smar - SmarValid

USER'S MANUAL

SmarValid - Valve Life Diagnose

JAN / 06

SmarValid

VERSION 1

SMARVALI ME

smar

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SMARVALID

INTRODUCTION

SmarValid (Valve Life Diagnose) is a diagnosis tool that was developed to be part of the **FY301** integration (Smart Valve Positioner) in the Fisher Rosemount AMS System. Through **SmarValid** is possible to monitor and to configure the main variables of FY301 diagnosis, besides obtaining alarm and creating graphs as: Step Response, Trend, Valve Signature and Hysteresis.

SmarValid communicates with **FY301** starting from version 2.15.

CONFIGURATION

FY301 Configuration

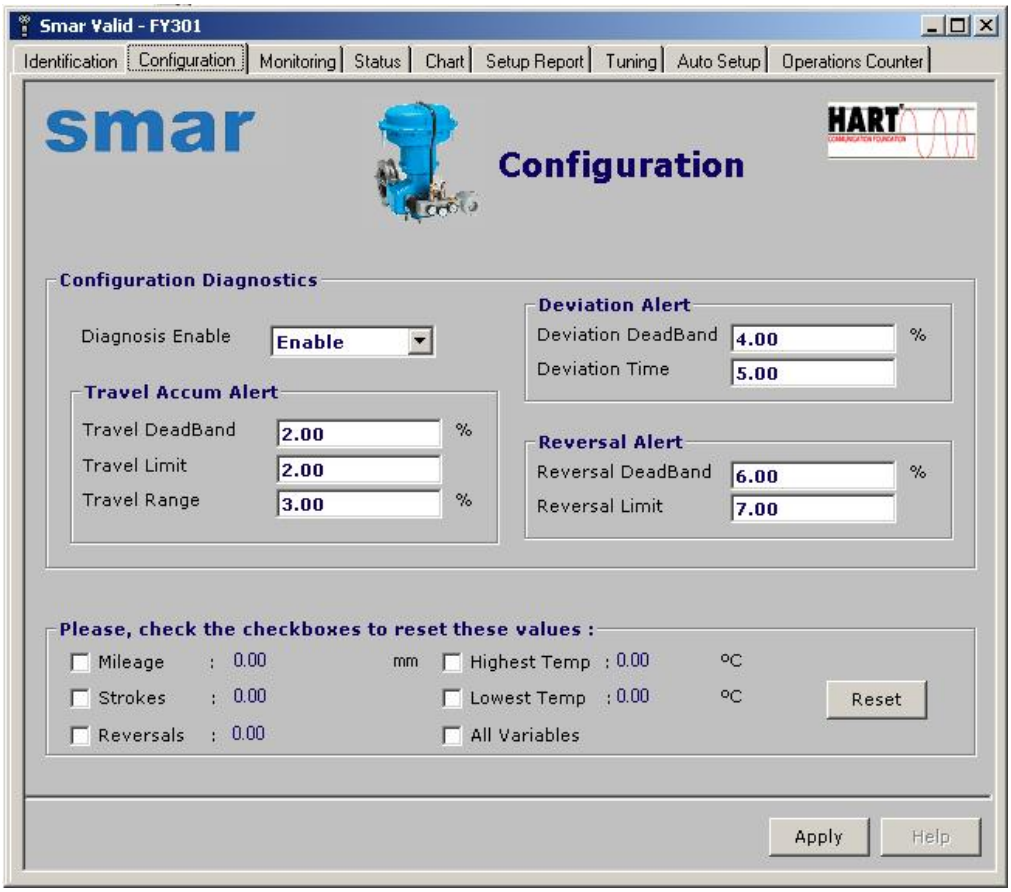

Figure 1.01 – FY301 Configuration

Functions of FY301 Configuration

Diagnosis Enable – This function allows engineering unit and parameters for diagnostic purposes configuration and shows positioner general conditions.

Travel Dead Band – This function is the magnitude value of the valve travel, in percentage of ranged travel, necessary to increment the travel.

Travel Limit – This function is the value of valve travel. When this value is exceeding, the function generates an alert. The alert is cleared by entering a new travel value lower than the travel limit.

Travel Range – This function is the valve movement range. For example: if the length is set to 30 mm, when the valve goes from fully closed to fully opened the travel will be increased by 30. The default length is 1.

Deviation Dead Band – This function represents the magnitude value of the valve deviation, in percent of ranged travel.

Deviation Time – This function represents the time in seconds that the valve can exceed the Deviation Dead Band before the alert is generated.

Reversal Dead Band – This function is the magnitude value of the valve movement, in percent of ranged travel, necessary to increment the reversal.

Reversal Limit – This function represents the value of the reversals. When this value is exceeded, an alert is generated. The alert is cleared by entering a new reversal value lower than the previous reversal limit.

Reset Variables – This function is necessary to reset all the registers related to the diagnosis. To reset the registers, do as follows:

1. Click on the Configuration tab.
2. Select the variables you want to reset. Case you want to reset all the registers, only click in “All Variables”.
3. Click on the reset button and the register will assume the initial values for the variables chosen.

