1 Use of product

Use this product for computers operated by a Windows ® OS operating system. This software can be operated on following systems:

- Windows® 10

1.1 Technical data

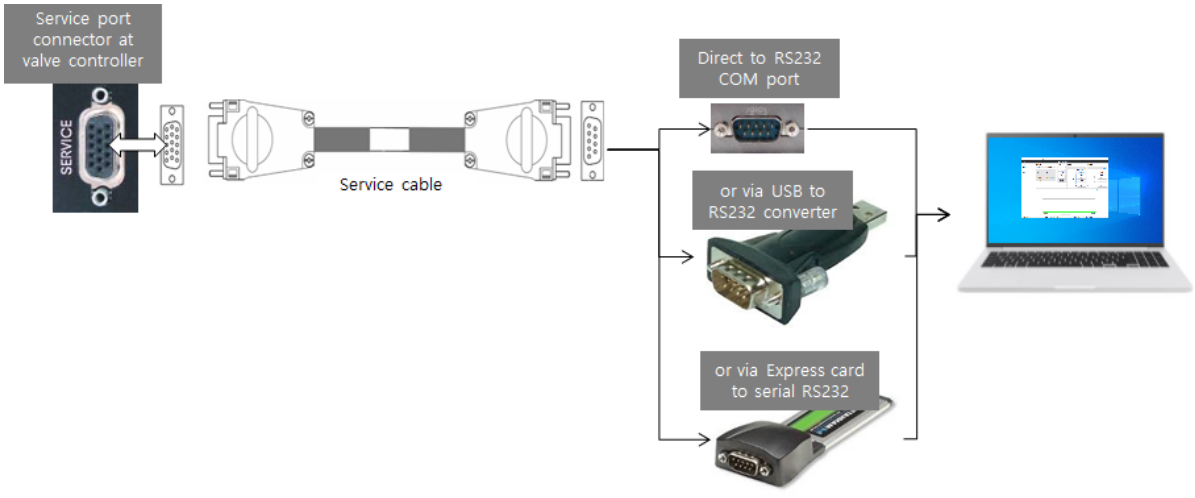
This software requires

- 100MB diskspace
- 2GB RAM
- RS232 serial port
- 1024x768 minimum resolution for the display

2 Installation

The provided ZIP file decompresses into your computer. You will see “NVM” folder.

3 Connect Valve to PC

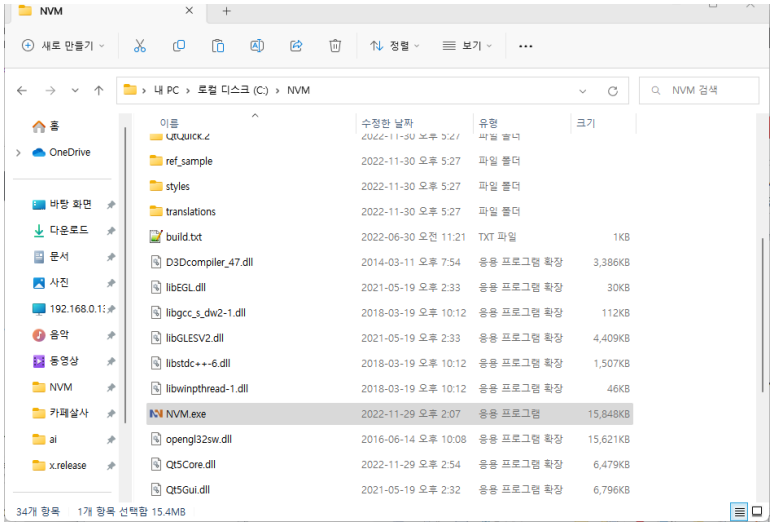


4 Start up

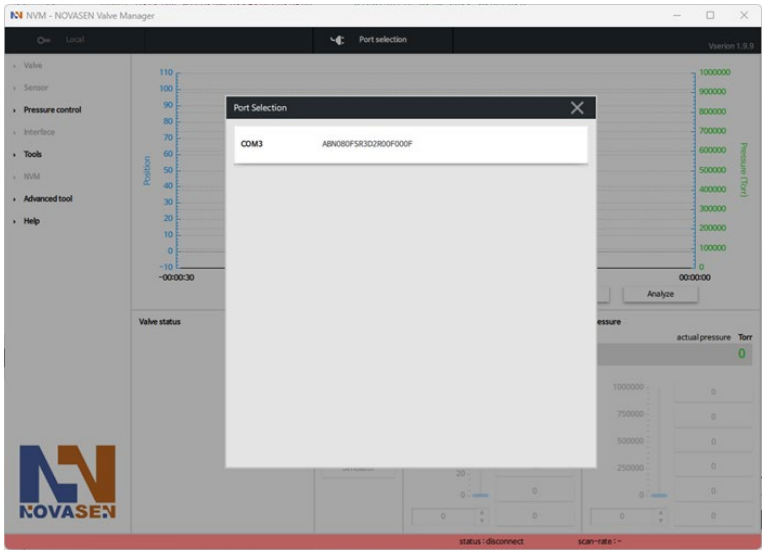
Check whether the PC is connected via the service port to your valve. Make sure, that the valve is supplied by 24VDC.

You need not do any adjustments for the RS232 port in advance. Setup of the RS232-port for the PC is done automatically by NVM Software.

1. Start the program on NVM folder > NVM.exe

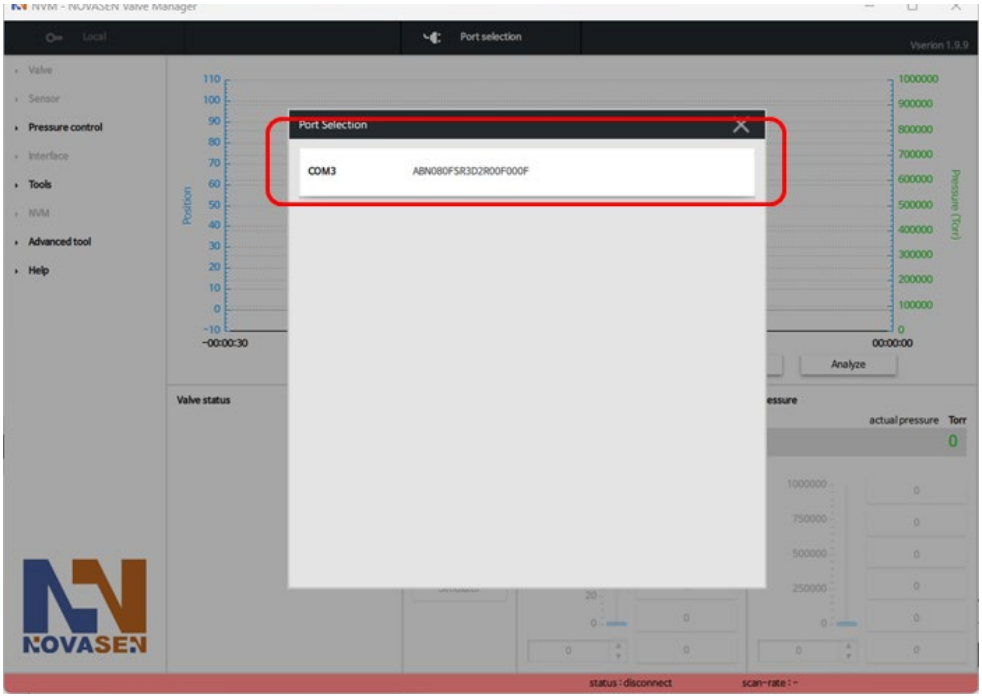


2. After startup is finished, the 'NVM' displays it Startup-screen. (example see below)



5 Connect NVM to valve

Select the port of the valve you want to connect from the port list shown in the pop-up. (double click)



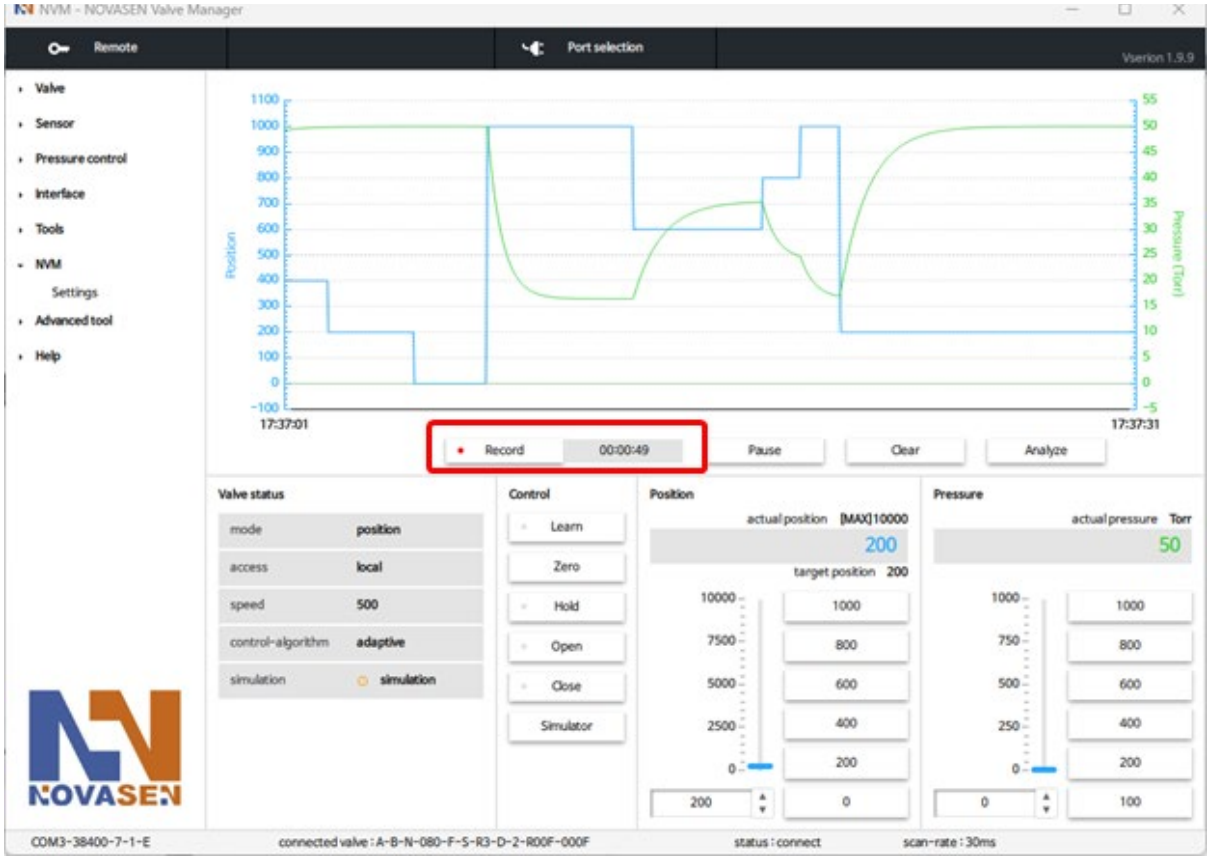
6 General screen

6.1 main screen configuration

Area	Description	Function
1	Top bar	REMOTE / LOCAL Port Selection Version - Release
2	Navigation	Explorer menus, adjustment and control
3	Chart	Display target position/pressure and current position/pressure
4	Valve status	Display the valve status
5	Control	Control(open/close/hold/learn/zero/simulation)
6	Position	Monitor, adjust target position
7	Pressure	Monitor, adjust target pressure
8	Status bar	Display com port, connected valve, connection status, scan-rate

6.2 Chart recorder

This function is used for record of position and pressure in time.



6.3 Status bar

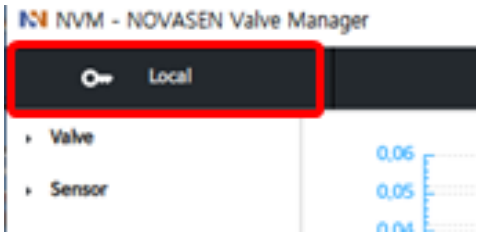
Connected (NVM is connected to valve, communication is OK and operation possible)

Disconnected (NVM is not connected to valve, no communication and no operation possible)

6.4 Use LOCAL MODE

Using the 'NVM' is only possible, when the valve is the 'Local Mode'.

- Click button [Local]

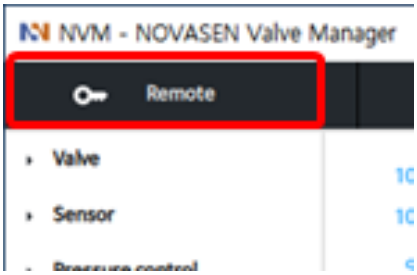


Now the valve can be operated easily via 'NVM'.

First steps should be [Open], [Close] etc.

Note: If Local operation is finished, please switch back to 'Remote mode'

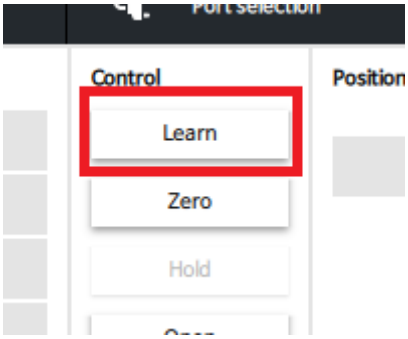
- Click button [Remote]



6.5 Learn

6.5.1 Execute learn

- Click button [Learn]



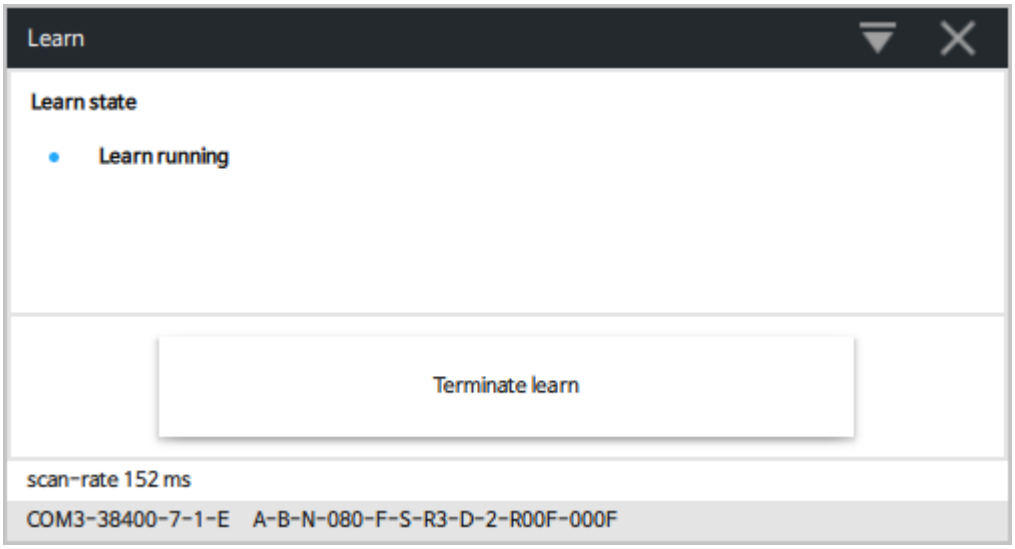
Enter the maximum pressure at which to Learn, and Click Learn

Note: Set the MFC or Flow to same as the actual process conditions.

