement			Output			
	v Style	Seat	Units	Output Scaling			
Totalizer							
Totalizer Reset	Units	Quant		Output Outline			
		Ouput		Output Scaling			
Analog Inputs (4-20mA) 6 Avail	lable						
Analog Input #1 (Typically res	served for control setpoint signal)	Scaling	Signal	Powered by Controller			
Name Flow SP	Units	4mA =	4 mA 20mA =	20 mA	Decimal 0.00		
Analog Input #2 (Typically res	served for control feedback signal	) Scaling	Signal	Powered by Controller			
Name 34 Actuator Feedbach	k Units	4mA =	4 mA 20mA =	20 mA	Decimal 0.00		
Analog Input #3		Scaling	Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #4		Scaling	Signal Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #5		Scaling	Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Analog Input #6		Scaling	Signal	Powered by Controller			
Name	Units	4mA =	20mA =		Decimal		
Digital Inputs 6 Available							
Digital Input 1 Name		Digital Input 2 Name		Digital Input 3 Nam	ne		
Purpose	F	Purpose		Purpose			
Digital Input 4 Name		Digital Input 5 Name		Digital Input 6 Nam	ie		
Purpose	F	Purpose		Purpose			
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Analog Outputs (4-20mA) Note: Analog Outputs and	re sourced wi	th controller power.			
Analog Output #1		Scaling			
Name 34 Actuator Command	Units	<b>4mA =</b> 4 mA	20mA =	20 mA	Decimal 0.00
		Scaling			
Analog Output #2	Units	4mA =	20mA =		Decimal
Name	Units	4004	20114 -		Decimal
Analog Output #3		Scaling			
Name	Units	4mA =	20mA =		Decimal
Analog Output #4		Scaling			
Name	Units	4mA =	20mA =		Decimal
Solenoid Outputs					
*Solenoid Output #1 (SO1)		Solenoid Output #2 (SO2)	for soleno	ids used on a 131 or 133	d solid state output typically reserved series valve. The output can be con-
Name Default: Closing Solenoid		Name Default: Opening Solenoid		PWM (default) or Discre represents an open circu	te ON/OFF. If configured as discrete, a it, and 1 a closed circuit.
Relay Output					
Relay Output #1 (RO1)		Relay Output #2 (RO2)			d as dry contact mechanical relays
Name		Name			Itputs are configured as Discrete n open circuit, and 1 a closed circuit.
Actions/Alarms					
Action #1					
Name	Describe				
Additional Comments					_
Action #2					_
Name	Describe				
Additional Comments	Describe				
_	_				
Action #3					
Name Additional Comments	Describe				
Addiuonai Comments					
Action #4					
Name	Describe				
Additional Comments					_
Communication					
GSM/GPRS Modbus TCP/I	Р	Modbus RTU (RS485/RS2		e: See ModBus specificat ementation. Refer to man	tion page for register mapping and nual for more details.
*Control Logic (Please specify all control logic u	sing sketche	s, diagrams, etc. Attach additiona	al sheets if necessarv	)	
This ValvApp provides a standard open loop flow con-	trol function	for a 340 series valve. The VC-22D	will transmit the flow	setpoint via a 4-20m	
actuator. The 34 series actuator is calibrated to move to					
DI1 and AI3 have been added into this program, even the field by landing signal cables on these IO points an			These serve as spare IC	points so additiona	l functionality can be added in
A flow offset interactive variable has been included. T	his may be a	ljusted in the field if the 34 series as	ctuator feedback and co	mmand do not mate	ch each other.
		B 1			
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

		N/A	Clas Va	VC-22D Mod	ibus Addres	
	Project Name: Date:	N/A				
Modbus	Input	Description	Data Type	Access	1/O Mannir	ng Comments
40007 Bit 0	Flow SP	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	34 Actuator Feedback	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
40007 Bit 2	Spare	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43002/43005
40007 Bit 2		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 3		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override			N/A N/A	Overrides 4-20mA Al5 Input to use Modbus Address 43006/43009
40007 BIt 5		Analog input Wodbus Override	ыс	Write	IN/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41002
40008 Bit 4		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41003
40008 Bit 5		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
10000 DIL 3		isigital input woodbus Override	DIC	write	IN/A	Overrides nardwire Dio Input to use wiodbus Address 41005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41000 41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI6 Value
+1002		Digital Input	word	Read/ write	016	Register Holds/Reads Dib Value
41006		Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	S02	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
+1009		Digital Output	woru	neau	NUZ	
43000/43001	Flow SP	Analog Input	Int 32	Read/Write	AI1	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003	34 Actuator Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
43004/43005	Spare	Analog Input	Int 32	Read/Write		Register Holds/Reads Al3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads Al4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads Al4 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads Al6 Value x100 for Two Implied Decimals
+5010/45011		Analog input	1111.52	Read/ write	AID	Register Holds/Reads Alo Value X100 for Two Implied Decimals
43036/43037	34 Actuator Command	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039	34 Actuator Command	Analog Output	Int 32	Read	A01 A02	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output Analog Output	Int 32	Read	A02 A03	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43042/43041			Int 32	Read	A03	Monitory Purposes (Optional) - Register Holds AO3 value x100 for Two Implied Decimals
+3042/43043		Analog Output	Int 32	Read	AU4	ivionitory Purposes (Optional) - Register Holds AO4 value x100 for Two implied Decimals

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C.14 350-PressureSustaining-P1-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all "Required fields have been filled out prior to submittal.

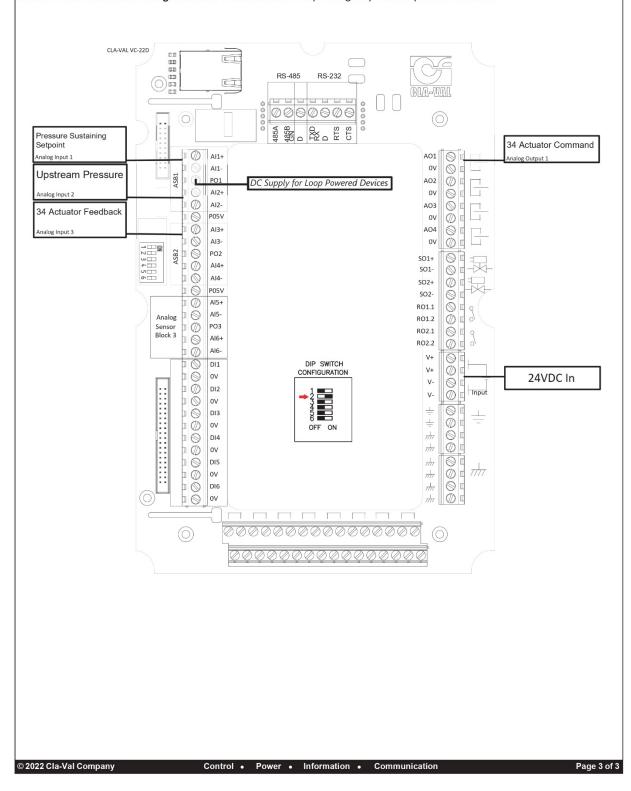
Information				Reset Form	Configur	ation: V	C-22D	
*Project Name	N/A			*Today's E	Date 12/19/22			
*Cla-Val Representive	N/A		Pro	oject Completion E	Date			
Control Valve Model Number (if known)	250			Customer Approval				
(if known)	350			Signat	ture		_	
Valve Regulation (If more than	2 PID's are required, spec	ify in logic on pa	ge 2)					
PID 1 - Valve Regulation	*Solenoid Config			PID 2 - Valve Regulation PID Selection Mode				
*Control Type	Control Type *Signal Loss			Control Type Signal Loss			oss	
Deadband (+/-)	Ramping		Dead	dband (+/-)		Ram	ping	
DP Metering (133 Valve)								
DP Metering Pressure Measurement ODPT Output								
	y Style	Seat	_	Units	Output	Scaling		
Totolizor								
Totalizer		0.						
Totalizer Reset	Units		Ouput		Output	Scaling		
Analog Inputs (4-20mA) 6 Available								
*Analog Input #1 (Typically re	served for control setpoint sign	nal)	Scaling	🗖 si	gnal Powered by	Controller		
Name Pressure Sustaining	Setpoint Units	<b>s</b> psi	<b>4mA =</b> 20	psi 20n	<b>hA =</b> 145 psi		Decimal 0.0	
Analog Input #2 (Typically re	served for control feedback sig	inal)	Scaling	🖌 si	gnal Powered by	Controller		
Name Upstream Pressure	Unit	s psi	<b>4mA</b> = 0 p	osi 20m	nA = 290 psi	_	Decimal 0.0	_
Analog Input #3			Scaling	🔲 Si	gnal Powered by (	Controller		
Name 34 Actuator Feedbac	k Unit	<b>s</b> psi	<b>4mA =</b> 20	psi 20n	<b>hA =</b> 145 psi		Decimal 0.0	
Analog Input #4			Scaling	🗌 Si	gnal Powered by (	Controller		
Name	Unit	s	4mA =	20m	nA =		Decimal	
Analog Input #5			Scaling	🔲 Si	gnal Powered by 0	Controller		
Name	Unit	s	4mA =	20m	nA =		Decimal	
Analog Input #6			Scaling	🗌 Si	gnal Powered by (	Controller		
Name	Unit	s	4mA =	20m	nA =		Decimal	
Digital Inputs 6 Available		7	_		_			-
Digital Input 1 Name		Digital Input 2	Name		Digital Inpl	ut 3 Nam	e	-1
Purpose		Purpose		_	Purpose			
Digital Input 4 Name		Digital Input 5	Name		Digital Inpl	ut 6 Nam	е	
Purpose		Purpose			Purpose			
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Analog Outputs (4-20mA) Note: Analog Outputs a	re sourced w	ith controller powe	er.		
Analog Output #1			Scaling		
Name 34 Actuator Command	Units	psi	<b>4mA =</b> 20 psi	<b>20mA =</b> 145 ps	si Decimal 0.0
			Scaling		
Analog Output #2	Units		4mA =	20mA =	Decimal
	onits		1004	20114 -	Decilitat
Analog Output #3			Scaling	_	
Name	Units		4mA =	20mA =	Decimal
Analog Output #4			Scaling		
Name	Units		4mA =	20mA =	Decimal
Solenoid Outputs					
Solenoid Output #1 (SO1)		Solenoid Outpu	ut #2 (SO2)	for solenoids used	22 are a powered solid state output typically reserved on a 131 or 133 series valve. The output can be con-
Name Default: Closing Solenoid		Name Default: C	Opening Solenoid		efault) or Discrete ON/OFF. If configured as discrete, a nts an open circuit, and 1 a closed circuit.
Relay Output					
Relay Output #1 (RO1)		Relay Output #	2 (RO2)		D2 are configured as dry contact mechanical relays
Name		Name			larms. These outputs are configured as Discrete f 0 represents an open circuit, and 1 a closed circuit.
Actions/Alarms					
Action #1					
Name	Describe	2			
Additional Comments					
Action #2					
Name	Describe				
Additional Comments	20001120				
Action #3		_			
Name Additional Comments	Describe	•			
Action #4					
Name	Describe	•			
Additional Comments					
Communication					
GSM/GPRS Modbus TCP/	Р	Modbus	RTU (RS485/RS232)		odBus specification page for register mapping and on. Refer to manual for more details.
*Control Logic (Please specify all control logic u	sing sketch	es, diagrams, et	c. Attach additional shee	ets if necessary)	
This ValvApp provides a standard open loop pressure	sustaining c	ontrol function for	r a 350 series valve. The V	/C-22D will transmit th	
the 34 series actuator. The 34 series actuator is calibra				•	
DI1 has been added into this program, even though it i landing signal cables on this IO point and configuring			ing. This serves as a spare	IO point so additional	tunctionality can be added in the field by
A pressure offset interactive variable has been include	d. This may	be adjusted in the	field if the 34 series actua	ator feedback and comm	nand do not match each other.
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#### Installation, Operation, and Maintenance Manual





