



—MODEL— **34 Series**

Electronic Actuator for 34 Series Pilot Controls

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Thank you for purchasing a 34 Series Electronic Actuated Pilot Control. With proper maintenance, the actuator will perform indefinitely and provide very accurate and reliable valve control. It is built with the latest technology utilizing the highest quality components.

34 Series Controls

The 34 Series Actuated Pilot Controls for 300 Series Valves consist of a hydraulic pilot subassembly and 130VC-3 Actuator. The Cla-Val Model CDHS-34, CRA-34, CRD-34, CMC-34, and CRL-34 pilot controls are factory set to full adjustment range of the pilot subassembly. The 34 Series Actuator accepts a 4 - 20 mA remote command set point or dry contact closure and positions spring-loaded hydraulic pilot subassembly as it maintains set point of pressure or flow rate. The pilot subassembly is automatically linear between the limit settings.

34 Series Control Operation

A.) The 34 Series actuator allows 34 Series Controls to be used in valve remote control applications where a simple change of pilot set-point is needed. SCADA instrumentation provides set-point control and verification communication based on this scale. The actuator can also be controlled by simple contact closure.

B.) Other suitable valve remote control applications are where 4 - 20 mA command input signal is calibrated to specific high and low range values. SCADA instrumentation provides set-point control and verification communication based on system dynamic conditions and valve's re-ranged scale. Using a laptop computer, the 34 Series actuator is calibrated in the field to specific minimum and maximum pressure or flow control settings that are in direct proportion to 4 - 20 mA command signal. Once values are established, the valve will be linear between limits and set-point will not exceed limits throughout the 4 - 20 mA signal range. For example, when actuator is calibrated to 4 mA = 50 psi to 20 mA = 100 psi, a 12 mA command signal will result in a 75 psi set point.

34 Series Actuator Hardware Set-up

BEFORE running actuator or software program, complete the following hookup steps:

Use good field wiring practices for low voltage DC analog instrumentation wiring (use 20-gauge twisted pair shielded wire minimum). Avoid potential ground loops. Avoid over tightening wiring connector fasteners.

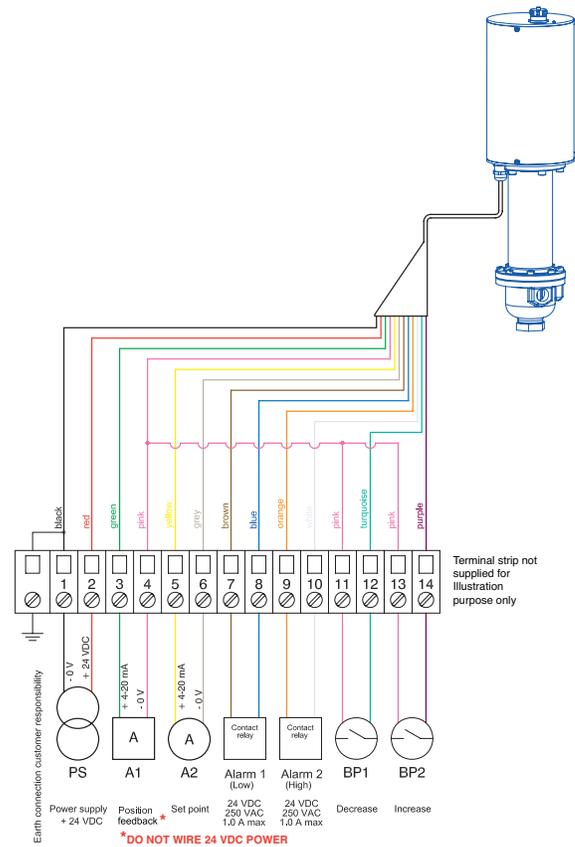
The enclosure is rated IP-68 (similar to NEMA 6P) submersible for short periods of time. It is not intended for continuous underwater use. Consult Cla-Val factory technical support if you have questions. The ten-wire ten meter cable is permanently attached to 34 Series actuator and should be terminated in suitable junction box or directly into an above grade RTU or similar device. Care should be used when attaching to wires to avoid damage. Installation of suitable protection from lightning is highly recommended.

There are no user serviceable parts inside the actuator and tampering or opening it will void the warranty. The ten-wire actuator cable is permanently attached. Internal damage not covered by warranty will occur if cable is removed.