MONITORING

FY301 Monitoring

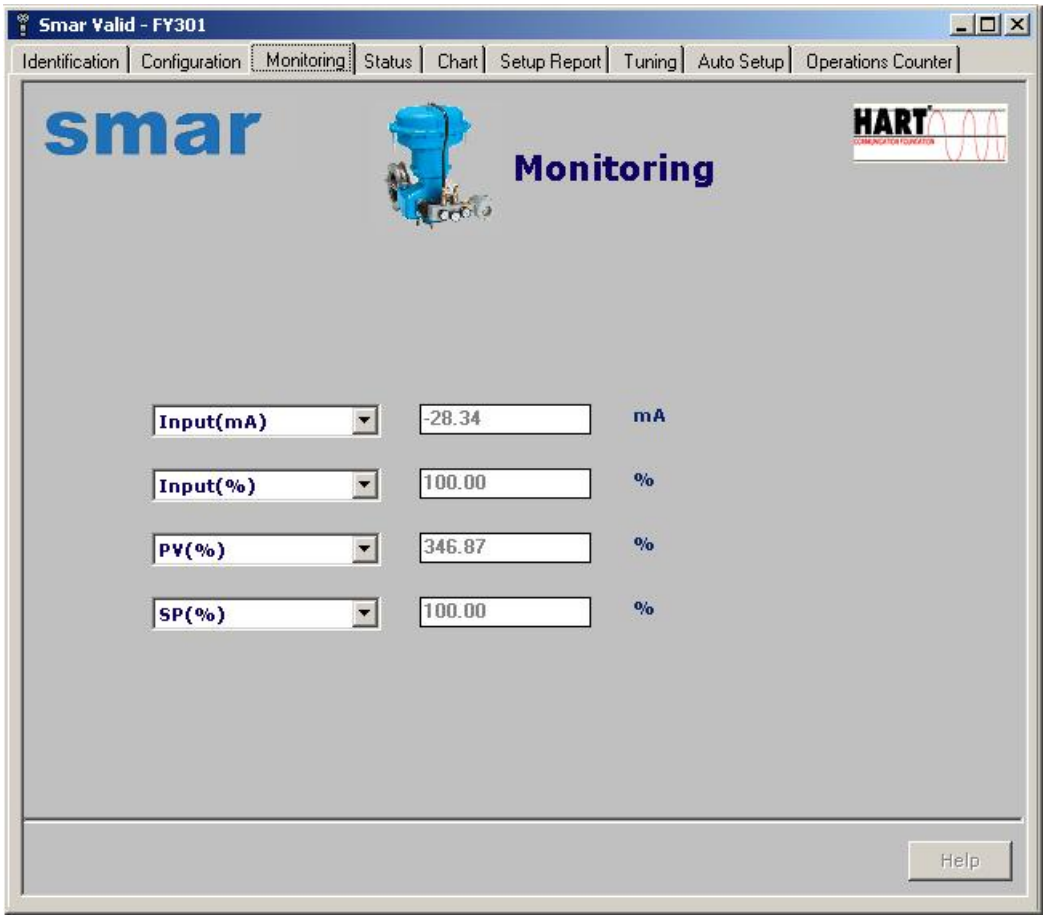

Figure 1.02 – FY301 Monitoring

The monitoring mode is a powerful tool for the maintenance process, giving all the required information for maintenance, diagnosis and tuning purposes - on line information.

Up to 4 different variables are showed at the same time on the display. The variables are from free choice of the operator, who may combine the relevant variables for comparison and enhanced diagnosis of both positioner and valve.

By clicking on each arrow at the left of each label on the display, it opens a window showing a list of the variables. To select the variable, click on it. Follow the same procedure for each label.

The variables are:

- **Input** (mA)
- **PV** (%)
- **Input** (%)
- **Error** (%)
- **Set Point** (%)
- **Intg – Reset** (%)
- **Hall Sensor**
- **Temperature** (ºC)
- **Piezo Voltage** (V)
- **Temperature** (ºF)
- **Mileage**
- **Strokes**
- **Reversals**
- **Low Temperature**
- **High Temperature**
- **Output Pressure 1**
- **Output Pressure 2**
- **Input Pressure**

STATUS

FY301 Advanced Status

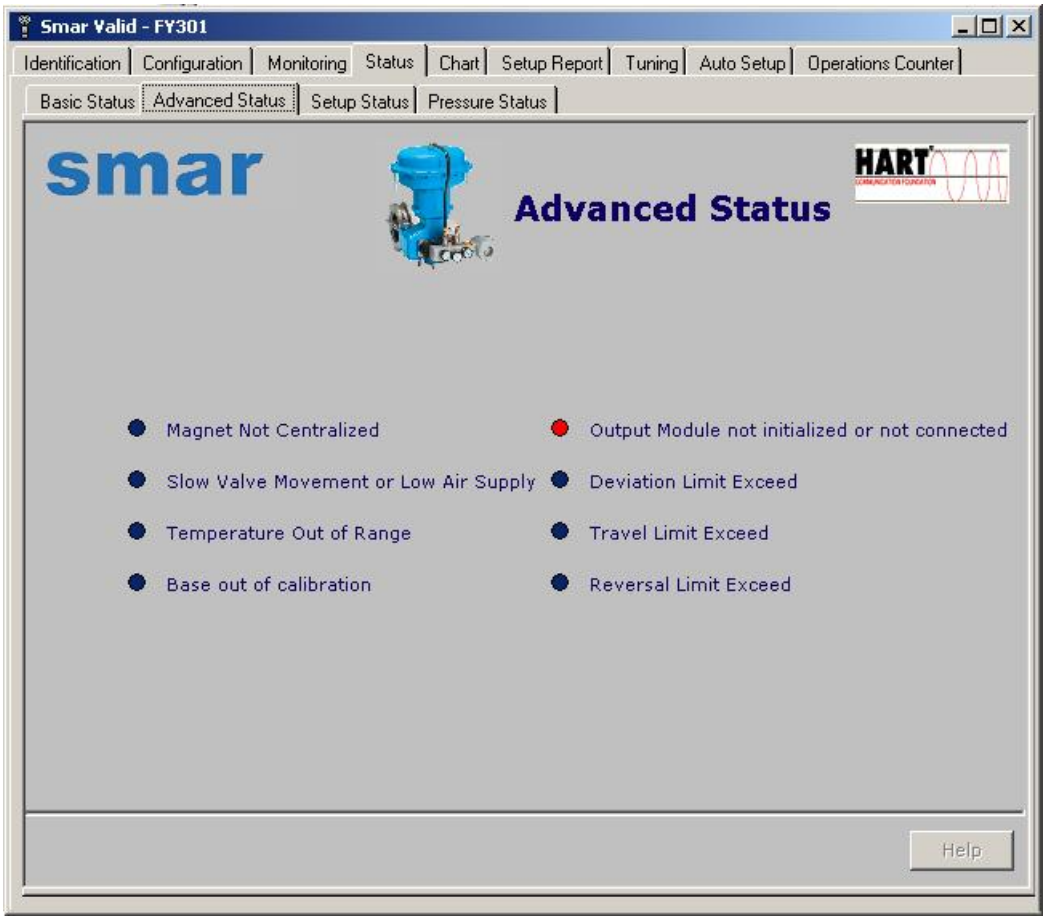

Figure 1.03 – FY301 Advanced Status

Magnet Not Centralized
Indicates that the magnet assembly needs a correction.

