SAMSON

Type 373x-5 Positioner (Revision 1)
-
FDT/DTM Device Integration into Yokogawa PRM

Plant Resource Manager

Revision 1.00

SAMSON GROUP

The following instructions are intended to help the user upon integration of the Type 373x-5 Positioner into Yokogawa's plant asset management tool, PRM (Plant Resource Manager).
Integration includes the installation of the Device Type Manager (DTM), start-up and initialization of the positioner as well as setting of the most important device parameters.

Note: This document does not describe the mechanical attachment to the valve, connection of the supply air and electrical connection to the fieldbus. Refer to the Mounting and Operating Instructions EB 8384-5 EN for more details.
Operation and handling of the Yokogawa PRM is not covered by this document. Refer to the documentation provided by Yokogawa.

Revision	Modifications/comments
1.00	First release

Contents

1. DTM installation

- Download the latest version of the DTM (Device Type Manager) from the SAMSON website (http://www.samson.de/support/enser018.htm).
- Unpack the zip file.
- Click on the setup.exe file to start installation. Follow the prompts.
- After the DTM has been installed, it appears in the list of programs in Microsoft Windows *(Fig. 1)*.

Fig. 1: Installed DTM included in list of programs

2. Integrating or assigning the DTM in Yokogawa PRM

After the DTM has been installed properly, it must be integrated or assigned in the PRM device catalog.

- Start the PRM Setup tool
- Start the DTM Setup routine and refresh the DTM device catalog by clicking 'Start DTM Setup' *(Fig. 2)*. All (newly) installed DTMs are automatically added to the device catalog.
- Select the 'Foundation Fieldbus' tab. This includes a list of all available DTMs. As illustrated in *Fig. 3*, the fields 'Vendor', 'Model' and 'Device Revision' are not filled in. Enter the text as shown in *Fig. 4* into these fields. Click OK.