### Installation, Operation, and Maintenance Manual

40007 Bit 0	Project Name:	N/A				
40007 Bit 0	Date:					
	nput Pressure Sustaining Setpoint	Description Analog Input Modbus Override	Data Type		N/A	ng Comments Overrides 4-20mA AI1 Input to use Modbus Address 43000/43001
	Upstream Pressure	Analog Input Modbus Override			N/A	Overrides 4-20mA Al2 Input to use Modbus Address 43002/43003
	34 Actuator Feedback	Analog Input Modbus Override			N/A	Overrides 4-20mA Al2 input to use Modbus Address 43002/43005
		Analog Input Modbus Override			N/A	Overrides 4-20mA Ald Input to use Modbus Address 43004/43005
		Analog Input Modbus Override				
		Analog Input Modbus Override Analog Input Modbus Override			N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
		Digital Input Modbus Override			N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
		Digital Input Modbus Override			N/A	Overrides Hardwire DI3 Input to use Modbus Address 41001
		Digital Input Modbus Override			N/A	Overrides Hardwire DIS input to use Modbus Address 41002
		Digital Input Modbus Override			N/A	Overrides Hardwire DIS Input to use Modbus Address 41005
		Digital Input Modbus Override			N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
NOUDO DIL S		angitar inpat incasas overnae	Dit	Wine	14/15	overnues narowire bio input to use mousus Address 41005
1000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
11001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
11002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
11003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
11004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
1005		Digital Input	Word	Read/Write		Register Holds/Reads DI6 Value
11006		Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	S02	Monitory Purposes (Optional)
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
11009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
	Pressure Sustaining Setpoint	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	Upstream Pressure	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
	34 Actuator Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
12026/12027	34 Actuator Command		1 1 22		101	Marine Research (Ontion R. Resides Units 101 Value 100 for The Institution in the
	54 Actuator Command	Analog Output	Int 32		A01 A02	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32			Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32		AO3	
43042/43043		Analog Output	Int 32	Read	A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals

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Installation, Operation, and Maintenance Manual

C.15 350-PressureSustaining-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all "Required fields have been filled out prior to submittal.

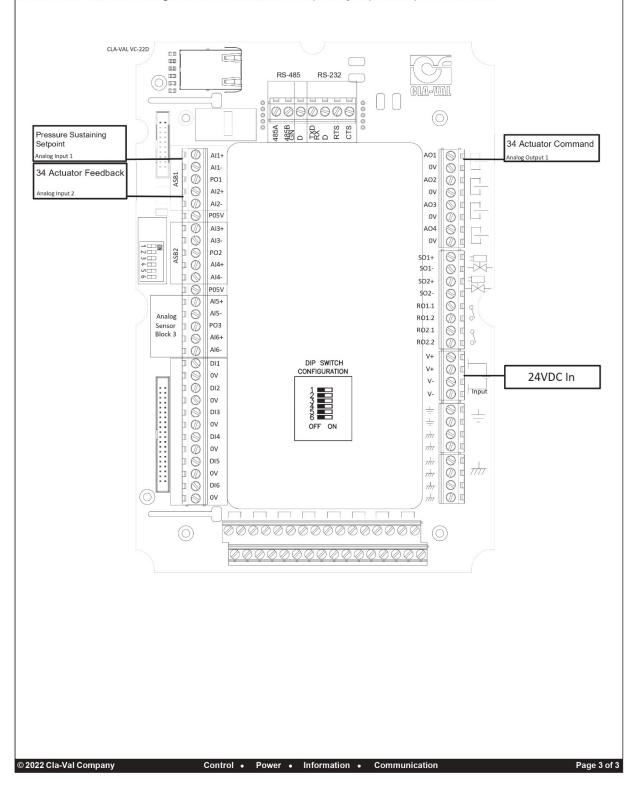
Information		Reset	Form Configuration	on: VC-22D			
*Project Name N/A		*Tod	ay's Date 12/19/22				
*Cla-Val Representive $N/A$		Project Comple	tion Date				
Control Valve Model Number (if known) 350		Customer	Approval				
(if known) 330		:	Signature				
Valve Regulation (If more than 2 PID's are required	d, specify in logic on pag	ie 2)					
PID 1 - Valve Regulation *Solenoid Co	onfig	PID 2 - Valve R	PID 2 - Valve Regulation PID Selection Mode				
*Control Type *Signal I	oss	Control Type	S	Signal Loss			
Deadband (+/-) Ram	ping	Deadband (+/-)		Ramping			
DP Metering (133 Valve)							
DP Metering Pressure Measurement	P1+P2 OPT		o	utput			
Size Body Style	Seat	Units	Output So	aling			
Totalizer							
Totalizer Reset	Units	Ouput	Output Sc	aling			
	omits	Ouput	Output So	anng			
Analog Inputs (4-20mA) 6 Available							
Analog Input #1 (Typically reserved for control setp	and the second se	Scaling	Signal Powered by Cor				
Name Pressure Sustaining Setpoint	Units psi	<b>4mA =</b> 20 psi	<b>20mA =</b> 145 psi	Decimal 0.0			
*Analog Input #2 (Typically reserved for control feed	back signal)	Scaling	Signal Powered by Cor	ntroller			
Name 34 Actuator Feedback	Units psi	<b>4mA =</b> 20 psi	<b>20mA =</b> 145 psi	Decimal 0.0			
Analog Input #3		Scaling	Signal Powered by Cor	ntroller			
Name	Units	4mA =	20mA =	Decimal			
Analog Input #4		Scaling	Signal Powered by Cor	ntroller			
Name	Units	4mA =	20mA =	Decimal			
Analog Input #5		Scaling	Signal Powered by Cor	ntroller			
Name	Units	4mA =	20mA =	Decimal			
Analog Input #6		Scaling	Signal Powered by Cor	ntroller			
Name	Units	4mA =	20mA =	Decimal			
Digital Inputs 6 Available	_						
Digital Input 1 Name	Digital Input 2	Name	Digital Input 3	3 Name			
Purpose	Purpose	_	Purpose				
Digital Input 4 Name	Digital Input 5	Name	Digital Input 6	6 Name			
Purpose	Purpose		Purpose				
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Analog Outputs (4-20mA) Note: Analog Outputs an	re sourced w	ith controller powe	er.				
Analog Output #1			Scaling				
Name 34 Actuator Command	Units	psi	4mA =	20 psi	20mA =	145 psi	Decimal 0.0
			Scaling				
Analog Output #2	Units		4mA =		20mA =		Decimal
Name	Units		4111A -		20111A -		Decima
Analog Output #3			Scaling				
Name	Units		4mA =		20mA =		Decimal
Analog Output #4			Scaling				
Name	Units		4mA =		20mA =		Decimal
Solenoid Outputs							
*Solenoid Output #1 (SO1)		Solenoid Outpu	ut #2 (SO2	)			solid state output typically reserved series valve. The output can be con-
Name		Name		-14	figured as		e ON/OFF. If configured as discrete, a
Default: Closing Solenoid		Default: C	Opening Solen	oid		, ,	
		51 01 1	(200)				
Relay Output #1 (RO1)		Relay Output #	2 (RO2)		typically us	sed for alarms. These out	d as dry contact mechanical relays tputs are configured as Discrete n open circuit, and 1 a closed circuit.
Name	8	Name			0,0077,0		
Actions/Alarms							
Action #1		_					
Name	Describe	•					
Additional Comments							
Action #2							
Name	Describe	2					
Additional Comments							
Action #3							
Name Additional Comments	Describe	2					
Action #4							
Name	Describe	•					
Additional Comments							
Communication							
GSM/GPRS Modbus TCP/I	Р	Modbus	RTU (RS4	85/RS232)	Note	: See ModBus specificati mentation. Refer to man	ion page for register mapping and ual for more details.
*Control Logic (Please specify all control logic us	sina skotch	es diagrams of	c Attach a	dditional sheet	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
This ValvApp provides a standard open loop pressure s							tpoint via a 4-20mA signal to
the 34 series actuator. The 34 series actuator is calibrat							
DI1 and AI3 have been added into this program, even the field by landing signal cables on these IO points an				thing. These ser	rve as spare IO	points so additional	functionality can be added in
A pressure offset interactive variable has been included	1. This may	be adjusted in the	field if the	34 series actuate	or feedback and	l command do not m	natch each other.
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#### Installation, Operation, and Maintenance Manual





