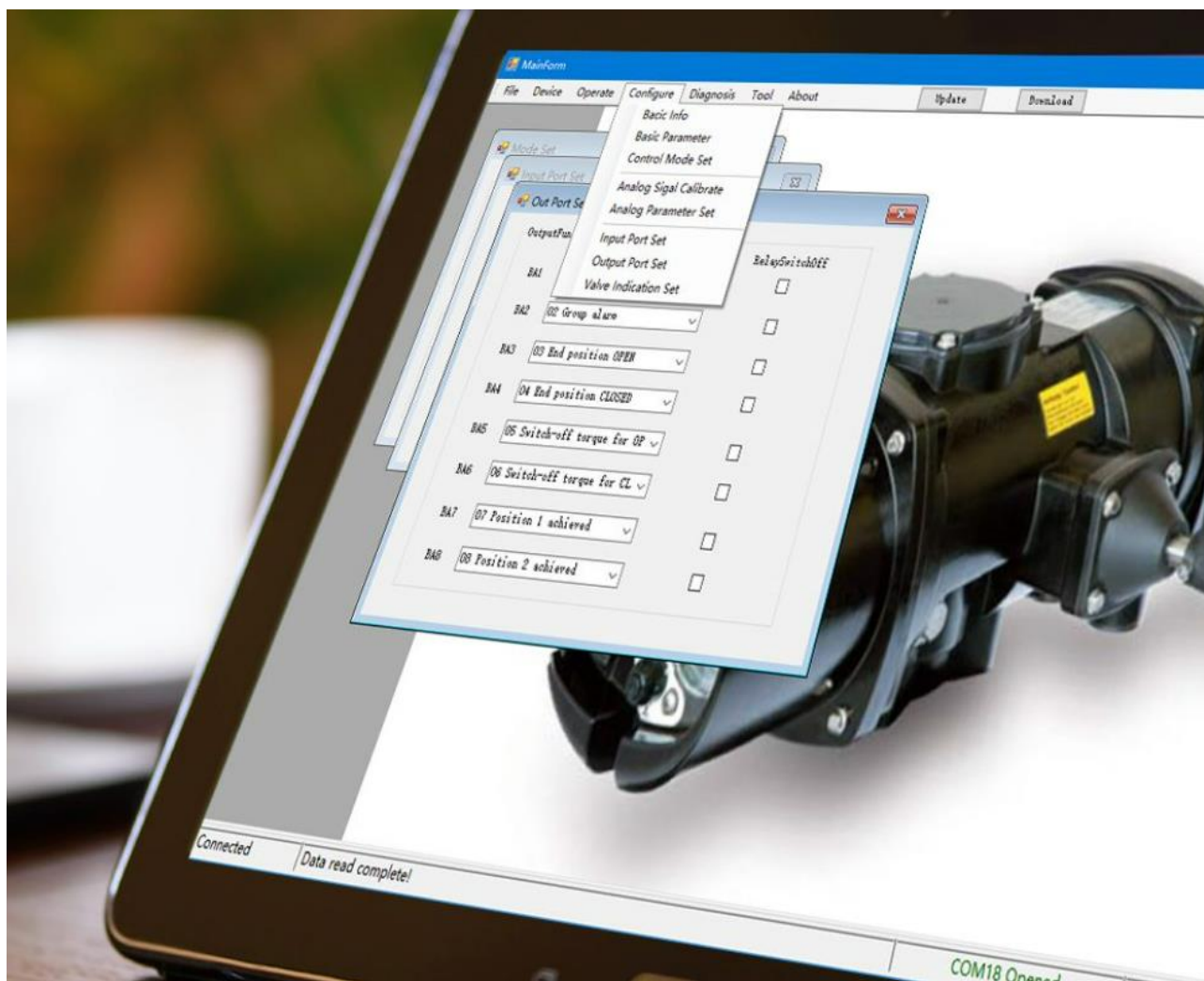




Smartrac-Actuator Connect (v1.30)

With Bluetooth interface

Technical Manual

Smartrac v1.30 (Beta Test)



Description:

This manual specifically covers the actuator-specific control and commissioning software called Smartrac, including its use and functionality with Ontrac electric actuator brands, Easytrac and Multitrac. The software is compatible with both wired and wireless connections. For wired connections, it utilizes Modbus to RS458 communication. For wireless connections, it pairs with Bluetooth and the actuator.

Smartrac provides comprehensive control functions for the actuator and presents them to the user through a beautiful, intuitive, and simple graphical interface. The menu design and visualization of the graphical interface align with user needs. Additionally, the software incorporates intuitive and accurate troubleshooting alarms, following the NAMUR Recommended Standard NE 107. This ensures that users can easily understand the operating status of the actuator.

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1. Bluetooth connection

1.1 Selecting the Bluetooth option

After entering the software interface, find the Bluetooth option in the Device tab drop down menu and click to enter the Bluetooth interface.