FIELD WIRING STEPS:

Terminate wires only applicable to your application. For example, minimal wiring requirements for power and remote set point are:

- 1.) Attach 12 to 24 VDC power to 34 Series Actuator cable. Black wire is for (-) negative; Red wire is for (+) positive. Provide minimum 500 mA supply.
- 2.) Attach 4 to 20 mA analog Remote Command Input (from SCADA system or loop calibrator) to 34 Series Actuator cable. Yellow is positive and Grey is negative.



Download Wiring Diagram from website (www.cla-val.com)

3.) After wiring is complete and actuator is powered, it can be used with 4 - 20 mA remote command input signal scaled to factory default pilot control adjustment range (Operation A, above).

Troubleshooting Actuator Set-up

1.) The actuator LED will remain red for approximately 30 seconds after power on, and then will switch to green indicating actuator is OK and that internal start-up test is complete.

2.) The actuator LED blinks red if there is a problem. After resolving the problem, reset the actuator by turning power off for ten seconds then on again.

3.) The actuator blinks red and green if still in the calibration mode. It will be necessary to finish calibration.

34 Series Software

For Operation A (above) applications, no changes to the 34 Series control preset values are needed. For Operation B (above) applications, the 34 Series Software kit is used to ONLY change factory-set values of: 1) range limits (high and low), 2) rotational speed of actuator, and 3) loss of signal mode. It is used only for set-up of 34 Series pilot controls during initial valve start-up or during valve repair.

Cla-Val 34 Series Software is required to communicate between your Windows laptop computer and the 34 Series Actuator. Required is the free software program, a special multi-USB connector cable, and these instructions. The software is obtained by downloading from our website. Only one cable is needed to work with all 34 Series Actuators. Replacement cables (p/n 20519203A) can be ordered at extra cost. Do not use this software for remote control of 34 Series Actuator.

Software Download Instructions

Supported Operating Systems are Windows XP and XP Service Pack 2

- 1) Go to Cla-Val website (www.cla-val.com) and navigate to 34 Series actuator software download page. Click the Download 130VC-3 Range Software button to start the download.
- 2) Do one of the following:
 - _ To start the installation immediately, click RUN to run this program from its current location.
 - _ To copy the download to your computer for installation at a later time, click SAVE to save this program.
- 3) This program will automatically be installed in new e-Drive folder in C: Program Files/Cla-Val folder on your computer. A new Cla-Val folder is created in Program Files folder and an "e-Drive" icon link is created on Desktop to start program.

34 Series Actuator and Software Set-up

Change 34 Series Actuator configuration from factory default settings, by using free download software from website (www.cla-val.com). To set up a communication link with 34 Series Actuator, first install software and cable driver and then special USB communications cable in laptop computer. After installing driver and communication cable, the actuator must be powered for link to work. Follow hardware set-up and wiring diagram instructions. Your computer must be on before powering the actuator.

Hardware set-up steps must be completed before program will communicate and change 34 Series factory default settings. Until wiring and power connections are made to the actuator, the software program can be opened, but new parameters can not be created or stored or sent to actuator. Changes to parameters must be done "live" and while control valve is operating.

Cla-Val multi-USB Driver Setup

When 34 Series communications cable is installed in your laptop computer USB port for the first time, Windows will search your computer for the cable multi-USB driver. If Windows Plug-and-Play does not automatically find the driver and connect to actuator, then the cable driver must be set-up manually. Please refer to document "N-USB Cable Driver Install" instructions to manually activate the cable driver.

Download multi-USB software from the Cla-Val web site:
www.cla-val.com

Opening Software

When the "e-Drive" desktop icon is clicked, the Actuator List will be displayed, which can contain multiple listing of the actuators.

