



# Volta Control System

*Firmware version v01.13+*



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## INSTALLATION, CONFIGURATION AND OPERATION MANUAL





## GENERAL WARNINGS

### READ AND UNDERSTAND ALL INSTRUCTIONS

before installing and operating the equipment. Failure to follow them can cause serious personal

injury, damage to the equipment or the environment. The operator should be familiar with the operating terminology of the oil equipment.

1. This document includes a basic guide for installation, operation and maintenance. **The field operator must be fully trained** in all aspects concerning the management of pressure control equipment, as well as the work to be performed. If any of the security procedures and policies mentioned are not followed, the work should not be performed. In this case, consult an MMA representative.
2. **Safety** is a combination of knowledge, being alert, common sense, experience in the use of equipment and in the environment of oil and gas fields.
3. Use **Personal Protective Equipment (PPE)** according to company policies. Use safety tools appropriate for the service of the equipment such as a helmet, steel-toe shoes, glasses, gloves and comfortable work clothes. If working in an area with a gas presence, always use spark-proof tools, do not smoke around the wellhead, do not drink alcoholic beverages before or during work. Never take a risk, remember, even low pressures can be lethal.
4. **Evaluate the hazards** that may arise before, during and after work. Be familiar with the start and stop program of the facilities to ensure that all sources of energy, electrical, pneumatic and pressure, are isolated as appropriate before starting work.
5. All company and legal **security requirements** must be met before working on the equipment. Pressure barriers will be fully tested before servicing. MMA recommends securing two pressure barriers before doing any work in the well. Always check for trapped pressure before performing an operation. All valves downstream of the pressure barriers must release the contained pressure.
6. **Verify presence of H<sub>2</sub>S**. In this case, always work with a partner in order to identify emergencies and exposure control methods. Pay attention to any symptoms that indicate H<sub>2</sub>S poisoning.
7. Always use appropriate lifting devices and **follow the safety rules in handling heavy products**. Never try to lift heavy objects with your hand. When lifting objects use the legs not the back.
8. **Safety instructions** - see last page.

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## 1. Introduction

The "Volta" is a self-contained hydraulic control system that incorporates electronic assistance which allows operators to completely safely open and close a hydraulic valve operated locally, remotely, and automatically by high or low line pressure and / or wellheads. (ESD).

The "Volta" is used to provide safe operation in oil or gas wells, operates on a stand-alone basis and ensures that the valve remains fully open without operator intervention.

Its field of application is onshore and offshore, new and retrofit well trees.

The "Volta" is ready to be integrated into the SCADA at no additional cost, it has RS 485 communication port with Modbus protocol.

It is possible to perform the operation, monitoring, and remote diagnosis of the situation, reducing the need for staff on site.

The use of "Volta" provides many benefits:

- RS 485 communications port with Modbus protocol. (Included in basic equipment).
- The communication port allows permanent access to valve status, actuator pressure, early fault detection, remotely operate the valve, etc.
- Reduction of operating expenses due to fewer visits to the well.
- Easy installation, predictive operation with low operator training time, minimal maintenance.
- Predictive fault detection using the Partial Stroke Test which enables scheduled maintenance and avoids loss of production due to breakage (not included in basic equipment).
- Locations without electrical power can be operated remotely using solar panels (not included in basic equipment) and the communications port, constantly maintaining the well within a safe operational framework.

Minute by minute, the "mate" stores the values measured every time there is an input, an event, or an alarm regarding its operation when it occurs.

It has a storage capacity greater than 6 months of operation.

This data can be extracted via SCADA or with a pen drive via USB port. A web application for visualizing, graphing, and analyzing the extracted data is available.



## 2. Description

The “Volta” has a power battery which is constantly powered by an electrical network or solar panel; the battery feeds, upon demand by the electronic control, an electro-hydraulic pump that is responsible for providing the flow and pressure required by the Hydraulic valve actuator to keep it open. For the closing it has a solenoid valve integrated to the electro-hydraulic pump that lowers the actuator pressure causing the valve to close.

The "Volta" has an actuator pressure stabilization system by daily temperature variation, provides and relieves hydraulic fluid automatically to keep the pressure inside the valve actuator stable within a preset range. This functionality eliminates the progressive closure that occurs in purely mechanical systems that require continuous operator intervention.

According to the client's requirement, the “Volta” can carry out the “Partial Stroke Test” or “Total Stroke Test” for the valve in a programmed and systematic manner. It allows the operator to foresee small anomalies in the operation, to predict future damage, avoid unexpected breaks and associated production losses.

## 3. Features

<b>Certifications</b>	SIL 2 for mSafe set
<b>Environmental operating conditions</b>	-40 to 185 °F (-40 to 85 °C) Humidity 0 a 95% non-condensing
<b>Electric power required</b>	14 to 92 VDC (14 to 160 W depending on battery charge demand)
<b>Control current</b>	(SIL2) 62.5 to 680 mA
	(NO SIL2) 25 to 80 mA
	Depending on communications frequency and power on display
<b>Autonomy without electric power</b>	2 to 5 days (Depending on SIL and number of operations)
<b>Control battery</b>	VRLA, 12 VDC, 7 Ah or higher (For temperatures up to 5 °F (-15 °C))
	AGM, 12 VDC, 8 Ah, CCA 100 Amp (For temperatures up to -40 °F (-40 °C))
<b>Power battery</b>	AGM, 12 VDC, 28 Ah, CCA 330 Amp or higher
<b>Hydraulic output pressure</b>	300 to 3.000 PSI (21 to 207 Bar)
<b>Oil volume</b>	1.0 Gallon (3.8 Ltrs.)
<b>Oil type</b>	FUCHS TITAN SAF 22 (For temperatures up to 5 °F (-15 °C))
	AEROSHELL Fluid 4 (For temperatures up to -40 °F (-40 °C))
	Mobil DTE10 Excel grade 32 (For temperatures up to -22 °F (-30 °C))
<b>Closing time</b>	Depends on valve size, line pressure and ambient temperature, typically less than 15 seconds.
<b>Types of usable sensors (Up to 4)</b>	Pressure sensors with 4-20 mA output (SIL 2 for safety function)
	Temperature sensors with 4-20 mA output
	Position sensors with discrete output
<b>Measurement accuracy</b>	+ - 0.5% (With calibration)
	+ - 1.0% (Without calibration)
<b>Types of usable actuators</b>	NA type Solenoids - consumption < 19 W
	NC type Solenoids - consumption < 19 W



<b>Control methodologies available</b>	Manual with time interlock
	Control by minimum and maximum levels of pressure or temperature
	Trigger pulled by a low battery event
	Flow calculation by orifice or positive choke and differential pressure measurement
	Automatic and configurable hydraulic pressure maintenance on the actuator
	Partial and total programmable stroke test (PST & TST)
<b>Response time</b>	0.02 seconds
<b>Supervision and remote control</b>	Connection with SCADA system via Modbus protocol
<b>Input value capture</b>	Ability to record inputs values < 6 months of operation with 1 minute intervals
<b>Event log</b>	It has the capacity to memorize more than 5.500 events and alarms
	It has the capacity to memorize 110 x PST or 27 x TST
<b>Certifications</b>	SIL 2 for PCB
<b>Power</b>	9.5 to 35 VDC
<b>Environmental operating conditions</b>	-40 to 185 °F (-40 to 85 °C) Humidity 0 to 95%
<b>User interface</b>	4 x 20 alphanumeric display w/backlight and 5 buttons keyboard
<b>Processing unit</b>	32-bit low power processor
<b>Available peripherals</b>	Brown-out reset circuit (Protects microcontrolled logic from power failure)
	Watchdog reset circuit (Restores processor operation in case of an internal fault)
	Real time clock
	Battery voltage monitor
<b>Communication interfaces</b>	1 USB port w/protection for 8KV electrostatic discharge
	1 RS485 port w/protection for 15KV electrostatic discharge
	Optionally GSM/GPRS modem
	Optionally 2nd RS485 or RS232 port
<b>Communication protocols</b>	Modbus-RTU
	Modbus-TCP (Available only with GSM / GPRS modem)
<b>Inputs</b>	6 4-20 mA analog inputs
	10 digital inputs
<b>Outputs</b>	8 1.6 Amp solid state outputs / 12 VDC (19 W) with short-circuit and overload protection



#### 4. Installation Instructions



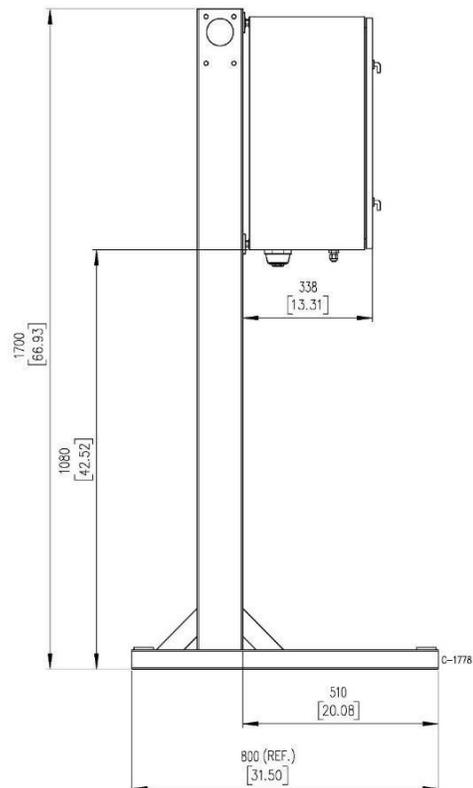
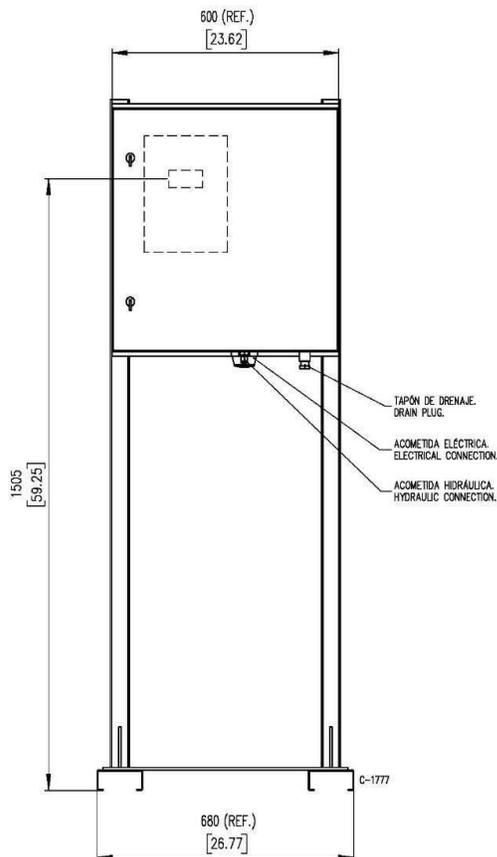
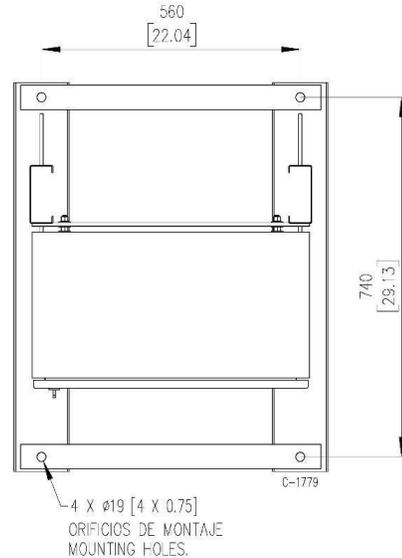
**WARNING**

Study and follow the following instructions very carefully as they indicate how you should secure and connect the “Volta” in a proper and safe manner.

The following is vital information and must be taken into account when installing the Volta on site.

Note: Drawing is for Reference Only, Volta is sold in Small and Large Displacement. Contact Volta ESD for your specific drawing.

<b>Technical Specifications</b>	
<b>Footprint</b>	26.8 x 32 inches
<b>Height</b>	67 inches
<b>Weight</b>	207 Lbs.
<b>Hydraulic Connection</b>	1 x 3/8" tubing.
<b>Electrical Connection</b>	1 x 1-1/2" NPT Female.





Proceed with the installation by following the steps below:

- 1) The "Volta" should be permanently secured to the ground with screws to a concrete base.
- 2) Locate the best place to set the "Volta," which is usually in front of the Christmas tree and in a straight line to where the hydraulic safety valve is located.



**DANGER**

When choosing the place to secure the "Volta," consider the minimum distances required for installation according to NEC Code.

The "Volta" cabinet must be located outside the areas marked as Div.1 or Div.2 (**unless properly equipped as Class 1, Div. 2 rated**) because it is not an equipment classified to work in these areas. The "Volta" is supplied with a floor mount that places the cabinet above 0.5 Mts. (18") from the ground level.