Slow Valve Movement or Low Air Supply
Indicates a possible block in the valve. This possible block can be due to normal use or very tight gasket; or that air supply is under the minimum necessary for the positioner to work.

Temperature Out of Range
Temperature higher or lower of the limit compared with the working specifications.

Base out of calibration
Indicates that the piezo transducer requires a calibration.

Output Module not initialized or not connected
Indicates that the output module needs a replacement or check on the connection.

Deviation Limit Exceed
Maximum error (position of the valve compared with the controller output) exceeded the configured deviation.

Travel Limit Exceed
Mileage above the maximum configured.

Reversal Limit Exceed
Number or reverse is above the configured limit.

FY301 Setup Status

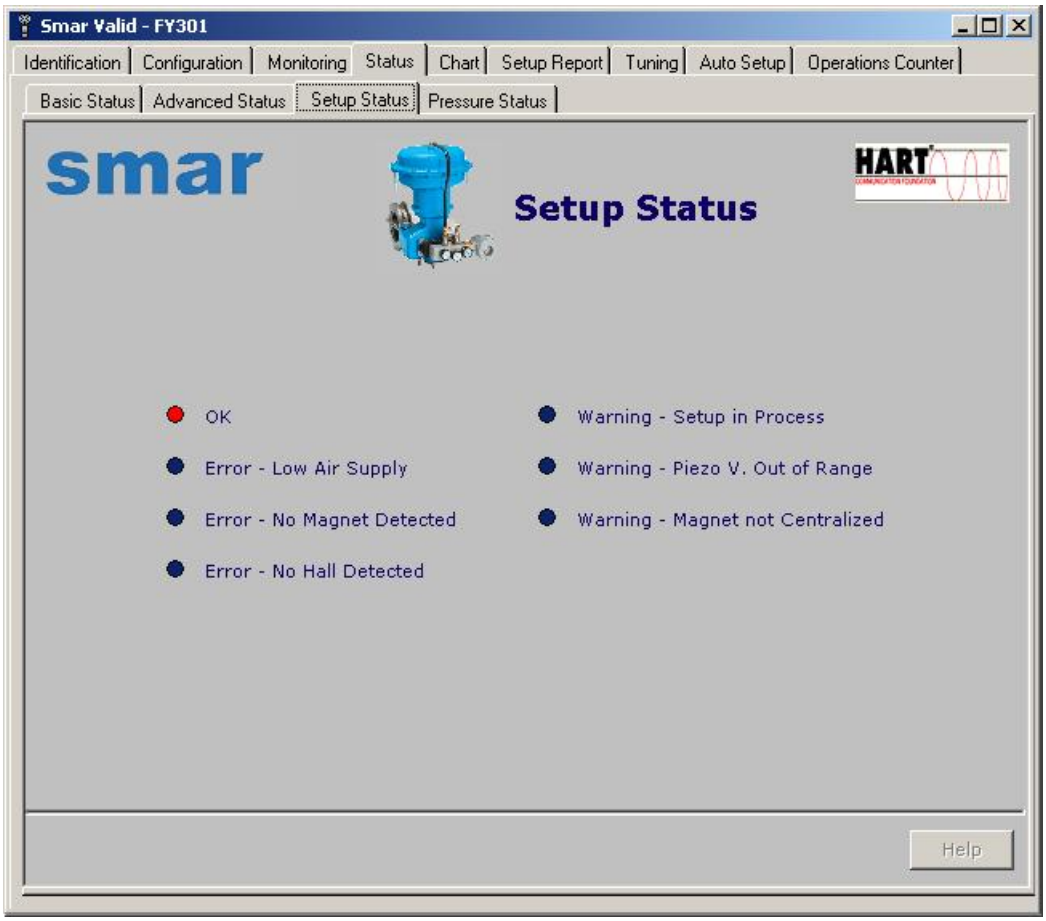

Figure 1.04 – FY301 Setup Status

OK
Indicates that setup was successful performed with no error or malfunction.

Error - Low Air Supply
Indicates that the air supply pressure is below the minimum for the positioner to work.

Error - No Magnet Detected
Indicates that is necessary to check the magnet assembly on the valve.

Error - No Hall Detected
Indicates a possible malfunction in Hall sensor.

Warning - Setup in Process
Indicates the setup is performing.

Warning - Piezo Voltage Out of Range
Indicates piezo transducer requires calibration.

Warning - Magnet not Centralized
Indicates the magnet was detected but requires a check. Verify the correct assembly position of the magnet related to the valve stem.