If the actuator is not connected to the laptop, the window will be empty but can be used to view the software to become familiarized with the different windows. Click the "cancel" button to launch the software

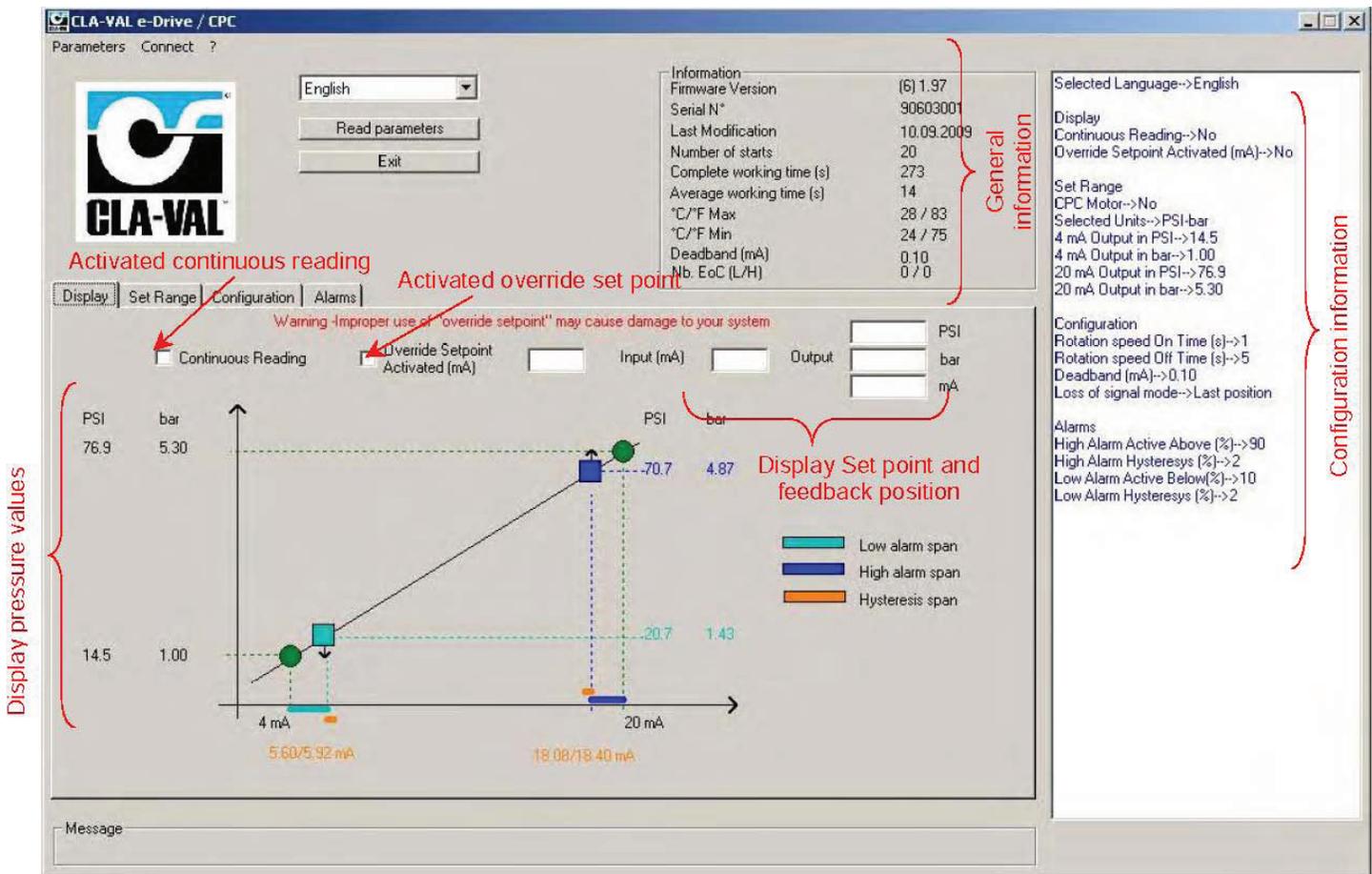
If connected to one or more actuators, click on "View All" and select the actuator you would like to communicate with from the list then click once on left mouse button.

Product name, Firmware version and serial number are displayed.

Starting Actuator Software

First, be sure hardware set-up and wiring to actuator is completed. Connect laptop computer to actuator using special multi-USB cable. Be sure computer is on and actuator is powered. Check that Actuator LED is steady green. The first window to appear will be display.