6.5.2 Learn status

While learn is running, the actual learn status is indicated in an additional window

- Click [Terminate Learn] button to cancel learn.
- Click [X] to close the learn-status window.



The following error conditions may appear during the learn procedure:

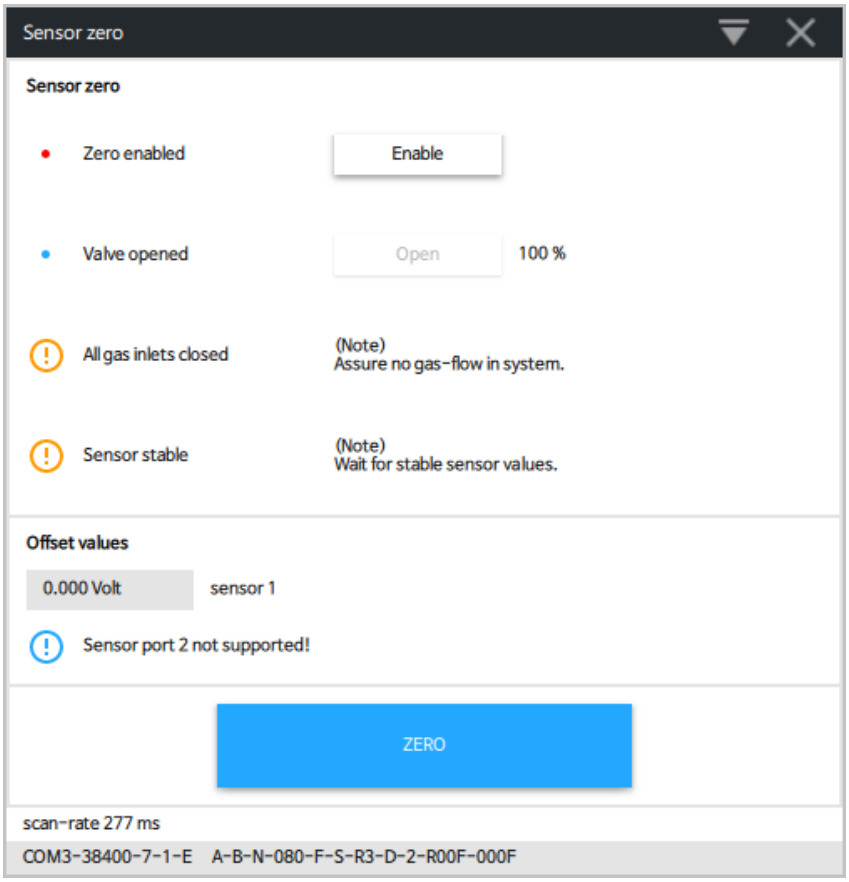
Error condition	Function
Failed by user	Control command was sent during learn procedure was running (e.g. OPEN, CLOSE, POSITION / PRESSURE command or Clicked "Terminate learn" button)
Failed by unit	Internal fault interrupting the learn procedure

6.6 Zero

Sensor Zero is a convenience function to calibrate the sensor at base pressure (no adjustment at sensor necessary). When Zero is performed the actual pressure value in set to zero. In case of 2 sensors both are calibrate (zero) at the same time.

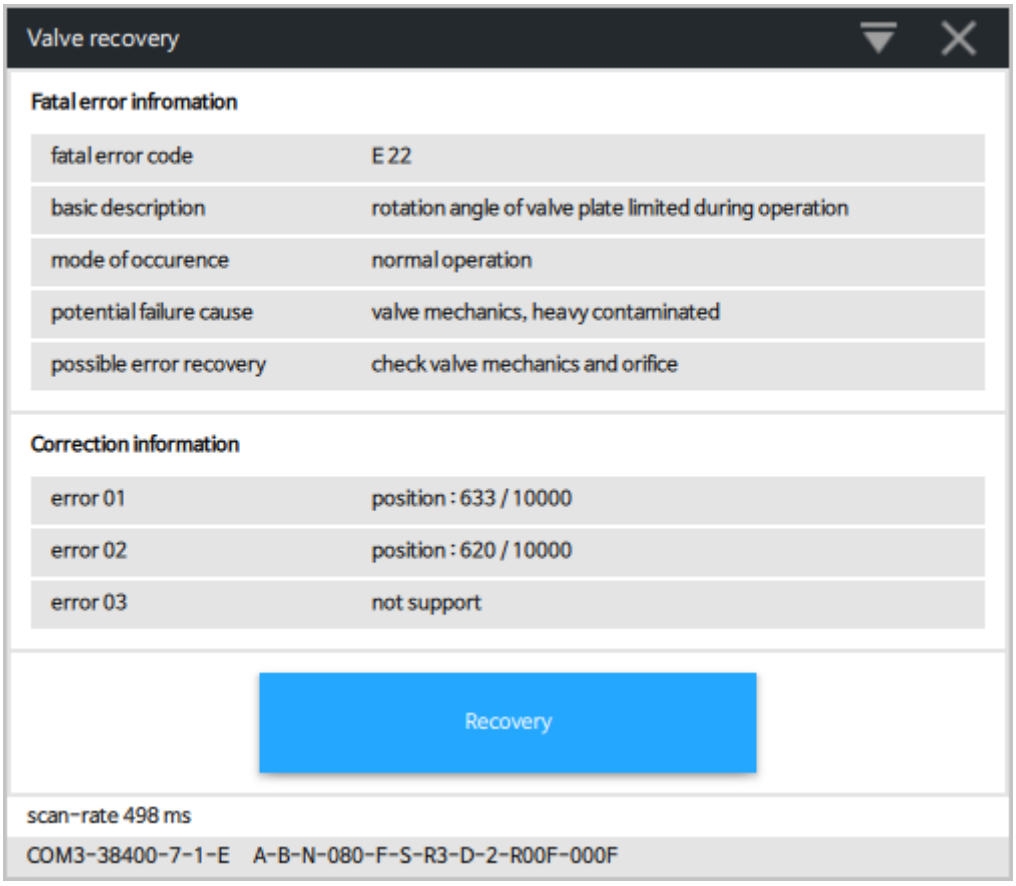
Condition for successful ZERO:

- Base pressure is reached (min. 10000 times below SFS)
- Enable Zero
- Valve is open
- No gas flow in system
- Sensor is on operating temperature
- Sensor stable, no shifting



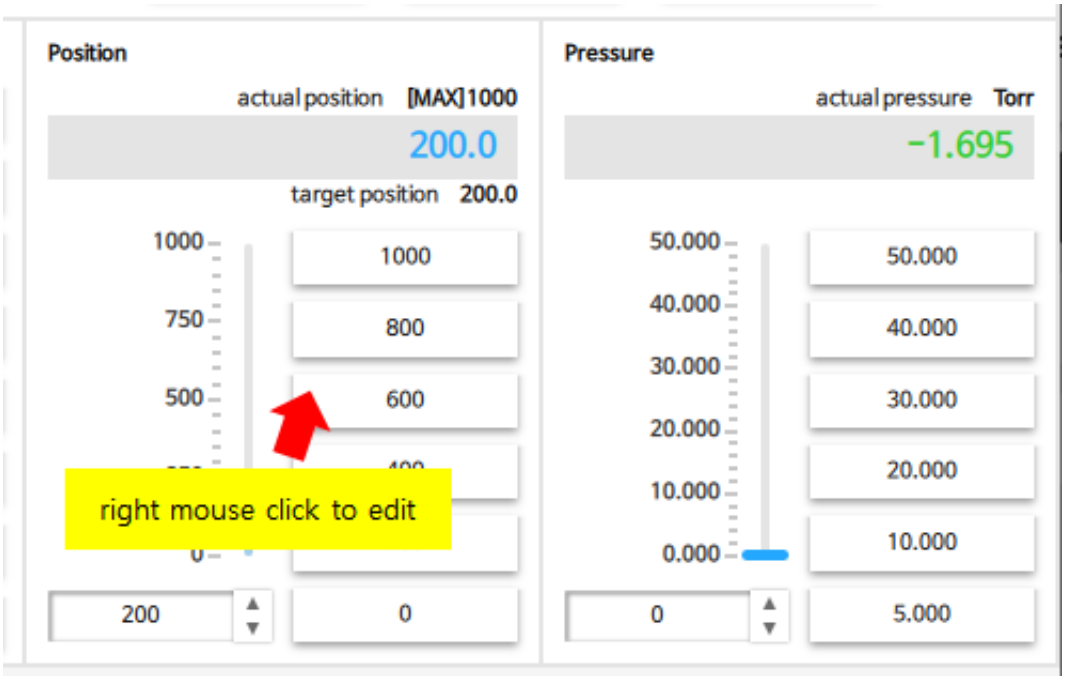
6.7 Fatal error

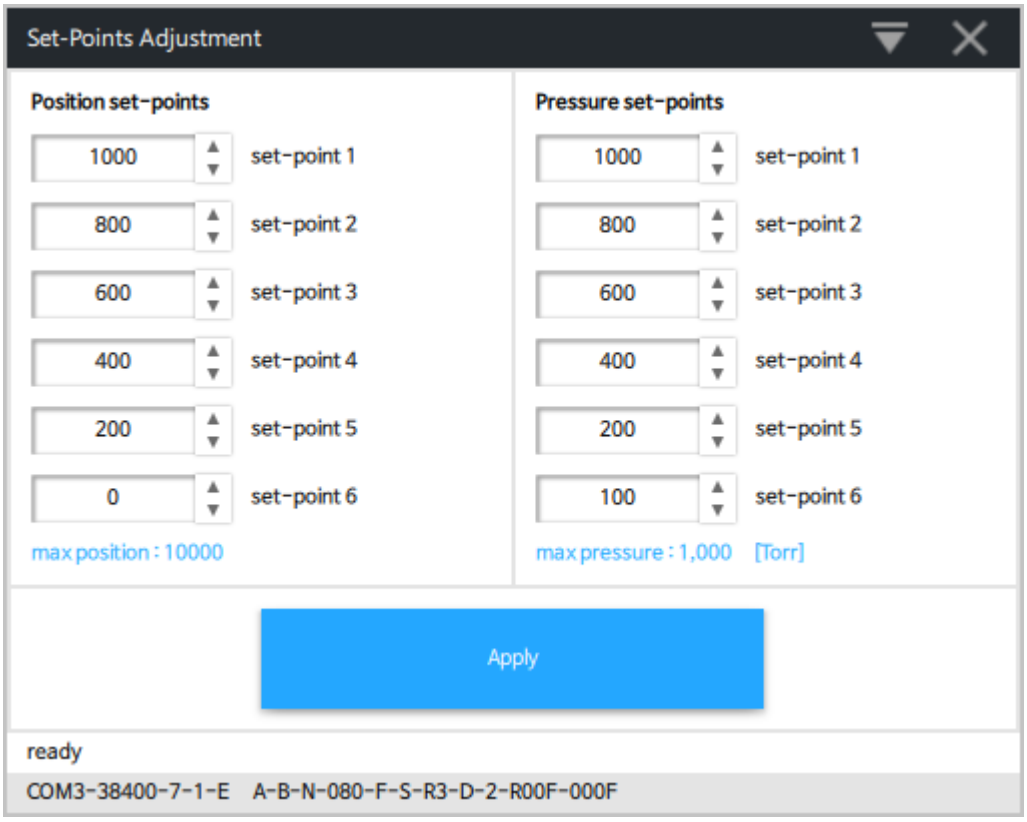
This window comes up if the valve ran into in an error condition. The basic error information is shown in the upper part of the window.



6.8 Setpoint Position and Pressure

These functions are used to set the position or pressure set-points.