**RECOMMENDATION**

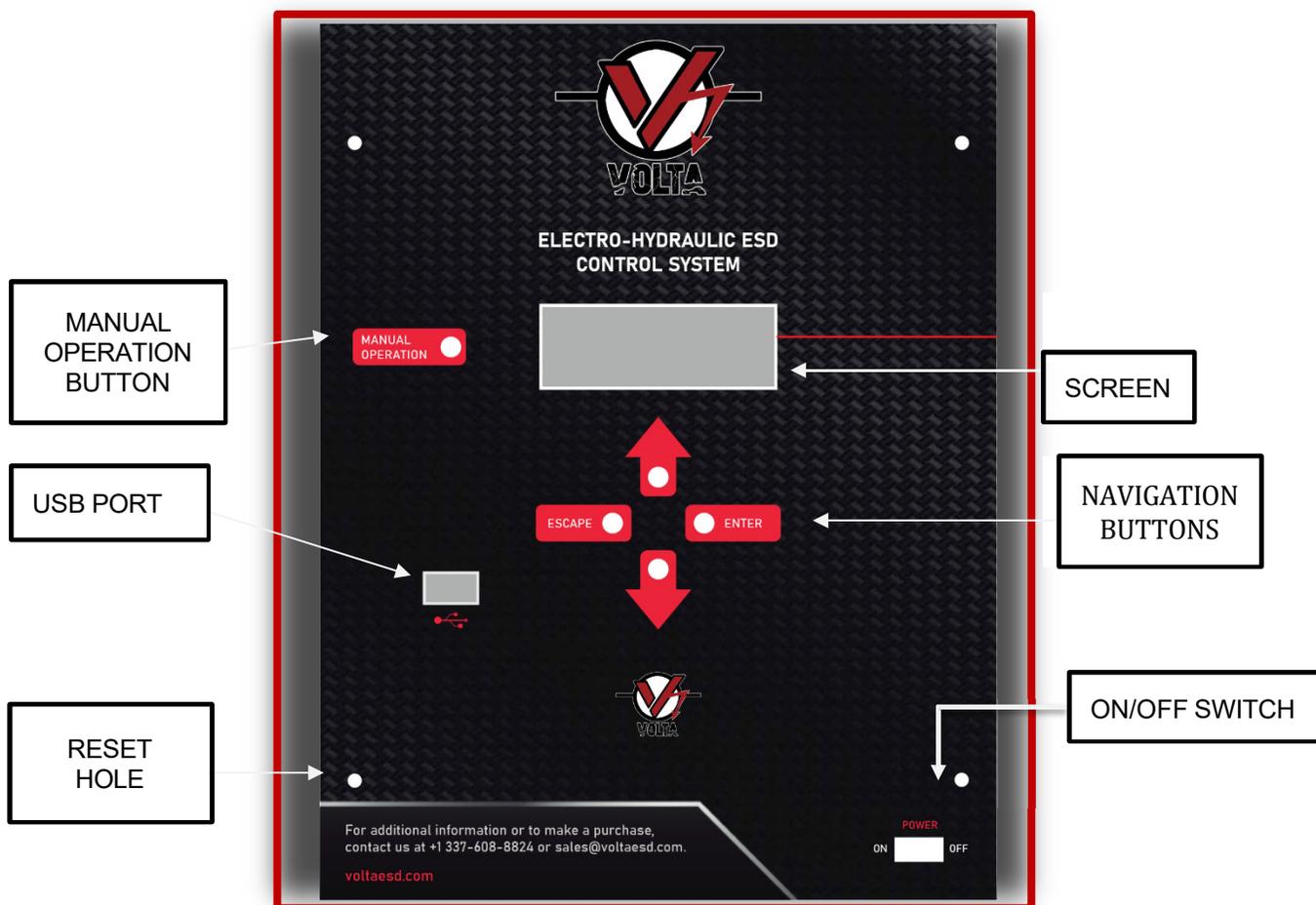
It is recommended to locate the "Volta" as close as possible to the hydraulic safety valve since opening and closing times will be shorter, especially the closing ones.

## 5. Operator Interface

### 5.1 Control Panel

The Control Panel has navigation, operation and reset buttons, power switch, screen and USB port that allow total interaction with the user. Some versions may include a fuse key.

### 5.2 Buttons



The VOLTA Controller has four main navigation buttons and 1 for manual operation.

The **ENTER** button allows you to confirm the selected option; it could be an option to access another menu or validate data.

The **UP** and **DOWN** arrow buttons allow you to navigate up and down between the menu options and allow you to change the data in ascending / descending form or among available options.

The **ESCAPE** button allows you to return to the previous menu or revert data changes without validation.

The **MANUAL OPERATION** button allows access to the Manual Operation mode whenever the option has been previously enabled. (See: 7 Screens Structure)

**WARNING**

The **RESET** button allows the VOLTA Controller to be reset and is accessed through a small hole, using a clip. VOLTA Controller can also be reset in Advanced Configuration as referenced on Page 14.

### 5.3 Screen Navigation System

The VOLTA Controller's screen navigation system is completely intuitive. The navigation buttons work as explained in the previous point 5.2 Buttons.



The arrow on the right side of the menu pointing down, indicates that there are more options below and are those with **GREY** background which are accessed through the corresponding UP or DOWN arrow button.

If the operator does not press any button for 60 seconds, the VOLTA Controller turns off the screen and returns to the idle position without validating the data that was previously entered and not confirmed with the ENTER button.

**CAUTION**

For better understanding, the characters that appear on the screens in **ORANGE** are **INFORMATION** and are not editable on that screen and the characters in **RED** are of **EDITION** or **COMMAND**.

## 6. Screen Structure

The screen's general map is in the attached giant sheet and inside the "Volta", at the back of the main gate.

## 7. Basic Operation

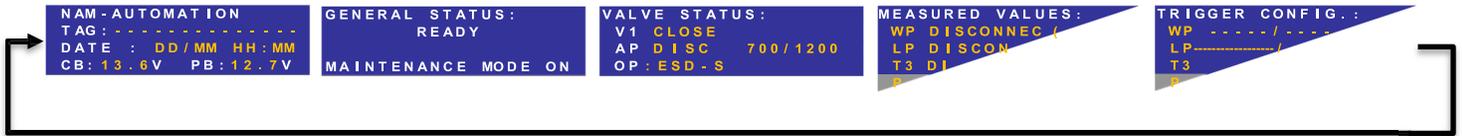
### 7.1 Turning on the Device

To turn on the Controller, slide the switch or on/off knob (See: 5 Operator Interface) from the OFF position to the ON position. The screen will turn on showing the device information, firmware version and serial number for 5 seconds, after which the first Information Screen will show up. This will also apply when the device is operational, but the display is off, and you press a button.

Some equipment may have a fuse switch or other type of ignition device.

## 7.2 Information Screens

The Information Screens are the following five, they are navigated by pressing the ENTER or SCAPE buttons.



The first screen indicates the TAG, current date and time and voltage of control and power batteries.

The second screen GENERAL STATUS indicates the current state of the equipment, like operation or failures, and the maintenance mode if it was enabled from factory config.

The third screen **VALVE STATUS** indicates the state of the hydraulic safety valve V1 (OPEN, OPENING, CLOSING, CLOSED OR DISCONNECTED).

The pressure inside the actuator of the hydraulic safety valve (AP) is also indicated and next to it and separated by a slash, the minimum and maximum pressure values that the VOLTA Controller will automatically maintain in the actuator.

The MODE in which the VOLTA Controller is operating is also indicated as shown in the table. If you are operating in MAN mode, the remaining time to fulfill that INTERLOCKED condition is also shown on the right. (See: 12 Manual Mode / Interlock Operation).

Mode	Description
ESD	Automatic (ESD)
ESD-S	Automatic (ESD) with SCADA enabled
MAN	Manual / Timed Interlocking

The third screen **MEASURED VALUES** indicates the value currently measured by pressure, temperature transmitters, etc. and uses the icons shown in the table to express a certain situation regarding the preset trigger values.

Icon	Description
√	Value measured within the minimum and maximum set values
↑	Value measured ABOVE the maximum set value (HIGH SET)
↓	Value measured ABOVE the minimum set value (LOW SET)
X	Sensor disconnected

The fourth screen **TRIGGERS CONFIG.** indicates, separated by a slash, the minimum and maximum values set for each input's triggers.

To exit the Information Screens and move to the Password Screen pressing the ENTER button for 2 seconds or move to the Manual Operation Screen pressing the MANUAL OPERATION button.

## 8. Passwords

```
ACCESS TO CONFIG.  
PASS : . . . .
```

To access the different configuration screens, a 4-digit numerical password is required; there are two passwords with different access levels.

They can be accessed from any Information Screens by pressing the ENTER button for 2 seconds.

The two configuration levels are called USER configuration and ADVANCED configuration.

The USER configuration with password **USER 1234**, allows access to: TRIGGER CONFIGURATION, ACTUATOR CONFIGURATION, FLOW CONFIGURATION, USER CONFIGURATION and SCADA CONFIGURATION.

The ADVANCED configuration with password **MASTER 3030**, allows access, in addition to the previous ones, to: ADVANCED CONFIGURATION.

Depending on the password entered, the VOLTA Controller cuts the options menu, leaving only those available for the corresponding password visible.

The USER password and MASTER password that allows access to the ADVANCED configuration can be modified. ¿

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> CHANGE PASS*

```
CHANGE PASS :  
→USER : 1 2 3 4
```

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> CHANGE PASS*

```
CHANGE PASS :  
→MASTER : 3 0 3 0
```

To change any of the two passwords, enter edit mode by pressing the ENTER button; the first character of the password will flash, modify the value with the arrow buttons and press the ENTER button; the second character will flash, modify the value with the arrow buttons and press the ENTER button; perform this sequence for each character until you reach the end. If you do not want to modify any character just press the ENTER button to move to the next character; when you press the ENTER button on the last character, the new password will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.



### CAUTION

New passwords shall not contain a first digit identical to the last one.



## 9. Basic Configuration

```
CONFIGURATIONS :
→TRIGGER CONFIG.
ACTUATOR CONFIG.
FLOW CONFIG.
USER CONFIG.
SCADA CONFIG.
RS485 DIAGNOSTIC
MAINTENANCE MODE
ADVANCED CONFIG
FACTORY CONFIG.
```

After entering the password, the screen shown below will be displayed.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will move to the selected option screen.

The “MAINTENANCE MODE” will appear only if it was enabled from Factory Config previously.

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG.*

```
USER CONFIG. :
→DATE / TIME
LANGUAGE
UNITS
TAG CHANGE
MANUAL OPER. BUTTON
DOWNLOAD BY USB
DEVICE DATA
CHANGE PASS
CONFIG. RESTORE
ABOUT US...
```

This is a transition and selection screen that allows access to other screens.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will move to the selected option screen.

This screen does not allow editing any data.

### 9.1 Date and Time

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> DATE / TIME*

```
DATE / TIME :
→DATE : DD / MM / YYYY
TIME : HH : MM : SS
```

In this screen you can set the DATE and TIME.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the DATE, you will first see DD (Days) flashing; modify the value using the arrow buttons and press the ENTER button, MM (Months) will flash, modify the value using the arrow buttons and press the ENTER button, YYYY (Years) will flash, modify the value, and press the ENTER button; the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

To change the HOUR you will first see HH (Hours) flashing; modify the value using the arrow buttons and press the ENTER button, MM (Minutes) will flash, modify the value using the arrow buttons and press the ENTER button, SS (Seconds) will flash, modify the value and press the ENTER button; the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.



## 9.2 Language

*USER PASSWORD >> CONFIGURATIONS [?] USER CONFIG. [?] LANGUAGE*



### CAUTION

If you DO NOT know the language you are setting, you may NOT be able to return to the original language when you change it.

```
LANGUAGE :  
→LANGUAGE : ENG
```

In this screen you can configure the LANGUAGE in which the VOLTA Controller shows the menus.

Enter edit mode by pressing the ENTER button, the current LANGUAGE option will flash, change the value using the arrow buttons and press the ENTER button; the new option will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The LANGUAGES available are ESP = Spanish, ENG = English and POR = Portuguese.

## 9.3 Units

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >>UNITS*

```
UNITS :  
→PRESSURE : PSI  
TEMPERATURE : °C
```

In this screen you can configure PRESSURE and TEMPERATURE measurement units used by the VOLTA Controller to express the values.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the PRESSURE unit, you will first see the current unit flashing; modify the value using the arrow buttons and press the ENTER button; the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The PRESSURE units available are PSI and BAR.

To change the TEMPERATURE unit, you will first see the current unit flashing; modify the value using the arrow buttons and press the ENTER button; the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The TEMPERATURE units available are \*C and \*F.

## 9.4 Change TAG

*USER PASSWORD >> CONFIGURATIONS >>USER CONFIG. >>TAG CHANGE*

```
TAG CHANGE :  
→TAG : PLU CE -1424
```

In this screen you can edit the TAG on which the VOLTA Controller is installed.

Enter edit mode by pressing the ENTER button; the first character of the current TAG will flash, modify the value using the arrow buttons and press the ENTER button; the second character will flash, modify the value using the arrow buttons and press the ENTER button; perform this sequence for each character until you reach the end. If you do not want to modify any character just press the ENTER button to move to the next character—. When you press —the ENTER button on the last



character the new TAG will be saved. If you press the ESC button at any time during the process, the changes will not be saved.