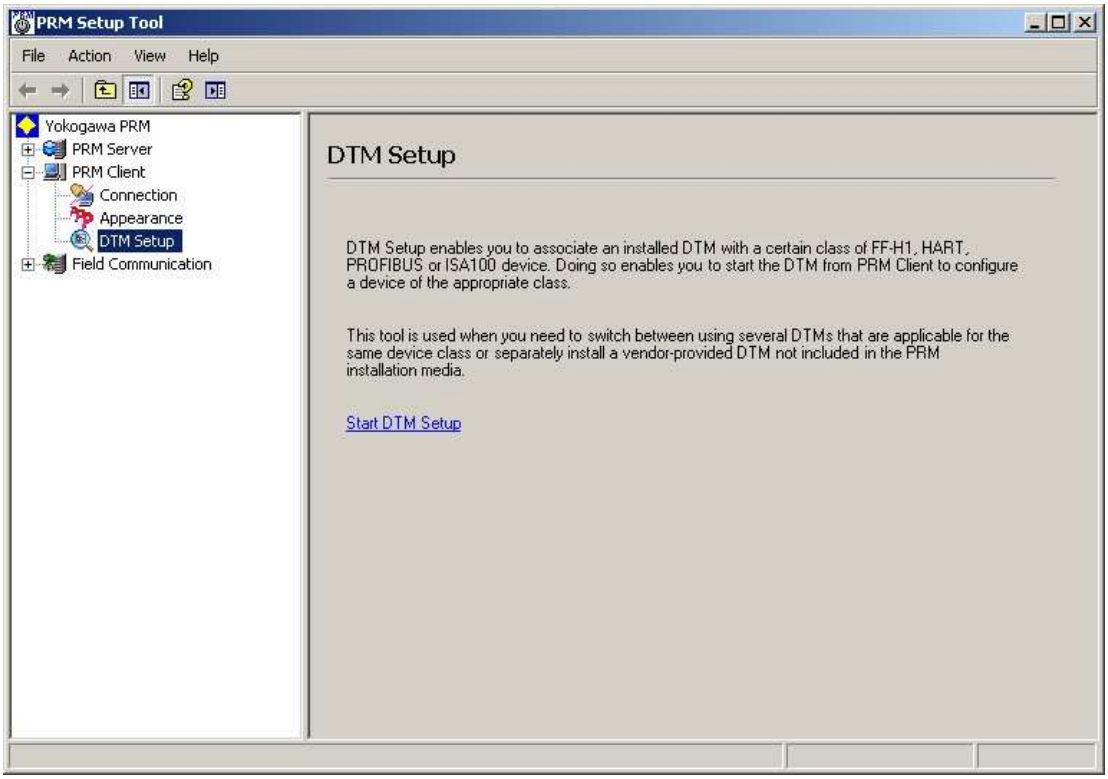

Fig. 2: DTM integration using PRM Setup tool

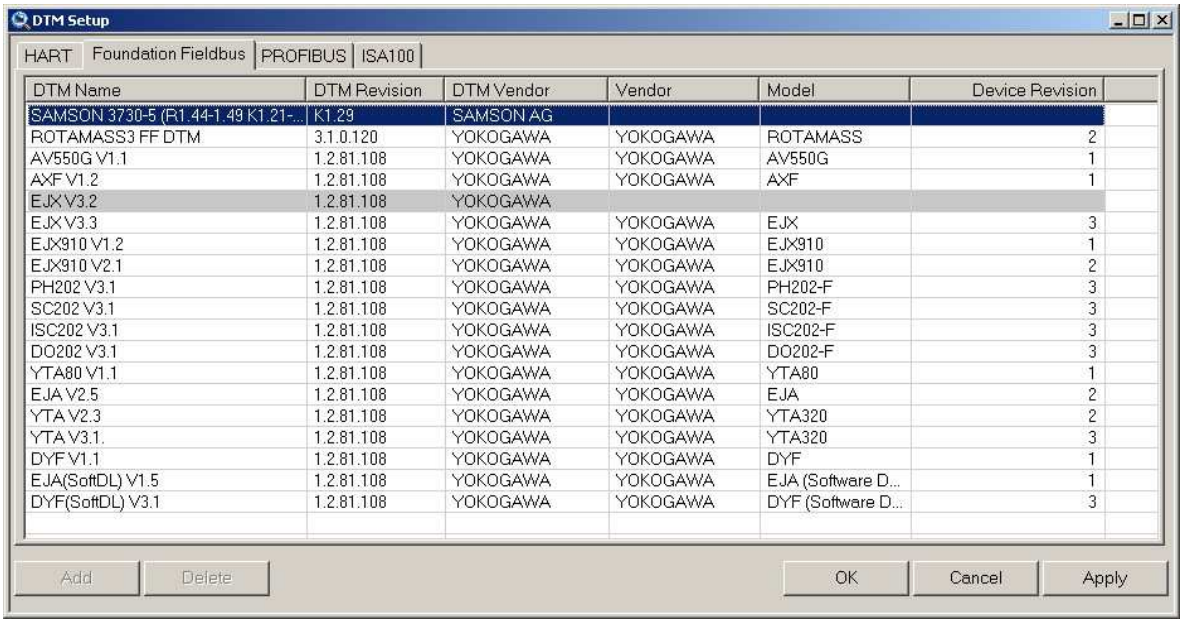

Fig. 3: List of all installed DTMs – missing details in fields of SAMSON DTM

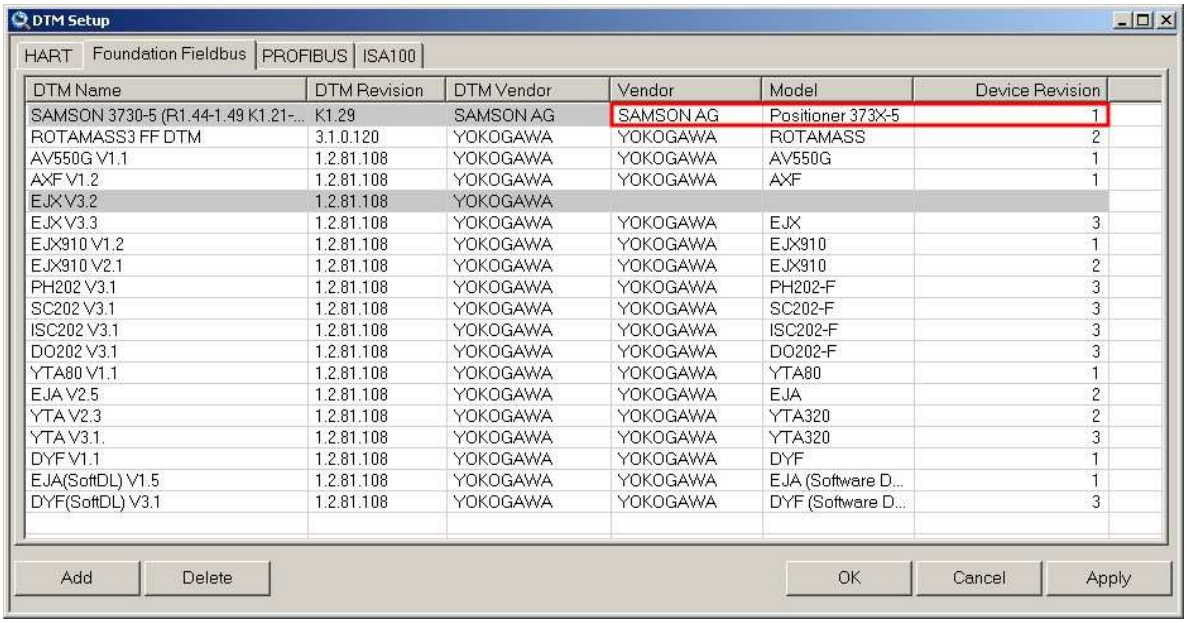

Fig. 4: List of all installed DTMs – details that need to be entered for the SAMSON DTM

IMPORTANT:
Enter the value '1' for positioners with firmware R1.44-R1.49 and K1.21-K1.29 in 'Device Revision' field.

3. Operator interface of SAMSON DTM

After the DTM has been installed and assigned, right-click on each device in the PRM interface to open a context-sensitive menu and select 'DTM Works' from this menu *(Fig. 5)*.

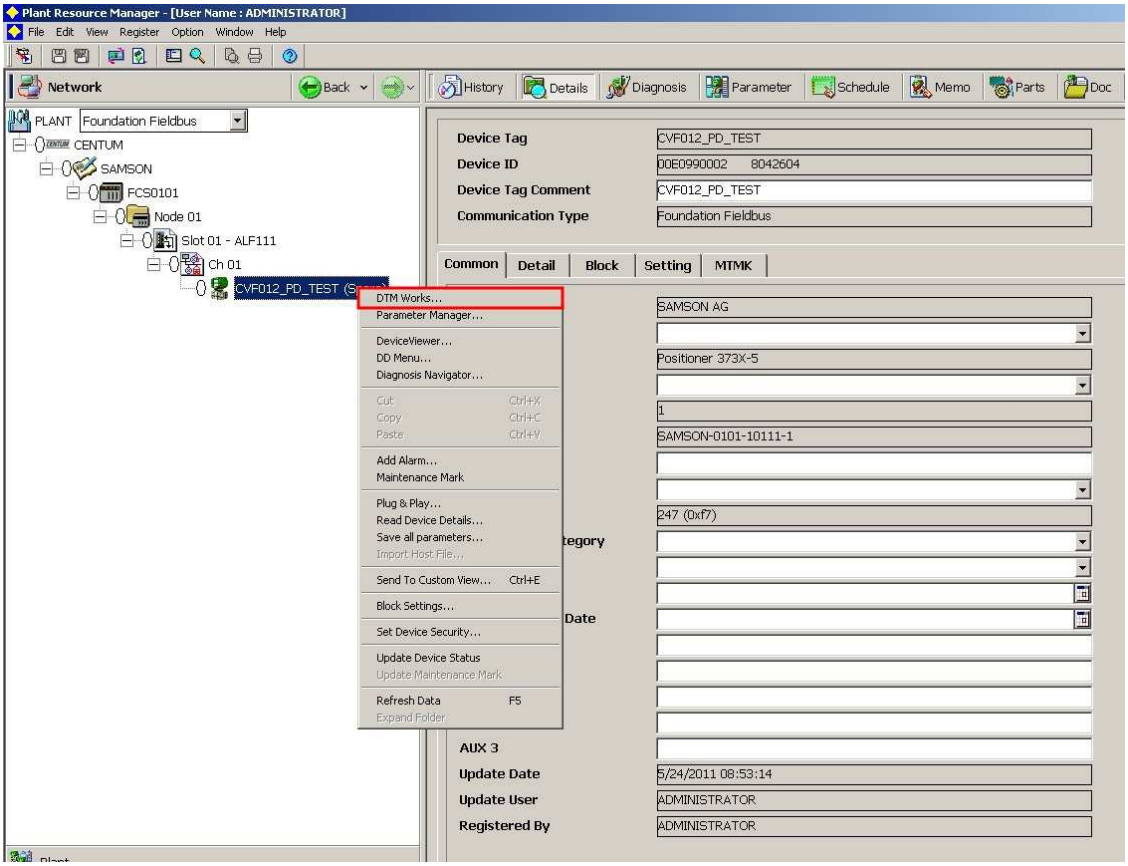

Fig. 5: Start DTM Works for Type 373x-5 Positioner

The structure of the positioner DTM is subdivided as follows *(Fig. 6)*:

- General positioner details
  - Model → Device name
  - DTM Version → Description
  - Display of device status according to NE 107 → Condensed state

- Toolbar
  - Hide/show device data 
  - Hide/show navigation area 
  - Read device data 
    Click this icon to upload <u>all</u> device parameters. The drop-down menu next to the icon allows the user to select the further options 'Read directory only' and 'Read directory and subdirectories only' (Fig. 7).
  - Write device data 
    Click this icon to download <u>all</u> device parameters onto the device. The drop-down menu next to the icon allows the user to select the further options 'Write directory only' and 'Write directory and subdirectories only'.
  - Activate/deactivate cyclic data readout 
    When the cyclic data readout is active, this icon appears next to parameters in the Status field (Fig. 6). ***Data are only read!***
  - Help (operating instructions) 
  - Print device parameters 

- Navigation window – The folders are organized in a tree structure.

- Parameter window – The parameters in the folders can be edited or functions can be started.