FY301 Pressure Status

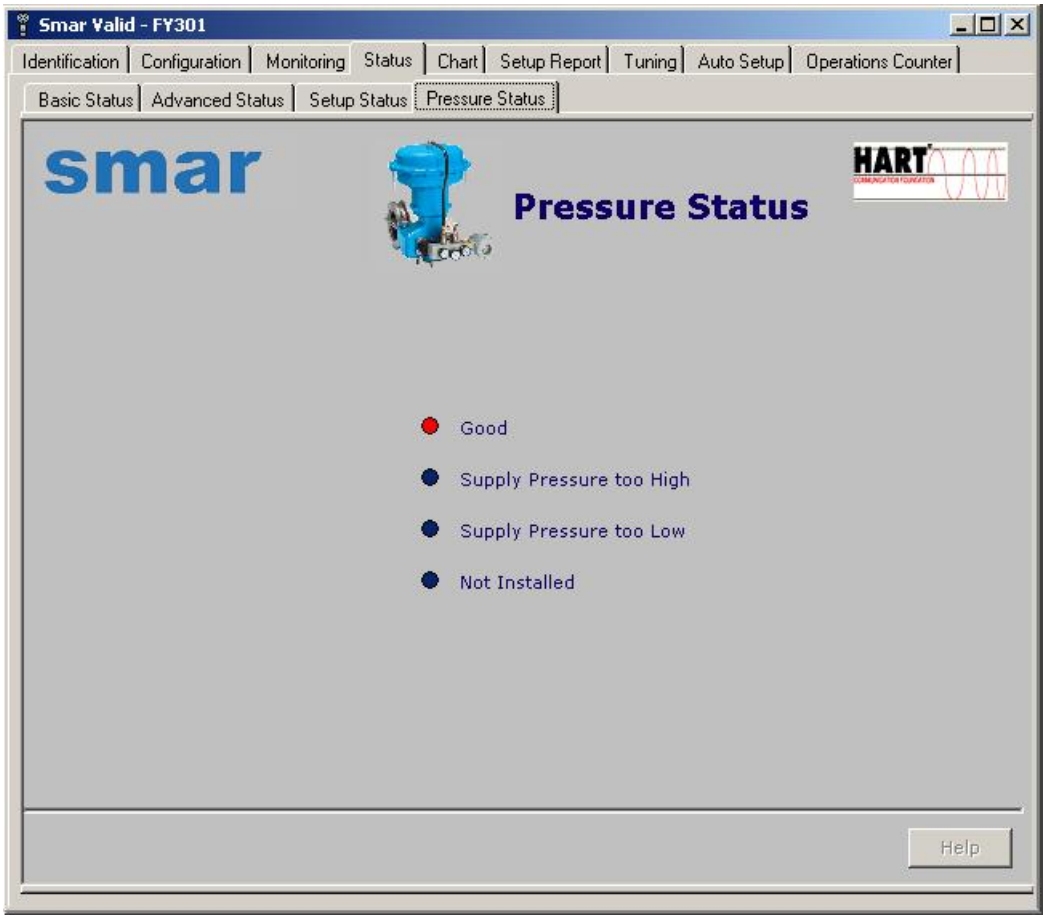

Figure 1.05 – FY301 Pressure Status

Good
Indicates the pressure is working in correct pressure range.

Supply Pressure too High
Indicates the air supply pressure is above the maximum allowed.

Supply Pressure too Low
Indicates the air supply pressure is below the minimum allowed.

Not Installed
Indicates the positioner does not have pressure sensor.

CHART

FY301 Step Response

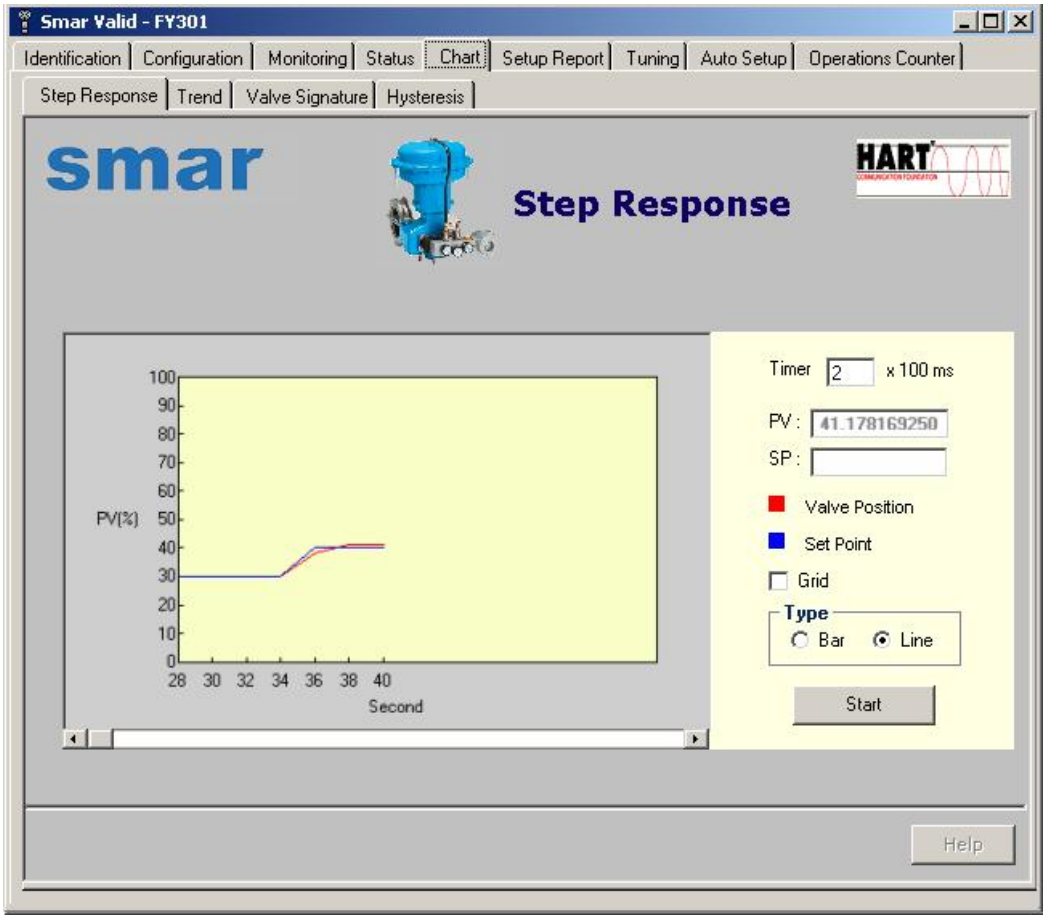

Figure 1.06 – FY301 Step Response

The **FY301** Step Response allows the user observe the dynamic behavior of the valve with the positioner.

This is possible through step change in the input versus the valve position, chosen by the user. It is very useful for tuning methods, helping the user to select the best values for the internal positioner controller parameters.