## Installation, Operation, and Maintenance Manual

roject Name: Date: sure Sustaining Setboint ctuator Feedback e	N/A Description Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override	Bit Bit			
sure Sustaining Setpoint ctuator Feedback	Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override	Bit Bit			
ctuator Feedback	Analog Input Modbus Override Analog Input Modbus Override Analog Input Modbus Override	Bit	Write		g Comments
	Analog Input Modbus Override Analog Input Modbus Override			N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
e	Analog Input Modbus Override	Rit		N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
				N/A	Overrides 4-20mA Al3 Input to use Modbus Address 43004/43005
				N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
				N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
e	Digital Input Modbus Override	Dit	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
2					Overrides Hardwire DI2 Input to use Modbus Address 41000
					Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002
					Overrides Hardwire DIS Input to use Modbus Address 41002
					Overrides Hardwire DI5 Input to use Modbus Address 41005
					Overrides Hardwire DIS Input to use Modbus Address 41004
	Digital input mousus overnide	DIC	write	IN/PA	overrides nardwire bio input to use woubus Address 41005
e	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
					Register Holds/Reads DI1 Value
		Word			Register Holds/Reads DI2 Value
					Register Holds/Reads DI4 Value
					Register Holds/Reads DI5 Value
					Register Holds/Reads DI6 Value
	Digital Output	Word	Read	S01	Monitory Purposes (Optional)
		Word			Monitory Purposes (Optional)
	Digital Output	Word	Read	R01	Monitory Purposes (Optional)
	Digital Output	Word	Read	R02	Monitory Purposes (Optional)
	Analog Input	Int 32			Register Holds/Reads Al1 Value x100 for Two Implied Decimals
ctuator Feedback		Int 32			Register Holds/Reads AI2 Value x100 for Two Implied Decimals
e					Register Holds/Reads AI3 Value x100 for Two Implied Decimals
	Analog Input	Int 32	Read/Write	AI4	Register Holds/Reads Al4 Value x100 for Two Implied Decimals
		Int 32			Register Holds/Reads AI5 Value x100 for Two Implied Decimals
	Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
ctuator Command					Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
					Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
					Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
	Analog Output	Int 32	Read	AO4	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
s	luator Command	Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Digital Input Digital Input Digital Input Digital Input Digital Input Digital Input Digital Input Digital Output Digital Output Analog Input Analog Input Analog Input Analog Input Analog Input	Digital Input         Word           Digital Output         Int 32           Analog Input         Int 32           Analog Input         Int 32           Analog Input         Int 32           Analog Input         Int 32           Analog Output         Int 32	Digital Input Modbus Override Bit         Write Write           Digital Input Modbus Override Digital Input Modbus Override Digital Input Modbus Override Bit         Bit         Write           Digital Input Modbus Override Digital Input Modbus Override Digital Input         Bit         Write           Digital Input Modbus Override Digital Input         Word         Read/Write           Digital Output         Word         Read/Write           Digital Output         Word         Read           Digital Output         Int 32         Read/Write           Analog Input         Int 32         Read/Write           Analog Input         Int 32         Read/Write	Digital Input Modbus Override Bit     Write NA       Digital Input     Word       Read/Write     Digital Input       Digital Input     Word       Read/Write     Digital Input       Digital Output     Word       Read     S01       Digital Output     Word       Read     S02       Digital Output     Word       Read     S02       Digital Output     Int 32       Read/Write     Analog Input       Int 32     Read/Write       Analog Input     Int 32       Analog Input     Int 32       Analog Input     Int 3

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Installation, Operation, and Maintenance Manual

C.16 390-PressureReducing-P2-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all \*Required fields have been filled out prior to submittal.