Display



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- 1 Start the e-Drive / CPC CLA-VAL software.
- 2 Select the e-Drive in the e-Line list.
- 3 Select language and click "Read parameters".
- 4 The right side will display specific configuration information. Also general information including the date of latest calibration, the average & total working time since the first power up, the number of starts, the serial number, the firmware version and the maximum and minimum recorded temperature is displayed.
- 5 Click on continuous reading to see the position of e-Drive, set point (mA) and, if used feedback position (mA and units).
- 6 To manually change the setting, write the setting and click on "Override Set point".

CAUTION: Improper use of "Override Set point" may cause damage to your system

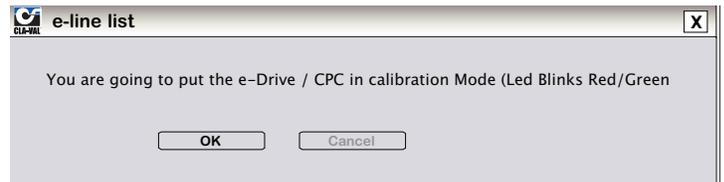
Calibration - Static and Dynamic

Before beginning the calibration process, determine if it is actually necessary! The actuator, if new, has been factory calibrated to the spring range shown on the pilot and may not require further calibration (30-300 spring range is calibrated from 40 to 140 psi).