The characters are alphanumeric.

### 9.5 Device Data

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> DEVICE DATA*

```

DEVICE DATA :
->MODEL :      E2
  FIRMWARE :  V01.02
  SN :         00020
  M. DATE :   00/MM/YYYY

```

This screen shows the Controller Model, Firmware Version, Serial Number and Manufacturing Date.

This screen does not allow editing any data.

### 9.6 Restore User Settings and Variables

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> CONFIG. RESTORE*



**CAUTION**

This operation discards all modifications previously made by the user and returns all user variables to the original factory settings.

```

USER CONFIG. :
DATE / TIME
LANGUAGE
UNITS
TAG CHANGE
MANUAL OPER. BUTTON
DOWNLOAD BY USB
DEVICE DATA
CHANGE PASS
->CONFIG. RESTORE
ABOUT US...

```

In this screen you can restore certain variables to their original factory value.

```

CONFIG. RESTORE :
PRESS :
ENTER TO CONFIRM
ESC. TO CANCEL

```

Navigating, select the CONFIG. RESTORE option using the left arrow; press the ENTER button and a confirmation screen.

will show up.

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN

```

If you press the ENTER button, variables are restored, and the VOLTA Controller will display a confirmation screen; if you press the ESCAPE button you exit the screen without restoring.

The variables that will be restored to default values are those shown in the corresponding table and column. (See: 23 Table of Values by Default Variables and Events).



### 10. Actuator Configuration

USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG.

```

ACTUATOR CONFIG. :
- - PRESS MAINTEN. - -
->MIN SET : 800 PSI
MAX SET : 1200 PSI
- - PARTIAL STROKE - -
ENABLE : YES
STROKE : 1 SWITCH
TEST INTE. : 015D00H
PST CALIBRATE
PST RUN TEST
- - - - -
DOWNLOAD BY USB
CONFIG. RESTORE

```

In this screen you can configure the minimum value called MIN SET and the maximum value called MAX SET. These values should be maintained by the VOLTA Controller inside the valve V1 actuator when using the hydraulic pump.

Navigating, select the option you wish to modify using the left arrow; pressing the ENTER button you will enter edit mode.

To change the MIN SET you will first see the current value flashing, in this case 800, modify the value using the arrow buttons, if you keep the arrow pressed, the value will change at a normal speed and after a certain time the speed will increase reaching the desired value more quickly. Once the desired value has

been reached, press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The range of values available depends on the values preset on another screen. (See: 22.1.1 Configuration of Sensor Ranges # 5).

To change the MAX SET, you will first see the current value flashing, in this case 1200, then proceed as explained to configure the MIN SET.

The values in ORANGE correspond to data loaded on other screens and the values in RED are the editable data on this screen.

### 11. Manual Mode / Interlock Operation

It can be accessed from any of the Information Screens by pressing the MANUAL OPERATION button for 2 seconds.



**CAUTION**

Access must have previously been enabled (See: 13 Manual Mode / Interlock Configuration).

```

MANUAL OPERATION :
V1 : CLOSE
->MAINT. : ON
TIME : 00 : 00 : 00

```

This screen allows the manual (RED) operation of valve V1 and setting an INTERLOCK period.

If maintenance mode is enabled at this menu, you will be able to disable it, not to enable it, just disable it.



## 11.1 Manual Mode Operation

Navigating, select Valve V1 using the left arrow; by pressing the ENTER button you will enter command mode.

To change the state of valve V1, you will first see the action that is about to take place, flashing. In the case of the example the **OPEN OK?** command will show up, flashing; press the ENTER button and valve V1 will open. If you press the ESCAPE button at any time during the process, no changes will occur.

The operated valve will remain in the commanded position when:

- You remain on this screen.
- There is no condition related to Automatic Mode Operation (ESD) that implies a different one. (*See: 14 Automatic Mode Operation (ESD)*).
- A different position is commanded, but the VOLTA Controller remains in the current command screen, and it does not turn off.
- A different position is commanded, but a timed interlock is performed (*See: 12.2 Interlock Mode Operation*).

## 11.2 Interlock Mode Operation

To maintain valve V1 in its current state for a certain period, an INTERLOCK operation can be carried out. Once the preset interlock period has finished, the VOLTA Controller will take control and decide the next actions depending on the SCADA or ESD.



### CAUTION

While the VOLTA Controller remains INTERLOCKED, the Automatic mode (ESD), the SCADA command and the PST & TST function are suspended; in the first case, the minimum and maximum safety system (ESD) will not operate in response to an event.

```
MANUAL OPERATION :
→V1 : OPEN OK?
MAINT. : ON
TIME : 00:00:00
```

Navigating, select the TIME option using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the INTERLOCK TIME, you will see that HH (Hours), MM (Minutes) and SS (Seconds) flash simultaneously; modify the value using the arrow buttons; the MM (Minutes) and then the HH (Hours) will automatically change. When you reach the desired value, press the ENTER button, the new values will be saved, and the time will begin to run in descending order. If you press the ESCAPE button at any time during the process, the changes will not be saved.

To cancel the INTERLOCK TIME, perform the operation described above, change the value to 00 hours, 01 minutes and then press the ENTER button; after 1 minute you will be able to change the state of valve V1 (*See: 12 Manual Mode Operation*).

The maximum preset time is 99 hours and 99 minutes.



## 12. Manual Mode / Interlock Configuration

USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> MANUAL OPER. BUTTON



In this screen you can enable or disable, the MANUAL OPERATION button preventing someone from manually operating the valve V1.

Enter edit mode by pressing the ENTER button, the option YES or NO will flash as appropriate, change the value using the arrow buttons and press the ENTER button; the new option will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

## 13. Automatic Mode Operation (ESD)

This mode of operation is also known as ESD (Emergency Shut Down), it can cause the closure of valve V1 when the measured values in any of the four analog inputs available for that purpose are outside the minimum and maximum values preset range. (See: 15 Automatic Mode (ESD) and Triggers Configuration).

Once the reason that triggered the valve closure has been regularized, there are two ways to replace the valve or to open it, which are as follows:

- Manual (MAN), the user must open the valve personally. (See: 12.1 Manual Mode Operation).
- Automatic (AUTO), the VOLTA Controller will automatically open the valve that was closed by a trigger.

The VOLTA Controller permanently runs in ESD mode in the background and prevails in terms of importance of actions over the other two modes or functions except before an INTERLOCK where it does NOT prevail.

To operate in ESD mode, minimum and maximum trigger values for each input must be preset (See: 14 Automatic Mode (ESD) and Triggers Configuration).

## 14. Automatic Mode (ESD) and Trigger Configuration

USER PASSWORD >> CONFIGURATIONS >> TRIGGER CONFIG.

This is a transition and selection screen that allows access to other screens.



Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will move to the selected option screen.

This screen does not allow editing any data.

USER PASSWORD >> CONFIGURATIONS >> TRIGGER CONFIG >> LINE PRESS.



In this screen you can set the minimum value called MIN SET, the maximum value called MAX SET and the type of REPOSITION.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.



To change the MIN SET, you will first see the current value flashing, in this case 420; modify the value using the arrow buttons, if you keep the arrow pressed the value will change at a normal speed and after a certain time the speed will increase, allowing to reach the desired value more quickly. Once the desired value is reached, press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

To prevent the V1 valve from being closed by MIN SET, leave it set to - - - - -, press the down arrow button until - - - - - appears.

The range of values available depends on the values preset on another screen. (See: 22.1.1 Configuration of Sensor Ranges # 1 and # 2) and (See: 22.2.2 Configuration of Sensor Ranges # 3 and # 4).

To change the MAX SET, you will first see the current value flashing, in this case 1300; then proceed as explained to set MIN SET.

To prevent the V1 valve from being closed by MAX SET, leave it set to - - - - -, press the up arrow button until - - - - - appears.

To change the type of REPOSITION, you will first see the current value flashing; in this case AUT; modify the value using the arrow buttons and press the ENTER button, the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The types of REPOSITION available are automatic AUT and manual MAN.

The type of WP input (Wellhead Pressure) and LP (Line Pressure) are preset at the factory and cannot be modified; however, the inputs named here T3 and P4 as an example, can be modified between the PRESSURE or TEMPERATURE input types.

The values in **ORANGE** correspond to data loaded on other screens and the values in **RED** are the editable data in this screen.

## 15. Maintenance Mode

*FACTORY PASSWORD >> FACTORY CONFIGURATIONS >> MAINTENANCE MODE*

```
FACTORY CONFIG. :
PARTIAL STROKE : YES
SOLENOID PWM : 100%
→MAINTENANCE : NO
```

When the device is in maintenance mode, the automatic operation is disabled, so you can leave the valve open or close. If the maintenance mode is enabled, some new menu will appear in configurations entering with master password.

*MASTER PASSWORD >> CONFIGURATIONS >> MAINTENANCE MODE*

```
MAINTENANCE MODE
→STATE : OFF
```

Here you can enable or disable the maintenance mode and a double check screen will appear asking to confirm you want to exit from safe mode. Also, you can disable it from SCADA or from Manual Operation Screen, not the other way.



## 16. PST & TSP Function Operation

This function performs a Partial Stroke Test (PST) or Total Stroke Test (TST) of valve V1 in a manual or automatic manner according to preset times. (See: 17 PST & TST Function Configuration).

The data obtained from this function are stored in the memory of the VOLTA Controller so that the user can analyze them at any time; the LOG format is as shown below.

When the VOLTA Controller is configured to operate with the PST or TST Function, a first operation in valve V1 is performed where pressures and operating times are recorded in its memory as a standard; after that, each PST or TST operation whether manual or timed, will be compared with the standard and will indicate if valve V1 has a potential problem or not, as can be seen in the LOG above.

```
NUMBER OF PST RECORDS: 000032
RE-01;START PST;12/03/2019;12:45
RE-01;0;0;244;0;0;1032;1;0
RE-01;1;0;244;0;0;1032;1;0
RE-01;2;0;244;0;0;1032;1;0
RE-01;3;0;254;0;0;325;1;0
RE-01;4;0;258;0;0;22;1;0
RE-01;5;0;258;0;0;20;1;0
RE-01;6;0;258;0;0;19;1;0
RE-01;7;0;257;0;0;18;1;0
RE-01;8;0;224;0;0;104;0;0
RE-01;9;0;215;0;0;116;0;0
RE-01;10;0;214;0;0;22;1;0
RE-01;11;0;214;0;0;56;1;0
RE-01;12;0;213;0;0;40;1;0
RE-01;END PST;1032;19;8;92;2;3;13
RE-01;RESULT OF PST;1switch;OK
02;START PST;12/03/2019;12:48
02;0;0;0;0;0;996;1;0
02;1;0;0;0;0;996;1;0
02;2;0;0;0;0;996;1;0
02;3;0;0;0;0;315;1;0
02;4;0;0;0;0;22;1;0
02;5;0;0;0;0;21;1;0
02;6;0;0;0;0;18;1;0
02;7;0;0;0;0;18;1;0
02;8;0;0;0;0;71;0;0
02;9;0;0;0;0;74;0;0
02;10;0;0;0;0;74;1;0
02;11;0;0;0;0;90;1;0
02;12;0;0;0;0;103;1;0
02;END PST;996;20;8;102;2;3;13
02;RESULT OF PST;1switch;OK
```



### CAUTION

The Automatic Mode (ESD) command has a CLOSURE operation priority over the PST & TST Function. It means that it will not be performed if an ESD is active.

If a CLOSURE instruction by Automatic Mode (ESD) occurs when valve V1 is OPEN due to a previous instruction from the PST & TST Function, it will be CLOSED immediately, invalidating the PST or TSP in progress.

To run this PST or TST function, valve V1 must have a position indicator; it may have only 1 switch to indicate the opening in addition to the previous one; it may have or not another switch to indicate the end of the PST or, in addition to the first one, it can have a switch to indicate the CLOSURE in case you want to perform a TST.

## 17. PST & TSP Function Configuration

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [ACTUATOR CONFIG.](#)

```
ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
->ENABLE: YES
STROKE: 1SWITCH
TEST INTE.: 015D00H↓
PST CALIBRATE
PST RUN TEST
-----
DOWNLOAD BY USB
CONFIG. RESTORE
```

In this screen you can configure, if ENABLED, the STROKE of valve V1 to be analyzed and the interval between PST or TST tests called TEST INTE.

It is also possible to CALIBRATE the PST pattern, RUN a PST or TST, DOWNLOAD BY USB the data stored in the memory of the PST and TST 's VOLTA Controller and finally also RESTORE factory settings of all options.

### 17.1 PST and TST Function Enablement

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [ACTUATOR CONFIG.](#) >> [ENABLE](#)

```
ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
->ENABLE: YES
STROKE: 1SWITCH
TEST INTE.: 015D00H↓
PST CALIBRATE
PST RUN TEST
-----
DOWNLOAD BY USB
CONFIG. RESTORE
```

With this option you can enable or not, the PST and TST function.

Navigating, select the ENABLED option using the left arrow; by pressing the ENTER button you will enter edit mode; the option YES or NO will flash as appropriate, modify the value using the arrow buttons and press the ENTER button; the new option will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

### 17.2 PST or TST Stroke

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [ACTUATOR CONFIG.](#) >> [STROKE](#)