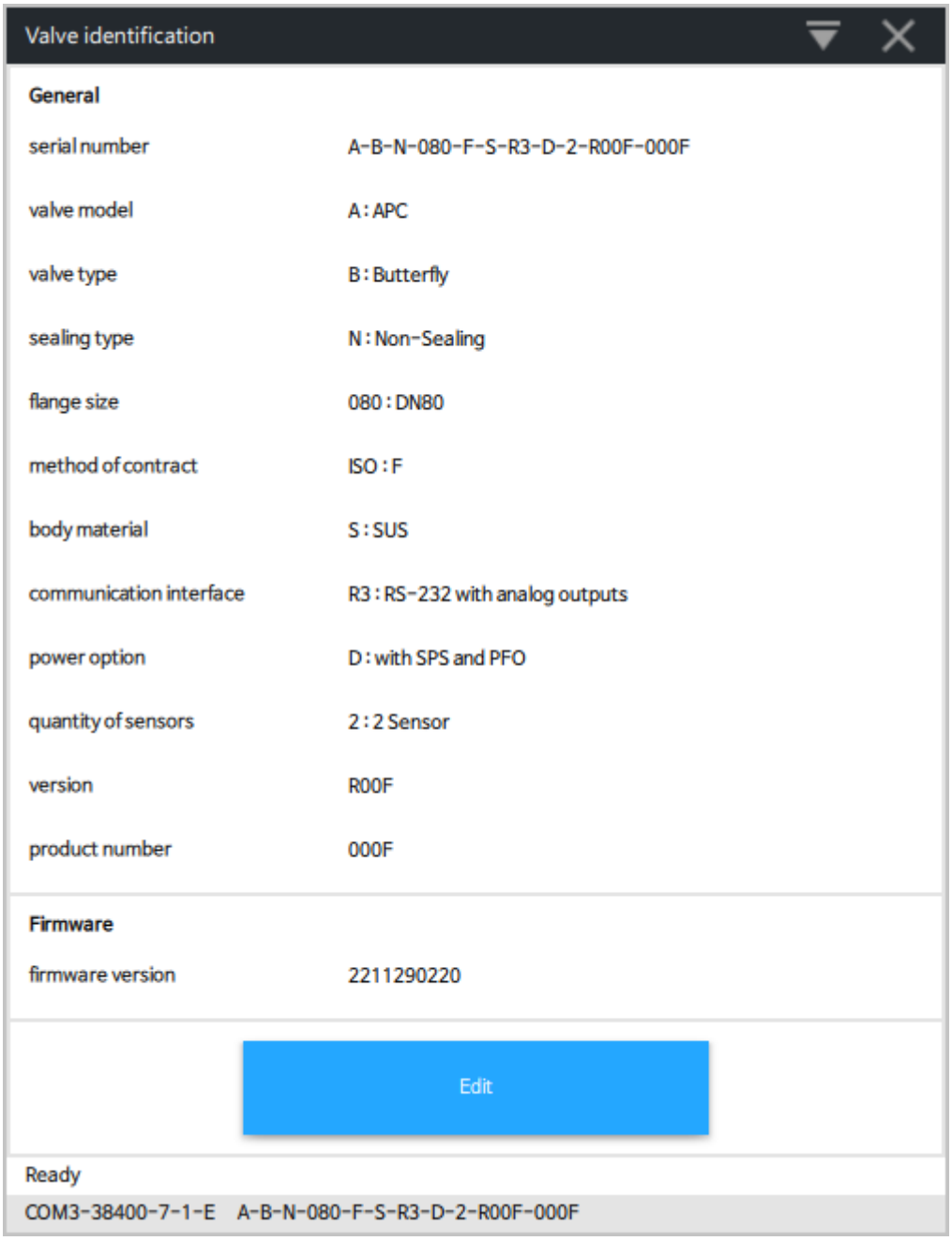




7 Valve menu

7.1 Identification

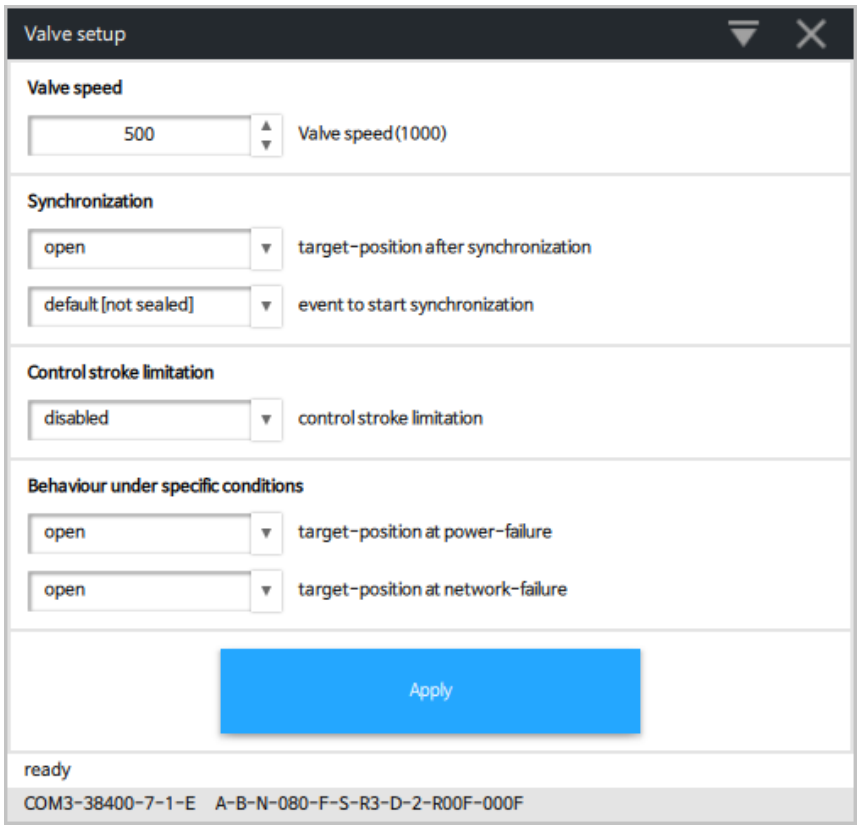
This window shows the configuration of the connected valve.



Notice : Edit properties may only be carried out by the NOVASEN service staff.

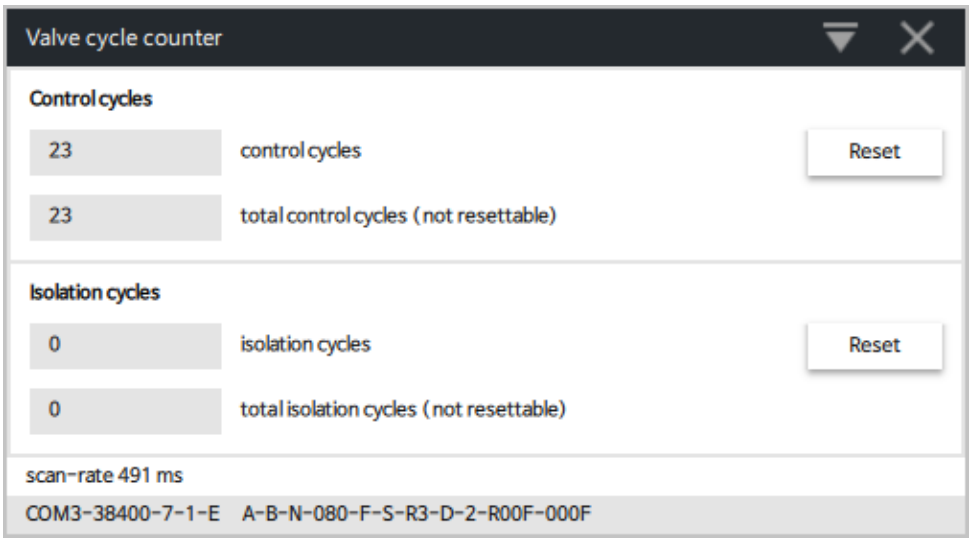
7.2 Setup

Basic configurations of valve must be adapted according to application needs. It is possible to change the settings.



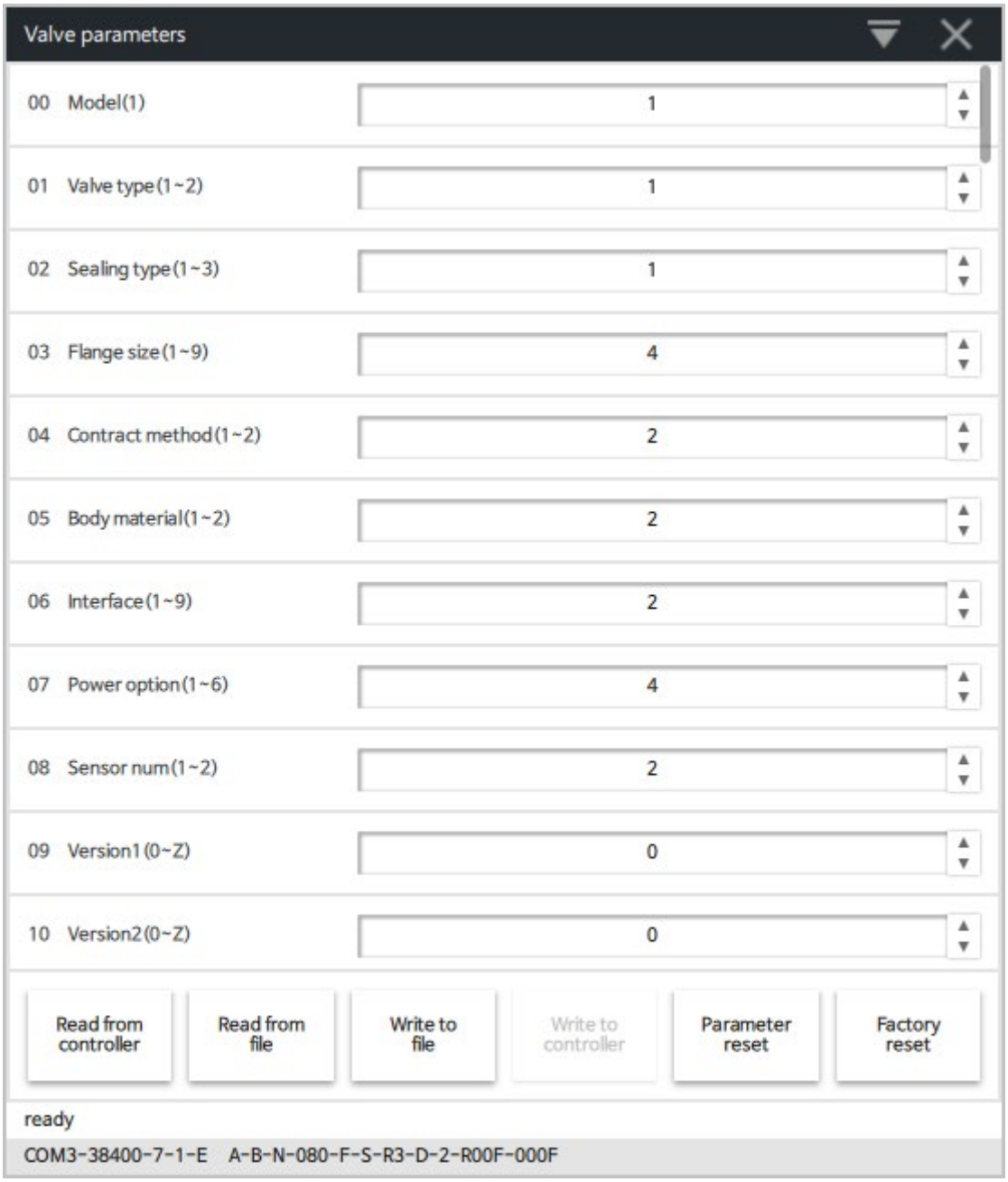
7.3 Cycle counter

This window shows the control cycles and the isolation cycles of connected valve. Reset of 'control cycles' and 'isolation cycles' are possible.



7.3 Parameters

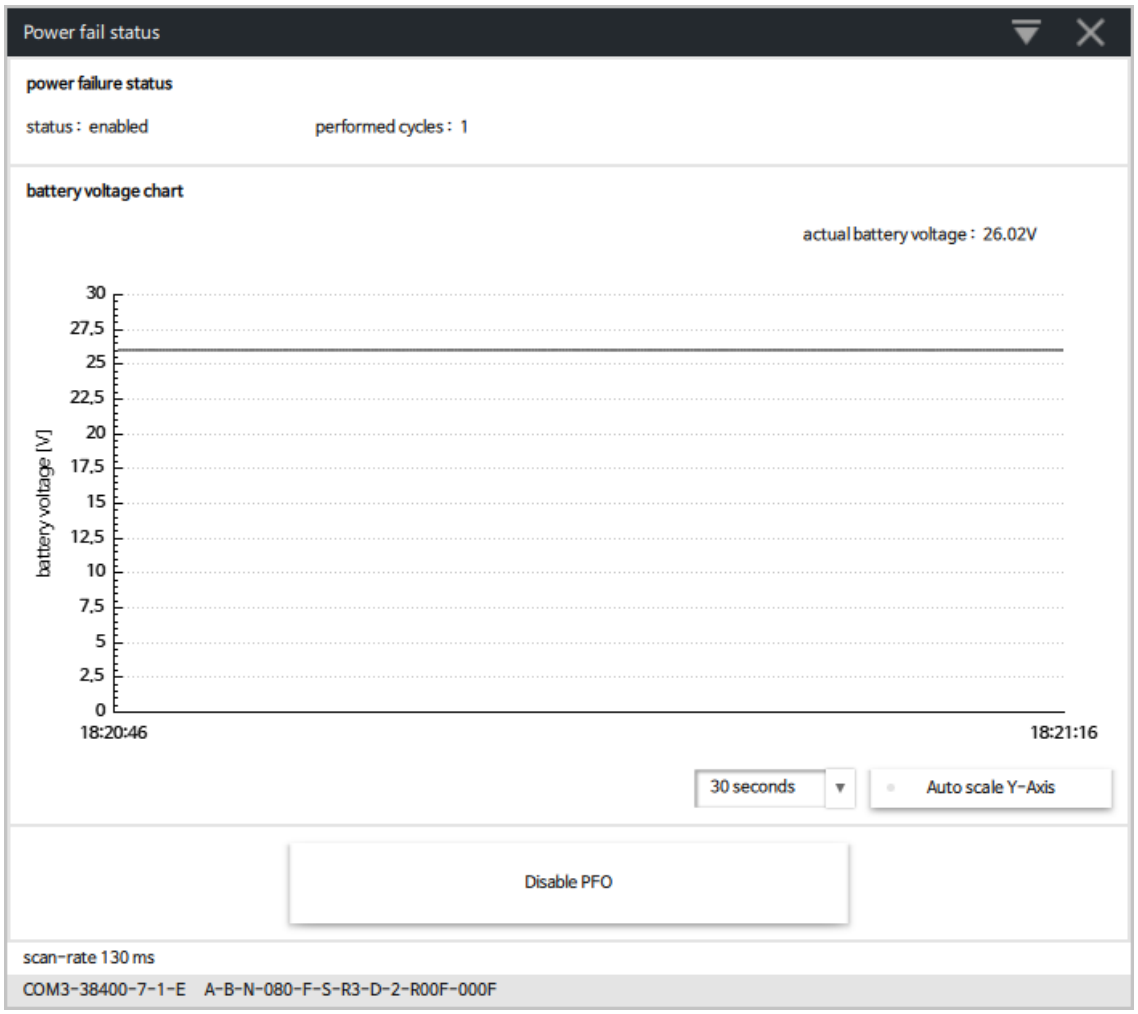
Notice : Update valve parameters may only be carried out by the NOVASEN service staff.



7.4 Power Fail Status

PFO = Power Failure Options

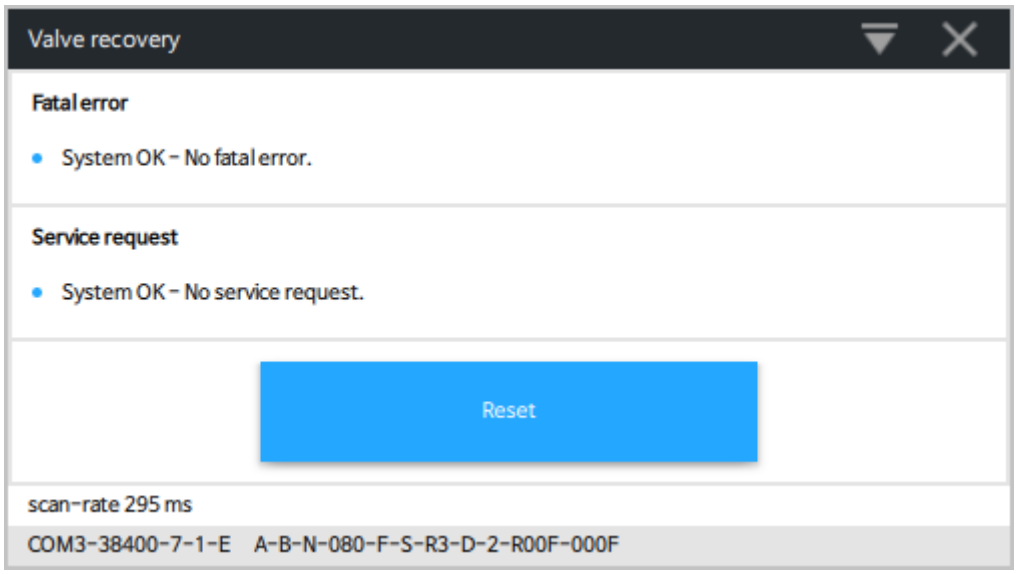
This window shows the status of PFO. This function is only available if PFO is installed. It is possible to disable PFO temporary. Click [Disable PFO]



- PFO is always enabled after power up!
- For “Safety”, disable PFO always before maintenance!

7.5 Recovery

With this function it is possible to [Reset] Fatal Error and 'Service Request'.



If Fatal Error appear:

The valve is heavily contaminated or gate seal is heavily sticking and valve cleaning is necessary.
Condition of fatal error = loss of more than 5 motor steps within 1 second.

1.Do the Maintenance procedure

2.Reset the 'Fatal Error'

If Service request appear:

The contamination of valve is getting higher and valve cleaning is necessary in near future.
Condition of service request = loss of more than 5 motor steps within 1 minute.