FY301 Trend

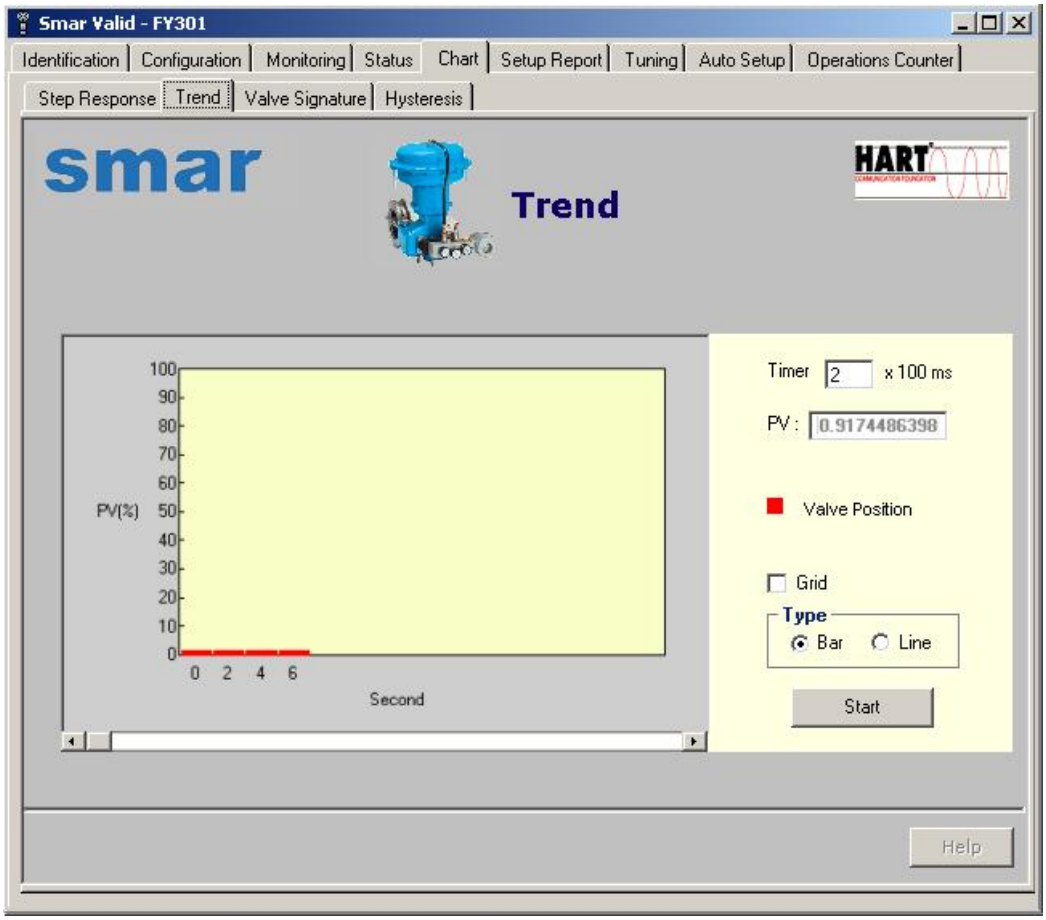

Figure 1.07 – FY301 Trend

The **FY301** Trend shows the valve position in a freely configurable time window, allowing the user to shift the time window giving historical valve position trend. Time scale is also configurable by the user.

FY301 Valve Signature

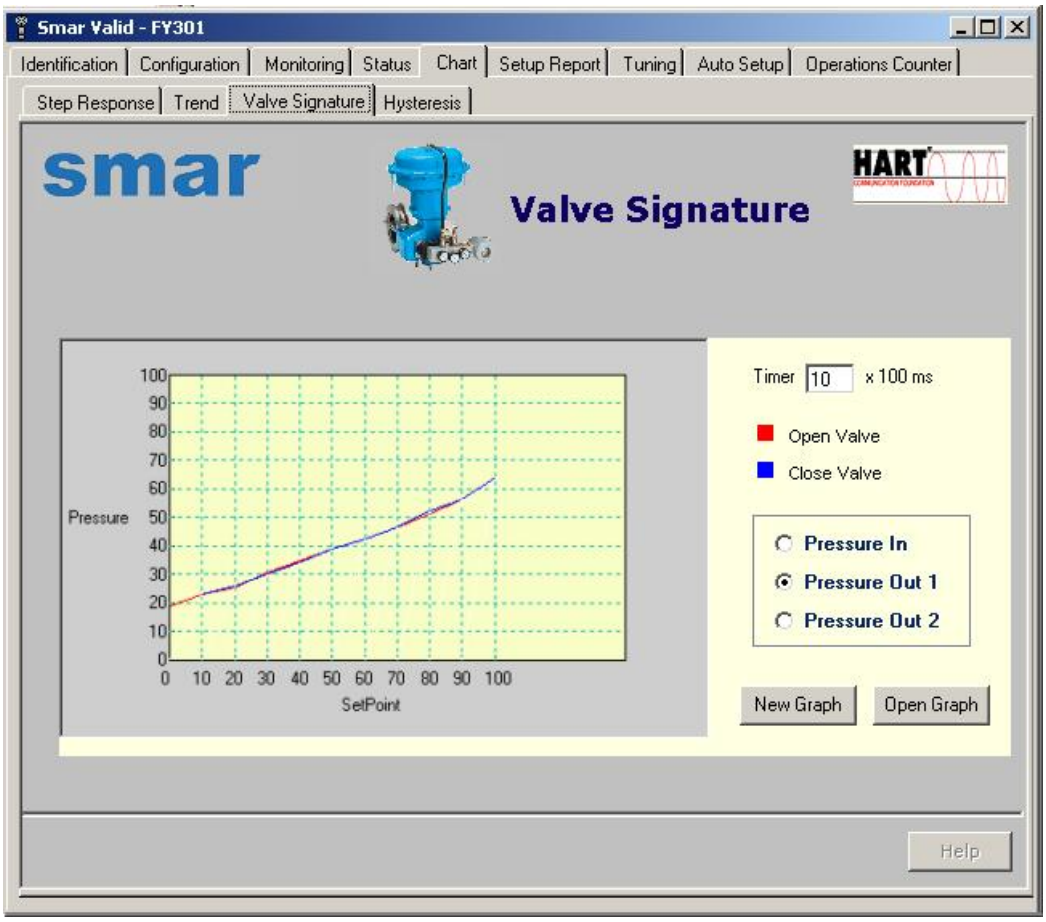

Figure 1.08 – FY301 Valve Signature

It shows the valve position versus the input received from the controller.

The positioner simulates a 0 to 100% variation in the input and record the valve position for further pro-active analysis. The graphic is saved by user choice.