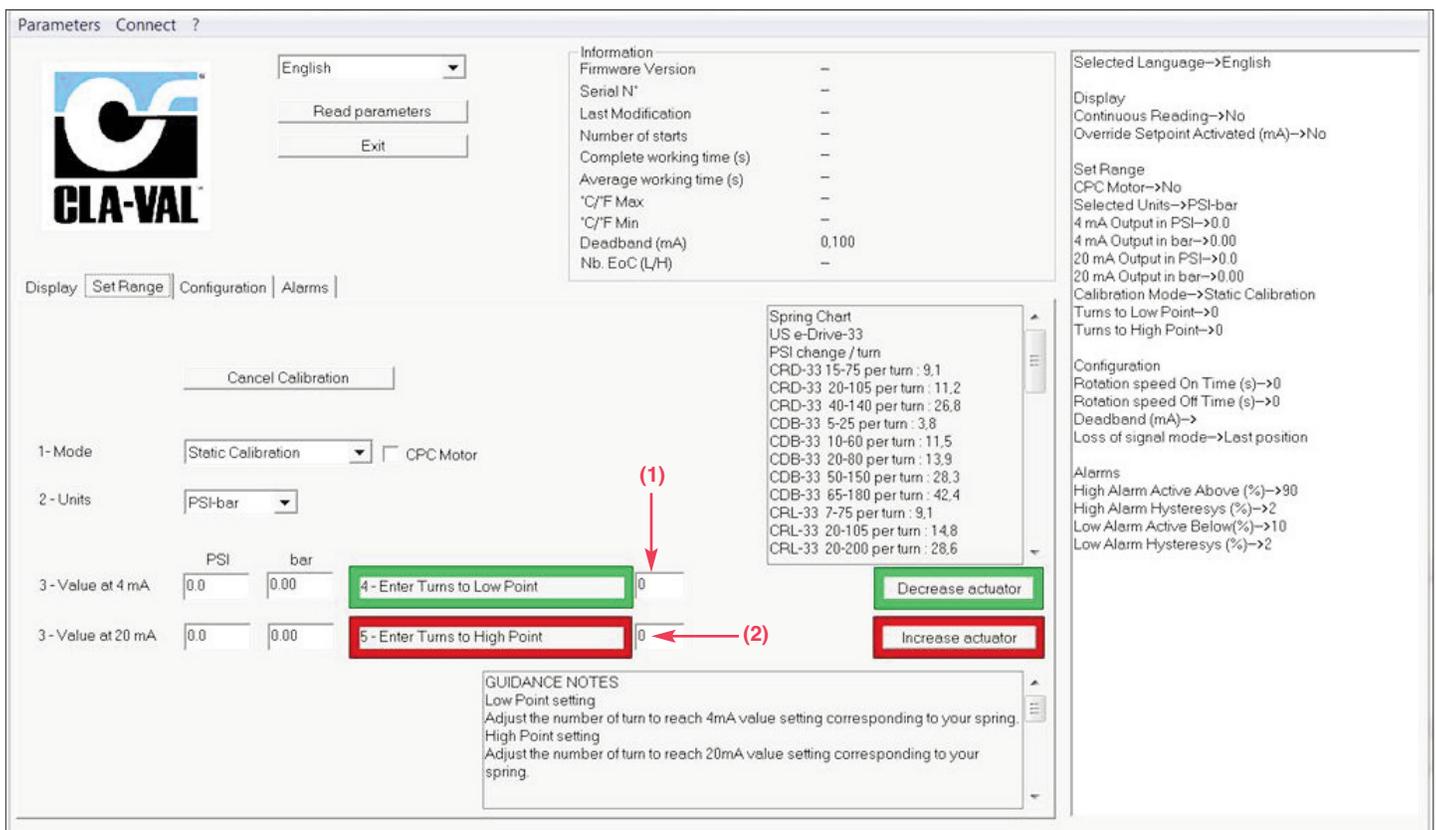
Static calibration

Static calibration is a fast and convenient method of calibrating the actuator by calculating the 4 and 20 mA values rather than raise or lower the actual system pressure. Dynamic Calibration requires that the system pressure is actually raised and lowered to the system values desired.

The "Set Range" window will launch either Static or Dynamic calibration. When the "Set Range" is activated, the following message will be displayed. To continue with calibration, click "OK", if not click "Cancel".



- 1 Select "Static Calibration" Mode. The "CPC Motor" check box should be unchecked (Disabled).
- 2 Use increase and decrease buttons to put valve in control of system. This will establish the reference set point.
- 3 Determine the pilot spring range. (Check nameplate label on pilot). Get the pressure change per turn per pilot revolution from the spring chart. Calculate the number of turns between the reference set point and desired low and high pressures.
- 4 These numbers are the "Value at 4 mA" and the Value at 20 mA". Numbers must be positive and can have up to 2 decimal places.
- 5 Enter the low value in set-point window (1).
- 6 Enter the high value in set-point window (2).
- 7 Click "Write Set Range" tab to complete actuator to complete calibration.



Example:

Valve is in control operating at 45 psi (3 bar).

The desired pressure at 4 mA is 30 psi (2 bar).

The desired pressure at 20 mA is 70 psi (4.8 bar).

From the spring chart, using a 15-75 spring, the pressure per turn is 10.2 psi (0.7 bar). The number of turns to Low set point is equal to 45 psi (3 bar) minus 30 psi (2 bar) divided by 10.2 psi (0.7 bar) = 1.47 turns. The number of turns to High set point is equal to 70 psi (4.82 bar) minus 45 psi (3 bar) divided by 10.2 psi (0.6 bar) = 2.45 turns.

Dynamic Calibration

When using this method, the system pressures must be changed from the actual minimum to maximum set-point values. If this is not possible, use "Static Calibration" mode.

The screenshot shows the 'Parameters Connect' window for the GLA-VAL system. The 'Set Range' tab is active, showing 'Dynamic Calibration' mode selected. The 'CPC Motor' checkbox is unchecked. The 'Units' are set to 'PSI-bar'. The 'Value at 4 mA' and 'Value at 20 mA' fields are both set to 0.0. The 'Adjust valve to 4 mA value' and 'Adjust valve to 20 mA value' buttons are visible. The 'Decrease actuator' button is highlighted in green, and the 'Increase actuator' button is highlighted in red. The 'Spring Chart' window is open, showing a table of valve characteristics. The 'GUIDANCE NOTES' section provides instructions for adjusting the valve settings.

Valve	PSI change / turn
CRD-33 15-75 per turn	9.1
CRD-33 20-105 per turn	11.2
CRD-33 40-140 per turn	26.8
CDB-33 5-25 per turn	3.8
CDB-33 10-60 per turn	11.5
CDB-33 20-80 per turn	13.9
CDB-33 50-180 per turn	28.3
CDB-33 65-180 per turn	42.4
CPL-33 7-75 per turn	9.1
CPL-33 20-105 per turn	14.8
CPL-33 20-200 per turn	28.6

GUIDANCE NOTES
Low Point setting : Adjust the valve to 4mA value setting using Decrease/Increase Actuator buttons, then select 'Low point setting'
High Point setting : Adjust the valve to 20mA value setting using Decrease/Increase Actuator then select 'High point setting'