```
ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
ENABLE: YES
->STROKE: 1SWITCH
TEST INTE.: 015D00H↓
PST CALIBRATE
PST RUN TEST
-----
DOWNLOAD BY USB
CONFIG. RESTORE
```

With this option it is possible to configure how the VOLTA Controller will take the stroke of valve V1 to obtain stroke times and pressures during the PST and TST function. They can be done in three diverse ways: with 1 switch (For TST), 2

switches (For PST) or two switches (For TST) on the position indicator of valve V1.

Navigating, select the STROKE option using the left arrow; by pressing the ENTER button you will enter edit mode.

1 SWITCH (For PST), a single switch is used to indicate the OPEN position of valve V1.



2 SWITCHES (For PST) are used. One switch indicates the OPEN position of valve V1 and the indication of a second switch that is generally located at 30% of the total stroke of valve V1 is also used.

2 SWITCHES (For TST) are used. One switch indicates the OPEN position of valve V1, and a second switch indicates the CLOSED position of valve V1.

### 17.3 Time Interval between PST's or TST's

*USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG. >> TEST INTE.*

```

ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
ENABLE : YES
STROKE : 1 SWITCH
->TEST INTE. : 015D00H
PST CALIBRATE
PST RUN TEST
-----
DOWNLOAD BY USB
CONFIG. RESTORE

```

With this option you can configure how often valve V1 will perform the PST or TST operation.

Navigating, select the TEST INTE. option using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the TEST INTE. you will see that DD (Days) and HH (Hours) flash simultaneously, modify the value using the arrow buttons, the HH (Hours) and then the DD (Days) will change automatically; when you reach the desired value press the ENTER button and the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The maximum resettable time is 999 days and 99 hours.

### 17.4 Calibrating PST or TST

*USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG. >> PST CALIBRATE*

```

ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
ENABLE : YES
STROKE : 1 SWITCH
TEST INTE. : 015D00H
->PST CALIBRATE
PST RUN TEST
-----
DOWNLOAD BY USB
CONFIG. RESTORE

```

With this option a standard calibration of PST or TST of valve V1 is performed, pressures and operating times are recorded in the VOLTA Controller's memory.

This standard will be used as a reference at the end of each PST or TST operation and will show a result.

**THESE CHANGES  
REQUIRES OPERATING  
THE VALVE & IT`LL  
GET OUT OF CONFIG.**

Navigating, select the PST CALIBRATE option using the left arrow, press the ENTER button; a warning screen will show up for a few seconds and then a confirmation screen: they will be displayed alternately.

If you press the ENTER button, the PST or TST standard calibration will be performed, and the VOLTA Controller will display a confirmation screen. If you press the ESCAPE button, you exit the screen without performing the standard calibration.

**PRESS :  
ENTER TO CONFIRM  
ESC. TO CANCEL**

**CLOSED VALVE  
PST NOT POSSIBLE**

To perform the PST or TST standard calibration, valve V1 must be in the OPEN position; if when you decide to perform the operation, valve V1 is closed, a screen will show up notifying this situation and indicating that it is not possible to perform it.

## 17.5 Run PST or TST Manually

*USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG. >> PST RUN TEST*

```

ACTUATOR CONFIG. :
--PRESS.MAINTEN.--
MIN SET : 800 PSI
MAX SET : 1200 PSI
--PARTIAL STROKE--
ENABLE: YES
STROKE: 1 SWITCH
TEST INTE.: 015D00H
PST CALIBRATE
->PST RUN TEST
-----↓
DOWNLOAD BY USB
CONFIG. RESTORE
  
```

With this option, a PST or TST of valve V1 is performed manually, pressures and operating times are recorded in the VOLTA Controller's memory.

Navigating, select the PST RUN TEST option using the left arrow, press the ENTER button and a confirmation screen will show up.

```

PRESS :
ENTER TO CONFIRM
ESC. TO CANCEL
  
```

If you press the ENTER button, the PST or TST will be performed; if you press the ESCAPE button you will exit the screen without performing the PST or TST.

## 17.6 Restore PST and TST Configuration and Variables

*USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG. >> CONFIG. RESTORE*



### CAUTION

This operation discards the modifications made to the STROKE or TEST INTERVAL variables of the PST or TST seen in points 17.2 and 17.3, and restores them to the original factory values. The actuator configuration is NOT restored to its original factory value.

Navigating, select the CONFIG. RESTORE option using the left arrow, press the ENTER button and a confirmation screen will show up.

If you press the ENTER button, the coefficients and the VOLTA Controller are restored, and a confirmation screen will be displayed. If you press the ESCAPE button, you exit the screen without restoring.

```

CONFIG. RESTORE :
PRESS :
ENTER TO CONFIRM
ESC. TO CANCEL
  
```

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
  
```

The variables that will be restored to default values are those shown in the corresponding table and column. (See: 23 Table of Values by Default Variables and Events).

## 18. Flow Measurement Function

This function calculates the production flow and requires the configuration of certain parameters (See: 19 Flow Measurement Function Configuration).

This function is always running in the background and requires the following hardware:

- A choke holder with diameter hole and known CV.
- Pressure measurement upstream of the choke holder corresponds to the well pressure measured by the WP input.
- Pressure measurement downstream of the choke holder corresponds to the pressure of the production line measured by the LP input.



- For greater calculation accuracy, the installation of the temperature measurement upstream of the choke holder is recommended. It is not an essential requirement.

Flow measurement is recorded minute by minute by the VOLTA Controller and can be sent via SCADA. (See: 21 SCADA Configuration).

Measurements can be seen and extracted from the VOLTA Controller using a pen drive. The VOLTA Controller stores this data for more than 6 months in its internal memory. (See: 20.1 Data Download by USB Port).

## 19. Flow Measurement Function Configuration

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [FLOW CONFIG.](#)

```
FLOW CONFIG. :
->FLUID :      OIL
CV :          1,00
OIL REL.DENS : 0,73↓
GAS ESP.CAL. : 1,40
GAS GRAV. :   0,83
GAS COMP. :   1,00
F.R.P.D. :   1,00
COEFFIC. RESTORE
```

In this screen you can configure the type of FLUID, the CV of the choke / hole holder assembly and characteristics of the GAS or OIL that is being produced.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter the edit mode.

### 19.1 Fluid Configuration

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [FLOW CONFIG.](#) >> [FLUID](#)

```
FLOW CONFIG. :
->FLUID :      OIL
CV :          1,00
OIL REL.DENS : 0,73↓
GAS ESP.CAL. : 1,40
GAS GRAV. :   0,83
GAS COMP. :   1,00
F.R.P.D. :   1,00
COEFFIC. RESTORE
```

In this screen you can configure the type of FLUID from which the VOLTA Controller will calculate the flow rate.

Navigating, select the FLUID option using the left arrow, press the ENTER button and you will see the current value flashing; modify the value using the arrow buttons and press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the

changes will not be saved.



### CAUTION

The correct configuration of the fluid is important since the VOLTA Controller uses different formulas to calculate the flow rate.

The available FLUIDS are OIL and GAS.



## 19.2 CV Configuration

*USER PASSWORD >> CONFIGURATIONS >> FLOW CONFIG. >> CV*

```
FLOW CONFIG. :
FLUID :      OIL
->CV :      1,00
OIL REL.DENS : 0,73↓
GAS ESP.CAL. : 1,40
GAS GRAV. :  0,83
GAS COMP. :  1,00
F.R.P.D. :   1,00
COEFFIC. RESTORE
```

In this screen you can configure the CV of the choke / hole holder set installed, the CV is necessary for the VOLTA Controller to perform the flow calculation.

Navigating, select the CV option using the left arrow; by pressing the ENTER button you will enter edit mode, you will see the current value flashing; modify the value using the arrow buttons and press the ENTER button and

the new values will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

Note: The CV values for choke must be provided by each manufacturer.

### 19.3 Coefficients Configuration for Flow Calculation

FLOW CONFIG. :	
FLUID :	OIL
CV :	1,00
→OIL REL.DENS :	0,73
GAS ESP.CAL. :	1,40
GAS GRAV. :	0,83
GAS COMP. :	1,00↓
F.R.P.D. :	1,00
COEFFIC. RESTORE	

In this screen you can configure certain coefficient values, which are integrated into the flow calculation formula used by the VOLTA Controller which are: Relative Petroleum Density (OIL.REL.DENS.), Specific Calorie of Gas (GAS ESP. CAL.), Gas Gravity (GAS GRAV.), Gas Compressibility (GAS COMP.) and Flow Rate for Pressure Drop (FRPD).

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

### 19.4 Restore Coefficients for Flow Calculation

*USER password >> CONFIGURATIONS >> FLOW CONFIG. >> COEFFIC. RESTORE*



#### CAUTION

This operation discards all the modifications made to the coefficients seen from 19.1 to 19.3 and restores them to the original factory values.

FLOW CONFIG. :	
FLUID :	OIL
CV :	1,00
OIL REL.DENS :	0,73
GAS ESP.CAL. :	1,40
GAS GRAV. :	0,83↑
GAS COMP. :	1,00
F.R.P.D. :	1,00
→COEFFIC. RESTORE	

In this screen, the coefficients for the flow calculation can be restored to their original factory value.

COEFFIC. RESTORE :  
PRESS :  
ENTER TO CONFIRM  
ESC. TO CANCEL

Navigating, select the COEFFIC. RESTORE option using the left arrow; press the ENTER button and a confirmation screen will show up.

OPERATION COMPLETE  
PRESS ENTER TO  
RETURN TO MAIN  
SCREEN

Pressing the ENTER button restores the coefficients and the VOLTA Controller will display a confirmation screen; if you press the ESCAPE button, you exit the screen without restoring.

The variables that will be restored to the default values are those shown in the corresponding table and column. (See: 23 Table of Values by Default Variable and Events).

## 20. Data Stored in Memory

The VOLTA Controller has a great capacity to store data in its internal memory, being able to exceed 6 months of use. It can store the data detailed as follows:

- Configuration Data.
- Minute by minute, the value measured in each of its 5 (Five) analog inputs and the flow rate produced against the previous minute in the corresponding unit.
- Trigger events, closing, opening at the time they occur.
- Battery status on an hourly basis.
- Data and results of PST & TST, compiled in a separate file.

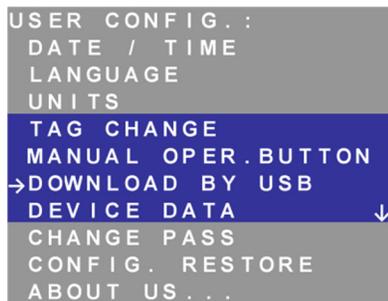
The data can be downloaded via the USB port of the VOLTA Controller. (See: 6.1 Control Panel), (See: 20.1 Data Download by USB Port) and (See: 20.4 PST & TST Data Download by USB Port).



Furthermore, the data can be transmitted by the SCADA system using the main RS485 port of the VOLTA Controller or a communications module and interface for other protocols, connected to the second communications port on the VOLTA Controller. (See: 3 Features)

### 20.1 Data Download by USB port

*USER PASSWORD >> CONFIGURATIONS >> USER CONFIG. >> DOWNLOAD BY USB*



In this screen you can download the data stored in the VOLTA Controller’s memory to a pen drive.

Navigating, select the DOWNLOAD BY USB option using the left arrow; by pressing the ENTER button you will move to the next screen.



Follow the instructions on the screen, after pressing the ENTER button, the status bar will indicate the progress of the download; when finished, a screen will show up indicating whether the download was successful or not.

### 20.2 Data File

The data file generated by the VOLTA Controller has a “txt” format and can be read with text editor programs such as Notepad, Word, Open Office, etc. It can also be imported by spreadsheet programs such as Excel, Open Office, etc. since the data is separated by semicolons.

The VOLTA Controller, when generating the data file, assigns it an intelligent name of 3 blocks separated by underscores, as follows: Serial number (Ex. 00020), date on which the file was obtained (Ex. 2019- 07-22 [YYYY-MM-DD]) and the time the file was obtained (Ex. 16:25:21).

The name would be as follows: 00020\_2019-07-22\_16.25.21.txt, and can be seen within the light-blue area of the image that follows in point 20.2.1 Configuration Data.

The file can reach 10 Mb sizes when it contains a lot of historical data.

The data file is divided into 3 blocks:

- Configuration Data.
- Historical Data and Production Registry.
- Historical events.



### 20.2.1 Configuration Data

Analyzing the data contained in the file, we can see the current VOLTA Controller’s configuration displayed in the header. The first two lines contain general data of the device.