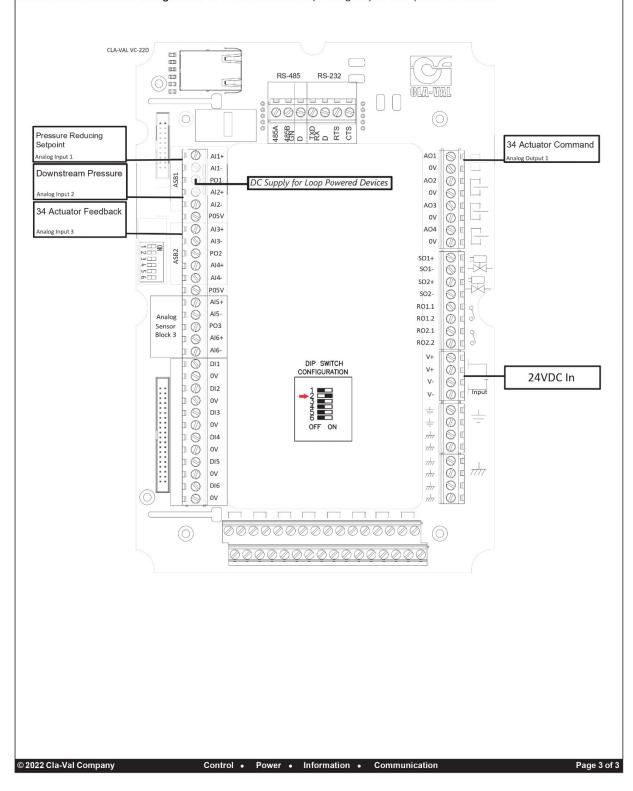
Information				Reset Form	n	Configuration	: VC-22D	
*Project Name	N/A			*Today's	Date	12/19/22		
*Cla-Val Representive			Pro	ject Completion	Date			
Control Valve Model Number (if known)	200			Customer Approval				
(if known)	390			Sign	ature		_	
Valve Regulation (If more than	2 PID's are required, spec	rify in logic on pag	je 2)					
PID 1 - Valve Regulation	*Solenoid Config			0 2 - Valve Regula	ation	PID Selecti	on Mode	
*Control Type	*Signal Loss		Cor	ntrol Type		Sig	nal Loss	
Deadband (+/-)	Ramping		Dead	lband (+/-)			Ramping	
DP Metering (133 Valve)								
DP Metering Pressure Measurement ODPT Output								
	y Style	Seat	_	Units		Output Scal	ing	
Totalizer								
Totalizer Reset	Unit	5	Ouput		-	Output Scal	ing	-1
Analog Inputs (4-20mA) 6 Available								
Analog Input #1 (Typically re	served for control setpoint sig	nal)	Scaling		Signal F	Powered by Contro	oller	
Name Pressure Reducing S	etpoint Unit	<b>s</b> psi	4mA = 40 I	psi 20	0mA =	140 psi	Decimal 0.0	
Analog Input #2 (Typically re	served for control feedback si	gnal)	Scaling	Z	Signal F	Powered by Contro	bller	
Name Downstream Pressur	unit	<b>s</b> psi	<b>4mA</b> = 0 ps	si 20	0mA =	290 psi	Decimal 0.0	
Analog Input #3			Scaling		Signal P	owered by Contro	ller	
Name 34 Actuator Feedbac	k Unit	<b>s</b> psi	4mA = 40 I	psi 20	0mA =	140 psi	Decimal 0.0	
Analog Input #4			Scaling		Signal P	owered by Contro	ller	
Name	Unit	s	4mA =	20	0mA =		Decimal	
Analog Input #5			Scaling		Signal P	owered by Contro	ller	
Name	Unit	s	4mA =	20	0mA =		Decimal	
Analog Input #6			Scaling		Signal P	owered by Contro	iller	
Name	Unit	s	4mA =	20	0mA =		Decimal	
			-	_				
Digital Inputs 6 Available		_						
Digital Input 1 Name		Digital Input 2	Name			Digital Input 3	Name	_
Purpose		Purpose				Purpose		
Digital Input 4 Name		Digital Input 5	Name			Digital Input 6	Name	
Purpose		Purpose				Purpose		
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Analog Outputs (4-20mA) /	Note: Analog Outputs are sourc	ed with controller powe	er.		
Analog Output #1			Scaling		
Name 34 Actuator Con	nmand Ui	nits psi	<b>4mA =</b> 40 psi	<b>20mA =</b> 140 psi	Decimal 0.0
			Scaling		
Analog Output #2	11	nits	4mA =	20mA =	Decimal
Name		lints	4111A -	20114 -	Decimal
Analog Output #3			Scaling	_	
Name	U	nits	4mA =	20mA =	Decimal
Analog Output #4			Scaling		
Name	U	nits	4mA =	20mA =	Decimal
Solenoid Outputs			( #0 (000)		
Solenoid Output #1 (S	:01) [	Solenoid Outp	ut #2 (SO2)	for solenoids used on a 131	owered solid state output typically reserved or 133 series valve. The output can be con-
Name Default: Closing Sole	enoid	Name Default:	Opening Solenoid		Discrete ON/OFF. If configured as discrete, a in circuit, and 1 a closed circuit.
Relay Output					
Relay Output #1 (RO1)		Relay Output \$	#2 (RO2)		nfigured as dry contact mechanical relays ese outputs are configured as Discrete
Name		Name			ents an open circuit, and 1 a closed circuit.
Actions/Alarms					
Action #1					
Name	Desc	cribe			
Additional Comments					
Action #2					
Name	Desc	cribe			
Additional Comments					
Action #3	Deer	cribe			
Additional Comments	Dest	LIDE			
Action #4					
Name	Desc	cribe			
Additional Comments					
Communication					
GSM/GPRS	Modbus TCP/IP	Modbus	RTU (RS485/RS232)		ecification page for register mapping and to manual for more details.
*Control Logic (Please spec	cify all control logic using sk	etches, diagrams, et	tc. Attach additional shee	ets if necessary)	
	rd open loop pressure reducing	g control function for	a 390 series valve. The VO	C-22D will transmit the pressur	e setpoint via a 4-20mA signal to the ssure setpoint it receives.
DI1 has been added into this pro landing signal cables on this IO			ing. This serves as a spare	IO point so additional function	ality can be added in the field by
A pressure offset interactive var			e field if the 34 series actus	ator feedback and command do	not match each other
	international and a second monored and a second sec		in the 2+ series actua	contract and command do	
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#### Installation, Operation, and Maintenance Manual





## Installation, Operation, and Maintenance Manual

	Project Name:	N/A	ora va	I VC-22D Mod		
	Date:					
Modbus	Input	Description	Data Type	Access	I/O Mappir	ng Comments
40007 Bit 0	Pressure Reducing Setpoint	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	Downstream Pressure	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 2	34 Actuator Feedback	Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA Al6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spare	Digital Input Modbus Override		Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
40008 Bit 1		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001
40008 Bit 2		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI4 Input to use Modbus Address 41003
40008 Bit 4		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI5 Input to use Modbus Address 41004
40008 Bit 5		Digital Input Modbus Override	Bit	Write	N/A	Overrides Hardwire DI6 Input to use Modbus Address 41005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41001		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write	DI5	Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write		Register Holds/Reads DI6 Value
41006		Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word		S02	Monitory Purposes (Optional)
41008		Digital Output	Word		R01	Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
				1		
43000/43001	Pressure Reducing Setpoint	Analog Input	Int 32	Read/Write	AI1	Register Holds/Reads Al1 Value x100 for Two Implied Decimals
43002/43003	Downstream Pressure	Analog Input	Int 32	Read/Write		Register Holds/Reads Al2 Value x100 for Two Implied Decimals
43004/43005	34 Actuator Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads Al4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write		Register Holds/Reads AI6 Value x100 for Two Implied Decimals
				1		
43036/43037	34 Actuator Command	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	AO2	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43040/43041		Analog Output	Int 32	Read	A03	Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43042/43043		Analog Output	Int 32	Read	A04	Monitory Purposes (Optional) - Register Holds AO4 Value x100 for Two Implied Decimals
13012/13013		rindrog output	IIIC DE	Incud	/10 /	/ · · · · · · · · · · · · · · · · · · ·

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Installation, Operation, and Maintenance Manual

C.17 390-PressureReducing-V2.1

# VC-22D ValvApp<sup>™</sup> Worksheet

This worksheet is intended for the configuration of ValvApps<sup>™</sup> used in the VC-22D Valve Controller. From the information provided below, Cla-Val will determine whether a standard ValvApp<sup>™</sup> should be used or if a custom ValvApp<sup>™</sup> is required. Additionally, this worksheet acts as a check list during commissioning to verify all parameters have been correctly configured in the VC-22D Valve Controller. Once this worksheet is completed, please return to your Cla-Val representative for approval. If a custom ValvApp is required and approved, a custom wiring diagram and ValvApp<sup>™</sup> will be created and emailed to you. Please verify all \*Required fields have been filled out prior to submittal.