FY301 Hysteresis

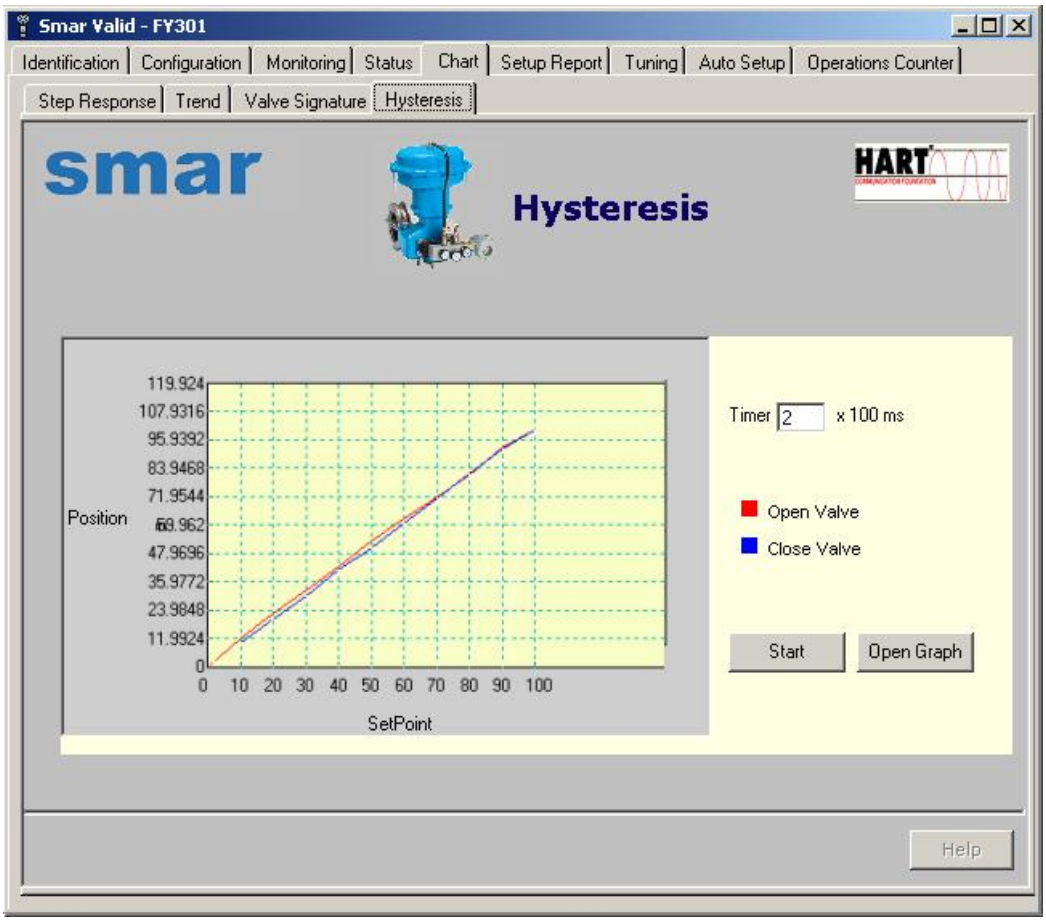

Figure 1.09 – FY301 Hysteresis

FY301 Hysteresis shows the valve position versus the Set Point.

The positioner simulates a 0 to 100% variation in the Set Point and record the valve position for further pro-active analysis. The graphic is saved by user choice.