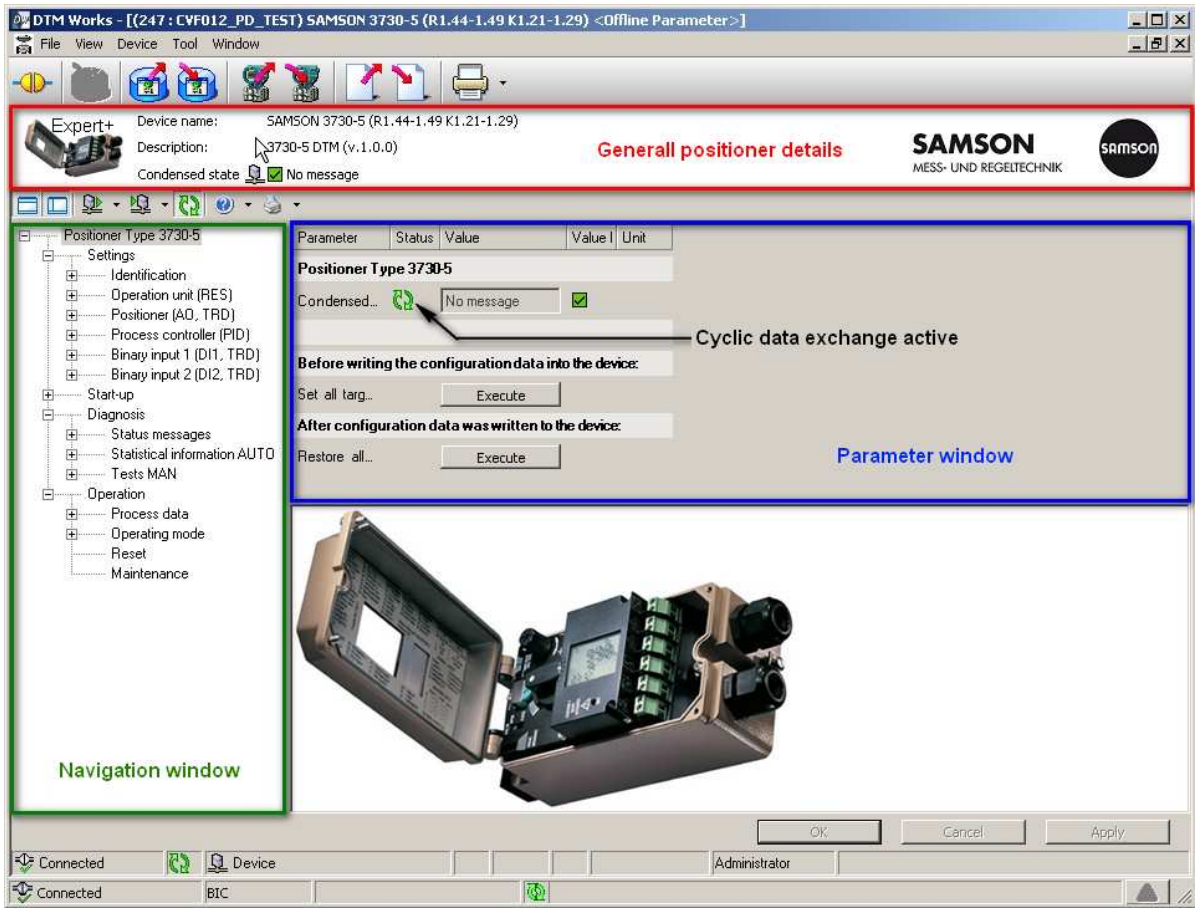

Fig. 6: Operator interface of the positioner DTM

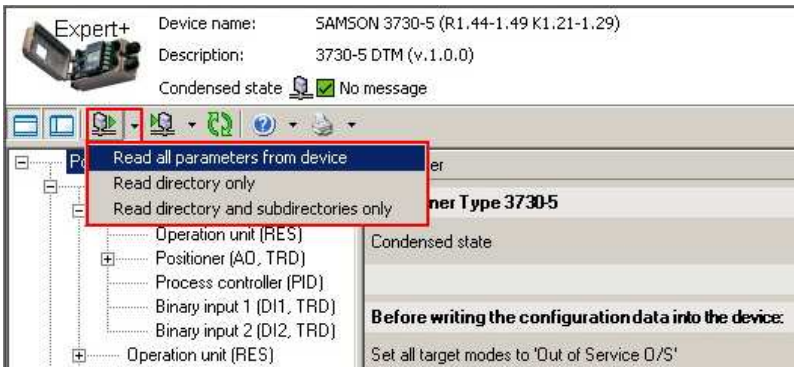

Fig. 7: Drop-down menu for reading parameters from device

3.1. Help text or parameter description in DTM

A description or help text to each parameter appears when the cursor is moved across it *(Figs. 8 and 9).*

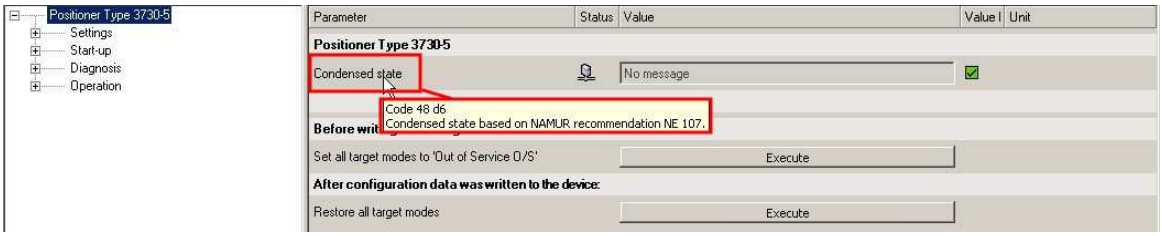

Fig. 8: Parameter description or help text for condensed state

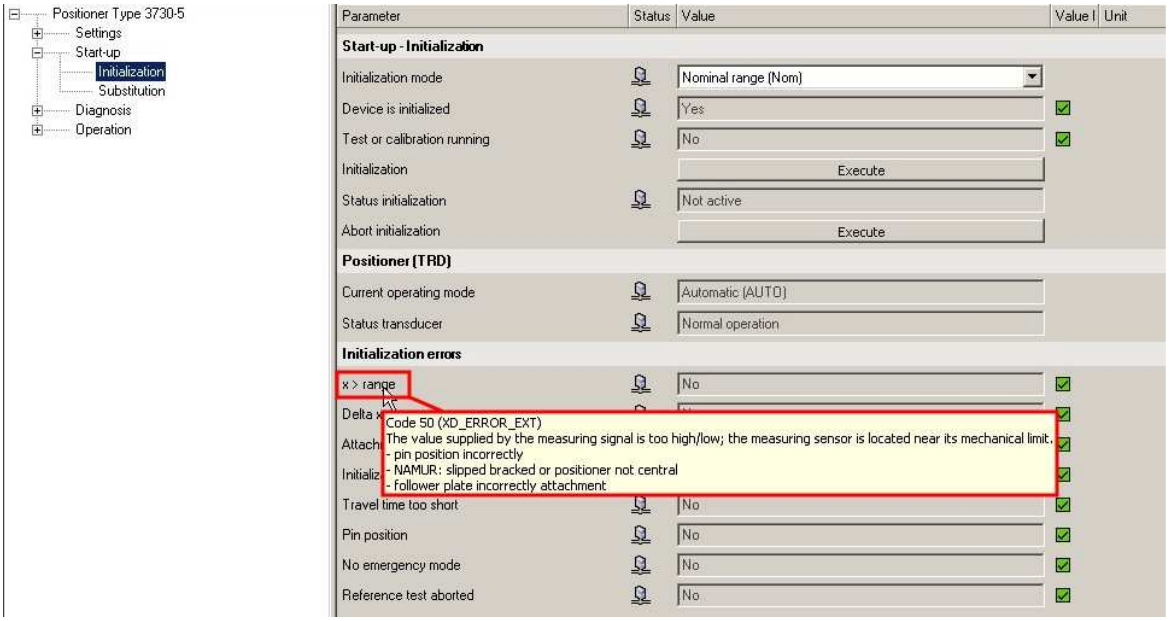

Fig. 9: Parameter description or help text for error messages

The help text for error messages additionally lists possible sources of error *(Fig. 9)*.

4. Parameter folders - Configuration and start-up

The 'Positioner Type 373x-5' main folder shows the device status as well as two executable functions:

- Set all target modes to O/S (Out of Service)
- Restore all target modes

On using the DTM, both functions serve to switch all FOUNDATION™ fieldbus Function Blocks and Transducer Blocks to the O/S (Out of Service) mode and back again to the original mode. These functions are designed to make operation easier during configuration. The reason for this is that certain parameters can only be changed in the O/S mode, meaning the relevant FOUNDATION™ fieldbus block must changed to O/S mode.

Note:

The most commonly used parameters are described here. Refer to the parameter list in the Mounting and Operating Instructions EB 8384-5 EN for parameters not described here.

4.1. Configuring identification data

Parameters used to describe the positioner, type of valve and actuator are stored in the here following folders. The 'Identification' folder also contains the PD_TAG and bus address *(Fig. 10)*.