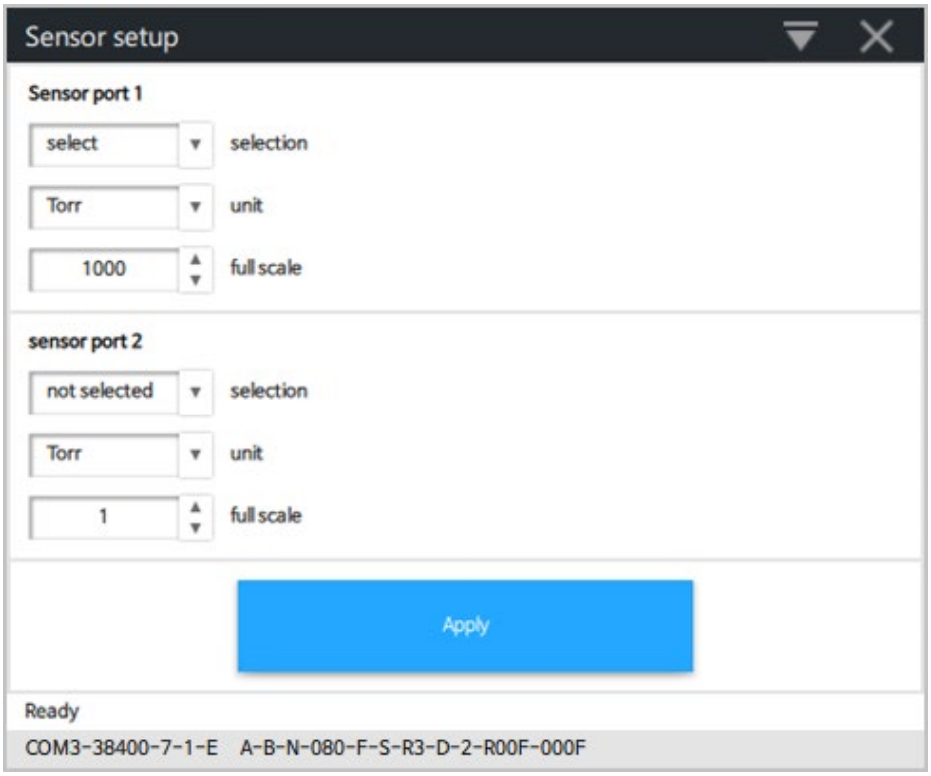
1. Do the Maintenance procedure

2. Reset the 'Service Request'

8 Sensor menu

8.1 Setup(for old version)

A sensor (vacuum gauge) is used for pressure control only. Depending on the hardware-specification **NOVASEN** valve controllers can support 1 or 2 sensors. In general sensors with a linear output-voltage range of 0 to10V are supported. A maximum sensor ratio of 100 is supported (2 sensor version).
Use the Sensor-Setup window to enter the sensor specifications of the connected sensor(s). For other sensor types please contact **NOVASEN**.

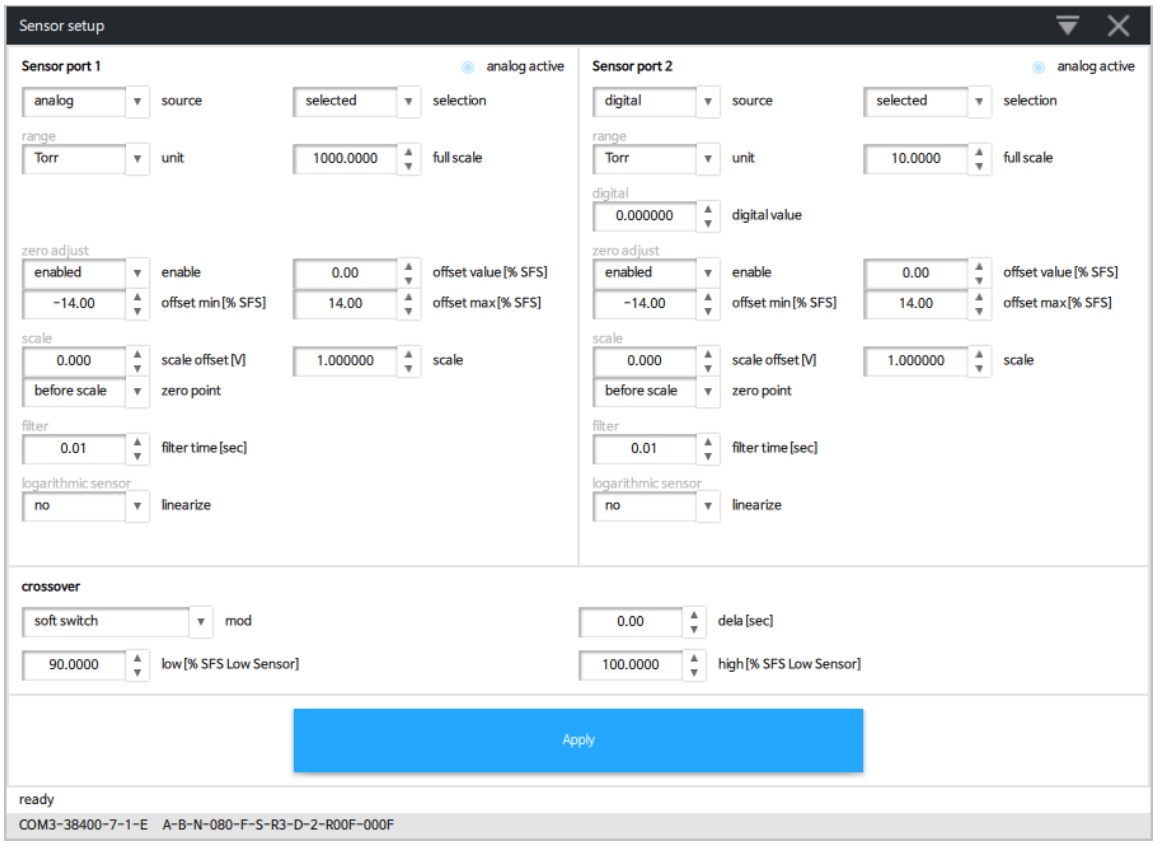


Settings

Item	Function
selection	'Selected' enable pressure control using the sensor connected to the appropriate sensor port 1 or 2. 'Not selected' to exclude this sensor from pressure control. The actual sensor value is still measured by the valve controller but is not used for pressure control.
unit	Select the pressure unit of the connected sensor according to the sensor specifications.
Full scale	Enter the full-range value of the connected sensor according to the sensor specifications. Data of sensor full scale (SFS)

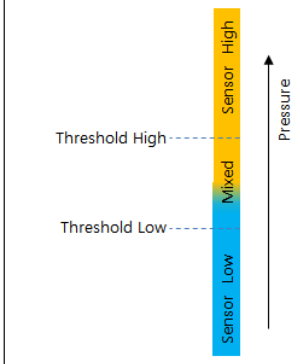
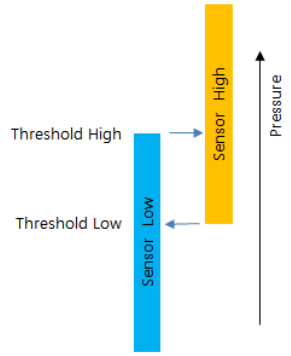
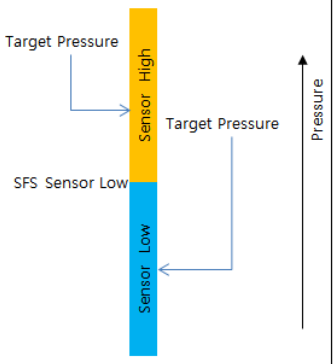
8.2 Setup(for new version)

A sensor (vacuum gauge) is used for pressure control only. Depending on the hardware-specification **NOVASEN** valve controllers can support 1 or 2 sensors. In general sensors with a linear output-voltage range of 0 to10V are supported. A maximum sensor ratio of 100 is supported (2 sensor version).
Use the Sensor-Setup window to enter the sensor specifications of the connected sensor(s). For other sensor types please contact **NOVASEN**.



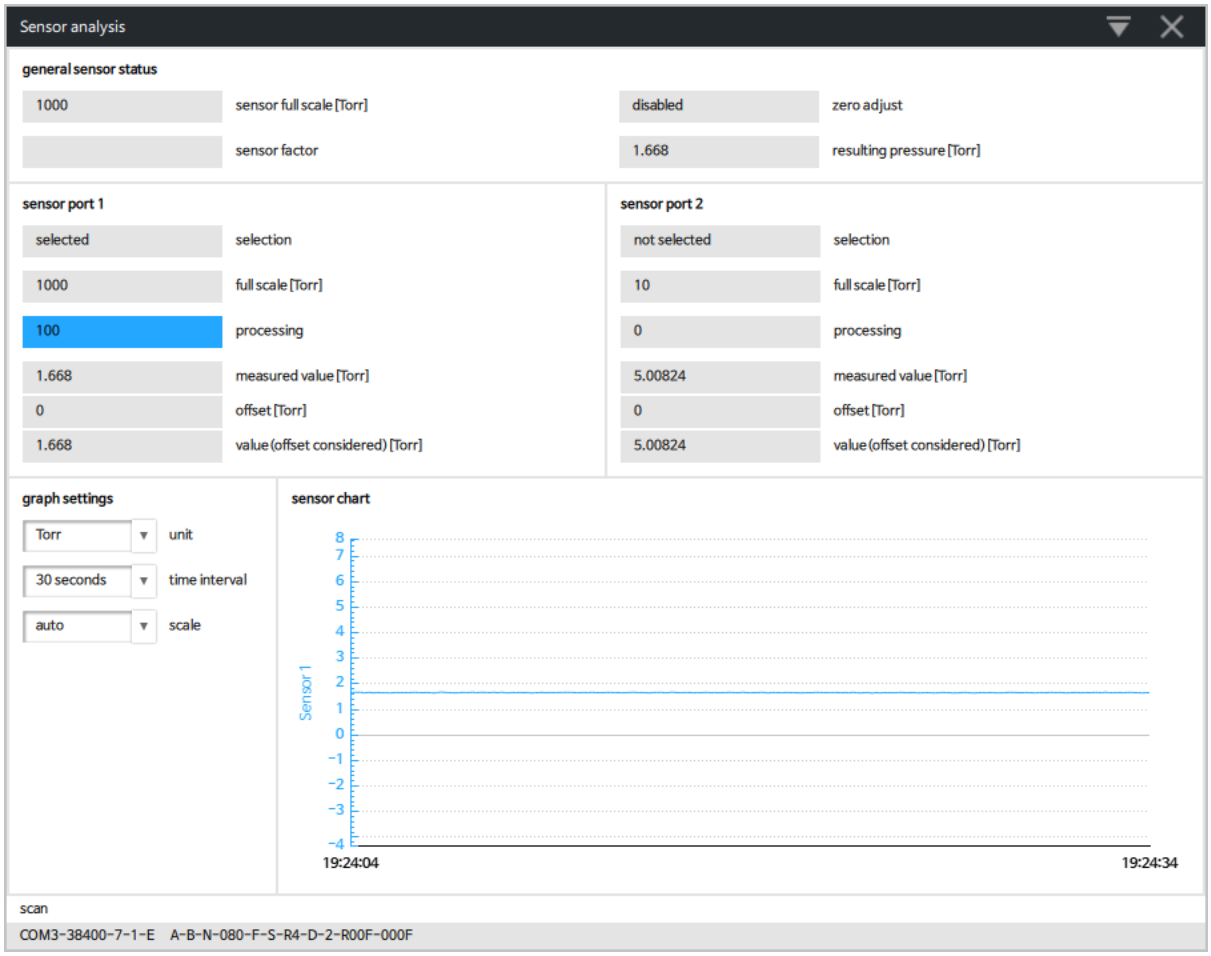
Item	Function
source	none -> if no analog or digital reading happens analog -> sensor is connected to the valve, read the analog voltage of the sensor digital -> sensor is not connected to the valve, valve receive the valve from the field bus(EtherCAT, Profibus or CCLink)
selection	“selected” enable pressure control using the sensor connected to the appropriate sensor port 1 or 2. “not selected” to exclude the sensor from pressure control. The actual sensor valve is still measured by the valve controller but is not used for pressure control.

unit	Select the pressure unit of the connected sensor according to the sensor specifications.
full-range	Enter the full-range value of the connected sensor according to the sensor specifications. Data of sensor full scale (SFS)
digital value	Actual value of the digital input. (Or it is possible to set the value for test purpose)
zero adjust	The feature is used to set the actual pressure value of a vacuum system to zero. Select enable or disable to activate or deactivate the feature. Please refer to <<6.6 Zero>> for further details.
offset value	Shows resulting value after a zero adjust or can be used to set the value.
offset limit min	Depending on the voltage range of the sensor the offset limit can be adjusted. e.g. range of Sensor -0.2..10.5V --> offset limit min = -0.2, offset limit max = 0.5V
offset limit max	
scale offset	Linear sensors with other voltage range as 0..10V has to be scaled: Sensor 0..5V --> scale factor = 2, scale offset = 0; Sensor 1..9V --> scale factor = 1.25, scale offset = 1.0 V Sensor -10..10V --> scale factor = 0.5, scale offset = -10.0 -10V Zero adjust must take place at the calculation point where the value should be 0, therefore zeroing must happens before or after scaling.In above example for sensor 1..9V it is after scale, for all others it is before scale.
scale factor	
zero point	
filter time	Reduces noise of the sensor signal Note: For pressure control it is not good to have delayed sensor signal, so be carefully with filtering of the sensor signal.

linearize log signal voltage per decade voltage at full scale	If a logarithmic sensor is used, then there are 2 possibilities: 1. Pressure control with the logarithmic signal - no linearization on the valve (Linearization 'off' in 'Sensor - Setup') - linearization in the NVM (Linearization 'on' in NVM - Settings') - use of PI pressure control algorithm (adaptive algorithm cannot be used because it needs a linear signal) - advantage: whole range of sensor can be used 2. Pressure control with a linearized signal - linearization on the valve (Linearization 'on' in 'Sensor - Setup') - no linearization in the NVM (Linearization 'off' in NVM - Settings') - can use adaptive or PI pressure control algorithm - disadvantage: only about 4 decades of the sensor range can be used for pressure control voltage per decade: normally can be found in the manual of the sensor. voltage at full scale: highest voltage point of the logarithmic sensor for pressure control
crossover mode crossover low crossover high crossover delay	● When two sensor are used for pressure control the crossover handles the two pressure signals to building one system pressure(Actual pressure) **Soft switch** Smooth transition between sensors  Within the threshold levels, the resulting measurement value is a summation of the two sensors signals with a proportional ratio of the two measured values. **When to use** This is the standard mode. Values of both sensors need to fit together in the crossover area. otherwise crossover effect result. (nonlinearity). Therefore, sensor ratio should not be too height(about <= 100). **Hard switch** Abrupt switcher between sensors  Switching between sensors according to the hysteresis threshold levels and an optional delay. **When to use** Preferred setting if the sensor signals don't fit together in the crossover area (for example if sensor ratio is high) **Target pressure**  crossover delay : wait time after crossover trigger happens (only for 'Hard Switch')