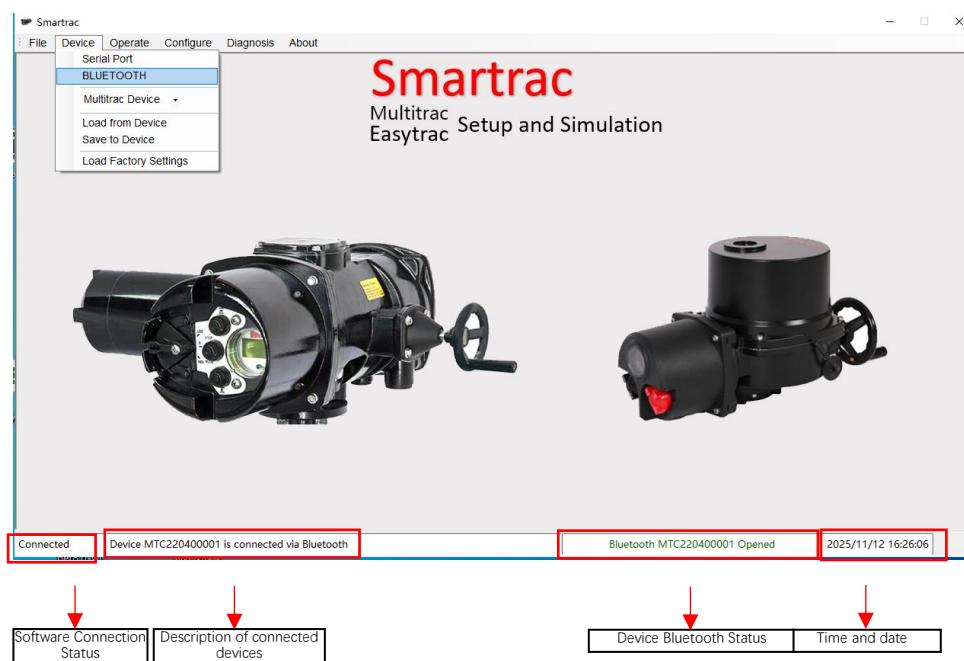


Figure 1

1.2 Establishment of connections

1. Search for Bluetooth devices:

- Click on the search button to search for Bluetooth devices.
- Nearby Bluetooth devices will appear in the left Bluetooth name box.

2. Select the Device to Connect:

- Identify the Bluetooth name of the device you want to connect to.
- Click on the Bluetooth name of that specific device.

3. Check Connection Status:

- On the right side of the data box, you'll see one of the following messages:
 - If it says "Bluetooth Device [Bluetooth name] Connected," it means the connection is successful.

- If it says “Bluetooth Device [Bluetooth name] Disconnected,” and there is no data transmission, it indicates that the Bluetooth connection failed.

4. Repeat the Steps if Needed:

- If the connection fails, repeat the steps shown in the figure until you achieve a successful Bluetooth connection.

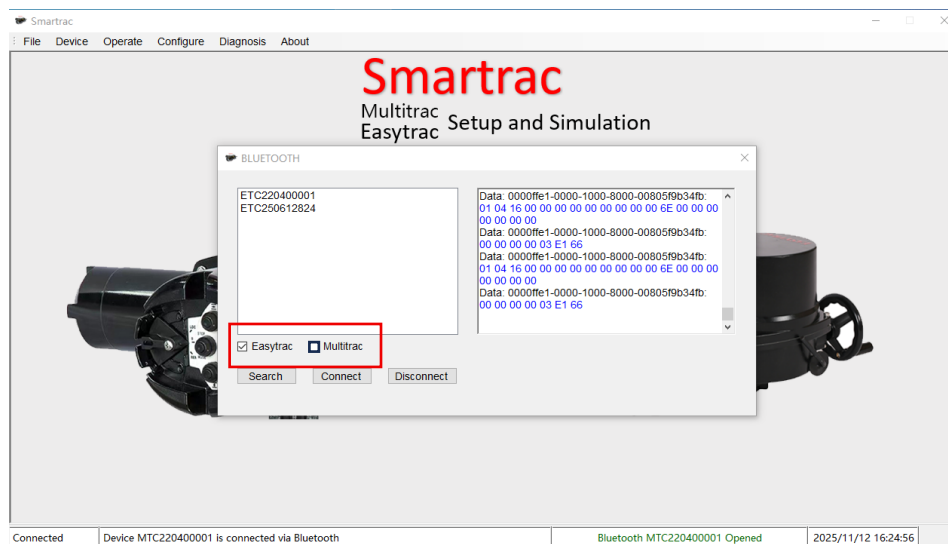


Figure 2

2. Functional Description

2.1 Device menu

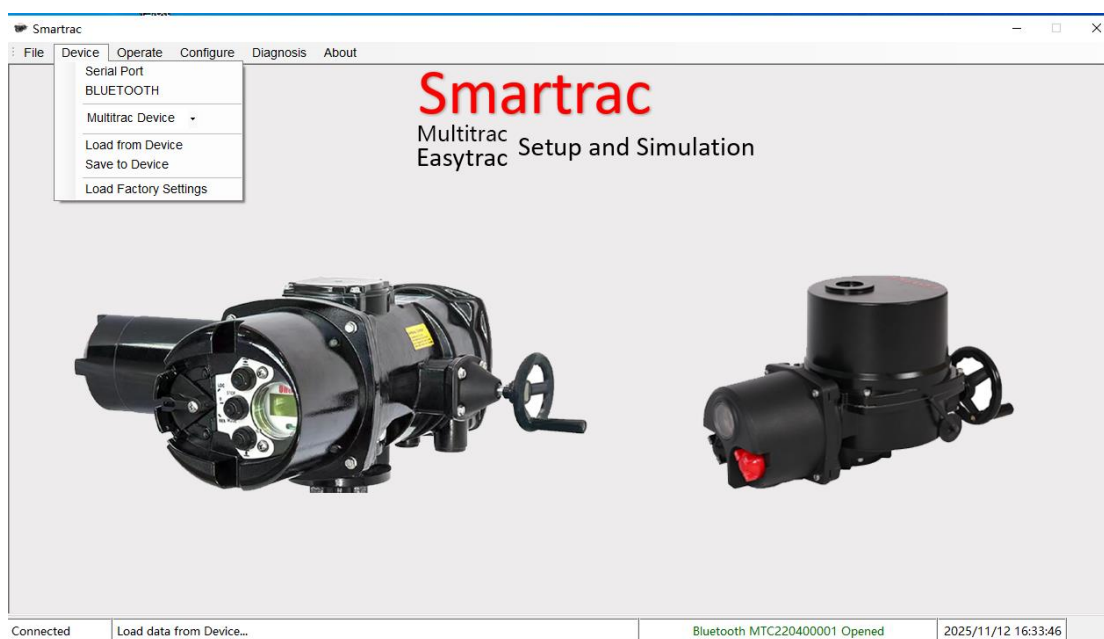


Figure 3

2.1.1 Serial Port

The **Serial Port** function serves as a crucial tool for debugging when PC equipment is connected to the actuator wiring. Let's break down its key components:

1. **Serial Port Selection:**
 - You can choose the appropriate serial port for communication between the PC and the actuator. This selection ensures smooth data exchange.
2. **Device Address Configuration:**
 - Specify the address of the connected actuator. This step ensures that the communication is directed to the correct device.
3. **Transmission Rate Settings:**
 - Configure the transmission rate (baud rate) for data transfer. The right rate ensures efficient communication without data loss.
4. **Read/Write Data Type and Register Address:**
 - Define whether you want to read or write data.