SETUP REPORT

FY301 Setup Report

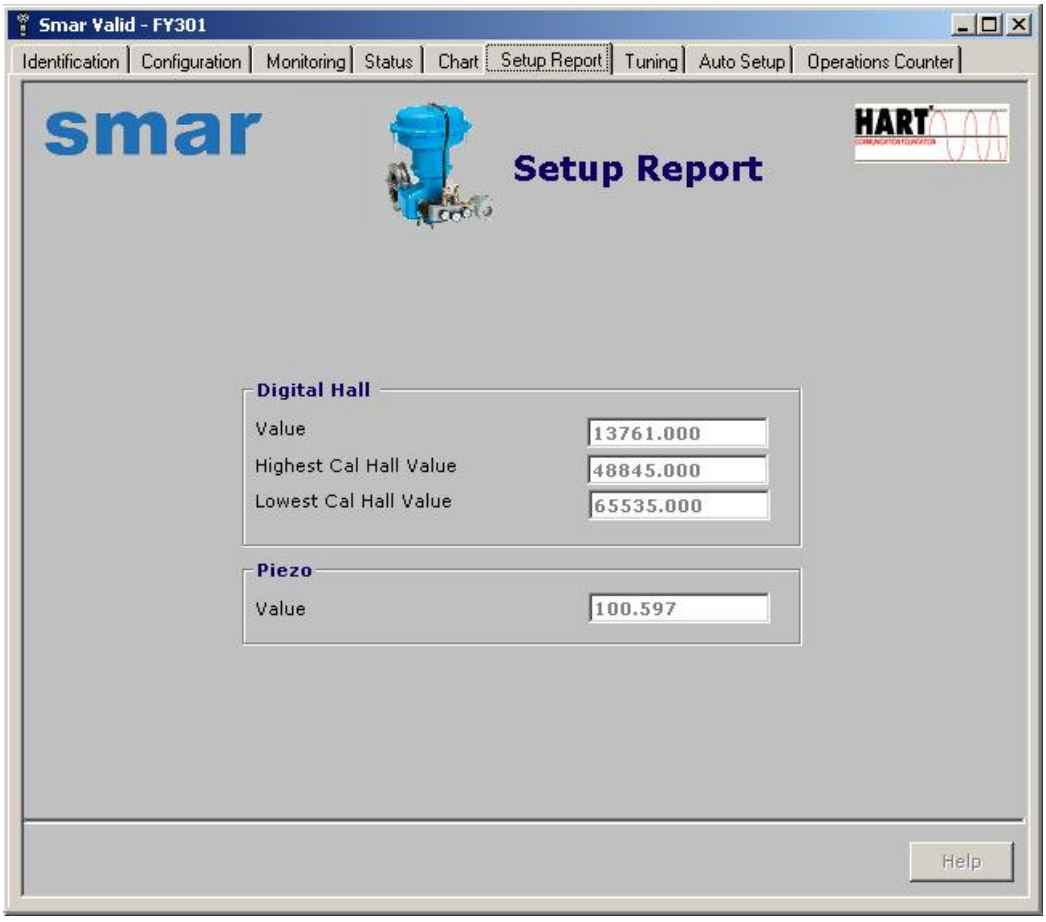

Figure 1.10 – FY301 Setup Report

Digital Hall Value
Digital value related to the Hall sensor voltage

Highest Cal Hall Value
Highest Calibration Hall sensor value

Lowest Cal Hall Value
Lowest Calibration Hall sensor value

TUNING

FY301 Tuning

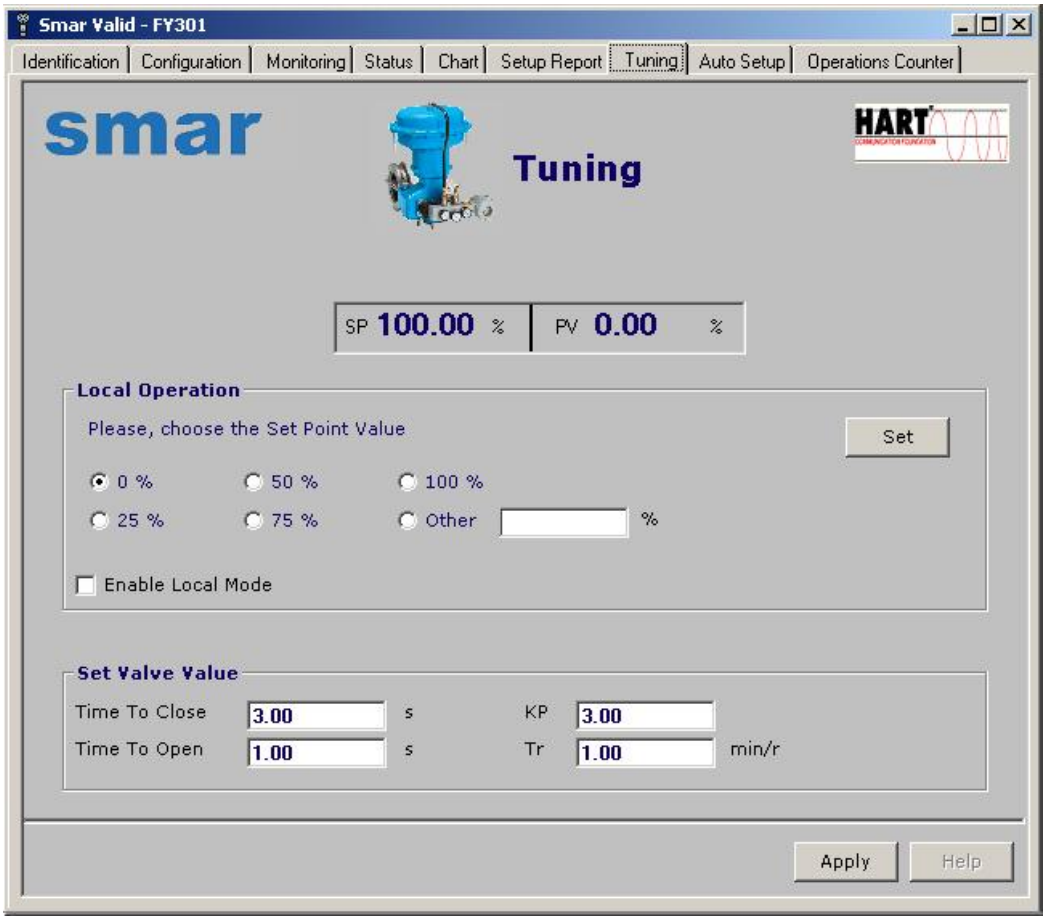

Figure 1.11 – FY301 Tuning

Options of FY301 Tuning

Time to Close
This option makes possible to close the valve through dampening adjustments.
The allowed range: 1 ≤ Time ≤ 60 s.

Time to Open
This option adjusts the valve opening dampening.
The dampening range: 0.1 ≤ TIME ≤ 60 s.

KP
This option provides the gain of the proportional action (KP) of the PI control mode.
The KP range value: 2 ≤ KP ≤ 45.

TR
This option allows the adjustment of the integral action (TR) of the PI control.
TR valve range is 0 ≤ TR ≤ 999 min/rep.

Local Operation
This function makes possible to adjust the valve position to fully open, fully closed, or any value in the allowed range.

This function is useful for testing valve performance and also to manually operate the process in the absence of measurement or other fault preventing closed loop control. To manually set the valve to a desired position, the valve positioner must be set to local mode. In local mode the valve positioner no longer reply to remote set points received over the 4-20 mA input.