8.3 Sensor analysis

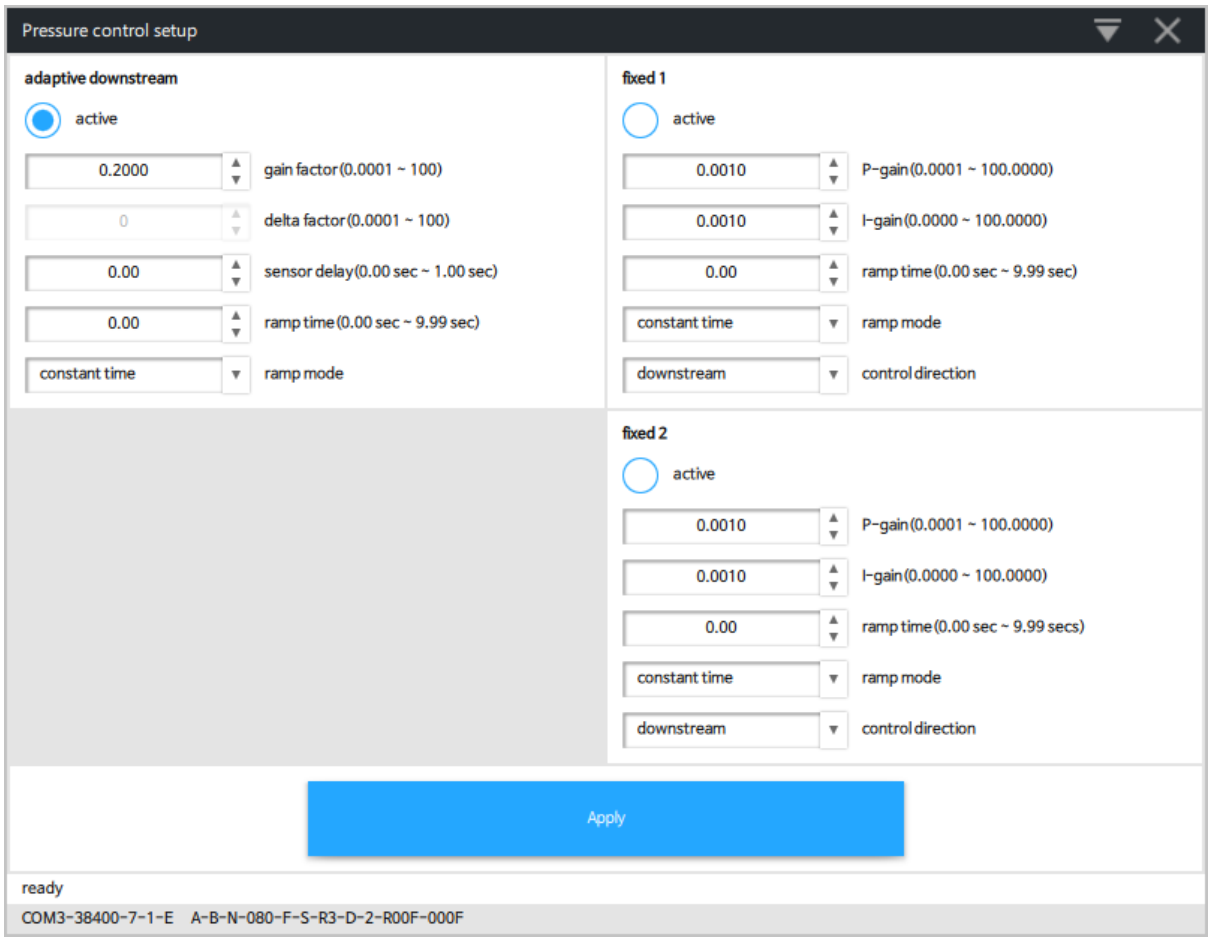
The Sensor analysis screen shows the actual data of connected sensor(s).



9 Pressure control menu

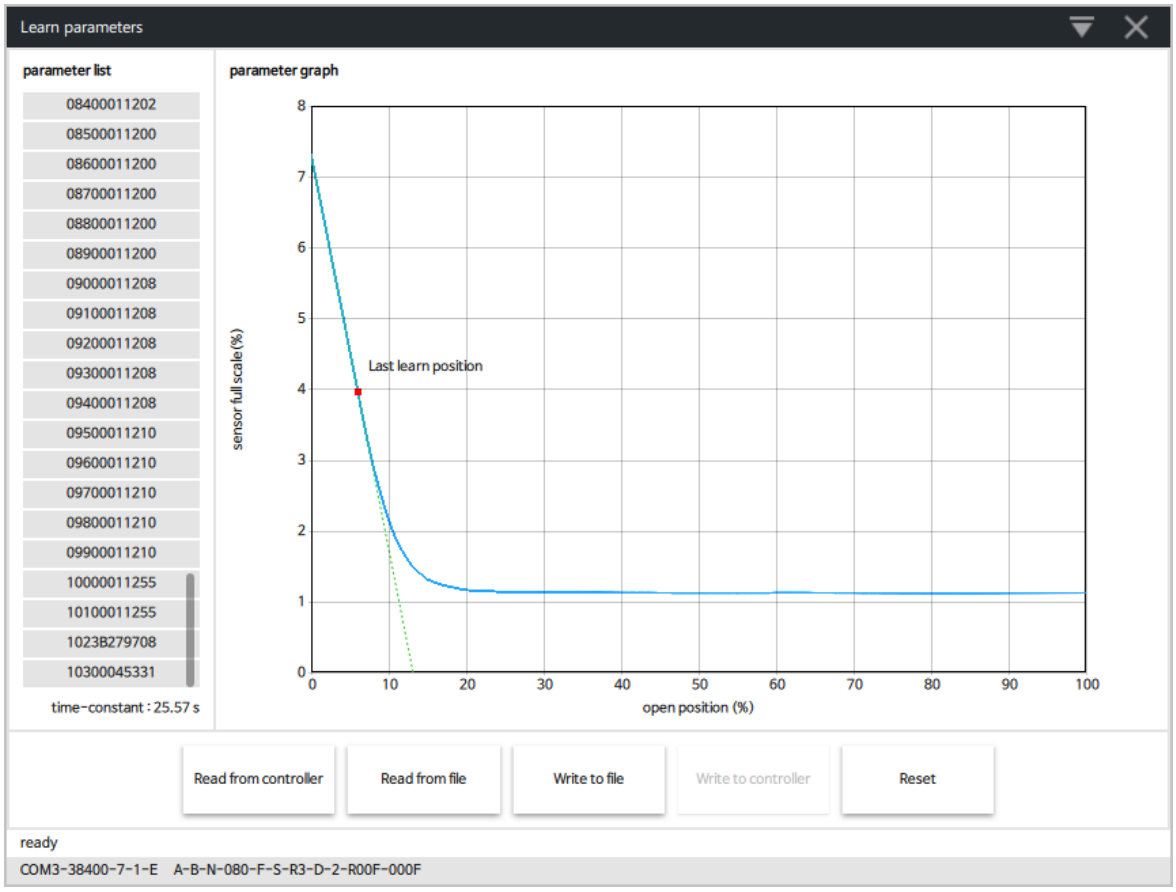
9.1 setup

Select the Pressure Control - Setup configuration according to requirement of application. Refer for details to chapter: «4.7 Tuning of pressure control (adaptive) » in the valve manual for function and adjustment procedure.



9.2 Learn parameters

With this function it is possible to «Load», «Write», «Read» or «Save» the 'Learn Parameters'.

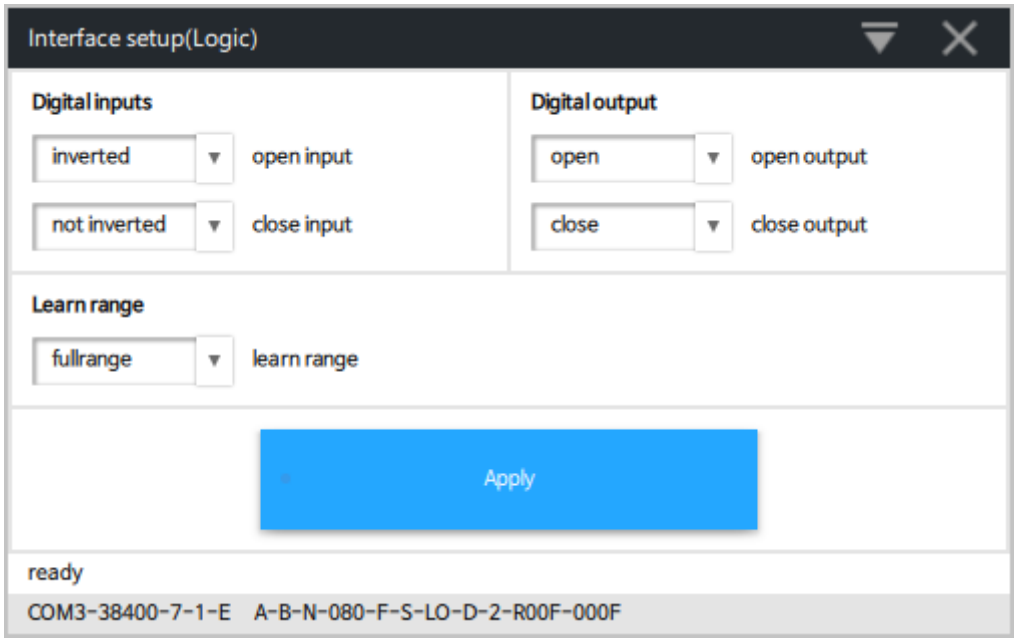


10 Interface(Logic)

10.1 setup

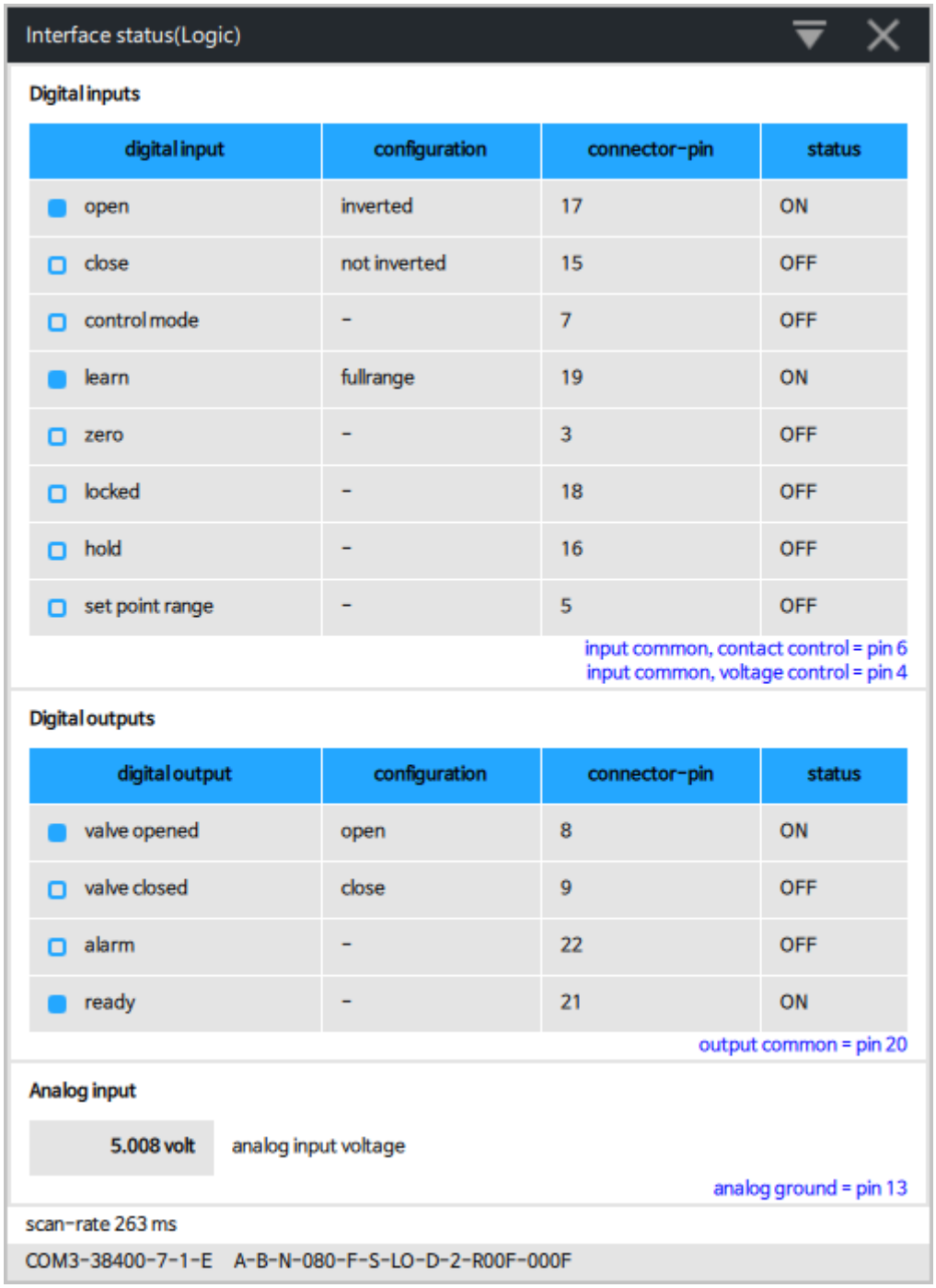
For setting the Logic interface configuration, select each parameter according to your host computer.

Refer to chapter: «Digital inputs» and «Digital outputs» in the valve manual for details.



10.2 status

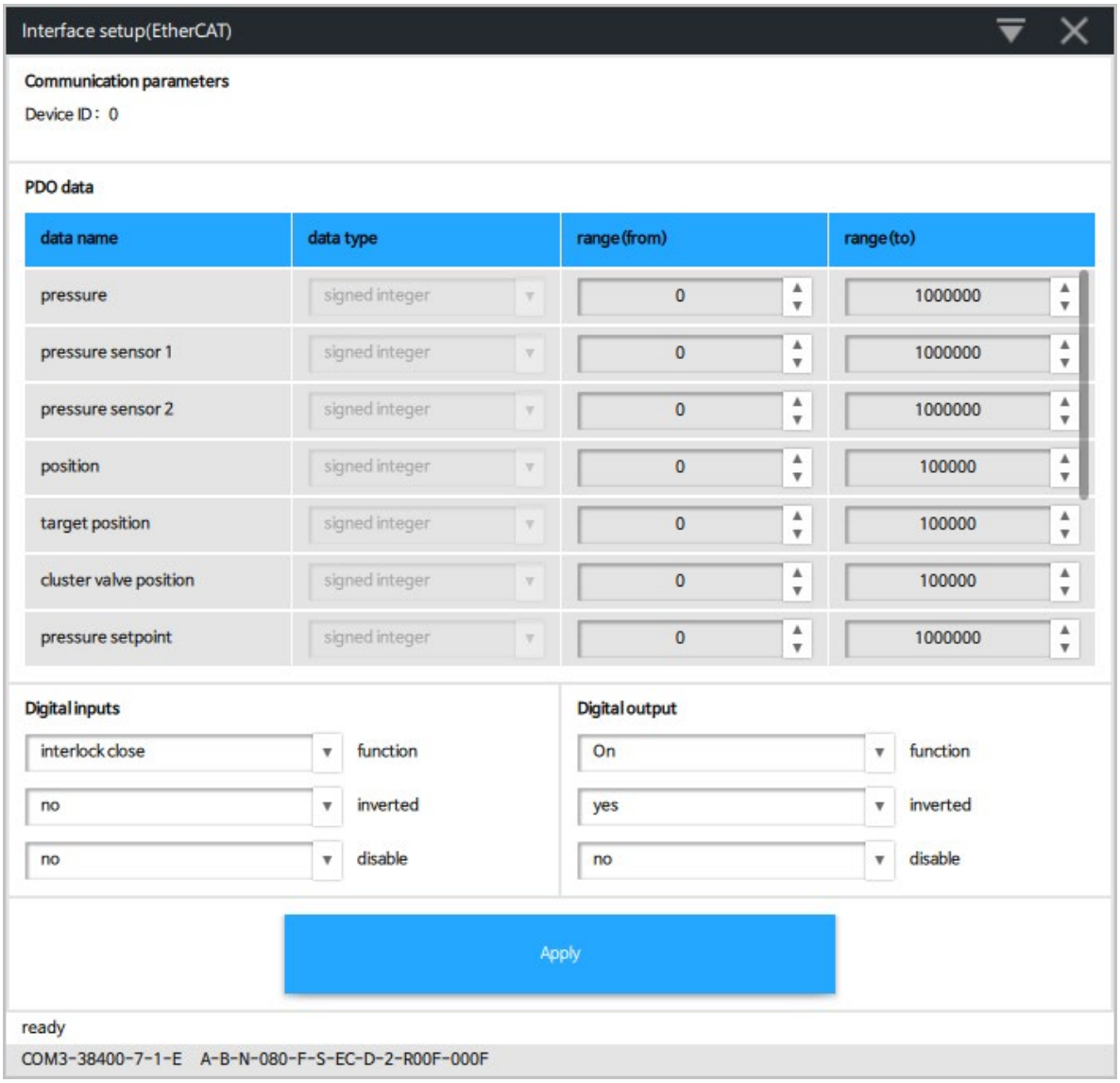
This window shows the Status (digital input / digital output / analog input) of connected valve with Logic interface.