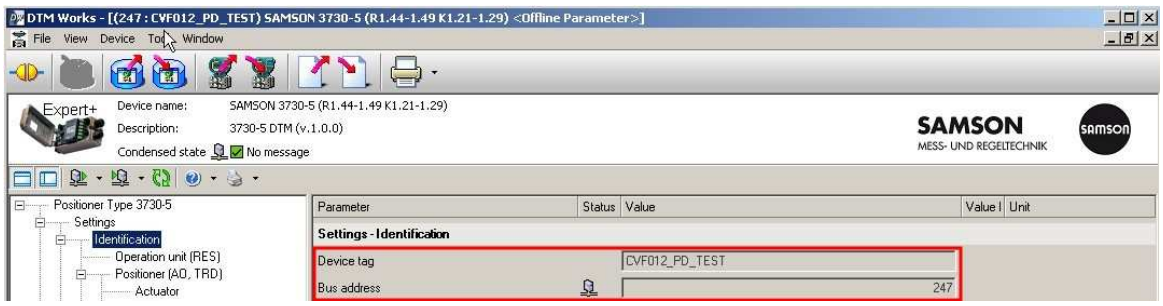

Fig. 10: Device tag/PD_TAG and bus address settings

4.1.1. Positioner details

The 'Operation Unit' folder contains general information on the positioner *(Fig. 11)*.

TAG (RES) [RES - TAG_DESC]
User-defined text for clear identification and allocation of the Resource Block
Description [RES Block - DESCRIPTOR]
Free text to describe the application
Message [RES Block - DEVICE_MESSAGE]
Free text
Serial number positioner [RES Block - DEVICE_SER_NUM]
Serial number of positioner
Product number positioner [RES Block - DEVICE_PRODUCT_NUM]
Positioner manufacturer's article code
Firmware revision control [RES Block - FIRMWARE_REVISION]
Firmware version of control R1.xx
Firmware revision communication [RES Block - FIRMWARE_REVISION]
Firmware version of communication K1.xx
Diagnosis level [AO TRD Block – DIAG_LEVEL]
Existing diagnosis level
Device ID [RES – DEV_TYPE]
ID number of positioner *(2 in this case for Type 3730-5)*
Device revision number [RES – DEV_REV]
Revision number of positioner *(1 in this case for Type 3730-5 K1.xx/R1.xx)*
Revision number device description [RES – DD_REV]
Revision number of device description

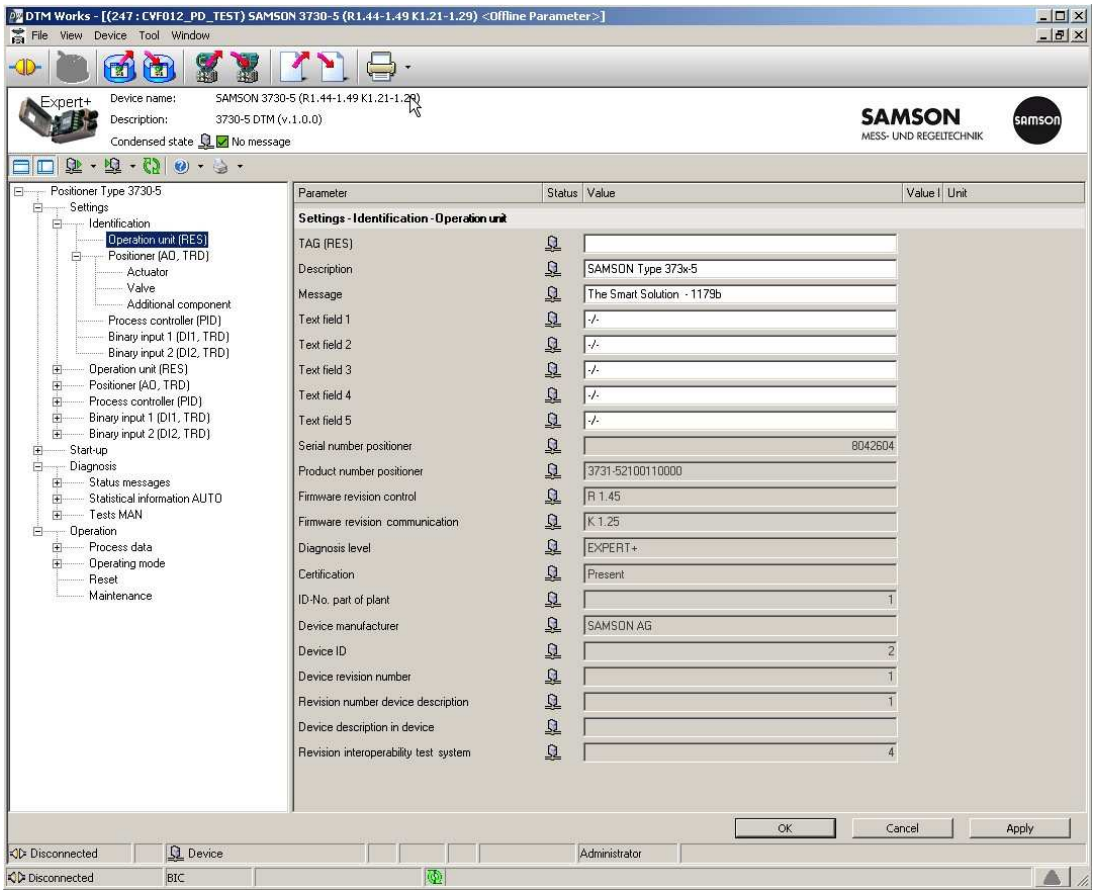

Fig. 11: Positioner details

4.1.2. Actuator details

The 'Actuator' subfolder in 'Positioner (AO,TRD)' contains general information on the actuator *(Fig. 12)*.

<u>Note:</u> *The 'Model' and 'Booster' parameters affect the diagnostic tests performed by EXPERT+. As a result, it is important to select the correct setting before start-up to ensure correct analysis of diagnostic data. Refer to Operating Instructions EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for more details.*

Model [AO TRD Block – DEVICE_CHARACTERISTIC]
Details on the actuator type (single- or double-acting)
Booster [AO TRD Block – DEVICE_CHARACTERISTIC]
Specifies whether a volume booster is used

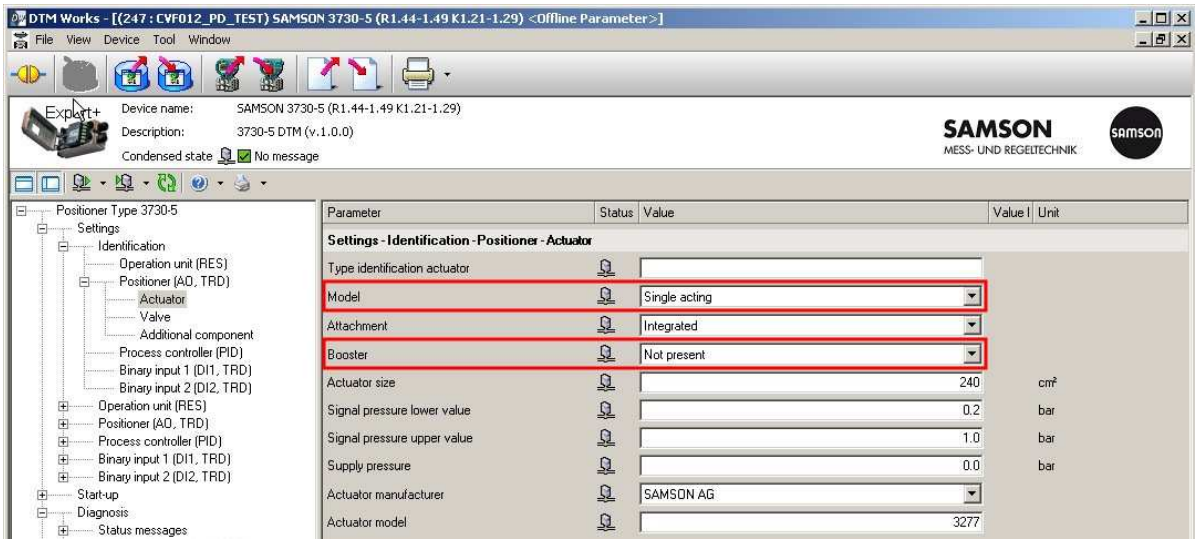

Fig.. 12: Actuator details

4.1.3. Valve details

The 'Valve' subfolder in 'Positioner (AO,TRD)' contains general information on the valve *(Fig. 13)*.