- Specify the register address where the data resides.

This comprehensive communication function allows you to interact effectively with the actuator.



Figure 4

2.1.2 Actuator type selection

Select the appropriate option that aligns with the actual actuator being used.



Figure 5

2.1.3 Load from Device

Import data from the device, through this function you can import real-time data of the device to the software for display.

2.1.4 Save to Device

Save the device settings to the device after changing them in the software.

2.1.5 Load Factory Settings

Restore all data in the device to factory settings.

2.2 Operate menu (Actuator valve position control)

Close the Bluetooth connection interface after the Bluetooth connection is successfully established. Click the Operate menu selection on the home page to enter the RunCtrl interface.



Figure 6

2.2.1 Analog valve position control

Set the valve position to which the valve operates in Target, click the OK button and the valve will activate and reach the set valve position.

2.2.2 Switching Valve Position Control

By clicking Open>>, the valve runs in the open direction to the maximum valve position 100% and then stops;

By clicking Close<<, the valve closes to the minimum position 0% and stops;

By clicking Stop, the valve stops at the current position.

2.2.3 Real-time valve level display

The Current field indicates the current valve position value, the valve position value displayed in the actuator interface is synchronized with the value displayed in the Current field.

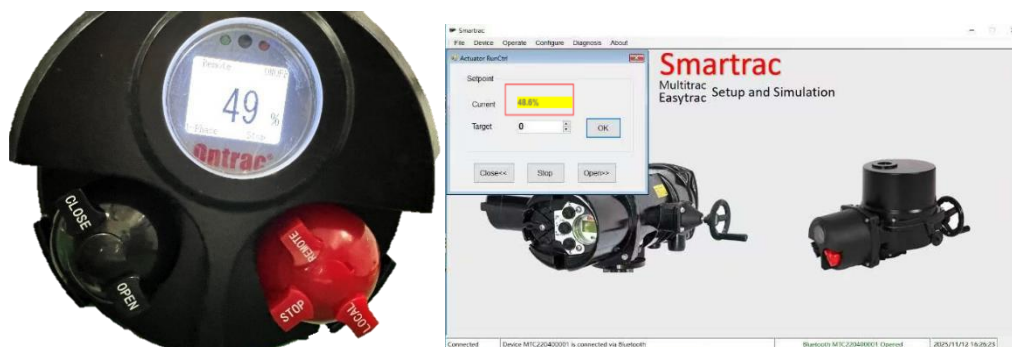


Figure 7

2.3 Configure menu

This menu is the actuator configuration menu, through which you can configure some control modes and actuator ports.

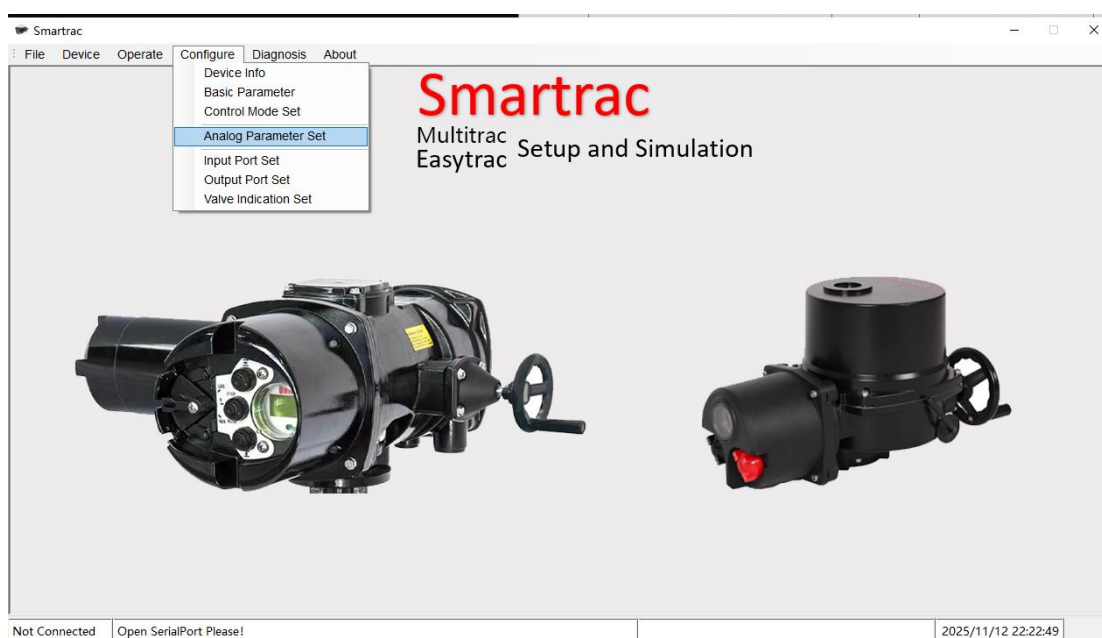


Figure 8

2.3.1 Device info

Device info shows specific information about each actuator, including the actuator model, software version, hardware version, and motor type.



Figure 9

The Serial No contains the model number of the Ontrac brand actuator and the specific numerical number showing also on the nameplate, of its last 12 digits..

Easytrac Series:

Serial No: ETC+XXXXXXXXXXXX(Depending on the specific product)

Multitrac Series:

Serial No: MTC+XXXXXXXXXXXX(Depending on the specific product)

Device info: Motor type(BI/Br/Ac)+ hardware version(H+x)+ firmware version(S+xxx)

BI: Brushless DC motor

Br: Brush DC Motor

Ac: AC motor



Figure 10

2.3.2 Control Mode Set

The Control Mode setting includes a key operation port and a digital input port. Both ports have a pointing

mode and a self-holding mode.