11 Interface(EtherCAT)

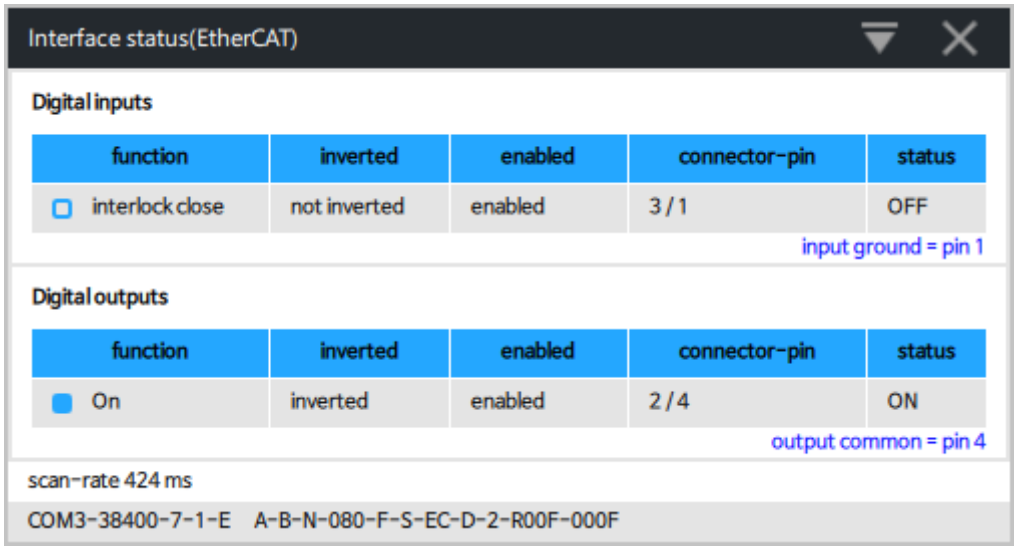
11.1 setup

For setting the EtherCAT interface configuration, select each parameter according to your host computer.



11.2 status

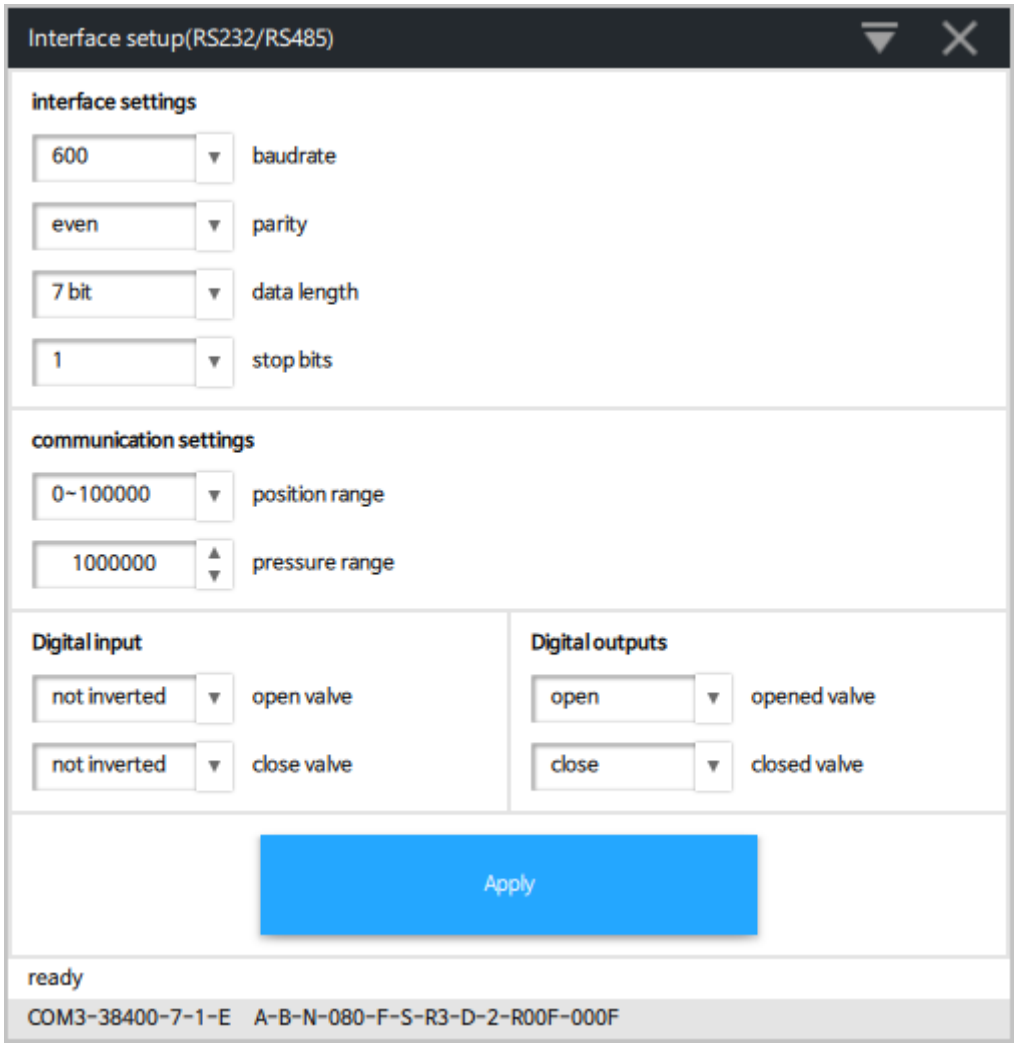
This window shows the Status (digital in/out) of connected valve with EtherCAT interface.



12 Interface (RS232)

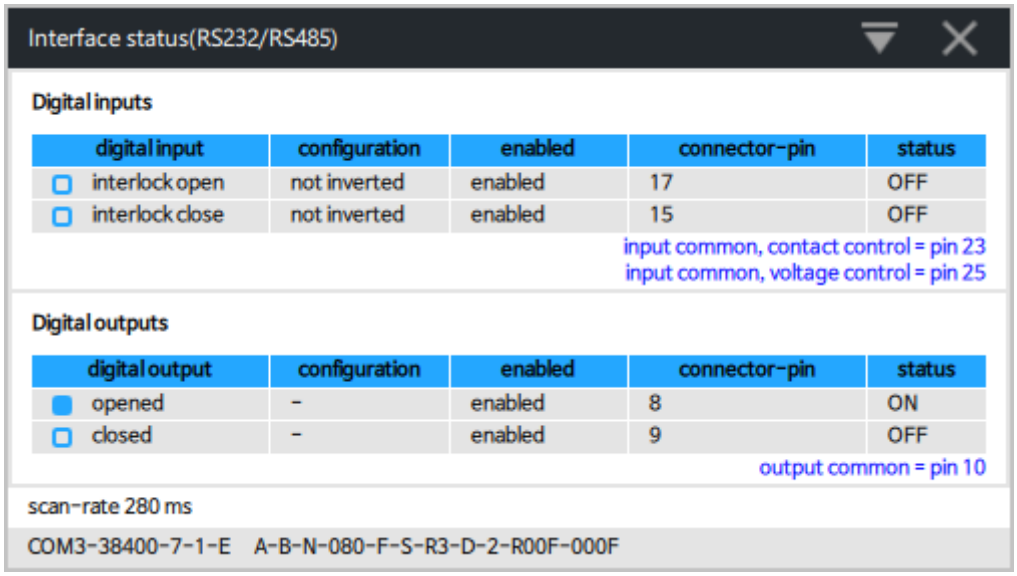
12.1 setup

For setting the RS232 interface configuration, select each parameter according to your host computer.



12.2 status

This window shows the Status (digital in/out) of connected valve with RS232 interface.



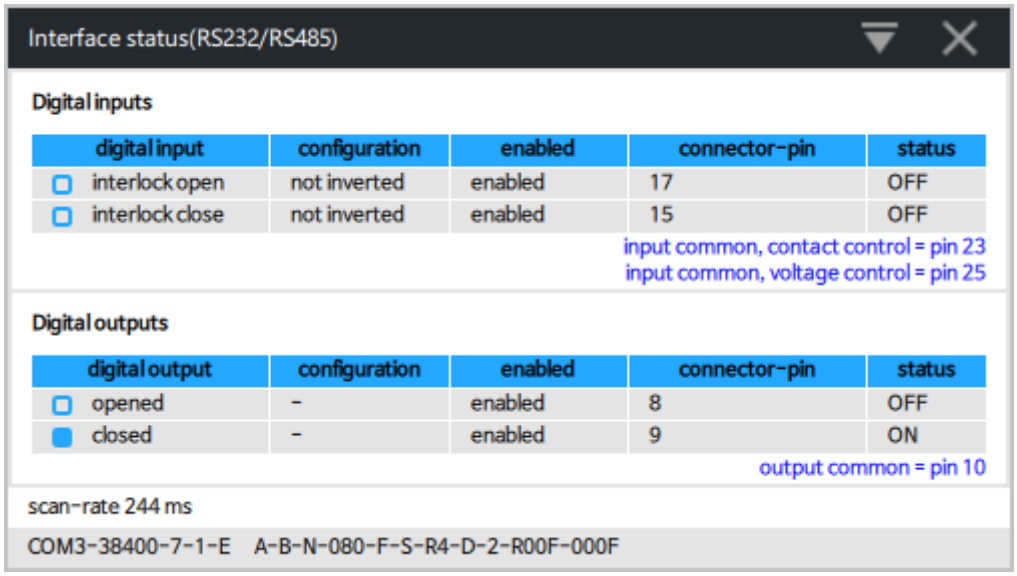
13 Interface (RS485)

13.1 setup

For setting the RS485 interface configuration, select each parameter according to your host computer.

13.2 status

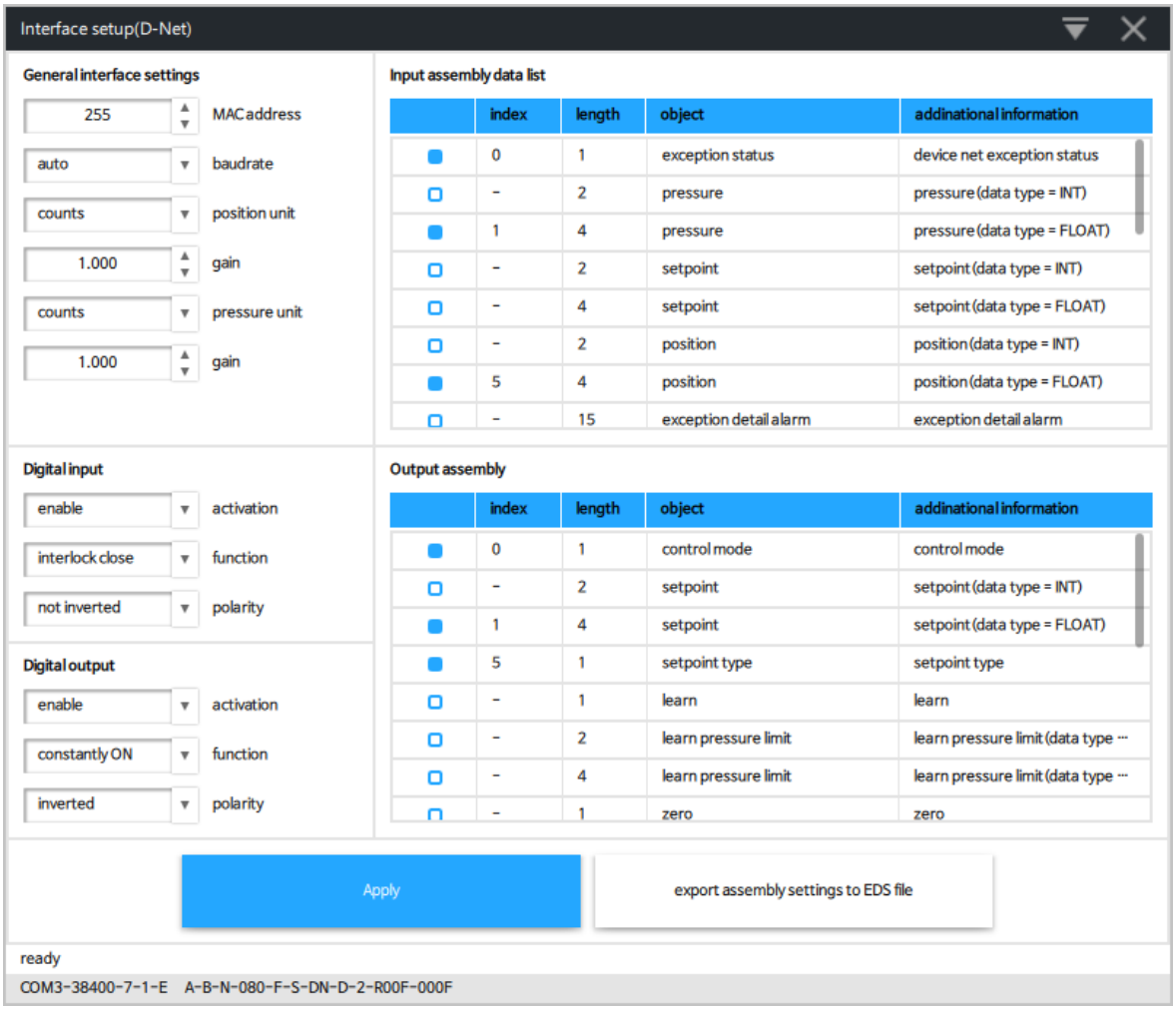
This window shows the of connected valve with RS485 interface.