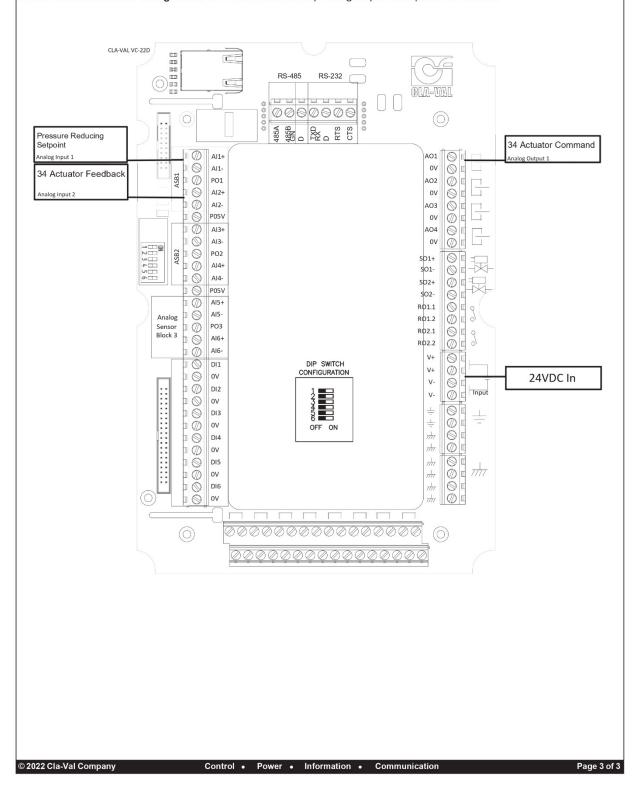
Information				Reset Form	Configura	tion: VC-22D		
*Project Name	N/A			*Today's Da	ate 12/19/22			
*Cla-Val Representive			Pro	oject Completion D	ate			
Control Valve Model Number	Control Valve Model Number (if known) 390			Customer Approval				
(if known)	390			Signate	ıre			
Valve Regulation (If more than	2 PID's are required, spe	cify in logic on pag	re 2)					
PID 1 - Valve Regulation	*Solenoid Config		PI	D 2 - Valve Regulatio	on PID Sel	lection Mode		
*Control Type	*Signal Loss		Co	ntrol Type		Signal Loss		
Deadband (+/-)	Ramping		Dead	lband (+/-)		Ramping		
DP Metering (133 Valve)								
DP Metering Pressure	OP1+P2 Measurement ODPT	2				Output		
	y Style	Seat	_	Units	Output \$	Scaling		
Tetelizer								
Totalizer								
Totalizer Reset	Unit	s	Ouput		Output \$	Scaling		
Analog Inputs (4-20mA) 6 Avai	lable							
*Analog Input #1 (Typically re	served for control setpoint sig	nal)	Scaling	Sig	nal Powered by C	Controller		
Name Pressure Reducing S	etpoint Uni	t <b>s</b> psi	<b>4mA =</b> 40	psi 20m	<b>A =</b> 140 psi	Decimal 0.0		
Analog Input #2 (Typically re	served for control feedback s	gnal)	Scaling	🔲 Sig	nal Powered by C	Controller		
Name 34 Actuator Feedbac	k Uni	t <b>s</b> psi	<b>4mA =</b> 40	psi 20m	<b>A =</b> 140 psi	Decimal 0.0	_	
Analog Input #3			Scaling	Sig	nal Powered by C	ontroller		
Name	Uni	ts	4mA =	20m	Α =	Decimal		
Analog Input #4			Scaling	Sig	nal Powered by C	ontroller		
Name	Uni	ts	4mA =	20m	Α =	Decimal		
Analog Input #5			Scaling	Sig	nal Powered by C	ontroller		
Name	Uni	ts	4mA =	20m	Α =	Decimal		
Analog Input #6			Scaling	Sig	nal Powered by C	ontroller		
Name	Uni	ts	4mA =	20m	Α =	Decimal		
Digital Inputs 6 Available								
Digital Input 1 Name		Digital Input 2	Name	[	Digital Inpu	t 3 Name		
Purpose		Purpose		_	Purpose			
Digital Input 4 Name		Digital Input 5	Name		Digital Inpu	t 6 Name		
Purpose		Purpose			Purpose			
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Analog Outputs (4-20mA) Note: Analog Outputs are sourced with controller power.									
	Analog Output #1			Scaling					
_	Name 34 Actuator Command	Units	psi	<b>4mA =</b> 40 psi	<b>20mA =</b> 140 psi	Decimal 0.0			
	Analog Output #2			Scaling					
	Name	Units		4mA =	20mA =	Decimal			
	A - L - Q - L - L //Q			Sealing					
	Analog Output #3 Name	Units		Scaling 4mA =	20mA =	Decimal			
	Name	Units		4004	2011A -	Decimal			
	Analog Output #4			Scaling					
	Name	Units		4mA =	20mA =	Decimal			
Sole	noid Outputs								
	*Solenoid Output #1 (SO1)		Solenoid Outpu	ut #2 (SO2)		red solid state output typically reserved			
	Name		Name		for solenoids used on a 131 or 133 series valve. The output can be con- figured as PWM (default) or Discrete ON/OFF. If configured as discrete, a value of 0 represents an open circuit, and 1 a closed circuit.				
Bala	Default: Closing Solenoid		Default: C	Dpening Solenoid					
Rela	Polou Output #1 (PO1)		Relay Output #		Note: BO1 and BO2 are config	und as day contract machanical valage			
Ш	Relay Output #1 (RO1) Name		Name	-2 (RO2)	typically used for alarms. These	Note: RO1 and RO2 are configured as dry contact mechanical relays typically used for alarms. These outputs are configured as Discrete ON/OFF, a value of 0 represents an open circuit, and 1 a closed circuit.			
Acti	ons/Alarms		Humo						
	Action #1								
	Name	Describe				_			
	Additional Comments					_			
						_			
	Action #2	Describe				_			
	Additional Comments	Describe							
Ш	Action #3		_						
	Additional Comments	Describe	2						
	Action #4								
	Name	Describe							
	Additional Comments								
Communication									
	GSM/GPRS Modbus TCP/IP		Modbus	RTU (RS485/RS232)	Note: See ModBus specifi implementation. Refer to n	ication page for register mapping and nanual for more details.			
*Control Logic (Please specify all control logic using sketches, diagrams, etc. Attach additional sheets if necessary)									
This ValvApp provides a standard open loop pressure reducing control function for a 390 series valve. The VC-22D will transmit the pressure setpoint via a 4-20mA signal to the									
34 series actuator. The 34 series actuator is calibrated to move to a position that applies appropriate spring force on the pilot based on the pressure setpoint it receives.									
D11 and A13 have been added into this program, even though they are currently not used for anything. These serve as spare IO points so additional functionality can be added in the field by landing signal cables on these IO points and configuring actions in the VC-22D.									
A pres	A pressure offset interactive variable has been included. This may be adjusted in the field if the 34 series actuator feedback and command do not match each other.								
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#### Installation, Operation, and Maintenance Manual

	Project Name:	N/A				
Date:						
	Input	Description	Data Type			ng Comments
40007 Bit 0	Pressure Reducina Setpoint	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al1 Input to use Modbus Address 43000/43001
40007 Bit 1	34 Actuator Feedback	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI2 Input to use Modbus Address 43002/43003
40007 Bit 2	Spare	Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI3 Input to use Modbus Address 43004/43005
40007 Bit 3		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA Al4 Input to use Modbus Address 43006/43007
40007 Bit 4		Analog Input Modbus Override		Write	N/A	Overrides 4-20mA AI5 Input to use Modbus Address 43008/43009
40007 Bit 5		Analog Input Modbus Override	Bit	Write	N/A	Overrides 4-20mA AI6 Input to use Modbus Address 43010/43011
40008 Bit 0	Spore	Digital Input Modbus Override	0.14	Write	N/A	Overrides Hardwire DI1 Input to use Modbus Address 41000
	Spare	Digital Input Modbus Override			N/A N/A	
40008 Bit 1 40008 Bit 2		Digital Input Modbus Override		Write Write	N/A N/A	Overrides Hardwire DI2 Input to use Modbus Address 41001 Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 2 40008 Bit 3		Digital Input Modbus Override		Write	N/A N/A	Overrides Hardwire DI3 Input to use Modbus Address 41002
40008 Bit 3		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41005
40008 Bit 4		Digital Input Modbus Override		Write	N/A	Overrides Hardwire DIS Input to use Modbus Address 41004
10000 Bit 5		signal input would a Overnue	DIC	write	14/74	Overrides narowine bio input to use moubus Address 41005
41000	Spare	Digital Input	Word	Read/Write	DI1	Register Holds/Reads DI1 Value
41000		Digital Input	Word	Read/Write		Register Holds/Reads DI2 Value
41002		Digital Input	Word	Read/Write		Register Holds/Reads DI3 Value
41003		Digital Input	Word	Read/Write		Register Holds/Reads DI4 Value
41004		Digital Input	Word	Read/Write		Register Holds/Reads DI5 Value
41005		Digital Input	Word	Read/Write		Register Holds/Reads DI6 Value
41006		Digital Output	Word	Read	S01	Monitory Purposes (Optional)
41007		Digital Output	Word	Read	S02	Monitory Purposes (Optional)
41008		Digital Output	Word	Read	R01	Monitory Purposes (Optional)
41009		Digital Output	Word	Read	R02	Monitory Purposes (Optional)
43000/43001	Pressure Reducina Setpoint	Analog Input	Int 32	Read/Write		Register Holds/Reads Al1 Value x100 for Two Implied Decimals
	34 Actuator Feedback	Analog Input	Int 32	Read/Write		Register Holds/Reads AI2 Value x100 for Two Implied Decimals
43004/43005	Spare	Analog Input	Int 32	Read/Write		Register Holds/Reads AI3 Value x100 for Two Implied Decimals
43006/43007		Analog Input	Int 32	Read/Write		Register Holds/Reads AI4 Value x100 for Two Implied Decimals
43008/43009		Analog Input	Int 32	Read/Write		Register Holds/Reads AI5 Value x100 for Two Implied Decimals
43010/43011		Analog Input	Int 32	Read/Write	AI6	Register Holds/Reads AI6 Value x100 for Two Implied Decimals
12026/12027	34 Actuator Command		1 1 22	0.1	101	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals
43036/43037	54 Actuator Command	Analog Output	Int 32	Read	A01	Monitory Purposes (Optional) - Register Holds AO1 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals
43038/43039		Analog Output	Int 32	Read	AO2 AO3	Monitory Purposes (Optional) - Register Holds AO2 Value x100 for Two Implied Decimals Monitory Purposes (Optional) - Register Holds AO3 Value x100 for Two Implied Decimals
43040/43041 43042/43043		Analog Output Analog Output	Int 32 Int 32	Read	A03 A04	Monitory Purposes (Optional) - Register Holds AOS value x100 for Two Implied Decimals
13042/43043		Analog Output	Int 32	Read	AU4	ivionitory Purposes (optional) - Register Holds A04 value x100 for two implied becimais

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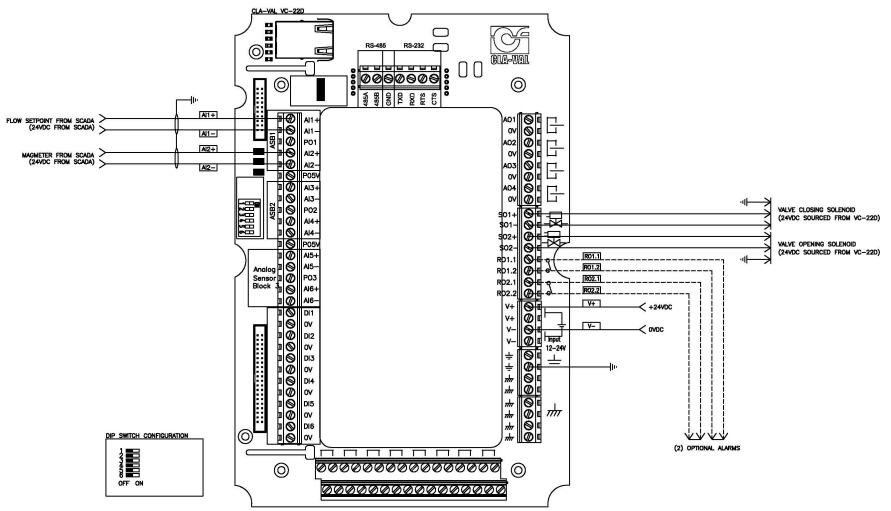
ModBus Register Mapping