- 1 Press the Set Range tab and select the Dynamic Calibration mode. Uncheck the "CPC Motor".
- 2 Select Units.
- 3 Enter the pressure/flow value at 4 mA and at 20 mA.
- 4 "Low point setting" - Look at the pressure/flow gauge/display and use the "Decrease actuator" button until the low pressure/flow setting is attained.
- 5 Click on "Low point setting" button to store the value.
- 6 "High point setting". Look at the pressure/flow on the gauge/display and use the "Increase actuator" button until the high pressure/flow setting is attained.
- 7 Click on the "High point setting" tab to store value.
- 8 When all values have been entered, click on "Write Set Range". Dynamic calibration is done.

Configuration

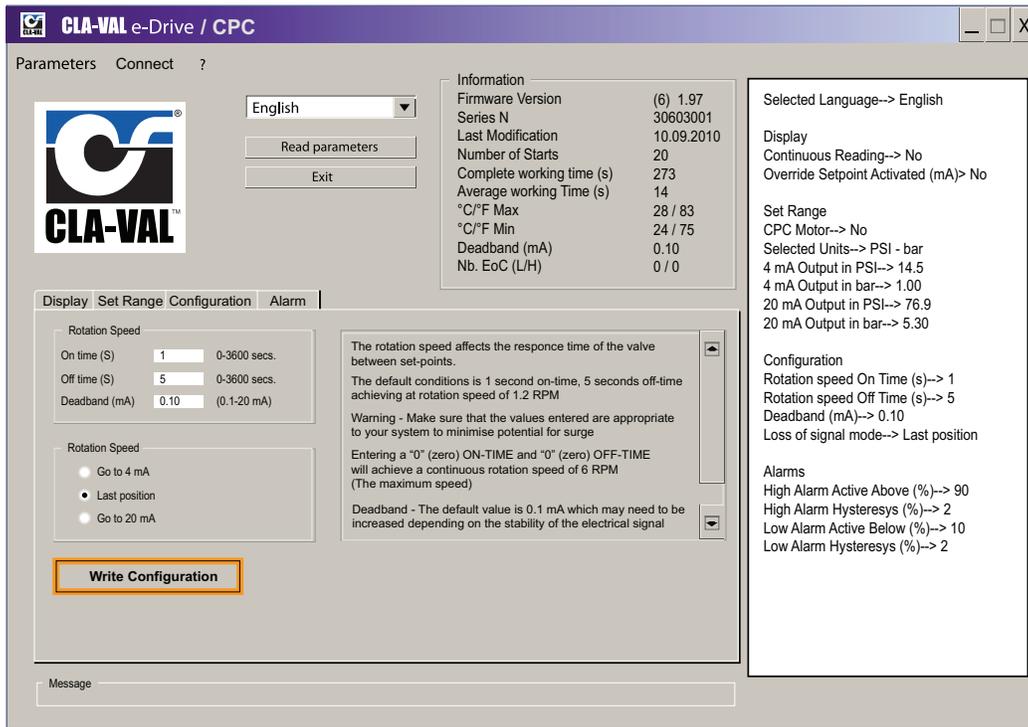
Use the configuration mode to set the rotation speed, dead band and loss of signal values.

- 1 Rotation speed affects the response time of the valve between set-points. The default condition is 1 second on-time, 5 seconds off-time achieving at rotation speed of 1.2 rpm. Entering a '0' (zero) on time and '0' (zero) off time will achieve a continuous rotation speed of 6 rpm (maximum speed).



Make sure that the values entered are appropriate to your system to minimize the potential for surge.

- 2 Dead band - The default value is 0.1 mA. This value can be increased depending on the stability of the of the set point signal. The actuator is internally isolated however, If the set point is inherently unstable, the actuator can dither. If this happens, improve the signal or increase the dead band.
- 3 Choose the loss of set point signal mode:
 - a. Go to 4 mA: Actuator will default to the 4 mA position (low set point).
 - b. Last position: Actuator will maintain the last position.
 - c. Go to 20 mA: Actuator will default to the 20 mA position (high set point).
- 4 Click on "Write Configuration" button to complete configuration.