14 Interface (DeviceNet)

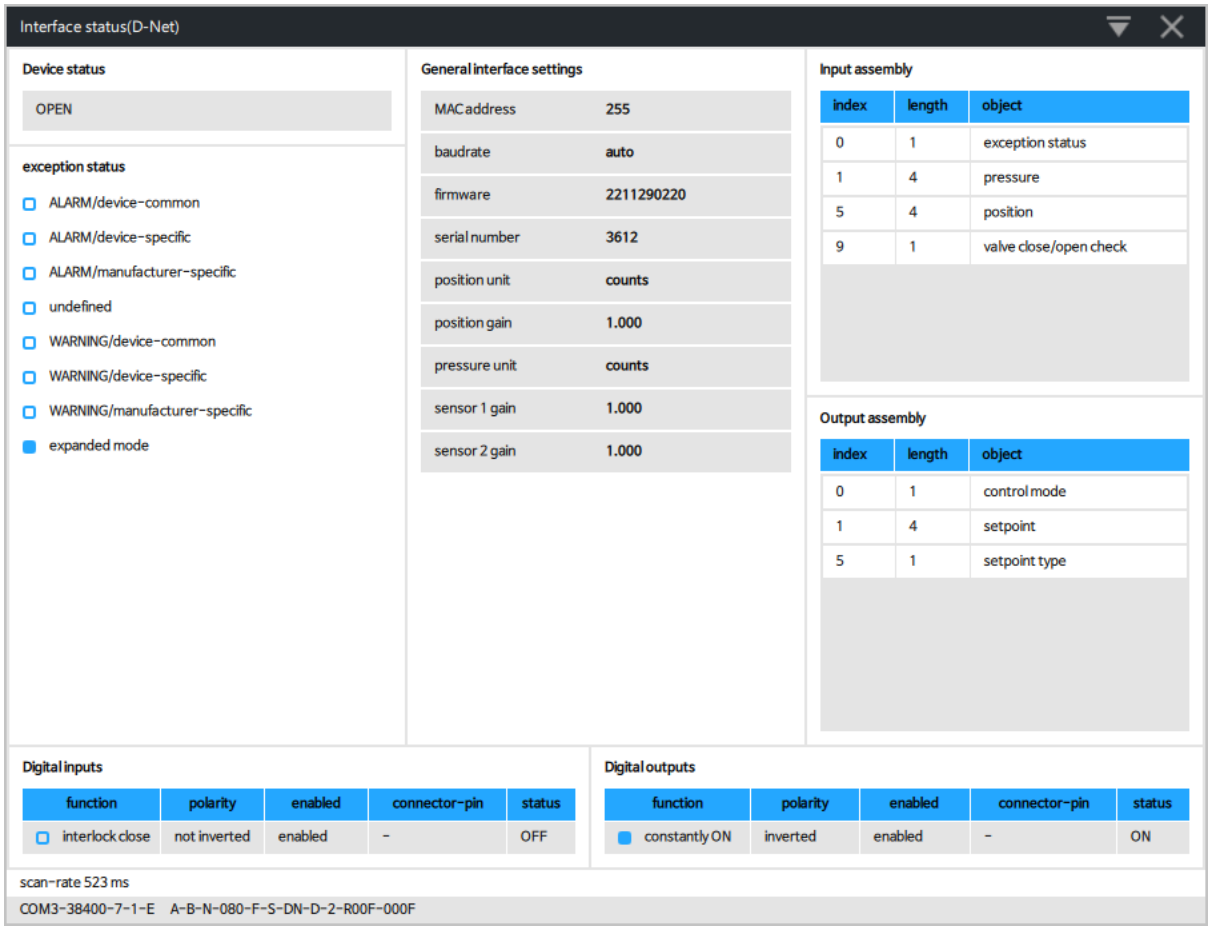
14.1 setup

For setting the DeviceNet interface configuration, select each parameter according to your host computer.



14.2 status

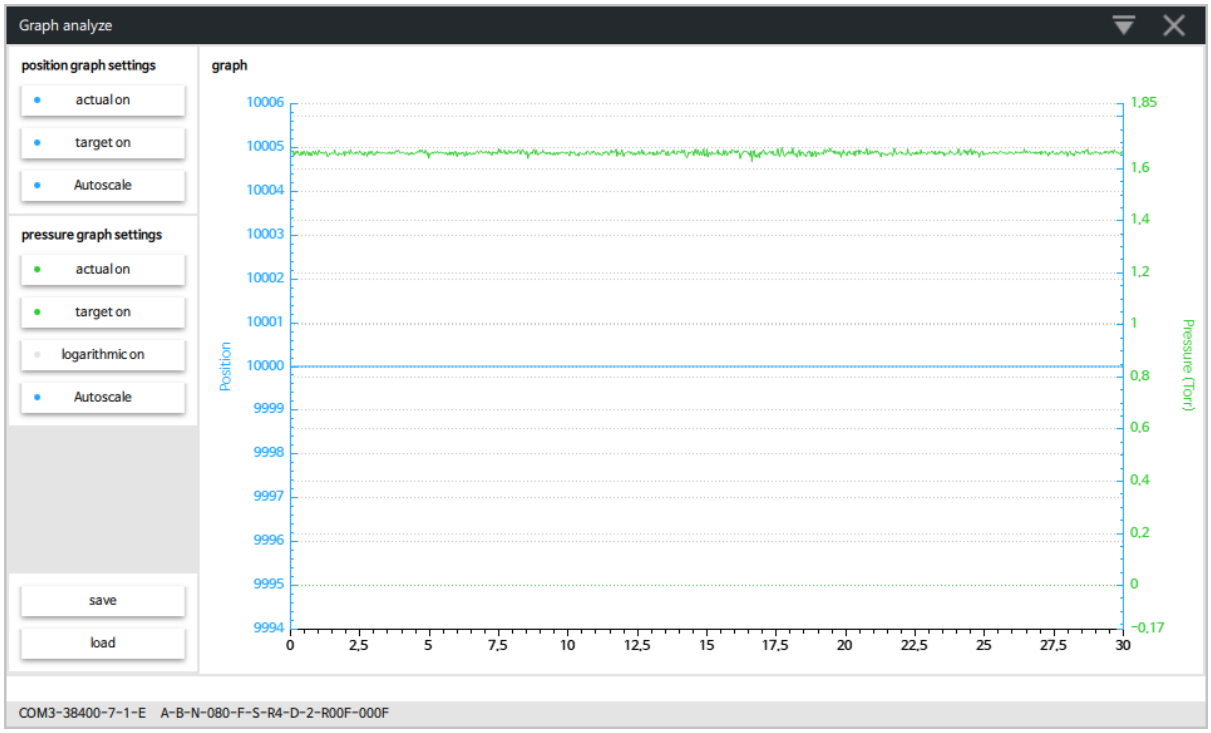
This window shows the of connected valve with DeviceNet interface.



15 Tool

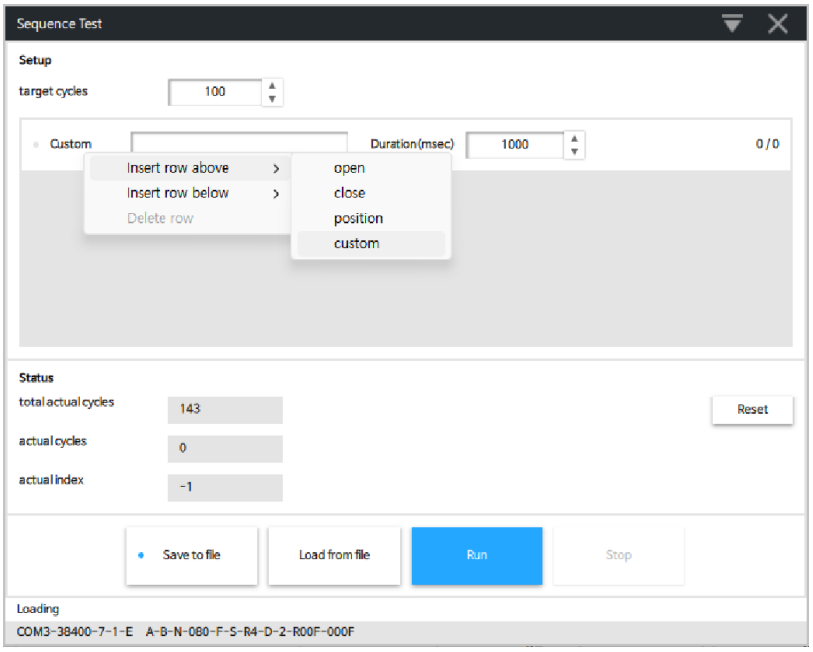
15.1 Graph analyze

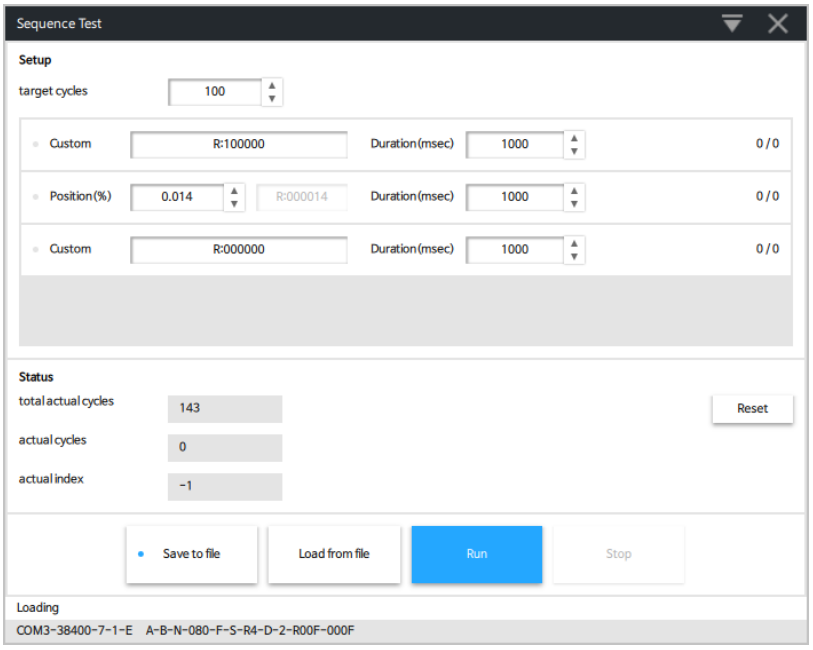
A chart that was recorded by the graph in the main screen can be displayed.



15.2 Sequencer

Creating a command sequence.



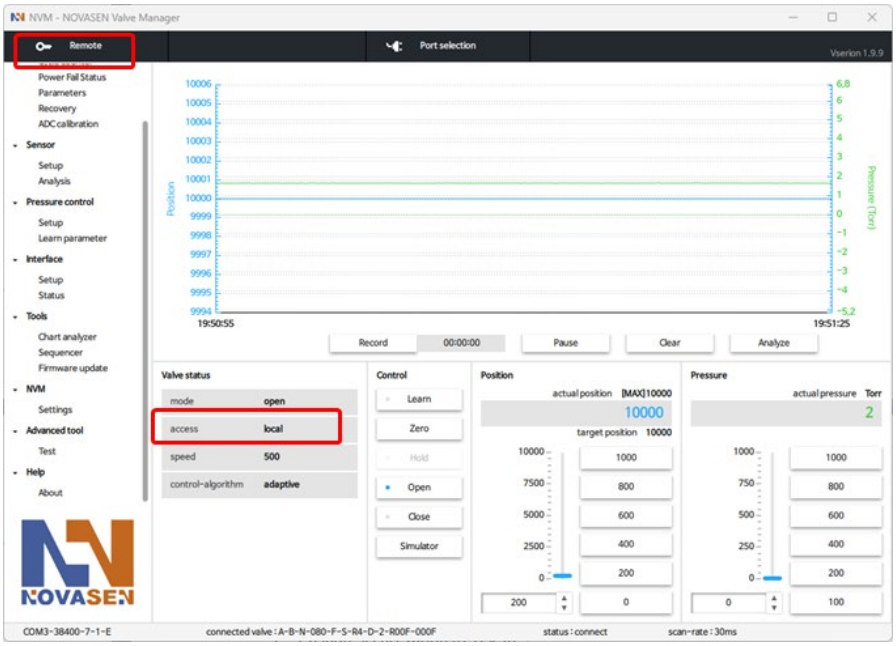


- Choose command or type command
- Input target cycles
- Click [Run] to start the sequence. Click [Stop] to stop the sequence

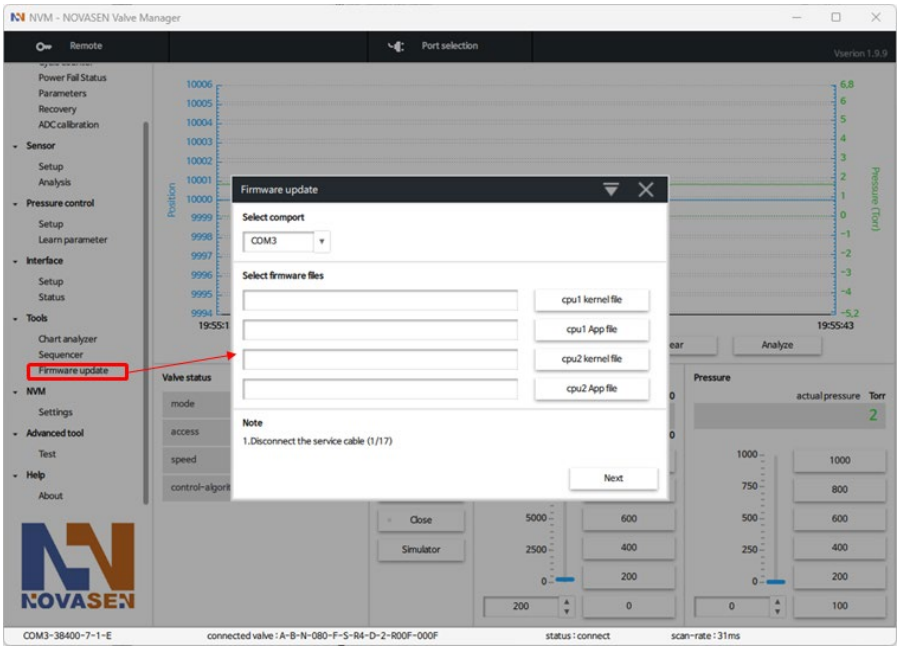
15.3 Firmware update

'Firmware update' is used for update firmware to valve controller.