> *Note:*
> *The 'Stuffing box' parameter setting affects the diagnostic tests performed by EXPERT+. As a result, it is important to select the correct setting before start-up to ensure correct analysis of the diagnostic data. Refer to Operating Instructions EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for more details.*

Valve type [AO TRD - VALVE_TYPE]
Details on the valve type (globe or rotary actuator)
Stuffing Box [AO TRD Block – DEVICE_CHARACTERISTIC]
Details on the valve packing

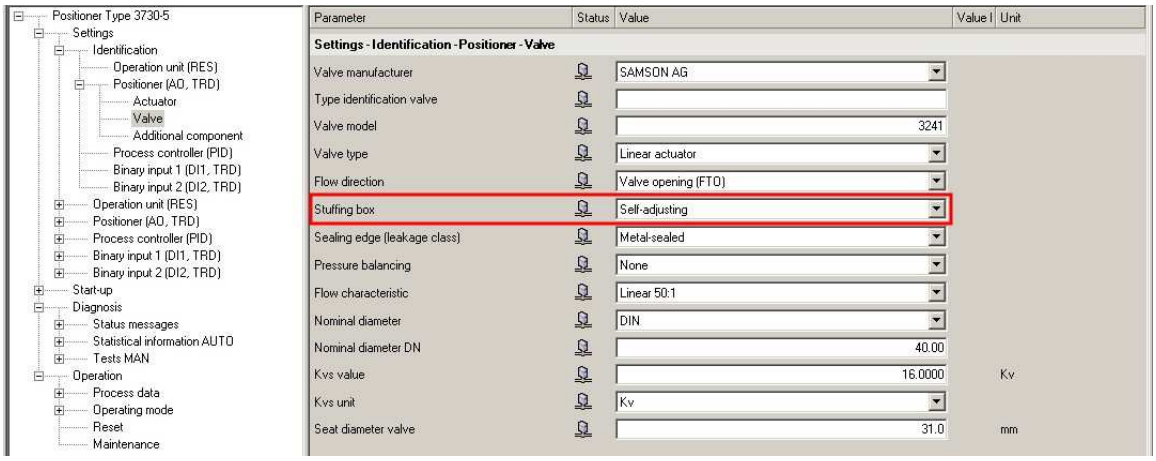

Fig. 13: Valve details

4.1.4. Details on positioner options installed

The 'Additional component' subfolder in 'Positioner (AO,TRD)' indicates which positioner options are installed, e.g. internal solenoid valve *(Fig. 14)*.

Note:
When an inductive limit switch is retrofitted, this setting must be changed to 'Implemented'.

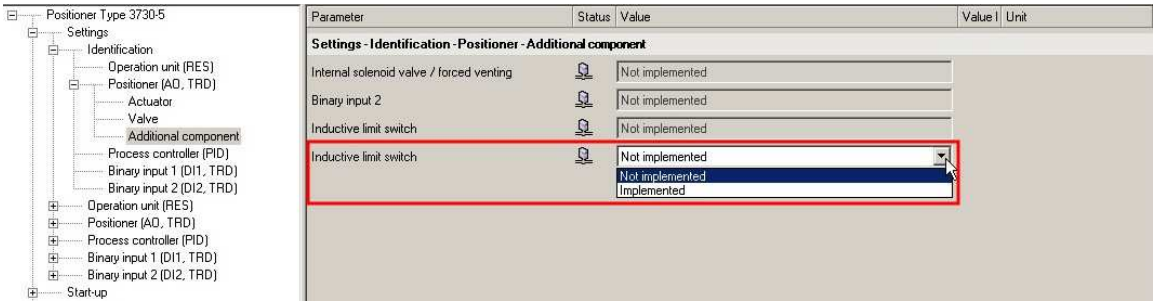

Fig. 14: Details on positioner options installed

4.2. Initialization/start-up of the positioner

Note:
Read the section on start-up in the Mounting and Operating Instructions EB 8384-5 EN!
Only the parameters affecting the initialization modes described here are listed in this document.
The attachment, pneumatic and electrical connections, volume restriction Q and the slide switch for the mechanical fail-safe position are not described here.

Note:
In positioners with EXPERT+ (extended diagnostics), the reference graphs for diagnosis are plotted automatically after the initialization process has been completed. Certain settings must be selected for 'Model' and 'Booster' in the actuator data as well as 'Stuffing box' in the valve data to ensure correct analysis for the diagnosis. Refer to Operating Instructions EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for more details.

CAUTION:
During initialization and recording of the reference graph, the valve moves through its entire travel range/angle of rotation!

4.2.1. MAX initialization – simplest method

The MAX initialization mode is the simplest way to initialize the positioner. The positioner adapts itself automatically to the maximum travel range/angle of rotation of the control valve.

In the 'Initialization' subfolder in 'Start-up', set the 'Initialization mode' parameter to 'Maximum range (Max)'. Click 'Execute' to start initialization *(Fig. 15)*.

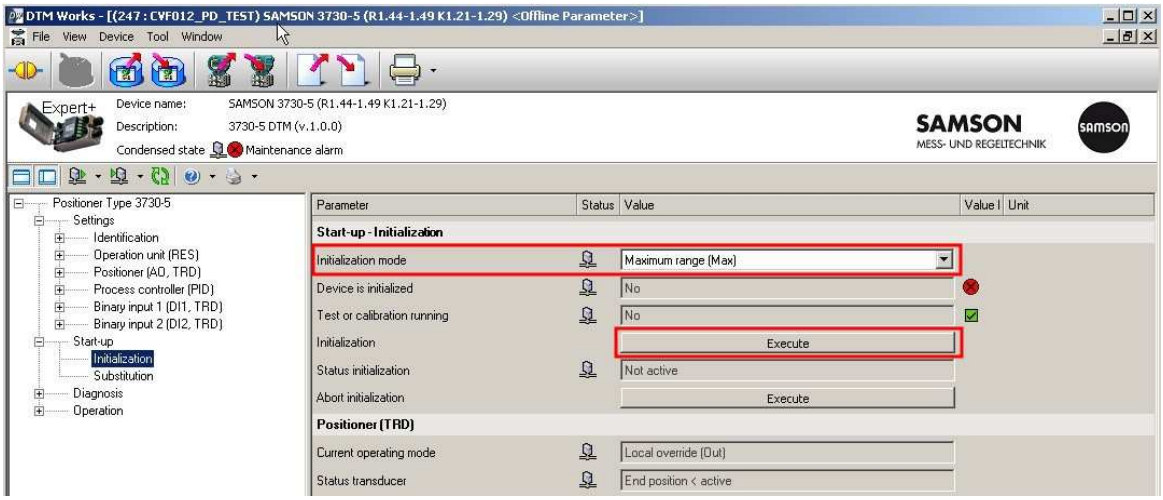

Fig. 15: MAX initialization – simplest method

4.2.2. NOM initialization – accurate method

The NOM (nominal range) initialization mode adapts the positioner exactly to the defined travel range/angle of rotation of the control valve.

The parameters necessary for the NOM initialization mode can be found in the 'Start-up' folder *(see section 4.2.3 on parameter description)*:

- Initialization mode
- Pin position
- Required nominal range[1]

After selecting these parameter settings, start initialization by clicking 'Execute' in the 'Initialization' subfolder in 'Start-up'.

[1] Only required on start-up for the first time or after the start-up parameters have been reset

4.2.3. Start-up parameters – 'Start-up' folder

The parameters necessary for initialization are listed in the 'Start-up' folder *(Fig. 16)*.