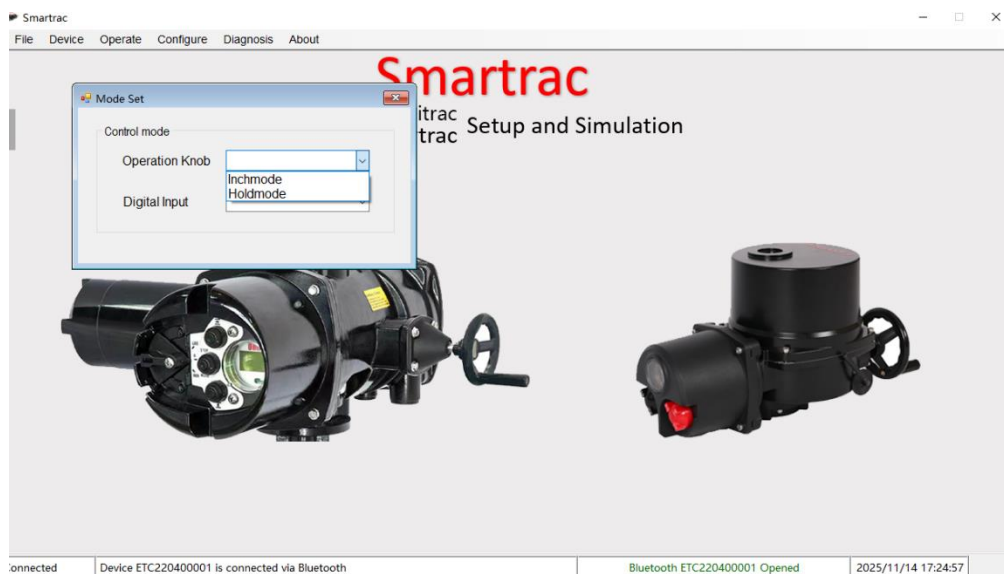


Figure 11

Table 1:

Ports	Directives	Clarification
Oper_Key	8	INCHMODE
	9	HOLDMODE
DigitalInput	8	INCHMODE
	9	HOLDMODE

2.3.3 Analog Parameter Set

Analog parameter settings.

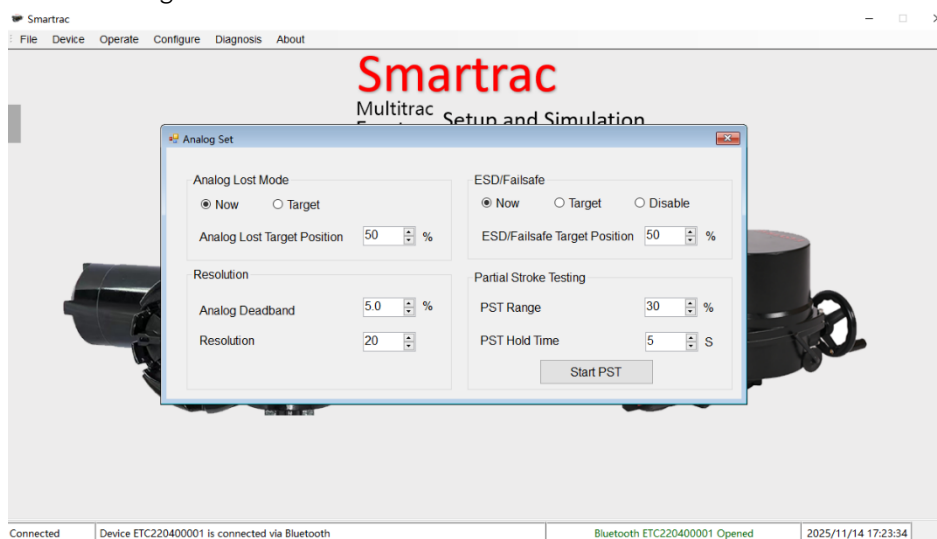


Figure 12

Analog Lost Mode: This part allows you to set whether the actuator stops at the current valve position after the 4-20mA signal is disconnected or whether it runs to the set valve position and then stops.

Resolution: Deadband for 4-20mA signals and Deadband for actuator operation. By adjusting the dead

zone can change the sensitivity of the valve. Deadband can make the valve stable, not sensitive to the valve is relatively stable, when a small perturbation signal into the control system, the valve will oscillate around the opening when the valve sensitivity is high, the deadband can effectively solve this problem, but at the same time also sacrificed the sensitivity.

ESD/Failsafe: An emergency shutdown device (ESD) is a safety mechanism designed to quickly and safely shut down a system or process in case of an emergency.to prevent accidents, equipment damage, or environmental hazards. The specific design and function of an emergency shutdown device from system perspective can vary depending on the application. It may involve physical buttons, switches, sensors that, when activated, trigger an automatic shutdown sequence. This sequence can include stopping machinery, cutting off power supply, closing valves, or activating other safety systems. Emergency shutdown devices are crucial for ensuring the safety of personnel and protecting assets in critical situations. They are often integrated into control systems and are subject to strict safety standards and regulations to ensure their reliability and effectiveness. To our actuator product, this setting allows customer to make a pre-selected action, to ensures that when an ESD signal is applied, the valve remains in its current position, stayput, or can be operated to the set valve position(including full open or close position).

Partial Stroke Test: Partial Stroke Test (PST) is a test in which the actuator is moved only part of its stroke to verify its operation without shutting down the process control system. It is a test method to avoid valve open/close failure. Many valves are seldom used in actual production processes, such as safety valves, which are opened or closed only in emergency situations. Due to the increasing corrosion and scaling of the valve stem, the friction, consequently the required applied force of the linear actuator or the applied torque of the rotary actuator, increases with time. Small, short movements in the closing direction do not interfere with the control process. PST allows customer to do periodically checking to ensure valve is in good shape without disturbing the run process.

This setting allows remote triggering of the PST. The PST operating range and dwell time can be set to ensure the accuracy of the PST function can be trusted.

The PST operation process is as follows:

1. The actuator is in startup or shutdown position.
2. The actuator is in remote mode and ready state.
3. PST signal is sent.
4. The actuator moves from the start position to the predefined test position.
5. Upon reaching the test position, the actuator remains in that position for a predefined amount of time, and then the actuator moves back to the start position.