Below, you can see configuration information related to the analog inputs, fluid measurement, partial stroke test, serial communication, wireless communication, valve V1 configuration and finally we see manufacturer information, firmware version and enabled functions.

```

DOWNLOAD DATE AND TIME: 12/03/2019 - 14:20:03
TAG: ----- SN: 00020 MANUF.DATE: 01/01/2019
MANUAL OPERATION KEY: YES

WP LOW: ----- HIGH: ----- REP.: AUT RANGE: 0/ 2321 PSI
LP LOW: 50 HIGH: ----- REP.: MAN RANGE: 0/ 2321 PSI
T3 LOW: --- HIGH: --- REP.: AUT RANGE: 0/ 200 *C
P4 LOW: ----- HIGH: ----- REP.: AUT RANGE: 0/ 2321 PSI
AP LOW: 800 HIGH: 1200 REP.: AUT RANGE: 0/ 3626 PSI

FLOW METER
FLUID: GAS
CV: 1.00 OIL REL.DENS: 0.73 GAS SPE.HEAT: 1.40
GAS GRAV.: 0.83 GAS COMP.: 1.00 P.D.R.F.: 1.00

PARTIAL STROKE TEST
ENABLE: YES STROKE: 1SWITCH TIMER: 015D 00H

SERIAL COMMUNICATION
ENABLE: NO PROTOCOL: MODBUS-RTU BAUD RATE: 9600 PARITY: EVEN
SLAVE: 1

WIRELESS COMMUNICATION
ENABLE: NO PROTOCOL: HART

V1 VALVE
SOLENOID: NA PUMP TIME OUT: 015 S SOLENOID TIME OUT: 030 S
POSITION IND.: NO
EX. COMMAND: +OPEN EX.COMM.REP.: MAN

FACTORY
MODEL: E02 FIRMWARE: V01.05 ADC REF.: 3.0000 VOLT
LOW CONSUMPTION: YES
INPUTS #1: mA #2: mA #3: NO #4: NO #5: mA
RST: YES SOLENOID PWM: 100% MANUFACTURER BRAND: MOTOMECANICA ARG

```

### 20.2.2 Historical Data and Production Record

The image shows the historical data and production records stored in the VOLTA Controller.

The date and time are shown in the first place and you can observe in the example that the jumps between each registration line are exactly 1 (one) minute.

Below, you can see the measured values in each of the five analog inputs on the indicated date (The fifth input is the actuator pressure); finally, you see the accumulated flow in its corresponding measurement unit, compared to the previous minute or record which means that it is only the production of 1 (one) minute.

The measurement units in which the values for each input are recorded are: PSI for pressures, \*C for temperatures, BARRELS for oil flow and MSCF for gas flow.

This part of the record is usually the most extensive since, as stated before, the data is recorded minute by minute; 1,440 lines are registered per day of operation, in the case of the example you can see that there are a total of 5,869 captures.

```

NUMBER OF CAPTURES: 05869

DATE;TIME;WP;LP;T3;P4;AP;FLOW
12/03/2019;12:26:36;0;270;0;0;0;0,00;MSCF
12/03/2019;12:27:35;0;269;0;0;24;0,00;MSCF
12/03/2019;12:28:35;0;272;0;0;0;0,00;MSCF
12/03/2019;12:29:35;0;271;0;0;0;0,00;MSCF
12/03/2019;12:30:35;0;268;0;0;0;0,00;MSCF
12/03/2019;12:31:35;0;272;0;0;0;0,00;MSCF
12/03/2019;12:32:35;0;271;0;0;0;0,00;MSCF
12/03/2019;12:33:34;0;238;0;0;1064;0,00;MSCF
12/03/2019;12:34:34;0;224;0;0;1004;0,00;MSCF
12/03/2019;12:35:34;0;293;0;0;0;0,00;MSCF
12/03/2019;12:36:34;0;292;0;0;0;0,00;MSCF
12/03/2019;12:37:33;0;292;0;0;0;0,00;MSCF
12/03/2019;12:38:33;0;291;0;0;0;0,00;MSCF
12/03/2019;12:39:33;0;291;0;0;0;0,00;MSCF
12/03/2019;12:40:33;0;290;0;0;0;0,00;MSCF
12/03/2019;12:41:33;0;237;0;0;1053;0,00;MSCF
12/03/2019;12:42:32;0;290;0;0;0;0,00;MSCF
12/03/2019;12:43:32;0;293;0;0;0;0,00;MSCF
12/03/2019;12:44:32;0;293;0;0;14;0,00;MSCF
12/03/2019;12:45:32;0;233;0;0;1051;0,00;MSCF
12/03/2019;12:46:32;0;257;0;0;0;0,00;MSCF
12/03/2019;12:47:32;0;251;0;0;14;0,00;MSCF
12/03/2019;12:48:33;0;0;0;0;1065;0,00;MSCF
12/03/2019;12:49:32;0;0;0;0;0;0,00;MSCF
12/03/2019;12:50:32;0;0;0;0;0;0,00;MSCF
12/03/2019;12:51:32;0;0;0;0;0;0,00;MSCF
12/03/2019;12:52:32;0;0;0;0;0;0,00;MSCF
12/03/2019;12:53:31;0;0;0;0;0;0,00;MSCF
12/03/2019;12:54:31;0;0;0;0;0;0,00;MSCF
12/03/2019;12:55:31;0;0;0;0;0;0,00;MSCF
12/03/2019;12:56:30;0;0;0;0;0;0,00;MSCF
12/03/2019;12:57:30;0;0;0;0;0;0,00;MSCF
12/03/2019;12:58:30;0;0;0;0;0;0,00;MSCF
12/03/2019;12:59:30;0;0;0;0;0;0,00;MSCF
12/03/2019;13:00:29;0;0;0;0;0;0,00;MSCF
12/03/2019;13:01:28;0;0;0;0;0;0,00;MSCF

```



### 20.2.3 Historical Events

The image shows the events stored in the VOLTA Controller.

The date and time are shown in the first place; then, and unlike the previous case of historical data and production records, irregular times are observed except in the case of BATTERY events that are every hour; this is because the events are recorded at the time they occur.

There is a wide variety of events that are registered in this part of the log, (See: 23 Table of Values by Variables Default and Events Table).

```

NUMBER OF EVENTS: 0063

DATE;TIME;EVENT ID
12/03/2019;12:26:00;DELETION OF EVENTS
12/03/2019;12:26:05;CFG: FACTORY;PARTIAL STROKE;NEW: YES;LAST: NO
12/03/2019;12:27:08;VALVE V1;OPEN;MANUAL
12/03/2019;12:27:31;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:29:22;ACCESS TO CONFIGURATION
12/03/2019;12:29:43;CFG: VALVES;VALVE V1;SOLENOID PULSE DURATION;NEW: 30 S;LAST: 90 S
12/03/2019;12:29:57;VALVE V1;OPEN;MANUAL
12/03/2019;12:30:18;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:31:51;ACCESS TO CONFIGURATION
12/03/2019;12:32:02;CFG: VALVES;VALVE V1;POSITION INDICATOR;NEW: ENABLED;LAST: DISABLED
12/03/2019;12:32:35;VALVE V1;OPEN;MANUAL
12/03/2019;12:32:50;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:33:26;VALVE V1;OPEN;MANUAL
12/03/2019;12:34:04;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:34:28;VALVE V1;OPEN;MANUAL
12/03/2019;12:34:37;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:39:14;LCD ON
12/03/2019;12:39:32;ACCESS TO CONFIGURATION
12/03/2019;12:39:41;CFG: VALVES;VALVE V1;POSITION INDICATOR;NEW: DISABLED;LAST: ENABLED
12/03/2019;12:39:53;CFG: SCADA;SERIAL COMMUNICATION;ENABLED;NEW: YES;LAST: NO
12/03/2019;12:40:04;ACCESS TO CONFIGURATION
12/03/2019;12:40:09;CFG: PST;ENABLED;NEW: YES;LAST: NO
12/03/2019;12:40:17;CFG: VALVES;VALVE V1;POSITION INDICATOR;NEW: ENABLED;LAST: DISABLED
12/03/2019;12:41:25;VALVE V1;OPEN;MANUAL
12/03/2019;12:41:33;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:43:30;ACCESS TO CONFIGURATION
12/03/2019;12:43:44;CFG: TRIGGER;SENSOR: PL;LOW;NEW: 50;LAST: DISABLED
12/03/2019;12:43:47;VALVE V1;OPEN;PARAMETERS OK
12/03/2019;12:44:27;VALVE V1;CLOSE;SCADA
12/03/2019;12:45:22;VALVE V1;OPEN;SCADA
12/03/2019;12:45:37;PST CALIBRATION
12/03/2019;12:45:49;VALVE V1;CLOSE;EXTERNAL COMMAND;
12/03/2019;12:46:40;LCD ON

```

### 20.3 PST & TST Data Download by USB Port

*USER PASSWORD >> CONFIGURATIONS >> ACTUATOR CONFIG. >> DOWNLOAD BY USB*



In this screen you can download to a pen drive the data stored in the VOLTA Controller's memory regarding time and speed measurements and results arisen from the PST or TST run by the VOLTA Controller.

Navigating, select the DOWNLOAD VIA USB option with the left arrow, pressing the ENTER button, you will move to the next screen.



Follow the instructions on the screen, then press the ENTER button; the status bar will indicate the progress of the download; when finished, a screen will show up indicating whether the download was successful or not.

Some older pen drive models may not work properly.



### 20.3.1 PST & TST Data File

The PST & TST data file generated by the VOLTA Controller has a "txt" format that can be read with text editor programs such as Notepad, Word, Open Office, etc. It can also be imported by spreadsheet programs such as Excel, Open Office, etc. since the data is separated by semicolons.

When generating the PST & TST data file, the VOLTA Controller assigns it an intelligent name of 3 blocks, separated by underscores and as follows: Serial number (e.g., 00020), date on which the file was obtained (Ex. July 22, 2019) and the time the file was obtained (Ex. 16:25:09). In the end \_PST is added, to differentiate it from the data file seen previously.

For the case of the example, the name would be as seen in the image on the right, and as follows: 00020\_2019-07-22\_16.25.09\_PST.txt

The file is divided into blocks by each PST or TST, each block has four sections:

- Indication of START showing date and time.
- PST or TST DEVELOPMENT measurements, taken every 0.1 second.
- END indication with a summary of the data obtained.
- Indication of the RESULT.

```

NUMBER OF PST RECORDS: 000032
RE-01;START PST;12/03/2019;12:45
RE-01;0;0;244;0;0;1032;1;0
RE-01;1;0;244;0;0;1032;1;0
RE-01;2;0;244;0;0;1032;1;0
RE-01;3;0;254;0;0;325;1;0
RE-01;4;0;258;0;0;22;1;0
RE-01;5;0;258;0;0;20;1;0
RE-01;6;0;258;0;0;19;1;0
RE-01;7;0;257;0;0;18;1;0
RE-01;8;0;224;0;0;104;0;0
RE-01;9;0;215;0;0;116;0;0
RE-01;10;0;214;0;0;22;1;0
RE-01;11;0;214;0;0;56;1;0
RE-01;12;0;213;0;0;40;1;0
RE-01;END PST;1032;19;8;92;2;3;13
RE-01;RESULT OF PST;1switch;OK
02;START PST;12/03/2019;12:48
02;0;0;0;0;0;996;1;0
02;1;0;0;0;0;996;1;0
02;2;0;0;0;0;996;1;0
02;3;0;0;0;0;315;1;0
02;4;0;0;0;0;22;1;0
02;5;0;0;0;0;21;1;0
02;6;0;0;0;0;18;1;0
02;7;0;0;0;0;18;1;0
02;8;0;0;0;0;71;0;0
02;9;0;0;0;0;74;0;0
02;10;0;0;0;0;74;1;0
02;11;0;0;0;0;90;1;0
02;12;0;0;0;0;103;1;0
02;END PST;996;20;8;102;2;3;13
02;RESULT OF PST;1switch;OK

```

Each PST or TST is grouped by numbers 01 through 99 at the beginning of the information chain; the reference or standard PST or TST, is also identified by the letters RE.

## 21. SCADA Configuration

[USER PASSWORD](#) >> [CONFIGURATIONS](#) >> [SCADA CONFIG.](#)

```

SCADA CONFIG.:
--- SERIE PORT ---
->ENABLE: NO
PROTOC.: MODBUS RTU
SPEED: 19200
PARITY: PAR
SLAVE N.: 1
--- WIRELESS ---
ENABLE: NO
PROTOC.: HART
CONFIG. RESTORE

```

In this screen you can configure the VOLTA Controller communications which are divided into Serial Communication called COM. SERIES and Wireless Communication called WIRELESS.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

The MODBUS map of the VOLTA Controller is shown below.