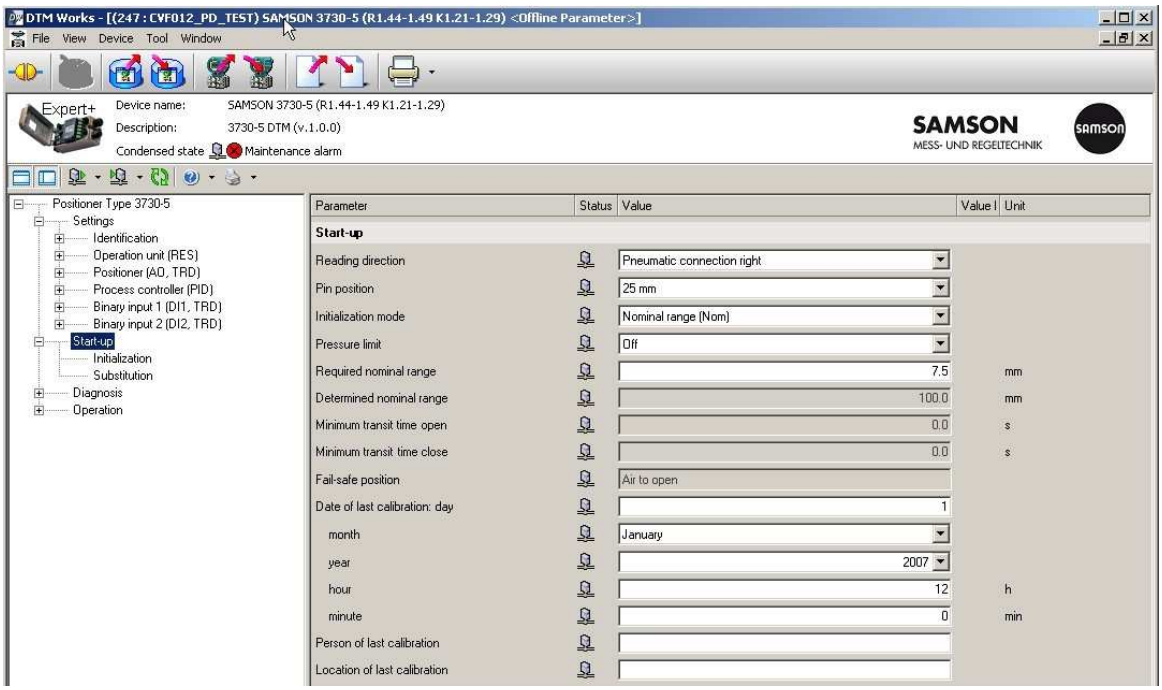

Fig. 16: Start-up parameters –Start-up folder

Pin position [AO TRD - TRANSM_PIN_POS]
The follower pin at the lever of the positioner must be inserted into the correct pin position according to the valve travel range/angle of rotation *(see note in section 4.2)*.
Initialization mode [AO TRD - INIT_METHOD]
The initialization mode must be selected.
Pressure limit [AO TRD - PRESSURE_LIMIT]
Limitation of the inlet pressure must be selected.
Required nominal range [AO TRD - RATED_TRAVEL]
Specify the travel range/angle of rotation. The unit mm or ° depends on the valve type *(see section 4.1.3 on valve type parameter)*.

Minimum transit time open [AO TRD - ACT_STROKE_TIME_INC]
Specifies the minimum transit time to reach OPEN position.
The minimum transit time to reach OPEN (100 % position) position is the actual time in seconds that the valve needs to move through the rated travel range/angle of rotation to open the valve.
Minimum transit time close [AO TRD - ACT_STROKE_TIME_DEC]
Specifies the minimum transit time to reach CLOSED position.
The minimum transit time to reach CLOSED (0 % position) position is the actual time in seconds that the valve needs to move through the rated travel range/angle of rotation to close the valve.
Fail safe position [AO TRD - SIGNAL_PRESSURE_ACTION]
This parameter is determined during initialization and indicates the position of the slide switch (AIR TO OPEN/AIR TO CLOSE). The positioner needs to be re-initialized when it is changed.

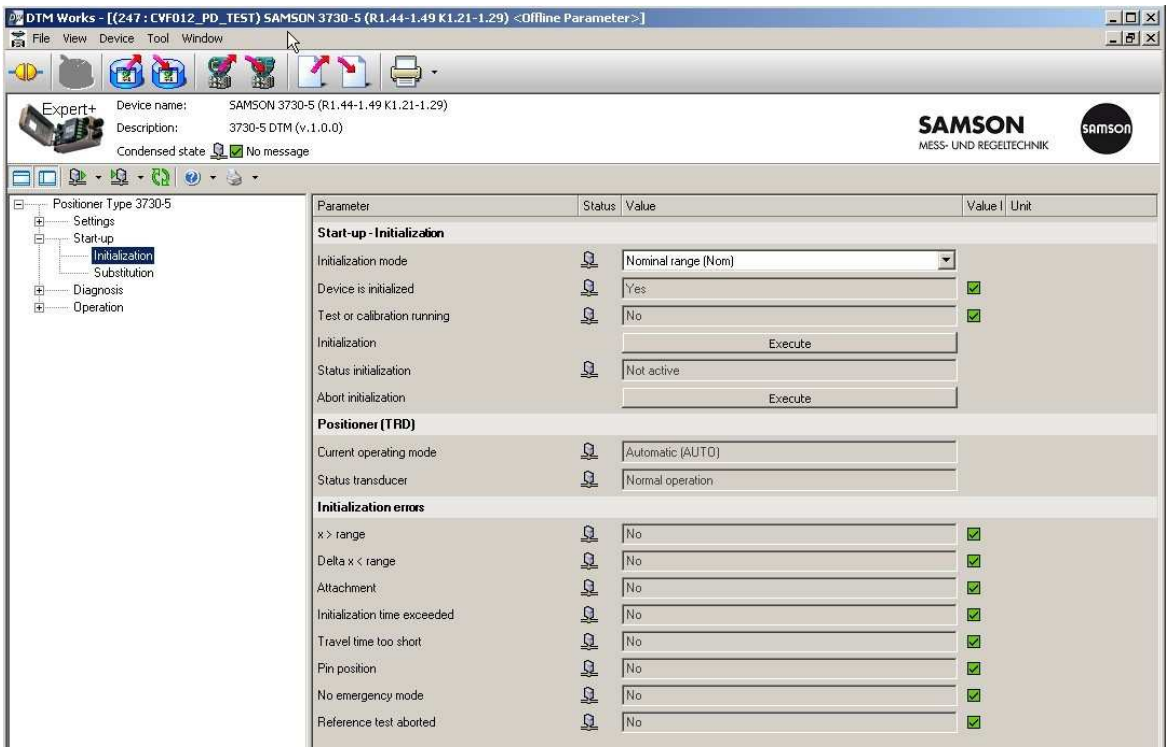

Fig. 17: Start-up parameters – Initialization subfolder in Start-up

4.2.4. Start-up parameters – 'Initialization' subfolder in 'Start-up'

In the 'Initialization' subfolder in 'Start-up' *(Fig. 17),* click 'Execute' to start or cancel initialization. Additionally, in online mode of the DTM, the initialization status can be monitored *(Fig. 18)*. If initialization fails ('Status initialization' parameter corresponds to 'Cancel' text message), the listed errors pinpoint the problem.