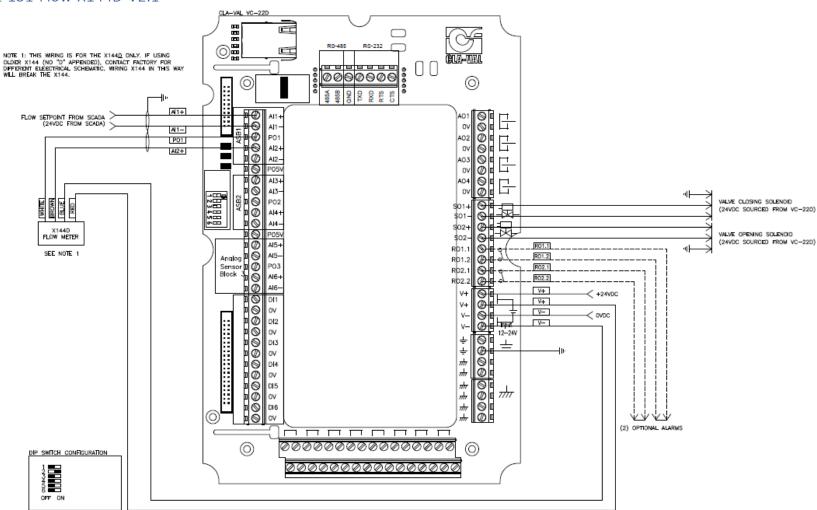
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#### Appendix D: Standard ValvApp Wiring Diagrams