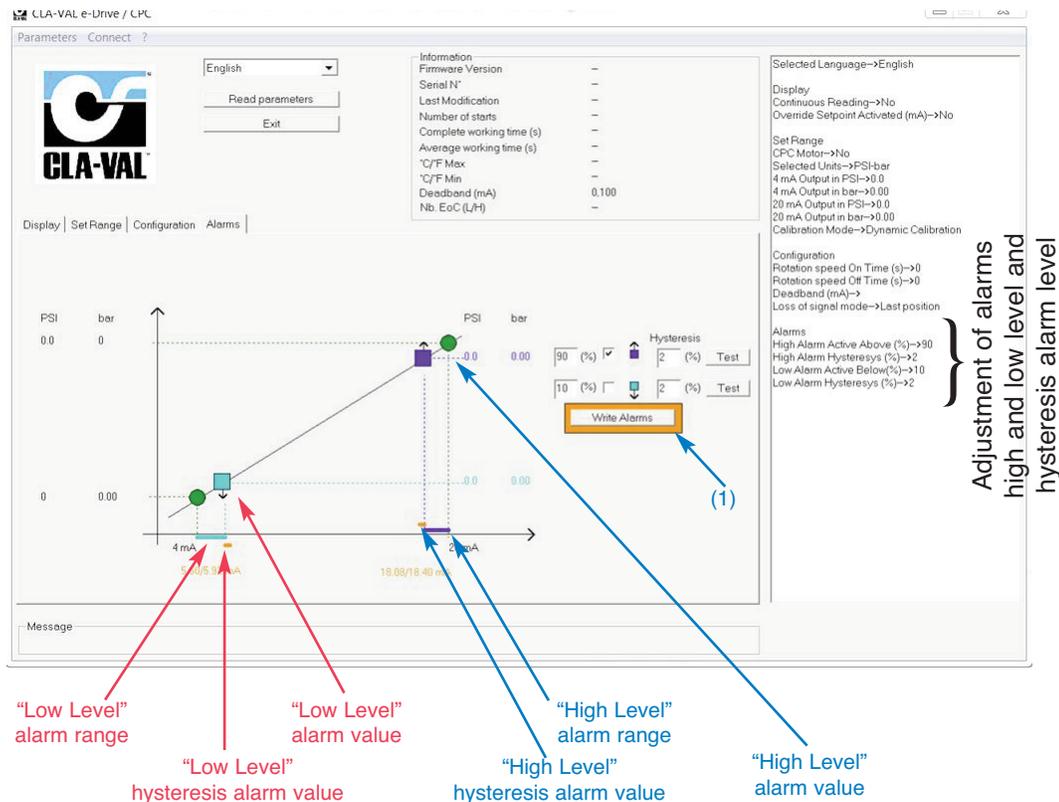


Alarms

The actuator has a Low and High Alarm with an adjustable hysteresis and is activated as shown in the lower window:
 Example: 10% Low alarm = 4 mA + (10% x 16 mA) = 5.6 mA. 90% High alarm = 4mA + (90% x 16 mA) = 18.4 mA.

Hysteresis

- 1 Hysteresis prevents chattering of the alarms when the set point is very close to the alarm status. It is calculated as follows:
 $4 \text{ mA} + (2\% \times 16 \text{ mA}) = 0.32 \text{ mA}$. Low alarm hysteresis therefore equals $5.6 \text{ mA} + 0.32 \text{ mA} = 5.92 \text{ mA}$. High alarm hysteresis equals $18.4 \text{ mA} - 0.32 \text{ mA} = 18.08 \text{ mA}$.
- 2 Enter the requested percentage, for the alarms and hysteresis.
- 3 Click on "Test" to close or open your contact relay.
- 4 Click on "Write Alarms" button to complete.



Troubleshooting FAQ

LED Diagnostics

When power is applied to the actuator, the LED will be red for approximately 5-30 seconds, and then will change to solid green.

Green

OK.

No light

Check power supply.

Red

High torque limit has been exceeded - Power down and power up again

Excessive Voltage has been applied (Above 32 Volts).

Blinking red/green

Calibration was not completed - recalibrate

Changing set-point without a 4-20 mA command signal with the USB cable connected to

Go to 'Display' tab and select Milliamp value and check the box to activate.

Changing set-point without a command signal without an e-Drive - USB cable.

Refer to wiring diagram.