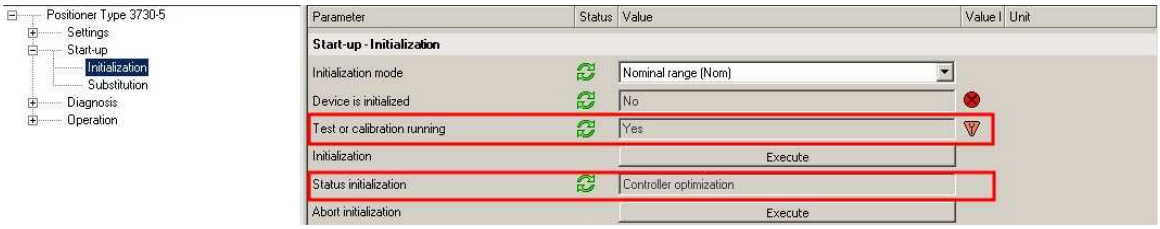

Fig. 18: Start-up parameters – Initialization folder – initialization in progress

x > range [AO TRD – XD_ERROR_EXT]
The value supplied by the measuring signal is either too high or too low, the measuring sensor is close to its mechanical limit *(see also help text for possible cause)*.
Delta x < range [AO TRD – XD_ERROR_EXT]
The measuring span of the lever is too low *(see also help text for possible cause).*
Attachment [AO TRD – XD_ERROR_EXT]
Positioner attachment incorrect *(see also help text for possible cause).*
Initialization time exceeded [AO TRD – XD_ERROR_EXT]
The initialization routine lasts too long *(see also help text for possible cause).*
Travel time too short [AO TRD – XD_ERROR_EXT]
The actuator positioning rates determined during the initialization are so short that the positioner cannot adapt itself optimally *(see also help text for possible cause).*
Pin position [AO TRD – XD_ERROR_EXT]
Initialization was canceled because the pin position must be entered (NOM Init) *(see also help text for possible cause).*
No emergency mode [AO TRD – XD_ERROR_EXT]
An emergency mode (open-loop control) is not available when the travel measuring system fails *(see also help text for possible cause).*

Reference test aborted [AO TRD – XD_ERROR_EXT]
An error occurred during plotting the reference graphs for the diagnosis *(see also help text for possible cause).*

4.3. Configuring the fault state

In the 'Fail-safe action' subfolder in 'Settings' -> 'Positioner (AO, TRD)' *(Fig. 19)*, set the fault state of the AO Function Block. The fault state is activated when a fault condition of the valid set point lasts longer than the determined time limit.

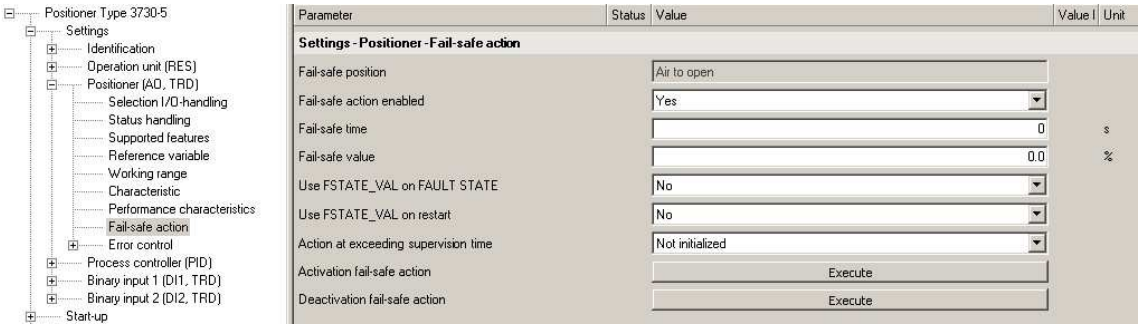

Fig. 19: Configuration of the fault state

Fail-safe position [AO TRD - SIGNAL_PRESSURE_ACTION]
This parameter is determined during initialization and indicates the position of the slide switch (AIR TO OPEN/AIR TO CLOSE). The positioner needs to be re-initialized when it is changed.
Fail-safe action enabled [RES – FEATURES_SEL]
Activates or deactivates the fault state to allow the fault state to be triggered.
Fail-safe time [AO FB – FSTATE_TIME]
The length of time, in seconds, that the AO Function Block will wait to set Fault State after the recognition of an error of the valid set point. The fault state is triggered when the fault still exists after the time interval has elapsed.
Fail-safe value [AO FB – FSTATE_VAL]
Determines the set point for the AO Function Block when the fault state is triggered.
Use FSTATE_VAL on FAULT STATE [AO FB – IO_OPTS]
Activates or deactivates the use of FSTATE_VAL as the set point when the fault state is triggered.
Use FSTATE_VAL on restart [AO FB – IO_OPTS]
FSTATE_VAL is used for the set point until there is a valid value on restarting the device.
Action at exceeding supervision time [AO FB – SHED_OPT]
Determines what action is to be taken when the monitoring time is exceeded (see SHED_RCAS

parameter in the Resource Block) while the connection between the fieldbus host system and the AO Block in RCAS mode is being checked. When the time has elapsed, the AO Block switches from RCAS mode to the mode selected in SHED_OPT. The action to be taken after the fault state ends is also determined.

Activation fail-safe action [AO TRD – SET_FAIL_SAFE_POS]

By clicking 'Execute' of the functions, the valve is directly moved to its mechanical fail-safe position or it is deactivated → **Deactivation fail-safe action** [AO TRD – SET_FAIL_SAFE_POS]

Note:
An active fail-safe position triggered by the AO or AO TRD is indicated on the positioner display by a blinking 'S'.

Note:
Refer to the parameter list in the Mounting and Operating Instructions EB 8384-5 EN for further details on parameters!

Additionally, it is possible to determine in **'Target to MAN if FAULT STAT activated'** *(Fig. 21)* in the 'Selection IO-handling' subfolder in 'Settings' -> 'Positioner (AO, TRD)' that TARGET_MODE switches to MAN when the fault state is triggered and the original target mode is lost as a result. After leaving the fault state, the AO Function Block remains in MAN and must be set to the required target mode by the user.

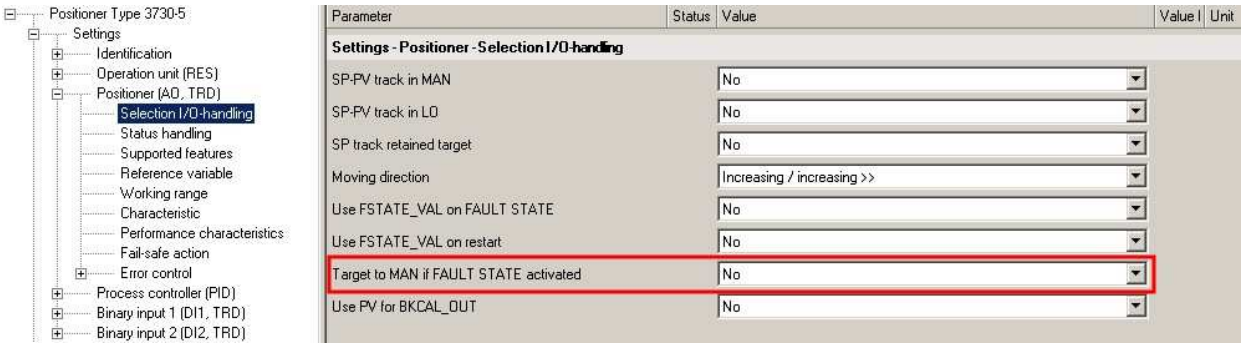

Fig. 21: Configuration of DI 1 Function Block

4.4. Configuring the DI Function Block (binary inputs)

In the 'Binary Input 1 (DI1, TRD)' and 'Binary Input 2 (DI2, TRD)' subfolders in 'Settings' (*Figs. 21 and 22)* the action of the DI Function Blocks can be configured. The '**Selection binary input 1/2**' parameters have the following options that can be selected:

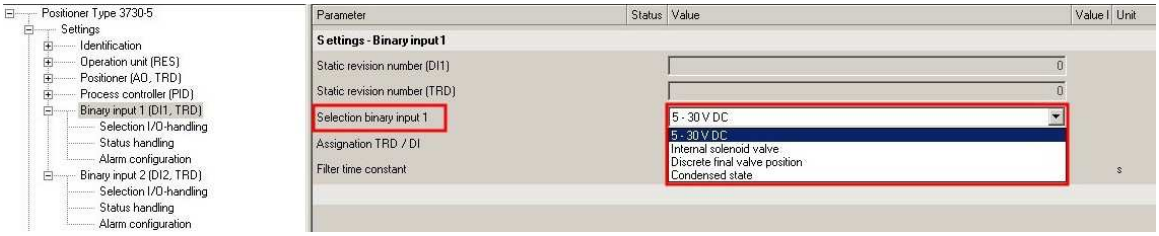

Fig. 21: Configuration of DI 1 Function Block

Fig. 22: Configuration of DI 2 Function Block

- **5 – 30 VDC** [RES – SELECT_BINARY_INPUT1] *only possible for DI1!*
  The positioner has a binary contact as standard to analyze the binary voltage signals (terminals 87 and 88). DI1 analyzes the state of the contact which is then indicated by the OUT_D parameter.