AUTO SETUP

FY301 Setup

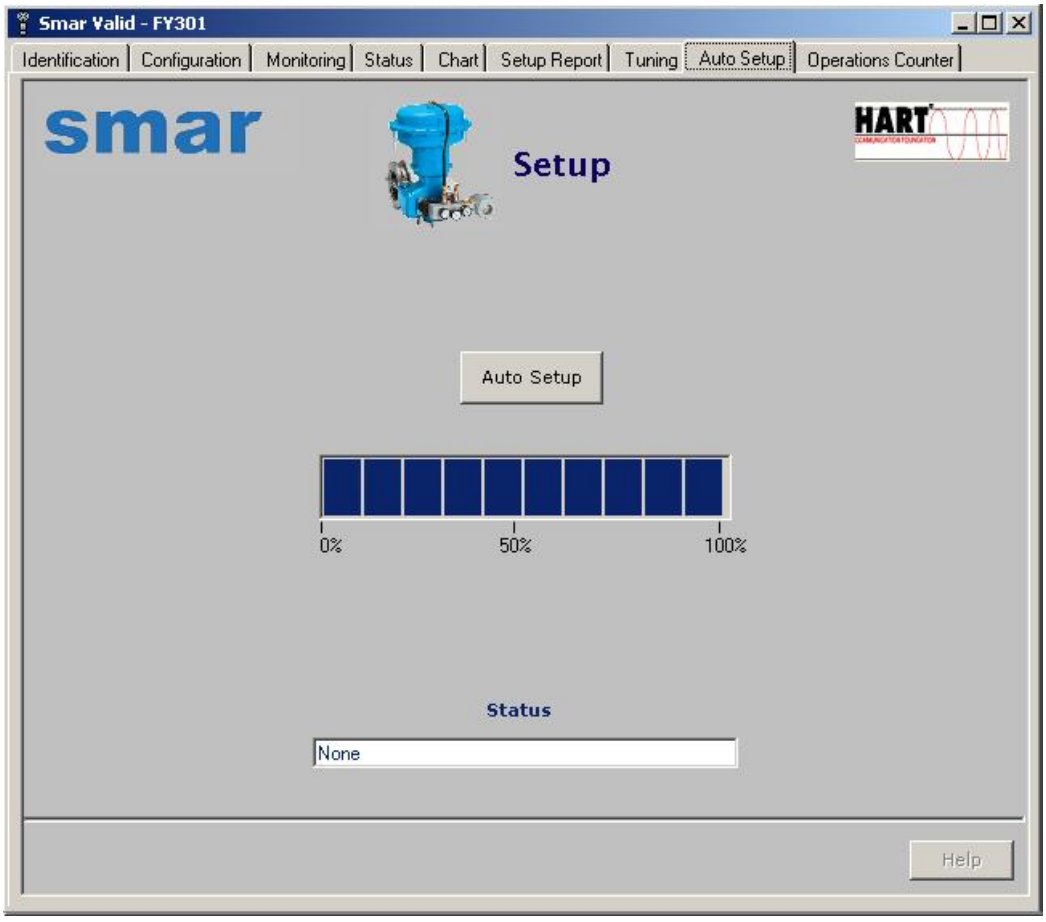

Figure 1.12 – FY301 Setup

RERANGING THE VALVE TRAVEL

To rerange the travel is to change the position values at which the valve is considered fully open and closed. This may also be done using the local adjustment. The FY301 automatically finds the fully open and closed positions of a valve, but the user may limit the travel. Achieving reverse action or split-range operation is a way to configure the input, which is done at the AdvConf function.

To execute the Auto Setup:

1. Be sure the valve is offline before proceed.
2. Click in Setup.
3. Choose Auto Setup button.
4. While performing the Auto Setup procedure, a window will open showing the setup progress in percentage (It is not related to the valve position; for detailed information about the setup phases, please see the FY301 instruction manual).
5. At end of the Auto Setup, the configurator displays the positioner status, giving to the user some tips on maintenance, in case fail or operating problems occur.

OPERATIONS COUNTER

FY301 Operations Counter

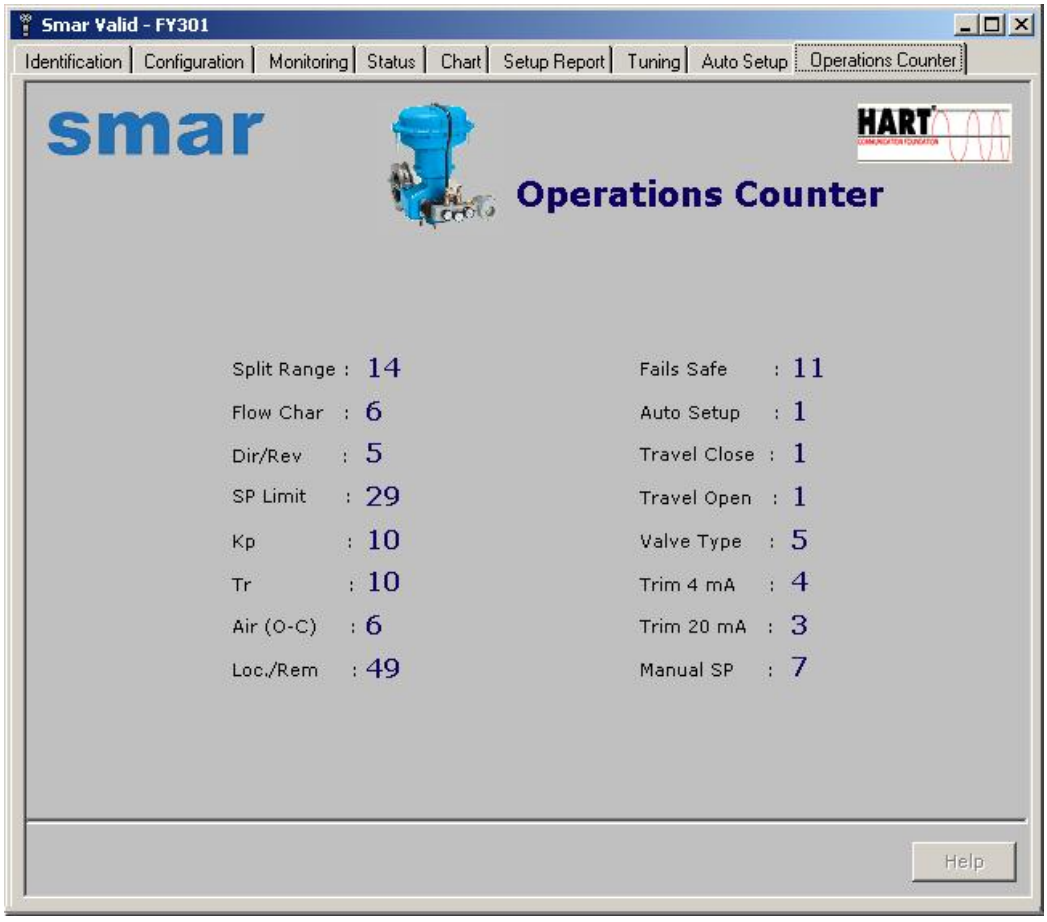

Figure 1.13 – FY301 Operations Counter

Every time one of the following items is altered, there is an automatic increment in the corresponding operations counter.

- **Split Range**
- **Flow Char**
- **Dir/Rev**
- **SP Limit**
- **Kp**
- **Tr**
- **Air (O-C)**
- **Loc/Rem**
- **Fails Safe**
- **Auto Setup**
- **Travel Close**
- **Travel Open**
- **Valve Type**
- **Trim 4 mA**
- **Trim 20 mA**
- **Manual SP**