Holding Registers				
Address	Data	Data type	Access	Details
40001	Serial Number LSW	Unsigned 32 bits integer	Read only	
40002	Serial Number MSW			
40003	Firmware Version	Unsigned 16 bits integer	Read only	Value multiplied by 100.
40004	Operational Mode	Unsigned 16 bits integer	Read only	0 MAN, 1 ESD, 2 ESD-S
40005	Analog Input #1 (Well head pressure) - Type	Unsigned 16 bits integer	Read only	0 pressure, 1 temperature
40006	Analog Input #1 (Well head pressure) - MIN Scale	Unsigned 16 bits integer	Read only	Unit PSI
40007	Analog Input #1 (Well head pressure) - MAX Scale	Unsigned 16 bits integer	Read only	Unit PSI
40008	Analog Input #1 (Well head pressure) - Current Value	Unsigned 16 bits integer	Read only	Unit PSI
40009	Analog Input #2 (Line pressure) - Type	Unsigned 16 bits integer	Read only	0 pressure, 1 temperature
40010	Analog Input #2 (Line pressure) - MIN Scale	Unsigned 16 bits integer	Read only	Unit PSI
40011	Analog Input #2 (Line pressure) - MAX Scale	Unsigned 16 bits integer	Read only	Unit PSI
40012	Analog Input #2 (Line pressure) - Current Value	Unsigned 16 bits integer	Read only	Unit PSI
40013	Analog Input #3 - Type	Unsigned 16 bits integer	Read only	0 pressure, 1 temperature
40014	Analog Input #3 - MIN Scale	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40015	Analog Input #3 - MAX Scale	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40016	Analog Input #3 - Current Value	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40017	Analog Input #4 - Type	Unsigned 16 bits integer	Read only	0 pressure, 1 temperature
40018	Analog Input #4 - MIN Scale	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40019	Analog Input #4 - MAX Scale	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40020	Analog Input #4 - Current Value	Unsigned 16 bits integer	Read only	Unit PSI if pressure or °C if temperature.
40021	Analog Input #5 (Actuator pressure) - Type	Unsigned 16 bits integer	Read only	0 pressure, 1 temperature
40022	Analog Input #5 (Actuator pressure) - MIN Scale	Unsigned 16 bits integer	Read only	Unit PSI
40023	Analog Input #5 (Actuator pressure) - MAX Scale	Unsigned 16 bits integer	Read only	Unit PSI
40024	Analog Input #5 (Actuator pressure) - Current Value	Unsigned 16 bits integer	Read only	Unit PSI
40025	Valve Status	Unsigned 16 bits integer	Read only	0 close, 1 open, 2 closing, 3 opening, 4 Intermediate position, 5 Unknow position, 6 PST.
40026	Last Valve Operation	Unsigned 16 bits integer	Read only	0 close, 1 open, 2 no action
40027	Last Operation Cause	Unsigned 16 bits integer	Read only	See detail A
40028	Partial Stroke Test - Mode	Unsigned 16 bits integer	Read only	0 1switch, 1 total
40029	Partial Stroke Test -Repetition Interval	Unsigned 16 bits integer	Read only	Hours
40030	Partial Stroke Test -Last Result	Unsigned 16 bits integer	Read only	See detail B
40031	Partial Stroke Test -Last Operation Time LSW	Unsigned 32 bits integer	Read only	Seconds from 01/01/1900 00:00:00 (UNIX time)
40032	Partial Stroke Test -Last Operation Time MSW			
40033	Emergency Shutdown - AI #1 LOW Trigger Level	Signed 16 bits integer	Read - Write	-1 = disabled, unit PSI
40034	Emergency Shutdown - AI #1 HIGH Trigger Level	Signed 16 bits integer	Read - Write	-1 = disabled, unit PSI
40035	Emergency Shutdown - AI #2 LOW Trigger Level	Signed 16 bits integer	Read - Write	-1 = disabled, unit PSI
40036	Emergency Shutdown - AI #2 HIGH Trigger Level	Signed 16 bits integer	Read - Write	-1 = disabled, unit PSI
40037	Emergency Shutdown - AI #3 LOW Trigger Level	Signed 16 bits integer	Read only	-1 = disabled, units PSI or °C
40038	Emergency Shutdown - AI #3 HIGH Trigger Level	Signed 16 bits integer	Read only	-1 = disabled, units PSI or °C
40039	Emergency Shutdown - AI #4 LOW Trigger Level	Signed 16 bits integer	Read only	-1 = disabled, units PSI or °C
40040	Emergency Shutdown - AI #4 HIGH Trigger Level	Signed 16 bits integer	Read only	-1 = disabled, units PSI or °C
40041	Emergency Shutdown - AI #5 LOW Trigger Level	Signed 16 bits integer	Read - Write	Unit PSI
40042	Emergency Shutdown - AI #5 HIGH Trigger Level	Signed 16 bits integer	Read - Write	Unit PSI
40043	Equipment Temperature	Signed 16 bits integer	Read only	Unit degrees Celsius
40044	Control Battery	Unsigned 16 bits integer	Read only	Value multiplied by 10, unit volts
40045	Power Battery	Unsigned 16 bits integer	Read only	Value multiplied by 10, unit volts
40046	Flow Rate	Unsigned 16 bits integer	Read only	Value x100, units BPD or MSCFD
40047	Recharge Counter	Unsigned 16 bits integer	Read only	



Detail A - Operation Cause Enumeration	
Code	Description
0	Manual operation
1	Low battery BC
2	Low battery BP
3	PC trigger
4	PL trigger
5	Analog input # 3 trigger
6	Analog input # 4 trigger
7	PA disconnected
8	SCADA
9	Hydraulic system failure
10	Other
11	Without value
12	Digital operation

Detail B - PST Result Enumeration			
Bit	Data	Values	Access
0	PST OK	0 flag OFF, 1 flag ON	Read only
1	Worst t1	0 flag OFF, 1 flag ON	Read only
2	Worst t2	0 flag OFF, 1 flag ON	Read only
3	Worst t3	0 flag OFF, 1 flag ON	Read only
7	Without value	0 flag OFF, 1 flag ON	Read only

Coils Registers				
Address	Data	Data Type	Access	Details
00001	Fluid	Bit	Read only	0 gas, 1 oil
00002	Analog Input #1 (Well head pressure) - Enabled	Bit	Read only	0 disabled, 1 enabled
00003	Analog Input #1 (Well head pressure) - Sensor connected	Bit	Read only	0 disconnected, 1 connected
00004	Analog Input #2 (Line pressure) - Enabled	Bit	Read only	0 disabled, 1 enabled
00005	Analog Input #2 (Line pressure) - Sensor connected	Bit	Read only	0 disconnected, 1 connected
00006	Analog Input #3 - Enabled	Bit	Read only	0 disabled, 1 enabled
00007	Analog Input #3 - Sensor connected	Bit	Read only	0 disconnected, 1 connected
00008	Analog Input #4 - Enabled	Bit	Read only	0 disabled, 1 enabled
00009	Analog Input #4 - Sensor connected	Bit	Read only	0 disconnected, 1 connected
00010	Analog Input #5 (Actuator pressure) - Enabled	Bit	Read only	0 disabled, 1 enabled
00011	Analog Input #5 (Actuator pressure) - Sensor connected	Bit	Read only	0 disconnected, 1 connected
00012	Valve #1 - Position Switches Enable	Bit	Read only	0 disabled, 1 enabled
00013	Valve #1 - Open Position Switch	Bit	Read only	0 switch OFF, 1 switch ON
00014	Valve #1 - Close Position Switch	Bit	Read only	0 switch OFF, 1 switch ON
00015	Partial Stroke Test - Enabled	Bit	Read only	0 disabled, 1 enabled
00016	Emergency Shutdown - AI #1 Automatic Reposition	Bit	Read only	0 disabled, 1 enabled
00017	Emergency Shutdown - AI #2 Automatic Reposition	Bit	Read only	0 disabled, 1 enabled
00018	Emergency Shutdown - AI #3 Automatic Reposition	Bit	Read only	0 disabled, 1 enabled
00019	Emergency Shutdown - AI #4 Automatic Reposition	Bit	Read only	0 disabled, 1 enabled
00020	Emergency Shutdown - AI #5 Automatic Reposition	Bit	Read only	0 disabled, 1 enabled



00021	Alarms - There are alarms	Bit	Read only	0 no alarms, 1 there are alarms
00022	Alarms - Disconnected Sensor	Bit	Read only	0 flag OFF, 1 flag ON
00023	Alarms - Emergency Shutdown Activated	Bit	Read only	0 flag OFF, 1 flag ON
00024	Alarms - Low Battery	Bit	Read only	0 flag OFF, 1 flag ON
00025	Alarms - Hydraulic System Failure	Bit	Read only	0 flag OFF, 1 flag ON
00026	Alarms - Position Switches Failure	Bit	Read only	0 flag OFF, 1 flag ON
00027	Alarms - Unsuccessful PST	Bit	Read only	0 flag OFF, 1 flag ON
00028	Alarms - Other	Bit	Read only	0 flag OFF, 1 flag ON
00029	Commands - Received Open Command	Bit	Read only	0 flag OFF, 1 flag ON
00030	Commands - Received Close Command	Bit	Read only	0 flag OFF, 1 flag ON
00031	Commands - Received 'Run PST' Command	Bit	Read only	0 flag OFF, 1 flag ON
00032	Commands - Received 'Calibrate PST' Command	Bit	Read only	0 flag OFF, 1 flag ON
This row was intentionally left blank.				
00101	Commands - Open Command	Bit	Read / Write	1 command ON
00102	Commands - Close Command	Bit	Read / Write	1 command ON
00103	Commands - Run PST Command	Bit	Read / Write	1 command ON
00104	Commands - Calibrate PST Command	Bit	Read / Write	1 command ON
00105	Commands - Clear Alarms Command	Bit	Read / Write	1 command ON
00106	Maintenance Mode	Bit	Read / Write	0:OFF / 1:ON - W:0 -> Exit Maint. Mode

## 21.1 Serial Communication Configuration

*USER PASSWORD >> CONFIGURATIONS >> SCADA CONFIG.*

```

SCADA CONFIG.:
--- SERIE PORT ---
->ENABLE: NO
PROT.: MODBUS-RTU
SPEED: 19200
PARITY: PAR
SLAVE N.: 1
--- WIRELESS ---
ENABLE: NO
PROT.: HART
CONFIG. RESTORE
  
```

In this screen you can enable the Serial Port and configure parameters to allow correct communication of the VOLTA Controller’s Serial Port with SCADA which are Protocol Type (PROT.), Speed (SPEED), Parity (PARITY) and Slave Number (SLAVE N.).

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button, you will enter edit mode.

To enable or change parameters you will first see the current value flashing; modify the value using the arrow buttons and press the ENTER button and the new parameter value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

## 21.2 Restore SCADA Configuration

USER PASSWORD >> CONFIGURATIONS >> SCADA CONFIG. >> CONFIG. RESTORE



### CAUTION

This operation discards all modifications made to the parameters seen in 21.1 and 21.2 and restores them to the original factory settings.

```

SCADA CONFIG. :
--- SERIE PORT ---
ENABLE:          NO
PROTOC.: MODBUS - RTU
SPEED:          19200
PARITY:         PAR
SLAVE N.:       1
--- WIRELESS ---↑
ENABLE:          NO
PROTOC.: HART
->CONFIG. RESTORE
    
```

```

CONFIG. RESTORE :
PRESS :
ENTER TO CONFIRM
ESC. TO CANCEL
    
```

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
    
```

In this screen, the parameters for Serial and Wireless Communications such as Protocol (PROTOC.), Speed, Parity and Slave Number can be restored to their original factory value.

Navigating, select using the left arrow the CONFIG. RESTORE option, press the ENTER button and a confirmation screen will show up.

If you press the ENTER button, parameter values are restored, and the VOLTA Controller will display a confirmation screen; if you press the ESCAPE button you exit the screen without restoring.

The variables that will be restored to default values are those shown in the corresponding table and column. (See: 23 Table of Values by Default Variable and Events).

## 22. Advanced Configuration

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG.

```

ADVANCED CONFIG. :
INPUT 4 - 20mA #1
INPUT 4 - 20mA #
INPUT 4 - 20mA
INPUT 4 - 20
INPUT 4 -
VALVE
DIGI
CH
->
    
```

This is a transition and selection screen that allows access to other screens. This screen does not allow editing any data.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will move to the selected option screen.

### 22.1 Configuration of Inputs 4-20mA #1, #2 y #5

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #2

```

INPUT 4 - 20mA #2 :
TYPE: LINE PRESS.
->MIN SET : 0 PSI
MAX SET : 2321 PSI↓
ZERO / SPAN RESET
ZERO / SPAN CALIBRA.
    
```

In this screen you can configure the MIN SET and MAX SET, reset, and calibrate ZERO and SPAN of the pressure sensor connected to the selected input.

The values in **ORANGE** correspond to data loaded on other screens and the values in **RED** are the editable data on this screen.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode. If you press the ESCAPE button at any time during the process, the changes will not be saved.

In the case of inputs # 1, # 2 and # 5, it is not possible to change the sensor TYPE since they are predefined at factory such as, Wellhead Pressure called WELL PRESS., Line Pressure called LINE PRESS. and Actuator Pressure ACT. PRESS. respectively.

### 22.1.1 Configuration of Sensor Ranges #1, #2 and #5

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #2 >> MIN SET*

```
INPUT 4 - 20mA #2 :
TYPE: LINE PRESS.
→MIN SET : 0 PSI
MAX SET : 2321 PSI↓
ZERO/SPAN RESET
ZERO/SPAN CALIBRA.
```

To set the minimum value called MIN SET and the maximum called MAX SET, which allows you to read the sensor that will be connected to the input, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the MIN SET, you will first see the current value flashing; in this case 0 PSI, modify the value using the arrow buttons, if you keep the arrow pressed the value will change at a normal speed and after a certain time the speed will increase allowing you to reach the desired value more quickly. Once the desired value has been reached, press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

To change the MAX SET, you will first see the current value flashing; in this case 2,321 PSI; then proceed as explained to set MIN SET.



#### CAUTION

This configuration defines the value range of the connected sensors; a bad configuration can cause erroneous reading, flow calculations and ESD triggers.

The range of values that can be set is 0 to 20,000 PSI or 0 to 1,369 BAR for pressure sensors.

### 22.1.2 Sensor Calibration by ZERO / SPAN RESET Option

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #2 >> ZERO/SPAN RESET*

```
INPUT 4 - 20mA #2 :
TYPE: LINE PRESS.
MIN SET : 0 PSI↑
MAX SET : 2321 PSI
→ZERO/SPAN RESET
ZERO/SPAN CALIBRA.
```

To reset the ZERO and SPAN of the pressure sensor connected to the selected input, select the ZERO RESET / SPAN option using the left arrow; press the ENTER button and a confirmation screen will appear.

If you press the ESCAPE button, you exit the screen without restoring; by pressing the ENTER button, the parameter values are restored and the VOLTA Controller will display a confirmation screen.