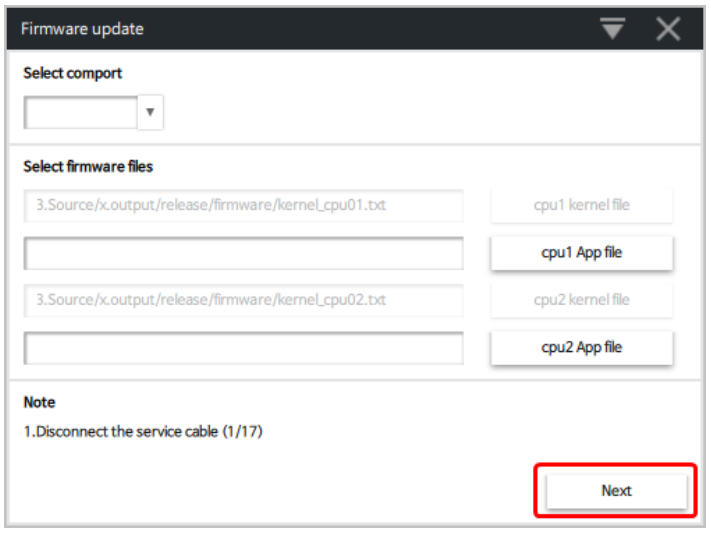
1. Change access mode to 'LOCAL'



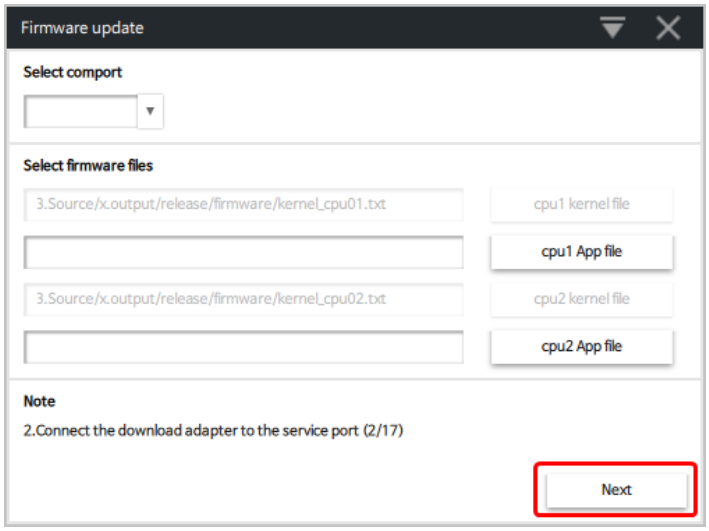
2. Click [Tools->Firmware update]



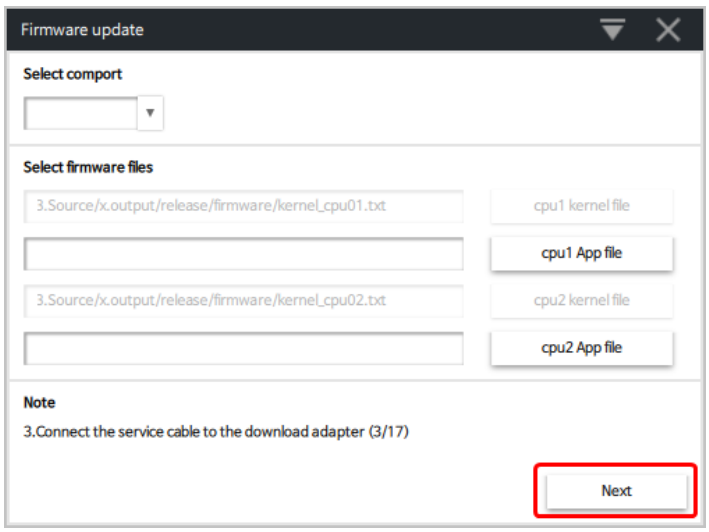
3. Disconnect the service cable. Click “Next”



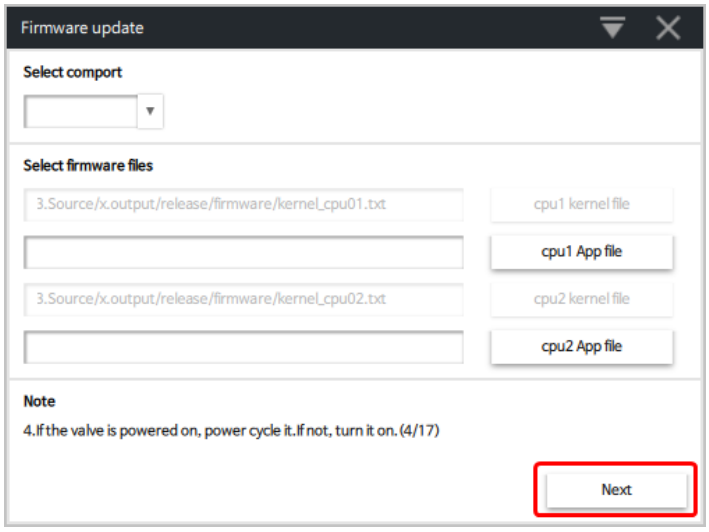
4. Connect the download adapter to the service port. Click “Next”



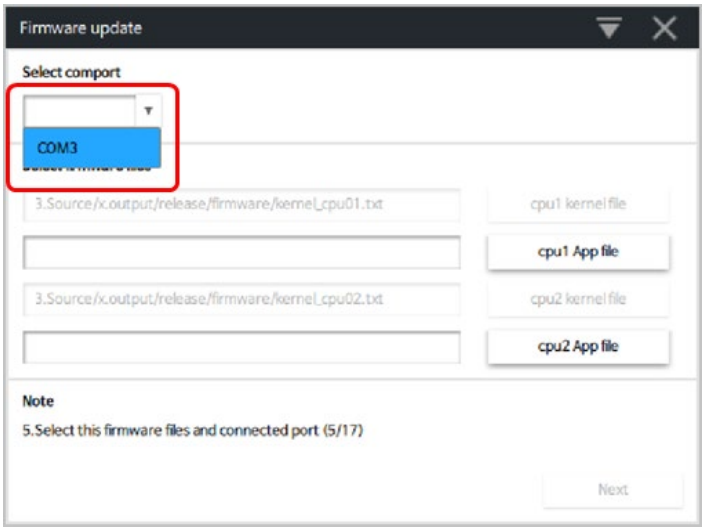
5. Connect the service cable to the download adapter. Click “Next”



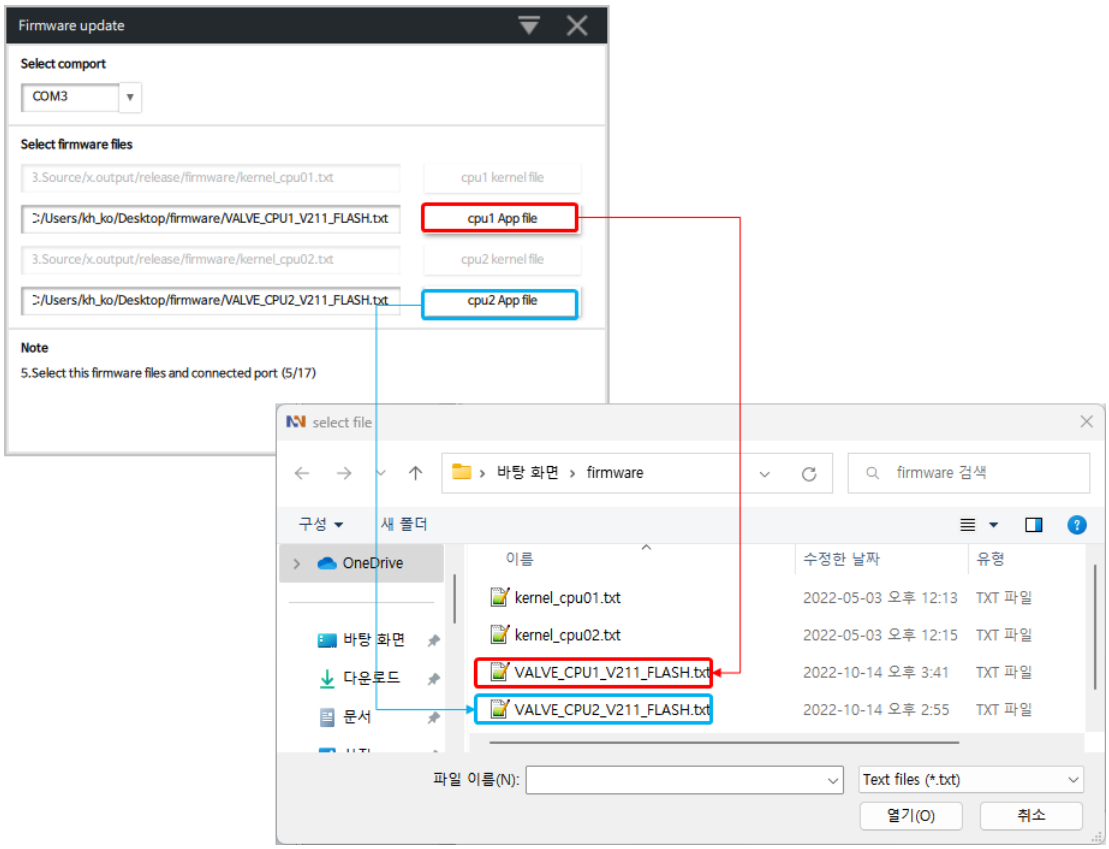
6. If the valve is powered on, power cycle it. If not, turn it on. Click “Next”



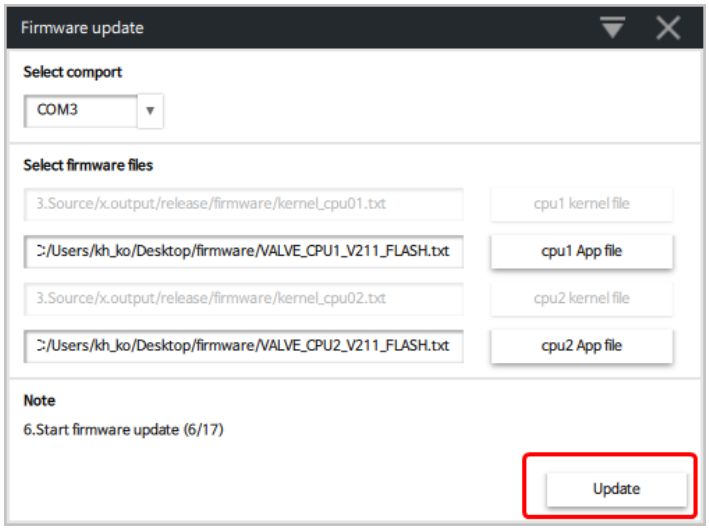
7. Select connected PC port



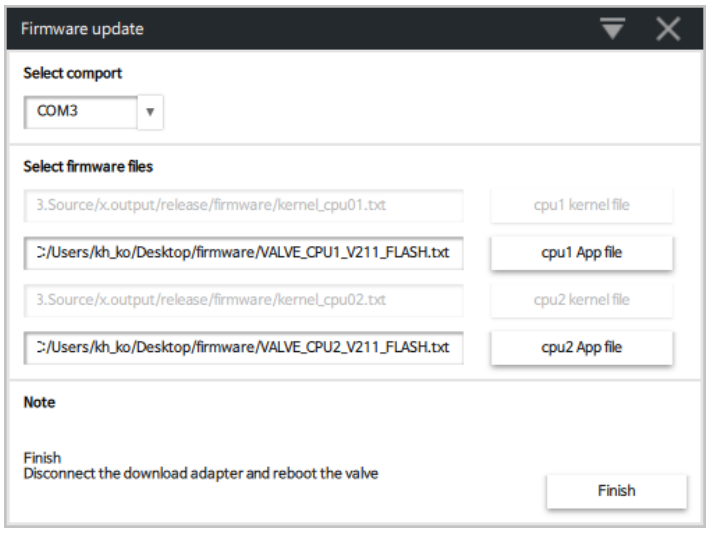
8. Select files for firmware update



9. Click [Update] to firmeware update



10. Disconnect the download adapter and service cable after the firmware update is finished.

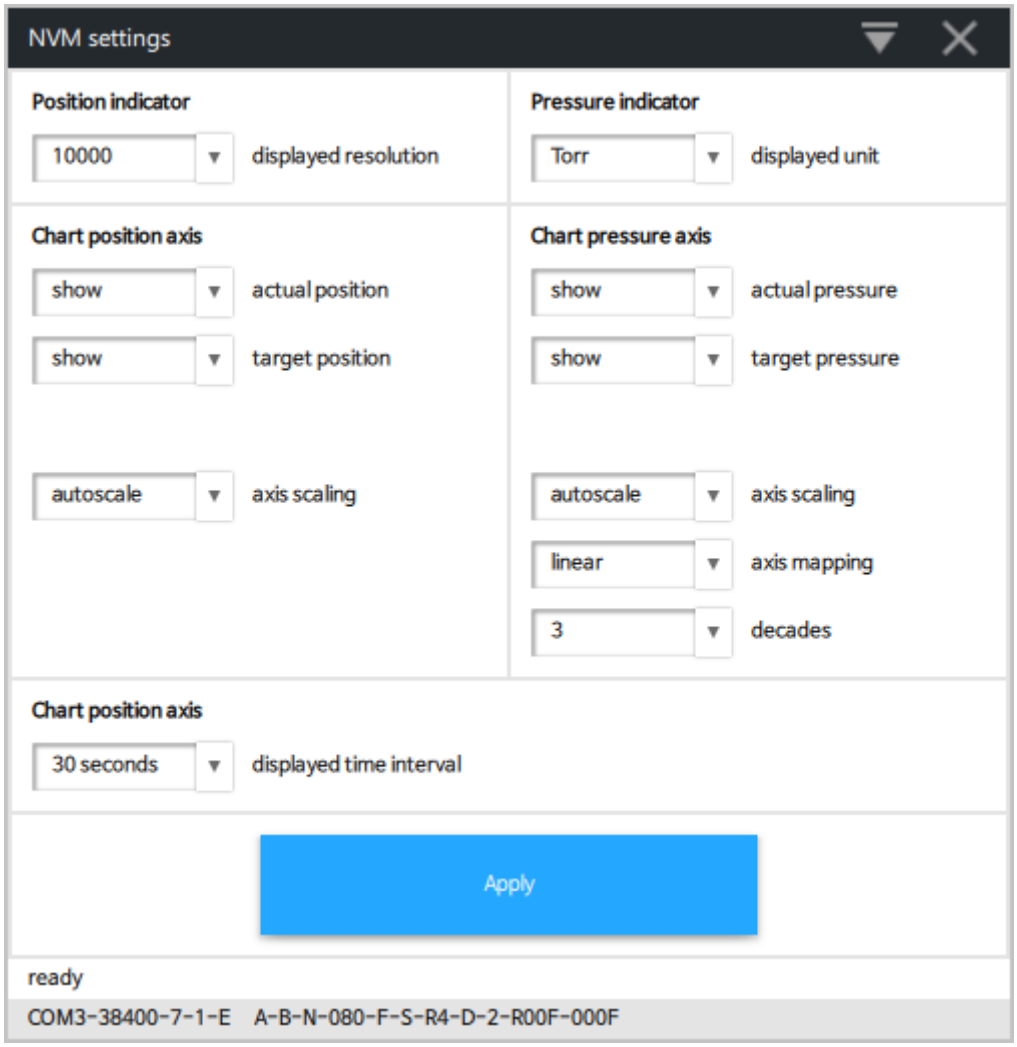


11. Reboot the valve.

16 NVM

16.1 Settings

The NVM Settings are used for adjustment of 'chart' (display) position, pressure and time axis.



17 Help

17.1 About