To Increase Actuator connect the Purple Wire with the Pink.

To Decrease Actuator connect the turquoise Wire with the Pink.

To Increase or Decrease the actuator without 4-20 mA signal.

Refer to wiring diagram in the this manual. To increase actuator connect the purple wire to the pink. To decrease actuator, connect the turquoise wire to the pink.

What are the default settings for the 34 Series actuator?

Factory default setting for 34 Series Actuator range parameter is the full pilot spring range scaled to match the 4 to 20 mA Remote Command Input analog signal. Factory default setting for 34 Series Actuator rotation speed is one rpm with 24 VDC power.

How do I get the software to work with the actuator?

To set up a link with 34 Series Actuator, first install cable driver and then the special multi-USB communications cable. After installing driver and communication cable, the Actuator must be powered for link to work. Follow wiring diagram and hardware hookup instructions. Download Wiring Diagram from website (www.cla-val.com).

How do I install Special USB Communication Cable?

When communications cable is installed in your laptop computer USB port for the first time, Windows will search your computer for the cable USB driver. If Windows Plug and Play does not automatically find the driver and connect to actuator, then the cable driver must be set up manually. Windows will take you step-by-step through the manual set up process. The cable USB driver is installed during software download. You will have to browse to the Cla-Val folder created during download where the driver file is located. Details are in this manual.

My computer does not have a USB port

Older laptop computers with only Serial port may have a problem using USB to Serial adapter with special USB connector cable and communicating with 34 Series actuator. Make sure the USB to Serial adapter cable is less than 18 inches long. Also, USB extension cables should not be used because they will degrade signals and cause problems. If problem persists, consult Cla-Val factory technical support.

Why is actuator LED still blinking red/green after I downloaded the settings?

Once the calibration mode button is activated, all steps must be done before downloading is begun. Actuator LED will show green when downloading is successful and complete.

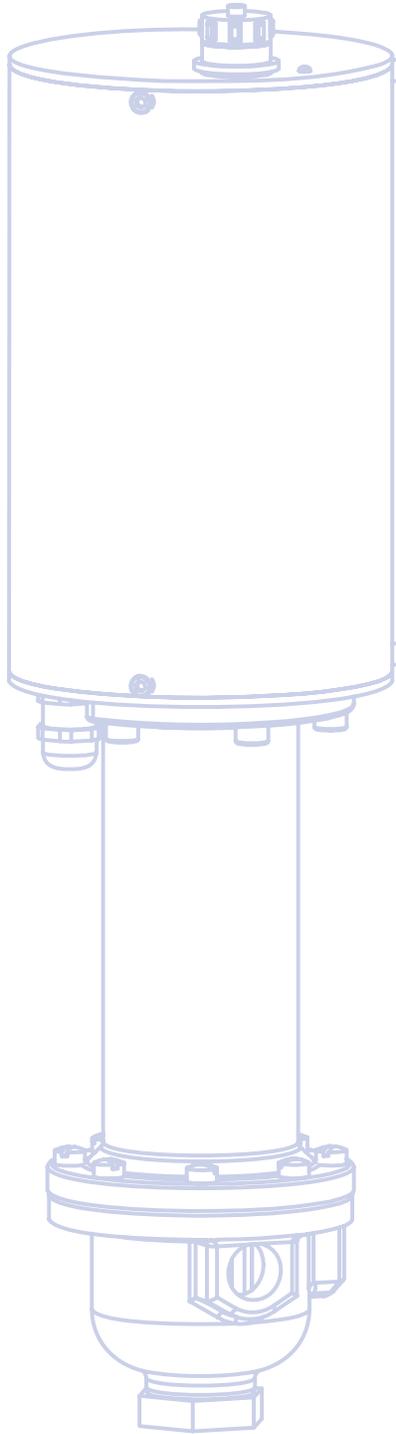
Can I make a file ahead of time and download it to 34 Series later?

All hardware hookup steps must be completed before program will communicate and change 34 Series parameters. Until wiring and power connections are made to the actuator, this program can be opened, but new parameters can not be created or stored or sent to the actuator. Changes to parameters must be done "live" and while control valve is operating. Actuator LED will show green when downloading is successful and complete.

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GENERAL DISCLAIMER

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N-34 Series (R-10/2017)

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