```
OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
```

Using the ZERO / SPAN RESET option, the VOLTA Controller assumes that 4mA or 0 Volt equals the value set as MIN SET, and 20 mA or 5 Volt equals the value set as MAX SET.

### 22.1.3 Sensor Calibration by ZERO / SPAN CALIBRATE Option

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #2 >> ZERO/SPAN CALIBRATE



**CAUTION**

To perform this operation, a hydraulic pump must be connected to the sensor that allows it to reach the maximum pressure or MAX SET set. (See: 22.1.1 Configuration of Sensor Ranges # 1, # 2 and # 5).

The purpose of the calibration process is to combine the phase shift between the expected current value for the scale ends set in 22.1.2, which by design are 4 mA or 0 Volt for ZERO and 20 mA or 5 Volt for SPAN, and the current value measured.

```
INPUT 4 - 20mA #2 :
TYPE: LINE PRESS.
MIN SET : 0 PSI ↑
MAX SET : 2321 PSI
ZERO/SPAN RESET
→ZERO/SPAN CALIBRA.
```

To calibrate the ZERO and SPAN of the pressure sensor connected to the selected input, select the ZERO / SPAN CALIBRATE option using the left arrow.

```
CALIBRATION LP :
TAKE PRESSURE TO
0 PSI AND THEN
PRESS ENTER
```

press the ENTER button and the first screen will show up.

To perform the sensor calibration, follow the instructions on the screens, first for 0 PSI called ZERO, and then for the full scale in this case of example 2321 PSI called SPAN.

```
CALIBRATION LP :
TAKE PRESSURE TO
2321 PSI AND THEN
PRESS ENTER
```

```
OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
```

If you press the ENTER button on the second screen, the current and pressure value measured will be paired and a screen indicating whether the calibration was successful or not will show up. If you press the ESCAPE button at any time during the process, the changes will not be saved.

This calibration method allows the VOLTA Controller to have the best reading accuracy available.

### 22.2 Configuration of Input 4-20mA #3 and #4

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #4

```
INPUT 4 - 20mA #4 :
→TYPE: PRESSURE
MIN SET : 0 PSI
MAX SET : 2321 PSI ↓
ZERO/SPAN RESET
ZERO/SPAN CALIBRA.
```

In this screen you can configure the TYPE, MIN SET and MAX SET, reset or calibrate ZERO and SPAN of the sensor connected to the selected input.

The values in **ORANGE** correspond to data loaded on other screens and the values in **RED** are the editable data on this screen.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode. If you press the ESCAPE button at any time during the process, the changes will not be saved.

### 22.2.1 Sensor Type Configuration

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #4 >> TYPE

```
INPUT 4 - 20mA #4 :
->TYPE: PRESSURE
MIN SET : 0 PSI
MAX SET : 2321 PSI ↓
ZERO / SPAN RESET
ZERO / SPAN CALIBRA .
```

To configure the sensor TYPE that will be connected to this input, select the TYPE option by navigating with the arrow buttons; press the ENTER button and you will see the current value flashing; in this case PRESSURE; modify the value using the arrow buttons. Once the desired value is reached, press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The TYPES available are PRESSURE and TEMPERATURE.

### 22.2.2 Configuration of Sensor Ranges #3 and #4

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20mA #4 >> MIN SET

```
INPUT 4 - 20mA #4 :
TYPE: PRESSURE
->MIN SET : 0 PSI
MAX SET : 2321 PSI ↓
ZERO / SPAN RESET
ZERO / SPAN CALIBRA .
```

To set the minimum value called MIN SET and the maximum called MAX SET, which allows you to read the sensor that will be connected to the input, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode.

To change the MIN SET, you will first see the current value flashing, in this case 0 PSI; modify the value using the arrow buttons, if you keep the arrow pressed, the value will change at a normal speed and after a certain time the speed will increase allowing you to reach the desired value more quickly. Once the desired value has been reached, press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

To change the MAX SET, you will first see the current value flashing; in this case 2,321 PSI; then proceed as explained to configure MIN SET.



#### CAUTION

This configuration defines the value range of the connected sensors; a bad configuration can cause erroneous reading, flow calculations and ESD triggers.

The range of values that can be set is 0 to 20,000 PSI or 0 to 1,369 BAR for pressure sensors and 0 to 999 ° C or 32 to 1,031 ° F for temperature sensors.

### 22.2.3 Sensor Calibration by ZERO / SPAN RESET Option

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20 mA #4 >> ZERO/SPAN RESET

```

INPUT 4 - 20mA # 4 :
TYPE: PRESSURE
MIN SET : 0 PSI ↑
MAX SET : 2321 PSI
→ZERO/SPAN RESET
ZERO/SPAN CALIBRA .
    
```

To reset the ZERO and SPAN of the pressure sensor connected to the selected input, select the ZERO RESET / SPAN option using the left arrow; press the ENTER button and a confirmation screen will show up.

If you press the ESCAPE button, you exit the screen without restoring; pressing the ENTER button restores parameter values and the VOLTA Controller will display a confirmation screen.

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
    
```

This option will not be available for a set temperature sensor.

Using the ZERO / SPAN RESET option, the VOLTA Controller assumes that 4mA or 0 Volt equals the value set as MIN SET, and 20 mA or 5 Volt equals the value set as MAX SET.

### 22.2.4 Sensor Calibration by ZERO / SPAN RESET Option

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> INPUT 4-20 mA #4 >> ZERO/SPAN CALIBRA.*



**CAUTION**

To perform this operation, a hydraulic pump must be connected to the sensor that allows it to reach the maximum pressure or MAX SET (See: 22.2.2 Configuration of Sensor Ranges # 3 and # 4).

The purpose of the calibration process is to pair the phase shift between the expected current value for the scale ends set in 22.2.2, which by design are 4 mA or 0 Volt for ZERO and 20 mA or 5 Volt for SPAN, and the current value actually measured.

```

INPUT 4 - 20mA # 4 :
TYPE: PRESSURE
MIN SET : 0 PSI ↑
MAX SET : 2321 PSI
→ZERO/SPAN RESET
→ZERO/SPAN CALIBRA .
    
```

To calibrate the ZERO and SPAN of the pressure sensor connected to the selected input, select the ZERO / SPAN CALIBRATE option using the left arrow; press the ENTER button and the first screen will show up.

To perform the sensor calibration, follow the instructions on the screens, first for 0 PSI called ZERO, and then for the full scale in this case of example 2321 PSI, called SPAN. (Ver: 22.2.2 Configuration of Sensor Ranges #3 and #4).

```

CALIBRATION P 4 :
TAKE PRESSURE TO
0 PSI AND THEN
CALIBRATION P 4 :
TAKE PRESSURE TO
2321 PSI AND THEN
PRESS ENTER
    
```

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
    
```

Pressing the ENTER button on the second screen will produce the pairing of the current and pressure value measured; a screen will appear indicating whether the calibration was successful or not. If you press the ESCAPE button at any time during the process, the changes will not be saved.

This calibration method allows the VOLTA Controller to have the best reading accuracy available.

This option will not be available for a configured temperature sensor.



### 22.3 Valve V1 Configuration

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> VALVE V1



In this screen you can configure the type of SOLENOID, pulse duration of the hydraulic pump called PUMP TIME OUT, pulse duration to the solenoid called SOLENOID TIME OUT and configure whether a position indicator is connected or not.

Navigating, select the option you wish to modify using the left arrow; by pressing the ENTER button you will enter edit mode. If you press the ESCAPE button at any time during the process, the changes will not be saved.

#### 22.3.1 Configuration of Solenoid Valve Type

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> VALVE V1 >> SOLENOID



To configure the type of SOLENOID valves that the VOLTA Controller is connected to, select the option by navigating using the arrow buttons and press the ENTER button and you will see the current value flashing; in this case NA, modify the value using the arrow buttons. Once the desired value is reached, press the

ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved. The types of solenoids available are:

NA = Normal Open, the solenoid valve will remain in the OPEN position in the absence of electrical power and will switch to the CLOSED position when the VOLTA Controller operates it. This option allows the solenoid to be constantly powered by the VOLTA Controller and SOLENOID TIME OUT configuration is disregarded. (See: 22.3.3 Configuration of Pulse Duration for Solenoid).

NC = Normal Closed, the solenoid valve will remain in the CLOSED position in the absence of electrical power and will switch to the OPEN position when operated by the VOLTA Controller. With this option, the VOLTA Controller does NOT supply power to the solenoid and SOLENOID TIME OUT configuration is regarded. (See: 22.3.3 Configuration of Pulse Duration for Solenoid).



**CAUTION**

The solenoids have different connection terminals on the PCB according to their type. Make sure that in addition to being configured as indicated above, they are connected in the correct place.

#### 22.3.2 Configuration of Pulse Duration for the Hydraulic Pump

MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> VALVE V1 >> PUMP TIME OUT



To set the maximum duration of the energy pulse that the VOLTA Controller will deliver to the hydraulic pump named PUMP TIME OUT, select the option by navigating using the arrow buttons and press the ENTER button and you will see the current value flashing, in this case 15 seconds; change the value using the

arrow buttons, holding down the arrow the value will change at normal speed and after a certain time the speed will increase which will allow you to reach the desired value more quickly. Once you have reached the desired



value press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The range of time values that can be set is 1 to 999 seconds.



**CAUTION**

The use of extensive period pulses may affect battery life, especially in certain areas with short daily charging periods and / or exceptionally low temperatures.

### 22.3.3 Configuration of Pulse Duration for Solenoid

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCES CONFIG. >> VALVE V1 >> SOLENO. T.OUT*

```

VALVE V1 :
SOLENOID : NA
PUMP TIME OUT : 15S
->SOLENO. T.OUT : 120S
POSITION IND. : AP

```

To set the duration of the energy pulse that the VOLTA Controller will deliver to the solenoid named SOLENOID TIME OUT, select the option by navigating with the arrow buttons and press the ENTER button, you will see the current value flash, in this case 120 seconds; modify the value with the arrow buttons,

holding down the arrow the value will change at normal speed and after a certain time the speed will increase which will allow you to reach the desired value more quickly Once the desired value has been reached press the ENTER button; the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

The range of time values that can be set is 1 to 999 seconds.



**CAUTION**

The use of extensive period pulses may affect battery life, especially in certain areas with short daily charging periods and / or exceptionally low temperatures.

### 22.3.4 Configuration of the Position Indicator for Valves

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> VALVE V1 > POSITION IND.*

```

VALVE V1 :
SOLENOID : NA
PUMP TIME OUT : 15S
SOLENO. T.OUT : 120S
->POSITION IND. : AP

```

To configure whether a valve V1 position indicator is connected to the VOLTA Controller, select the option by navigating with the arrow buttons, press the ENTER button and you will see the current value flashing, in this case YES; modify the value using the arrow buttons. Once the desired value is reached,

press the ENTER button and the new value will be saved. If you press the ESCAPE button at any time during the process, the changes will not be saved.

## 22.4 Digital Mode

*MASTER PASSWORD >> ADVANCED CONFIGURATION >> DIGITAL MODE*

```

ADVANCED CONFIG . :
  VALVE V1          ↑
→ DIGITAL MODE
  CHANGE PASS      ↓
  
```

Digital operation mode allows controller to receive valve opening or closing command by two digital inputs.

If the valve was closed by failure (such as being out of range in some pressure), then the program will ignore the open valve command.

To enable or disable Digital Mode:

```

DIGITAL MODE :
→ STATE :           OFF
  
```

## 22.5 Factory Reset

*MASTER PASSWORD >> CONFIGURATIONS >> ADVANCED CONFIG. >> FACTORY RESET*



### CAUTION

This operation discards all modifications previously made by the user and returns ALL the variables to the original factory settings.

In this screen you can restore all variables to their original factory value, select the option by navigating with the arrow buttons and pressing the ENTER button, a confirmation screen will show up.

```

FACTORY RESET :
PRESS :
  ENTER TO CONFIRM
  ESC. TO CANCEL
  
```

Pressing the ENTER button restores the values and the VOLTA Controller will display the confirmation screen. If you press the ESCAPE button, you exit the screen without restoring.