Successful completion of the PST is subject to the following conditions:

1. the actuator must be in the start or shutdown position and the start position must be 0% or 100%. for the user to perform an actuator PST.
2. the actuator is not in one of these two positions when the function is initiated, the test will not be executed and will not end successfully.
3. the actuator must remain in Remote Mode and Ready (no errors) throughout the PST period.
4. the PST function must not be interrupted by other commands (switch inputs, commands from the optional fieldbus comms) during operation.

5. the shutdown torque must not be exceeded during PST.
 6. the total PST time must be less than the preset maximum time.
- If the actuator state setting does not fulfill any of the above, the test will not execute and will not be successfully terminated.

2.3.4 Input Port Set

Setting the input port. Digital input port configuration.

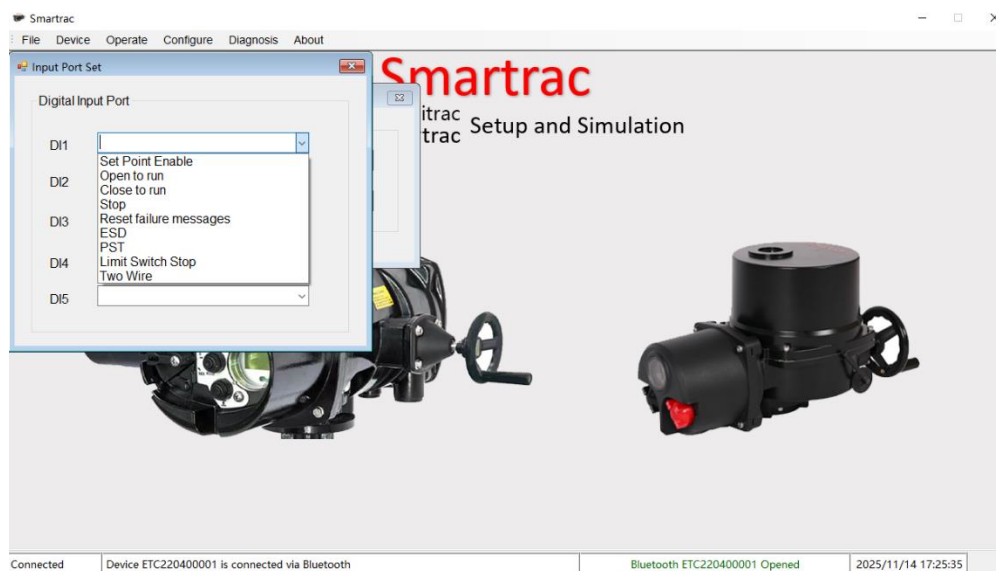


Figure 13

Table 2:

Port number	Directives	Clarification
DI1-DI5	01	Set Point Enable
	02	Open to run
	03	Close to run
	04	Stop
	05	Reset failure messages
	06	ESD
	07	PST
	08	Limit Switch Stop
	09	Two Wire

2.3.5 Output Port Set

Output port setting. Digital output port configuration.

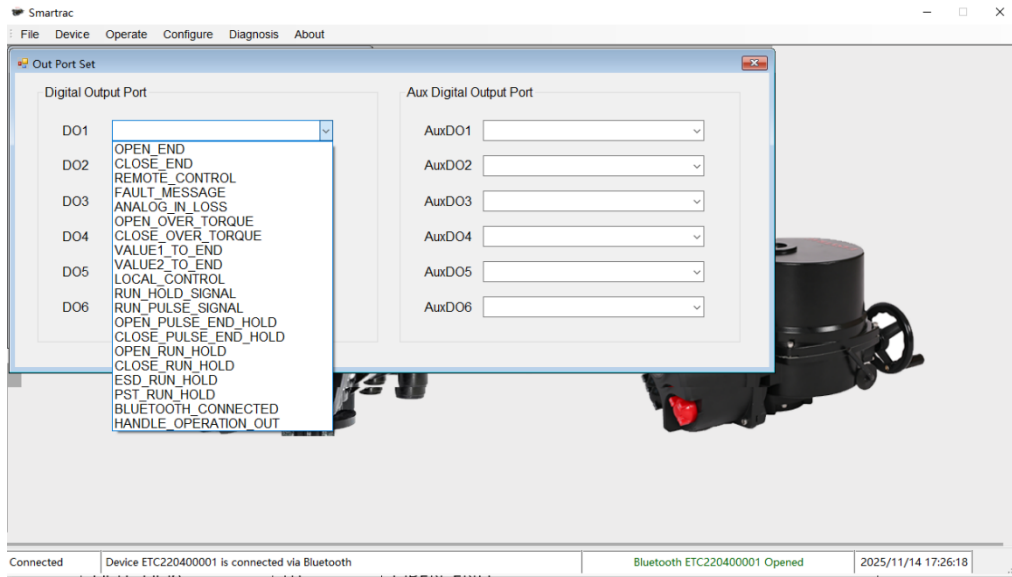


Figure 14

Table 3:

Port number	Directives	Clarification
DO1-DO6 AxDO1-AxDO6	01	OPEN_END
	02	CLOSE_END
	03	REMOTE_CONTROL
	04	FAULT_MESSAGE
	05	ANALOG_IN_LOSS
	06	OPEN_OVER_TORQUE
	07	CLOSE_OVER_TORQUE
	08	VALUE1_TO_END
	09	VALUE2_TO_END
	10	LOCAL_CONTROL
	11	RUN_HOLD_SIGNAL
	12	RUN_PULSE_SIGNAL
	13	OPEN_PULSE_END_HOLD
	14	CLOSE_PULSE_END_HOLD
	15	OPEN_RUN_HOLD
	16	CLOSE_RUN_HOLD
	17	ESD_RUN_HOLD
	18	PST_RUN_HOLD
	19	BLUETOOTH_CONNECTED
	20	HANDLE_OPERATION_OUT

Figure 15

2.4 Diagnosis menu

2.4.1 Alarms/Failures

The Alarms/Failures page under the Diagnosis menu will show the current actuator alarm and error messages. Alarms are also flashing in the upper right corner of the actuator screen.