D.1 131-Flow-Mag-V2.1

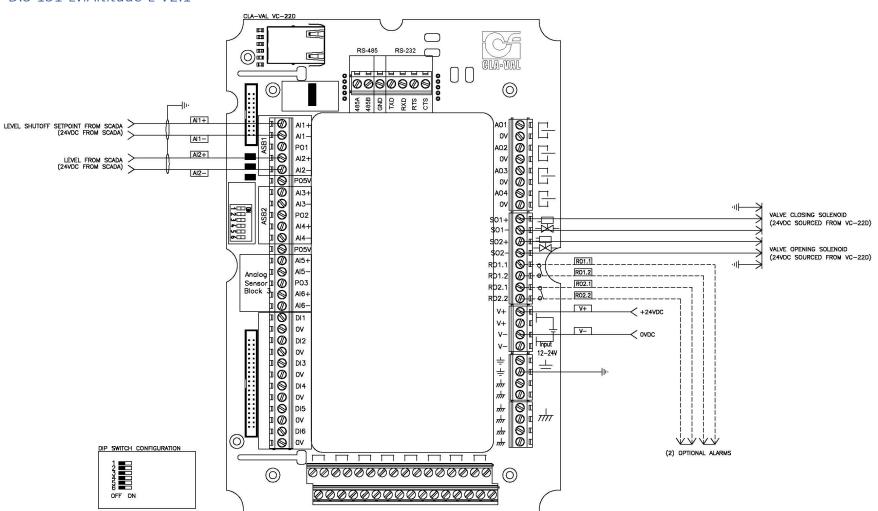




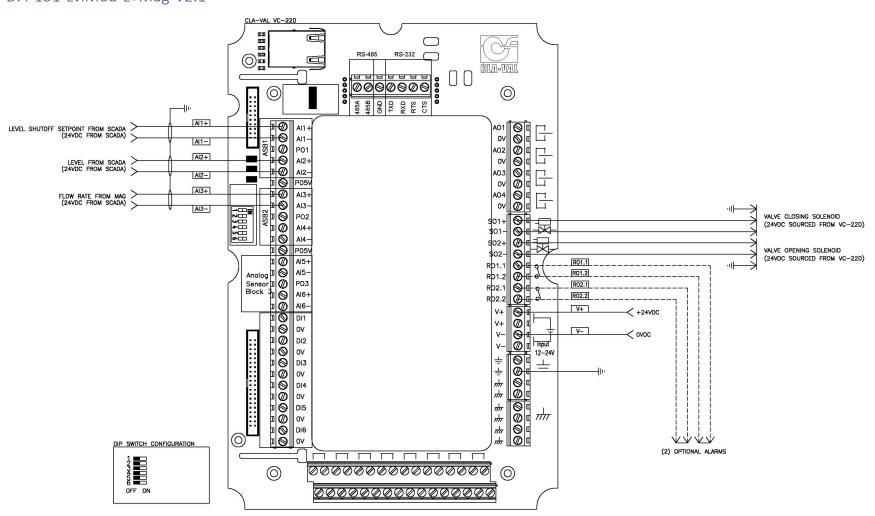








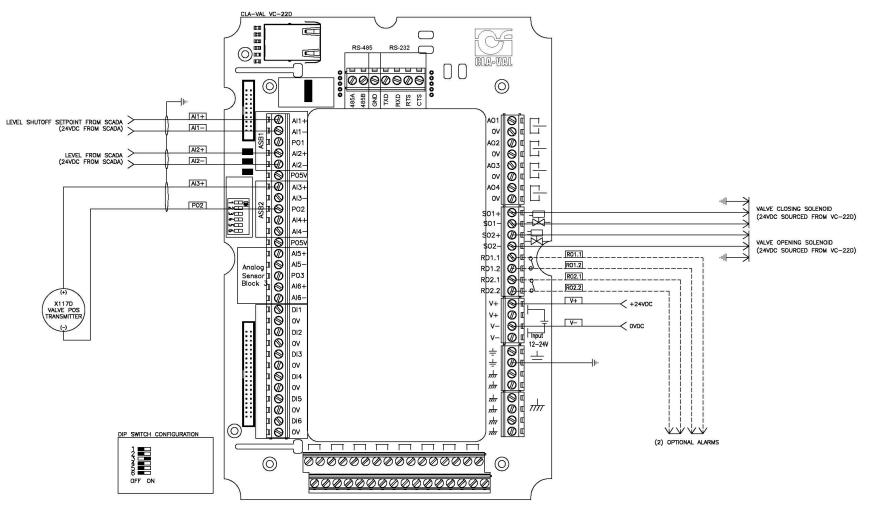


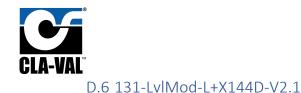


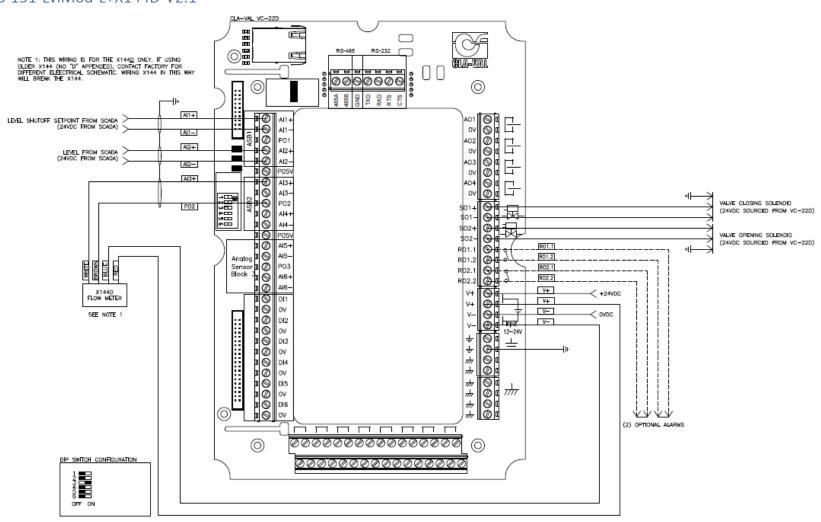


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D.5 131-LvlMod-L+X117D-V2.1



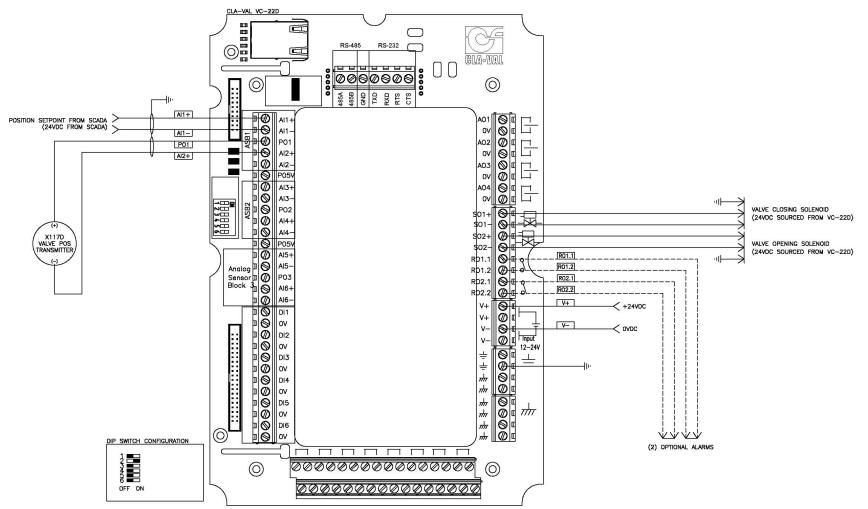






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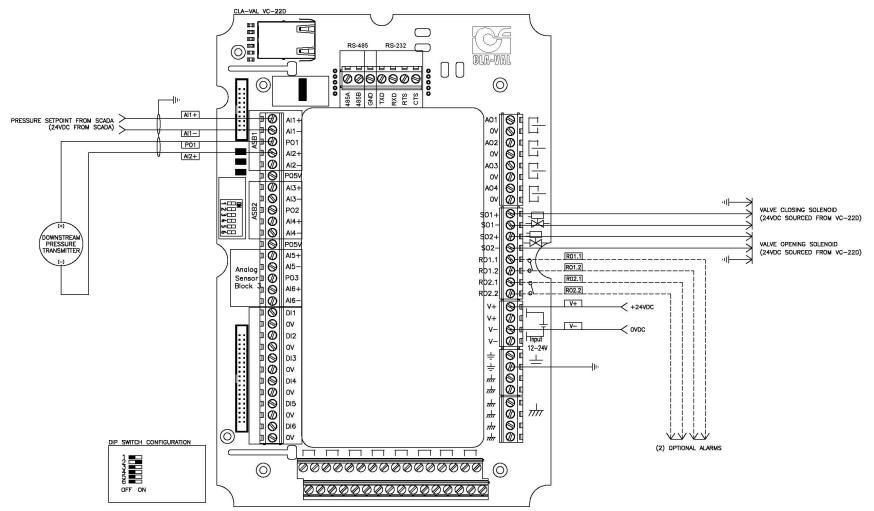
D.7 131-Position-X117D-V2.1





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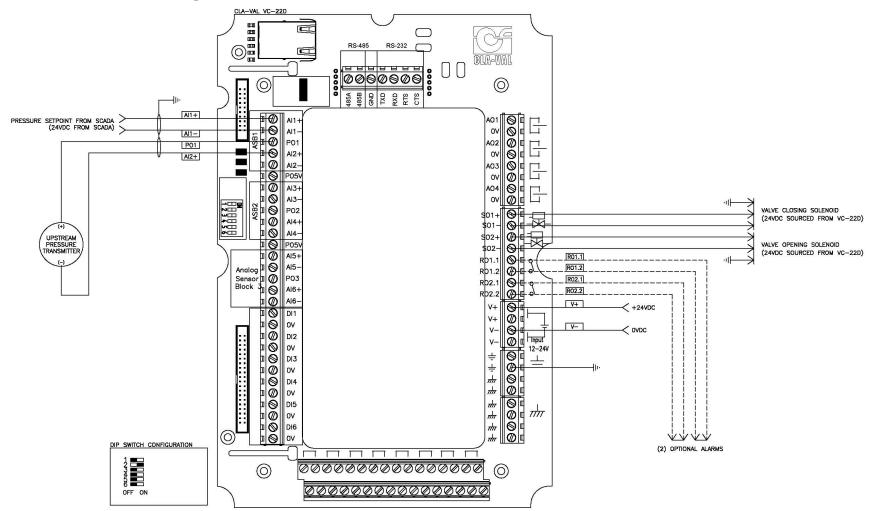
D.8 131-PressureReducing-P2-V2.1





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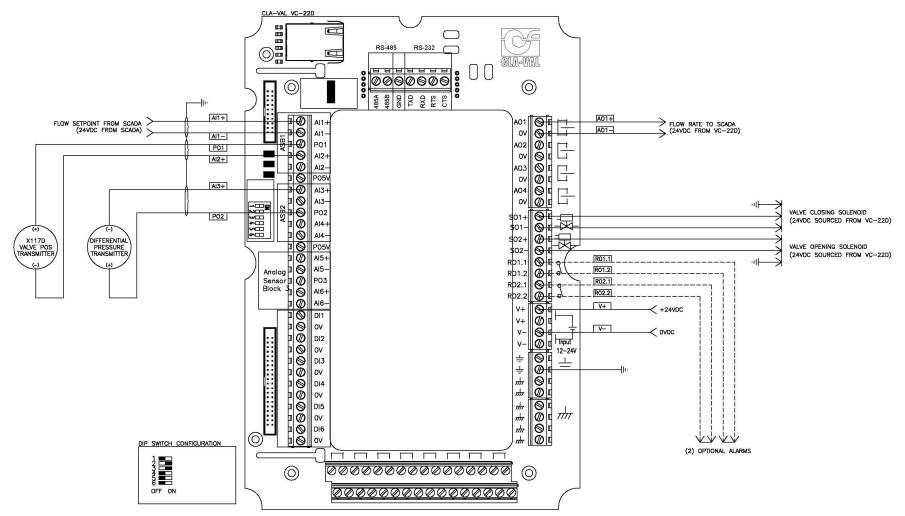
D.9 131-PressureSustaining-P1-V2.1





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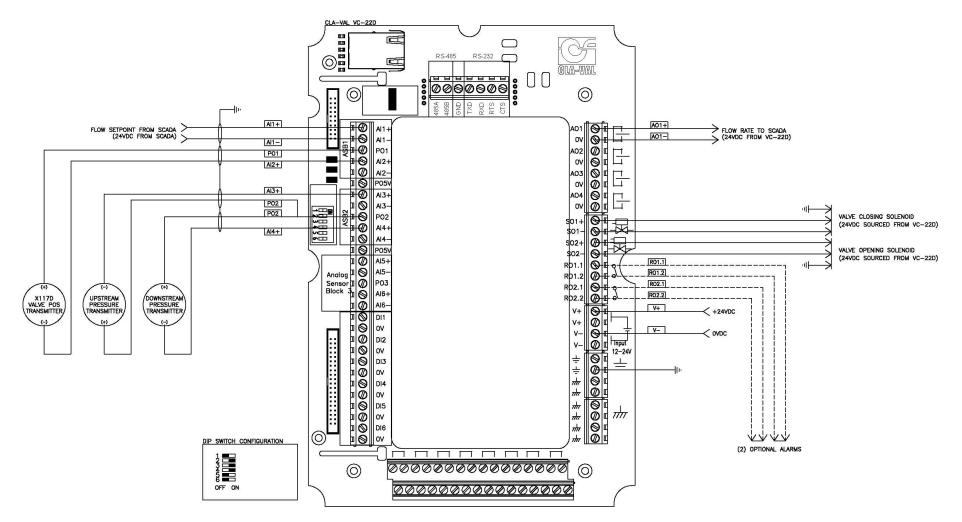
D.10 133-Flow-DP+X117D-V2.1





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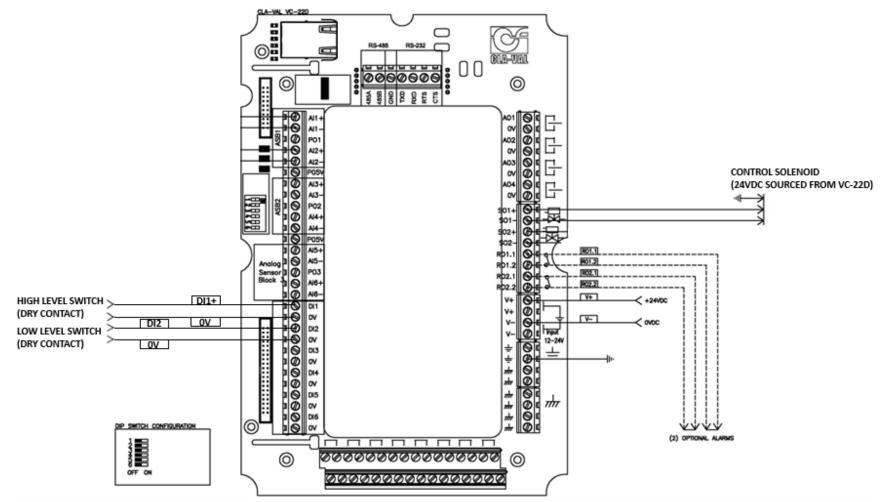
D.11 133-Flow-P1+P2+X117D-V2.1