```

OPERATION COMPLETE
PRESS ENTER TO
RETURN TO MAIN
SCREEN
  
```

The variables that will be restored to the default values are those shown in the corresponding table and column. (See: 23 Table of Values by Default Variable and Events).



23. Table of Values by Default Variables and Even

<b>Serial Number</b>		00000 - 99999	0020				
<b>Manufacturing Date</b>		Date	09/23/2019				
<b>Low Consumption</b>		YES / NO	YES				X
<b>ADC Reference</b>		2.7000 / 3.3000	3.0000 V				
<b>Válve #1</b>	<b>Solenoid Type</b>	NO/NC	NO				X
	<b>Pump Time Out</b>	1 / 999	15 sec.				X
	<b>Solenoid Time Out</b>	1 / 999	90 sec.				X
	<b>Posición Indicator</b>	YES / NO / AP	NO				X
<b>Input #1</b>	<b>Enabled</b>	NO / mA / V	mA				
	<b>Type</b>	WELL PRES.	WELL PRES.				X
	<b>Name</b>	WVP	WVP				X
	<b>Range</b>	0 - 20000	0-2321 PSI				X
	<b>Low Trigger</b>	0 - 20000	----- PSI		X		X
	<b>High Trigger</b>	0 - 20000	----- PSI		X		X
	<b>Reposition</b>	AUT / MAN	AUT		X		X
	<b>Enabled</b>	NO / mA / V	mA				
<b>Input #2</b>	<b>Type</b>	LINE PRES.	LINE PRES.				X
	<b>Name</b>	LP	LP				X
	<b>Range</b>	0 - 20000	0-2321 PSI				X
	<b>Low Trigger</b>	0 - 20000	----- PSI		X		X
	<b>High Trigger</b>	0 - 20000	----- PSI		X		X
	<b>Reposition</b>	AUT / MAN	AUT		X		X
<b>Input #3</b>	<b>Enabled</b>	NO / mA / V	NO				
	<b>Type</b>	PRESSURE / TEMPERATURE	TEMPERATURE				X
	<b>Name</b>	P3 / T3	T3				X
	<b>Range</b>	0 - 999	0-200 °C				X
	<b>Low Trigger</b>	0 - 999	--- °C		X		X
	<b>High Trigger</b>	0 - 999	--- °C		X		X
<b>Input #4</b>	<b>Reposition</b>	AUT / MAN	AUT		X		X
	<b>Enabled</b>	NO / mA / V	NO				
	<b>Type</b>	PRESSURE / TEMPERATURE	PRESSURE				X
	<b>Name</b>	P4 / T4	P4				X
	<b>Range</b>	0 - 20000	0-2321 PSI				X
	<b>Low Trigger</b>	0 - 20000	----- PSI		X		X
<b>Input #5</b>	<b>High Trigger</b>	0 - 20000	----- PSI		X		X
	<b>Reposition</b>	AUT / MAN	AUT		X		X
	<b>Enabled</b>	mA / V	mA				
	<b>Type</b>	ACTUATOR PRE.	ACTUATOR PRE.				
	<b>Name</b>	AP	AP				
	<b>Range</b>	0 - 9999	0-3570 PSI				X
<b>Partial Stroke</b>	<b>Low Trigger</b>	0 - 9999	800 PSI		X		X
	<b>High Trigger</b>	0 - 9999	1200 PSI		X		X
	<b>Enabled</b>	YES / NO	NO				
	<b>Travel</b>	1 SWITCH / 2 SWITCH / TOTAL	1 SWITCH	X			X
	<b>Time Between Test</b>	000D00H - 999D99H	15D00H	X			X
	<b>Fluid</b>	GAS / OIL	GAS		X		X
<b>Flow</b>	<b>CV</b>	0.01 / 250.0	1.00		X		X
	<b>OIL REL. DENS.</b>	0.01 / 1.00	0.73		X		X
	<b>GAS ESP. CAL.</b>	0.01 / 2.00	1.40		X		X
	<b>GAS GRAV.</b>	0.01 / 1.00	0.83		X		X
	<b>GAS COMP.</b>	0.01 / 1.00	1.00		X		X
	<b>F.R.P.D.</b>	0.01 / 1.00	1.00		X		X
	<b>Language</b>	ESP / ENG / POR	ENG			X	X
<b>User</b>	<b>Pressure Unit</b>	PSI / BAR	PSI		X		X
	<b>Temperature Unit</b>	*C / *F	*F		X		X
	<b>TAG</b>	Alphanumeric	--		X		X
	<b>Manual Operation Button</b>	YES / NO	YES		X		X
	<b>User Pass</b>	0000 - 9999	1234		X		X
<b>Master Pass</b>		0000 - 9999	3030				X
<b>Serial Communication</b>	<b>Enabled</b>	YES / NO	NO			X	X
	<b>Protocol</b>	MODBUS-RTU / <b>FIELDBUS</b>	MODBUS-RTU			X	X
	<b>Speed</b>	9600 / 19200	9600			X	X
	<b>Parity</b>	EVEN / ODD / NO	EVEN			X	X
	<b>Slave Number</b>	1 - 247	1			X	X
<b>Wireless</b>	<b>Enabled</b>	YES / NO	NO			X	X
	<b>Protocol</b>	HARD / ISA	HART			X	X



LCD ON
CONFIGURATION ACCESS
CFG: MANUAL OP. BUTTON; NEW: <b>DISABLED</b> ; PREVIOUS: <b>ENABLED</b>
USER RESET CONFIGURATION
FACTORY RESET CONFIGURATION
SENSOR; <b>P4</b> ; DISCONNECTED
CFG: TRIGGER; SENSOR: <b>WVP</b> ; LOW LEVEL; NEW: <b>90</b> ; PREVIOUS: <b>DISABLED</b>
CFG: TRIGGER; SENSOR: <b>LP</b> ; HIGH LEVEL; NEW: <b>1200</b> ; PREVIOUS: <b>850</b>
CFG: TRIGGER; SENSOR: <b>T3</b> ; REPOSITION; NEW: <b>MANUAL</b> ; PREVIOUS: <b>AUTOMATIC</b>
CFG: INPUTS; <b>P4</b> ; TYPE; NEW: <b>PRESSURE</b> ; PREVIOUS: <b>TEMPERATURE</b>
CFG: INPUTS; <b>P4</b> ; MINIMUM RANGE; NEW: <b>0</b> ; PREVIOUS: <b>20</b>
CFG: INPUTS; <b>P4</b> ; MAXIMUM RANGE; NEW: <b>3621</b> ; PREVIOUS: <b>2321</b>
CFG: INPUTS; <b>P4</b> ; ZERO; NEW: <b>25</b> ; PREVIOUS: <b>0</b>
CFG: INPUTS; <b>P4</b> ; SPAN; NEW: <b>3621</b> ; PREVIOUS: <b>20000</b>
<b>V1</b> VALVE; CLOSE; <b>T3</b> TRIGGER
<b>V1</b> VALVE; OPEN; PARAMETERS OK
<b>V1</b> VALVE; CLOSE; MANUAL/HOLD
<b>V1</b> VALVE; OPEN; MANUAL/HOLD
<b>V1</b> VALVE; CLOSE; LOW BATTERY
<b>V1</b> VALVE; CLOSE; HYDRAULIC SYSTEM FAILURE (OVER 30 OIL PRESSURE CYCLES PER DAY )
CFG: VALVES; VALVE: <b>V1</b> ; POSITION INDICATOR; NEW: <b>PA</b> ; PREVIOUS: <b>YES</b>
CFG: VALVES; VALVE: <b>V1</b> ; WORKS WITH SENSOR: <b>WVP</b> ; NEW: <b>NO</b> ; PREVIOUS: <b>YES</b>
CFG: VALVES; VALVE: <b>V1</b> ; SOLENOID; NEW: <b>NO</b> ; PREVIOUS: <b>NC</b>
CFG: VALVES; VALVE: <b>V1</b> ; OPENING TIMEOUT; NEW: <b>07 S</b> ; PREVIOUS: <b>05 S</b>
CFG: VALVES; VALVE: <b>V1</b> ; CLOSING TIMEOUT; NEW: <b>17 S</b> ; PREVIOUS: <b>12 S</b>
CFG: FLOW METER; FLUID; NEW: <b>GAS</b> ; PREVIOUS: <b>OIL</b>
CFG: FLOW METER; CHOKE VALUE, CV; NEW: 2,15; PREVIOUS: 1,00
CFG: FLOW METER; OIL RELATIVE DENSITY; NEW: 0,70; PREVIOUS: 0,73
CFG: FLOW METER; GAS SPECIFIC HEAT; NEW: 1,45; PREVIOUS: 1,40
CFG: FLOW METER; GAS GRAVITY; NEW: 0,80; PREVIOUS: 0,83
CFG: FLOW METER; GAS COMPRESSIBILITY; NEW: 1,15; PREVIOUS: 1,00
CFG: FLOW METER; DPRF VALUE; NEW: 0,90; PREVIOUS: 1,00
FLOW METER COEFFICIENTS RESET
BATTERY STATUS (CB): <b>12,6</b> ; (PB): <b>13,1</b>
LOW BATTERY (CB), SOLENOIDS DISABLED (11,4V)
NORMAL BATTERY (CB), SOLENOIDS ENABLED (12,2V)
CRITICAL BATTERY (CB), DATA RECORDING NOT AVAILABLE (10,8V)
NORMAL BATTERY (CB), DATA RECORDING AVAILABLE (11,2V)
LOW BATTERY (PB), PUMP DISABLED (11,4V)
NORMAL BATTERY (PB), PUMP ENABLED (12,2V)
CFG: TRIGGER; SENSOR: <b>PA</b> ; LOW LEVEL; NEW: <b>800</b> ; PREVIOUS: <b>DISABLED</b>
CFG: TRIGGER; SENSOR: <b>PA</b> ; HIGH LEVEL; NEW: <b>1200</b> ; PREVIOUS: <b>850</b>
POSSIBLE HYDRAULIC SYSTEM FAILURE, OVER 20 OIL PRESSURE CYCLES PER DAY
CFG: PST; ENABLED; NEW: <b>YES</b> ; PREVIOUS: <b>NO</b>
CFG: PST; STROKE; NEW: <b>1 SWITCH</b> ; PREVIOUS: <b>2 SWITCH</b>
CFG: PST; TEST INTERVAL; NEW: <b>015 D 00 H</b> ; PREVIOUS: <b>030 D 12 H</b>
PST RESULT: <b>OK</b>
PST CALIBRATION
ACTUATOR CONFIGURATION RESET
CFG: SCADA; SERIAL COMUNICATION; ENABLED; NEW: <b>YES</b> ; PREVIOUS: <b>NO</b>
CFG: SCADA; SERIAL COMUNICATION; PROTOCOL; NEW: <b>MODBUS-RTU</b> ; PREVIOUS: <b>FIELDBUS</b>
CFG: SCADA; SERIAL COMUNICATION; BAUD RATE; NEW: <b>19200</b> ; PREVIOUS: <b>9600</b>
CFG: SCADA; SERIAL COMUNICATION; PARITY; NEW: <b>EVEN</b> ; PREVIOUS: <b>NO</b>
CFG: SCADA; SERIAL COMUNICATION; SLAVE N.; NEW: <b>1</b> ; PREVIOUS: <b>247</b>
CFG: SCADA; WIRELESS COMUNICATION; ENABLED; NEW: <b>YES</b> ; PREVIOUS: <b>NO</b>
CFG: SCADA; WIRELESS COMUNICATION; PROTOCOL; NEW: <b>HART</b> ; PREVIOUS: <b>ISA</b>
SCADA CONFIGURATION RESET
EVENTS DATA DELETED
CAPTURES DATA DELETED
PST DATA DELETED
CFG: FACTORY; ADC REFERENCE VOLTAGE; NEW: <b>3.0500 V</b> ; PREVIOUS: <b>3.0025 V</b>
CFG: FACTORY; SERIAL NUMBER; NEW: <b>00027</b> ; PREVIOUS: <b>00000</b>
CFG: FACTORY; MANUFACTURING DATE; NEW: <b>12/07/2017</b> ; PREVIOUS: <b>01/01/2000</b>
CFG: FACTORY; LOW POWER; NEW: <b>YES</b> ; PREVIOUS: <b>NO</b>
CFG: FACTORY; INPUTS; #1: <b>4-20mA</b> ; #2: <b>1-5V</b> ; #3: <b>NO</b> ; #4: <b>NO</b> ; #5: <b>4-20mA</b>
CFG: FACTORY; PARTIAL STROKE; NEW: <b>YES</b> ; PREVIOUS: <b>NO</b>

## SAFETY INSTRUCTIONS



### CAUTION

Indicates a situation in which **moderate** personal injury and / or operation failure may occur.



### WARNING

Indicates a situation which, if not avoided, may result in **severe** personal injury and / or failure in the operation.



### DANGER

Indicates a situation which, if not avoided, will result in **serious** injury or **death**.

### RECOMMENDATION

Indicates a recommended practice which is **not related to personal safety**.