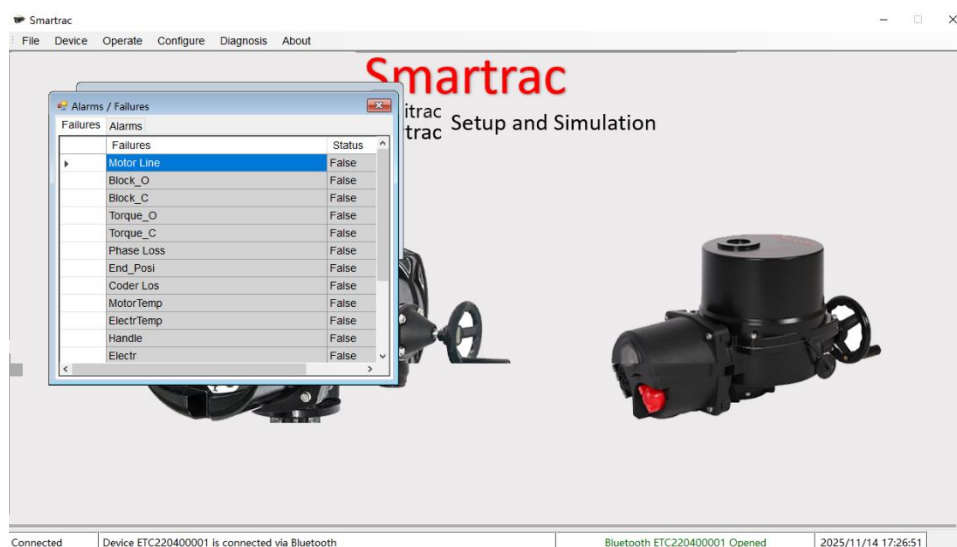


Figure 16

Based on the error messages provided by the software, the causes of errors and alarms can be further determined and resolved by checking against the table below.

Table 5:

No	Display Text	Error Description	Reason/Measure
1	Motor Lin	Wrong output wiring of motor	Need Ontrac technical personnel instruction or on-site service
2	Block_O	Blocking in Open direction	Try operate the actuator in opposite direction, if the alarm is still on, please increase the setting value, but make sure value within limited working condition
3	Block_C	Blocking in Close direction	Try operate the actuator in opposite direction, if the alarm is still on, please increase the setting value, but make sure value within limited working condition

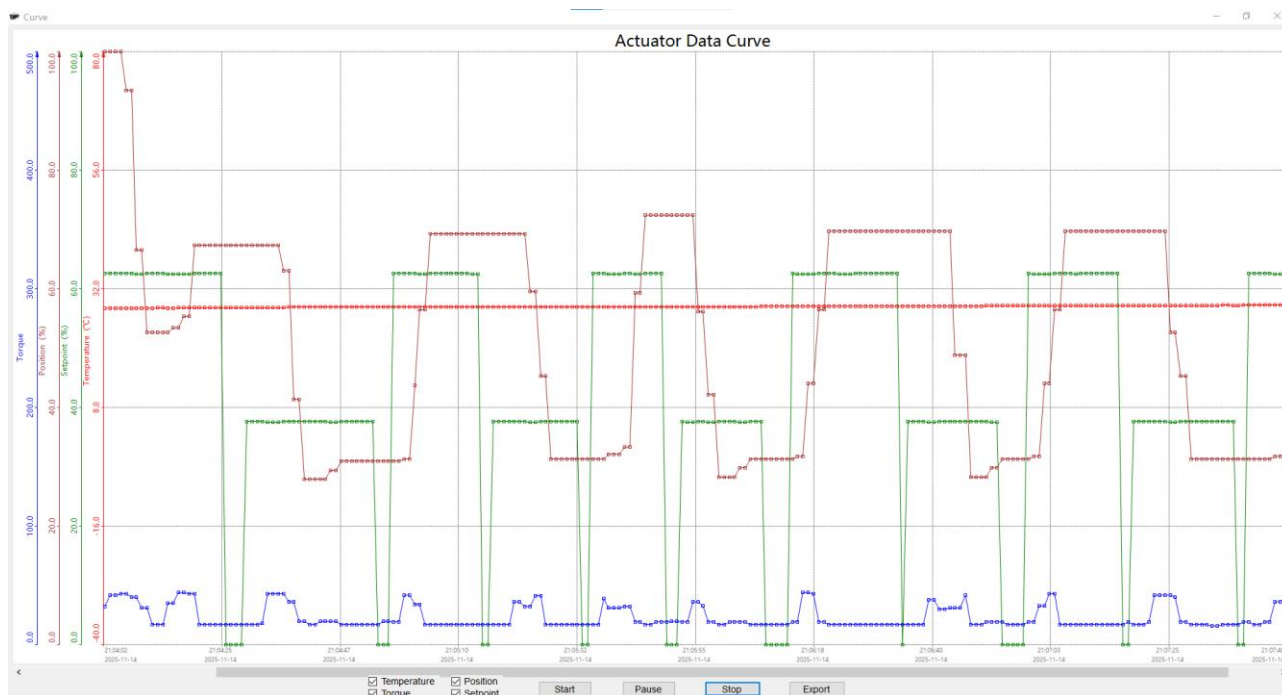
4	Torque_O	Phase of main power supply missing	Check main power supply
5	Torque_C	Input exceeds the limit	Please check current supply, make sure the current is within 3.6mA – 20.8mA
6	Phase Los	Exceeding the adjustable travel range	Manually shake the handle to move the mechanical position to the operable range
7	End_Pos	Abnormal operation status of hand wheel	Push the handwheel back to the original electric operation position
8	Coder Los	Encoder not match or error	Change the encoder

No	Display Text	Alarm Description	Reason/Measure
1	Set Point	Input exceeds the limit	Please check current supply, make sure the current is within 3.6mA – 20.8mA
2	Hand wheel	Abnormal operation status of hand wheel	Push the handwheel back to the original electric operation position
3	Limit AllOp	Open to end position alarm	Use the hand crank to roll the device to an unlimited position to eliminate the alarm
4	Limit AllCls	Close to end position alarm	Use the hand crank to roll the device to an unlimited position to eliminate the alarm

2.4.2 Actuator Dynamic Curve

Access the Actuator Dynamic Curve page by clicking Data Curve under the Diagnosis menu. Click Start to start reading in the data to plot the curve, and Stop to stop plotting the curve. Click Export to save the plot locally. The curve data can also be exported through Export in the form of excel table curve specific data information, including the curve value, the time of the event (specific to the second), in the curve graph of each point covered by a relatively complete and practical data information. The actuator dynamic curve is shown below:





2.4.2.1 Valve Position Dynamic Curve

The Position Valve Position Curve is a real-time display of the actuator's valve opening over time, presented as a line graph. It provides valuable insights into:

- Control accuracy and stability
- Potential equipment abnormalities or failures
- Opportunities for operating parameter optimization
- Efficiency and energy-saving potential
- Intelligent control and management capabilities

By observing the valve position curve, users can promptly detect issues, take corrective actions, and enhance overall equipment safety, reliability, and performance.