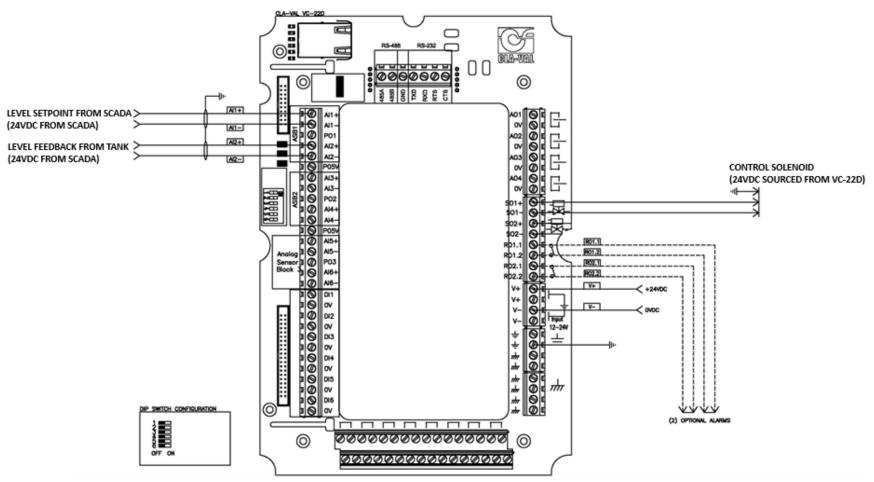


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D.13 136-LvlAlt-HLLL-Switches-V1.0









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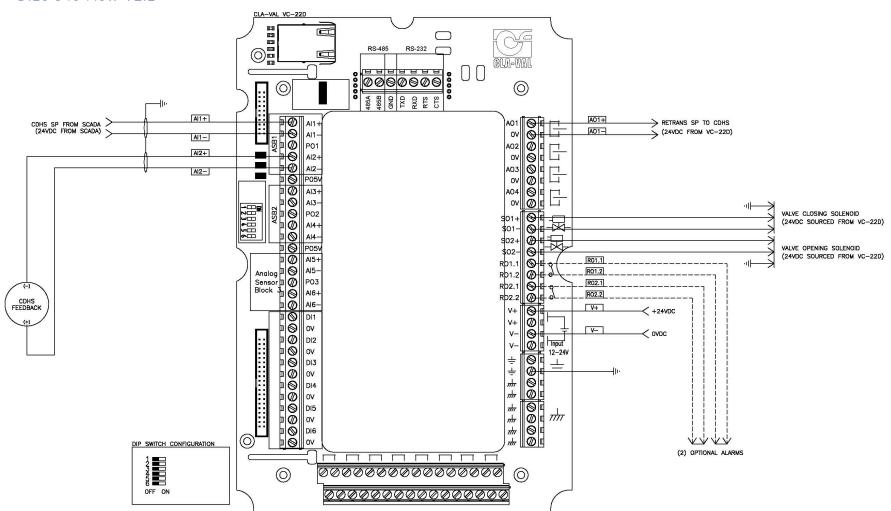
RS-232 RS-485 đ CLA-VA 0000000  $\bigcirc$  $\bigcirc$ :: 485A 485B GND GND TXD RXD RTS CTS ЧĿ AI1+ A01+ RETRANS SP TO CDHS CDHS SP FROM SCADA 2 (24VDC FROM SCADA) AI1-A01-(24VDC FROM VC-22D) AI1-Al1-P01 Al2+ Al2-P05V AI2+ FLOW RATE FROM SCADA AI2-AI3+ AI3+ AI3-AI3-P02 VALVE CLOSING SOLENOID 01 (24VDC SOURCED FROM VC-22D) AI4+ 5 \$01-Al4-÷ \$02+ P05\ -77-VALVE OPENING SOLENOID Õ \$02-(24VDC SOURCED FROM VC-22D) AI5+ R01.1 лĿ Rb1.1 AI5-R01.2 Ø RD1.2 P03 R02.1 RD2.1  $\odot$ AI6+ R02.2 RD2.2 Ø CDHS FEEDBACK 46-V+ +24VDC 
 Image: Constraint of the (+) V-< OVDC  $\bigcirc$ DIP SWITCH CONFIGURATION (2) OPTIONAL ALARMS  $\bigcirc$  $\bigcirc$ OFF ON 

 $\Box$ 

CLA-VAL VC-22D

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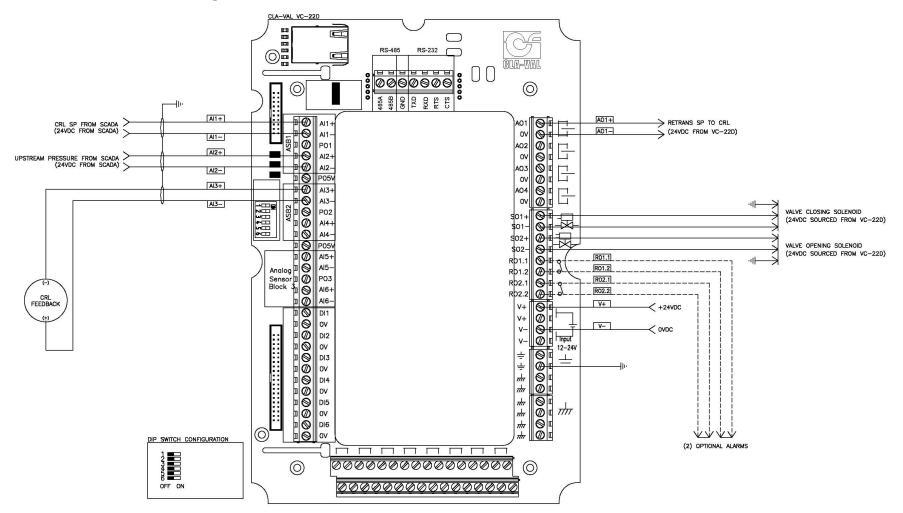






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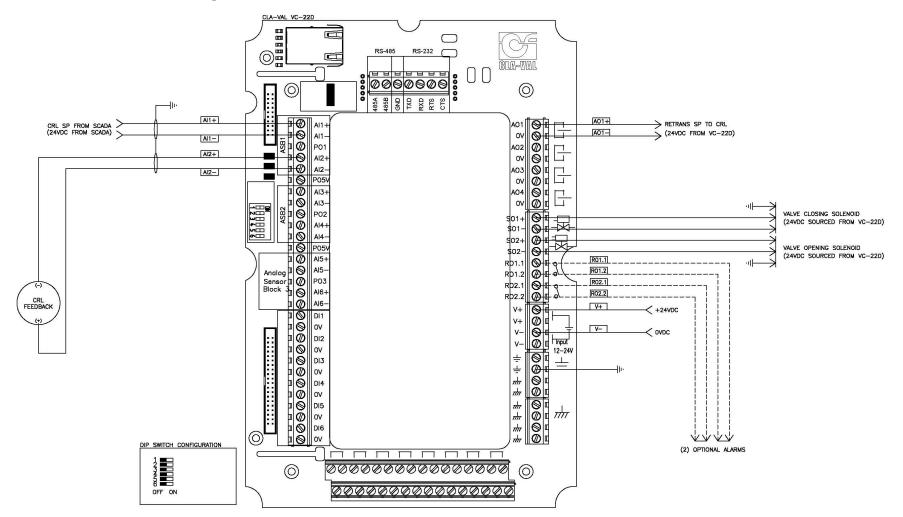
D.17 350-PressureSustaining-P1-V2.1





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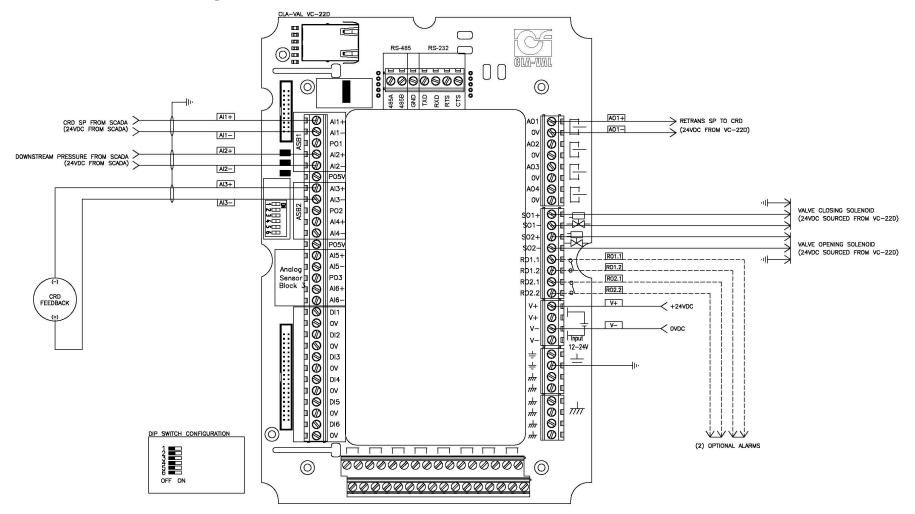
D.18 350-PressureSustaining-V2.1





Installation, Operation, and Maintenance Manual

D.19 390-PressureReducing-P2-V2.1





Installation, Operation, and Maintenance Manual

D.20 390-PressureReducing-V2.1