2.4.2.2 Remote Control Signal (4-20 mA)

The Setpoint Curve is a visual representation of the input current and valve position changes, serving as a key indicator of remote control signal input. It provides valuable insights into:

-
- Accuracy and flexibility of valve control
 - Correctness of remote control signal input
 - Real-time equipment status and performance
 - Opportunities for operating parameter optimization
 - Potential for energy consumption and maintenance cost reduction

By observing the setpoint curve, users can ensure accurate signal input, assess valve control effectiveness, and make data-driven decisions to enhance equipment performance and cost-efficiency.

2.4.2.3 Electronic Control Unit Temperature

The Temperature Curve displays the temperature of the electronic control unit (ECU) over time. It serves as a valuable tool for:

- Early warning detection: Establish a mechanism to promptly identify abnormal temperature changes and take preventive actions.
- Equipment stability and reliability: Ensure consistent and dependable operation.
- Productivity improvement: Minimize downtime caused by temperature-related issues.
- Maintenance cost reduction: Prevent costly repairs and extend equipment lifespan.
- Data-driven decision-making: Provide insights for optimizing equipment operation.

By closely monitoring the ECU's temperature curve, users can proactively address potential problems, enhance equipment safety and stability, and optimize overall performance.

2.4.2.4 Torque Curves

The Torque Curves illustrate the change in torque generated by the equipment over time. They serve as essential indicators of:

- Output bearing torque: The amount of torque exerted on the actuator's output bearing.

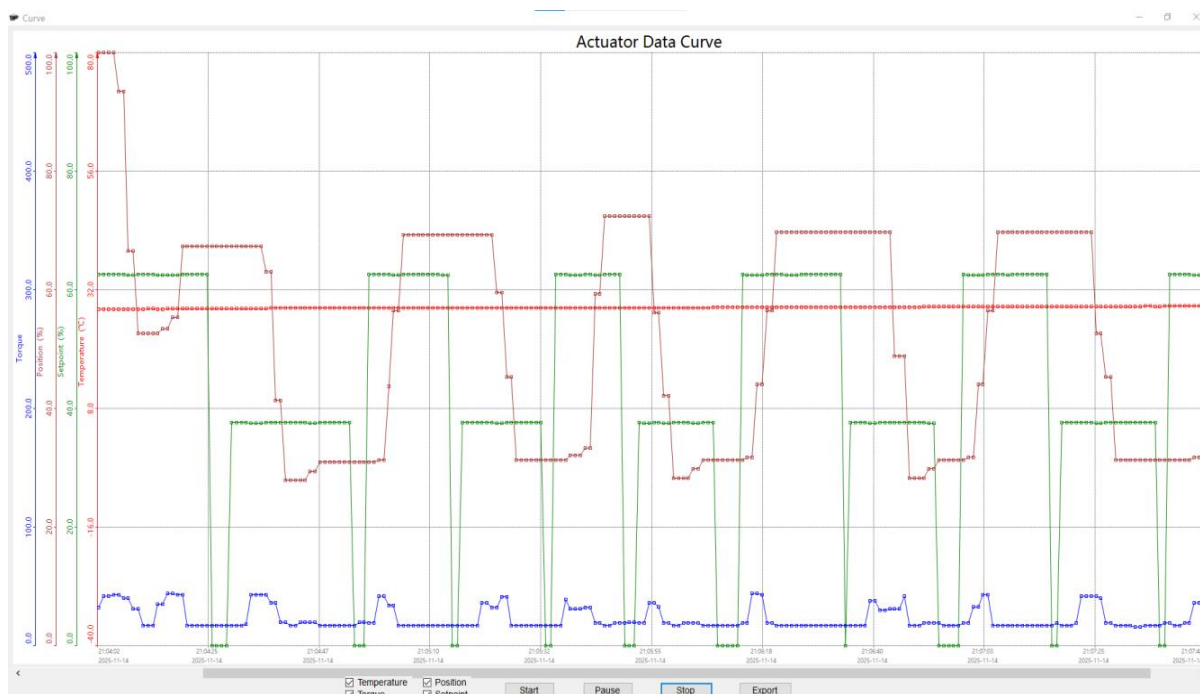
- Load and output capacity: The equipment's ability to handle load and deliver output during operation.
- Safety and stability: Potential overload or underload conditions that could compromise equipment.
- Working efficiency and performance: Insights into equipment optimization opportunities.

By carefully analyzing the Torque Curves, users can:

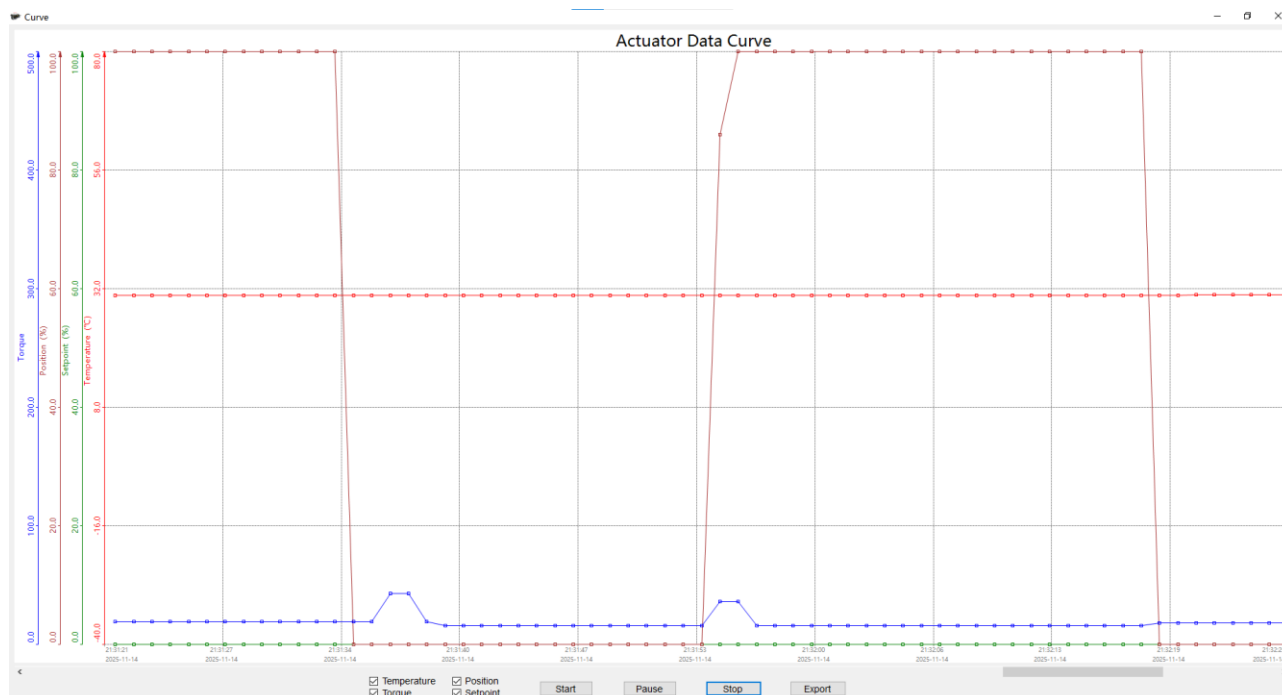
- Proactively address potential issues: Identify overload/underload risks and take corrective actions.
- Assess equipment safety and stability: Ensure reliable and consistent operation.
- Optimize operating parameters: Enhance productivity and energy efficiency.

Make informed decisions: Use data-driven insights to improve overall equipment performance.

- **The actuator supports two control modes: ON/OFF discrete control and 4–20 mA analog control. Due to the difference in control logic, the behavior of the curves shown in SmartTrack also differs.**



When analog control enable, the actuator converts the external 4–20 mA signal into a corresponding Setpoint value (e.g., 4 mA = 0%, 12 mA = 50%, 20 mA = 100%). Therefore, when the input varies between 4 mA and 20 mA, the Setpoint curve in Smarttrack changes accordingly, and the Position curve follows the commanded motion with a slight response delay.



When ON/OFF control enable, the actuator operates to fully open or fully closed position driven by the input signal. No target position(Setpoint) is used in this mode. As a result, actuator data curve shows the Position curve moving from 0% to 100%, while the Setpoint curve remains at 0%. This indicates that the actuator relies solely on the open/close command rather than a target position

2.4.3 Event Logger (Fault Logger)

Purpose:

- Adheres to NAMUR Recommended Standard NE 107.
- Provides historical fault details for maintenance personnel.
- Assists in troubleshooting and preventative measures.

Prerequisite:

- Set actuator time upon initial use:
 - Navigate to the Event Logger page.
 - Click "Set time."
 - Ensure synchronization with PC device time.

Accessing Fault Information:

1. Access the Event Logger page:

-
- Locate the "Diagnosis" menu.
 - Select "Event Logger."
 2. Initiate recording:
 - Click "Start Record."
 3. View fault details:
 - Serial number
 - Fault description
 - Valve position at fault time
 - Fault occurrence time
 4. Terminate recording:
 - Click "Stop Record."

Exporting Fault Data:

- Click "ExportLog" to save fault information as a local file on the PC for:
 - Documentation
 - Further analysis
 - Sharing with technical support

Key Points:

- Time synchronization is crucial for accurate fault logging.
- The Event Logger aids in identifying recurring issues and optimizing maintenance strategies.
- Exported data facilitates collaboration and in-depth troubleshooting.

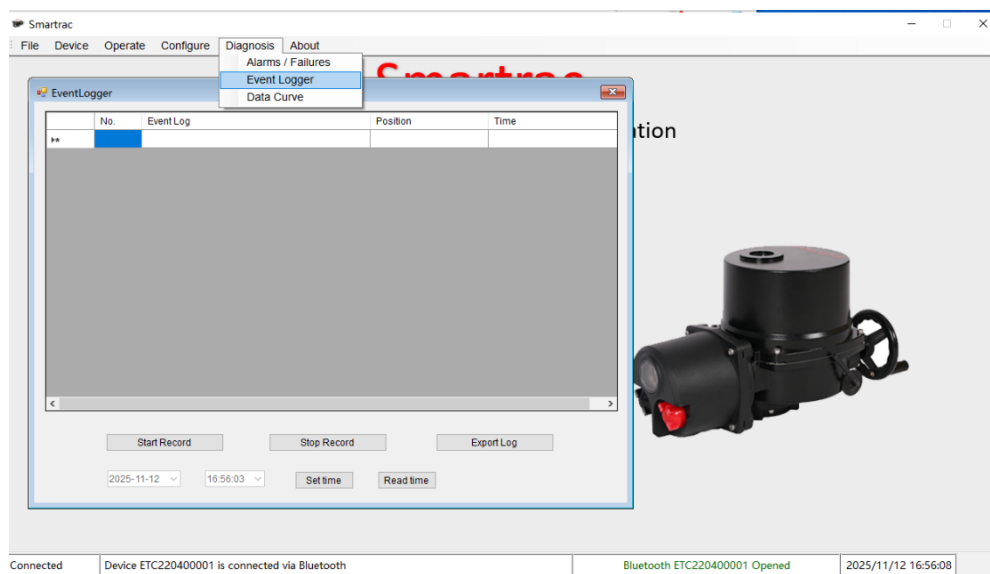


Figure 18

Note: This fault log is used by equipment maintenance personnel to troubleshoot faults.