- **Floating contact** [RES – SELECT_BINARY_INPUT2] *only possible for DI2!*
  An optional binary input is available to analyze a floating contact (terminals 85 and 86). DI2 analyzes the state of the contact which is then indicated by the OUT_D parameter.
  When a pressure sensor (leakage sensor) is connected at the test connection of the bellows, its switching state is indicated as a diagnostic message in EXPERT+ and added to the logging. For this purpose, the option 'Actively open – leakage detection' or 'Actively closed – leakage detection' must be configured in the 'Configuration binary input 2' parameter *(Fig. 23)*.

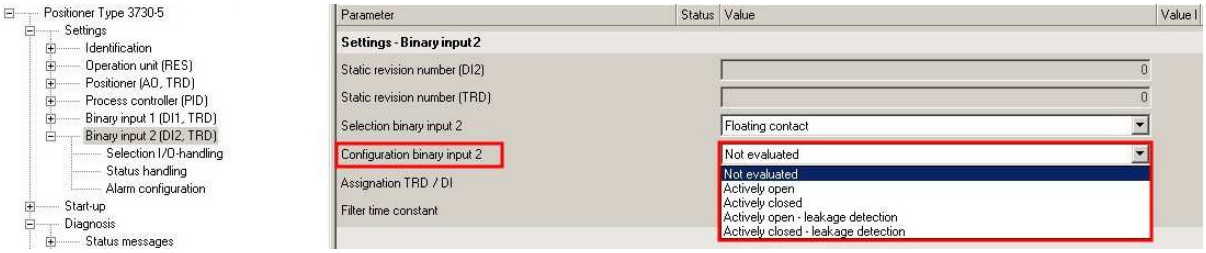

Fig. 23: Configuration of DI 2 Function Block – Pressure monitoring at bellows' test connection

- **Internal solenoid valve** [RES – SELECT_BINARY_INPUT1/2]
  In this setting, the current switching state of the optional internal solenoid valve is read and then indicated by OUT_D. '0' indicates that the solenoid valve is de-energized (U < 15 V DC) and '1' indicates that the solenoid valve is energized (U > 19 V DC).

- **Discrete final valve position** [RES – SELECT_BINARY_INPUT1/2]
  In this setting, the current discrete valve position is indicated by OUT_D. The assignment of values is as follows:
  - 0 – Device not initialized
  - 1 – Valve closed
  - 2 – Valve open
  - 3 - Valve in intermediate position

- **Condensed state** [RES – SELECT_BINARY_INPUT1/2]
  In this setting, the current condensed state based on NAMUR Recommendation NE 107 is indicated by OUT_D. The assignment of values is as follows:
  - 0 – No message
  - 1 – Maintenance required
  - 2 – Maintenance demanded
  - 3 – Maintenance alarm
  - 7 – Function check

- **Condensed state and VST** [RES – SELECT_BINARY_INPUT2] *only possible for DI1!*
  In this setting, the partial stroke test in EXPERT+ can be started in addition to the indication of the condensed state. '7' must be simulated over the 'SIMULATE_D' parameter of the DI 2 Function Block.

The other parameters is the 'Binary Input 1 (DI1, TRD)' and 'Binary Input 2 (DI2, TRD)' subfolders in 'Settings' are as follows:

Assignation TRD/DI [DI FB – CHANNEL]
Determines which Transducer Block is assigned to the DI Block. The assignment for the Type 3730-5 Positioner (Revision 1) is as follows:

- DI 1 FB is connected to DI 1 TRD over Channel 1
- DI 2 FB is connected to DI 2 TRD over Channel 2

Filter time constant [DI FB – PV_TIME]
Used to enter the filter time constant (in seconds) of the digital filter until a binary state at the input of the function block is adopted in the PV_D parameter. The PV_D parameter is identical to the OUT_D output in AUTO mode.

5. Parameter folders – Operation

Note:
Only the folders are described here. Refer to the Mounting and Operating Instructions EB 8384-5 EN for parameters not described here.

5.1. Process values of the Function Blocks

The 'Process Data' subfolder in 'Operation' contains the process values of function blocks. In addition to the process values and their states, the current statues of the function block and the associated Transducer Blocks is shown *(Fig. 24)*.

In the lower part of the parameter window, there is a bar graph showing the positioning value, current valve position and setpoint deviation. For cyclic data exchange, we recommend to activate the online mode of the DTM in this window.

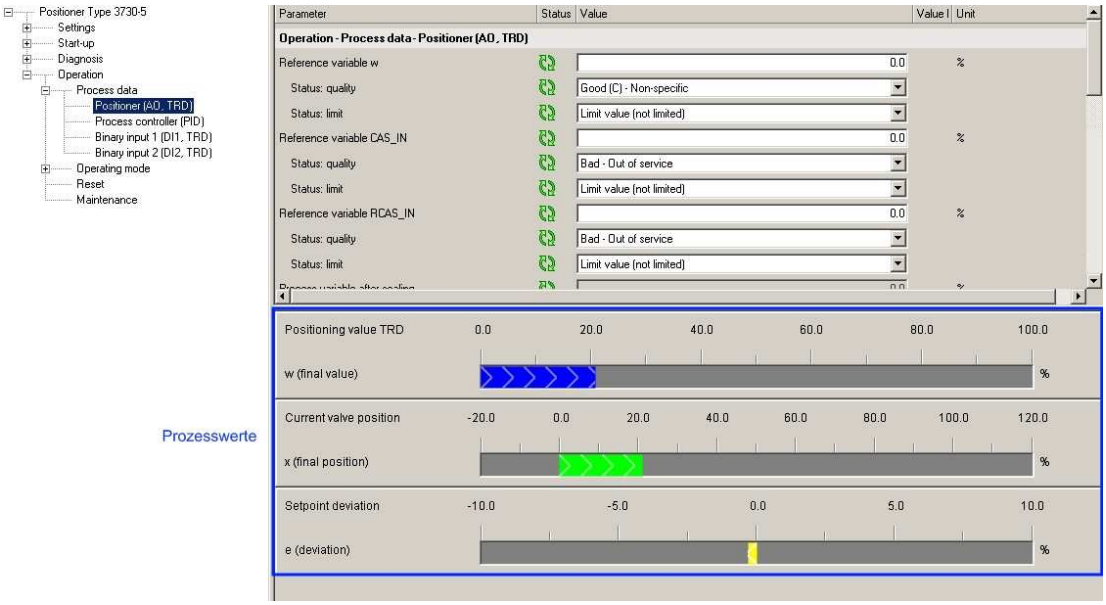

Fig. 24: Process values of AO and AO TRD Blocks

5.2. Operating modes of the Function Blocks and Transducer Blocks

The current and permissible operating modes of the Function Blocks and Transducer Blocks can be read or changed in the 'Operation Mode' subfolder in 'Operation'. Open the list of possible modes for the target mode by clicking 'Fade in' button *(Fig. 25)*.

5.3. Resetting single error messages

Any generated error messages can be reset in the 'Reset' subfolder in 'Operation' *(Fig. 26)*. Refer to EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for additional texts about individual errors.

5.4. Zero calibration

A zero calibration can be started in the 'Maintenance' subfolder in 'Operation' by clicking 'Execute' *(Fig. 27)*.

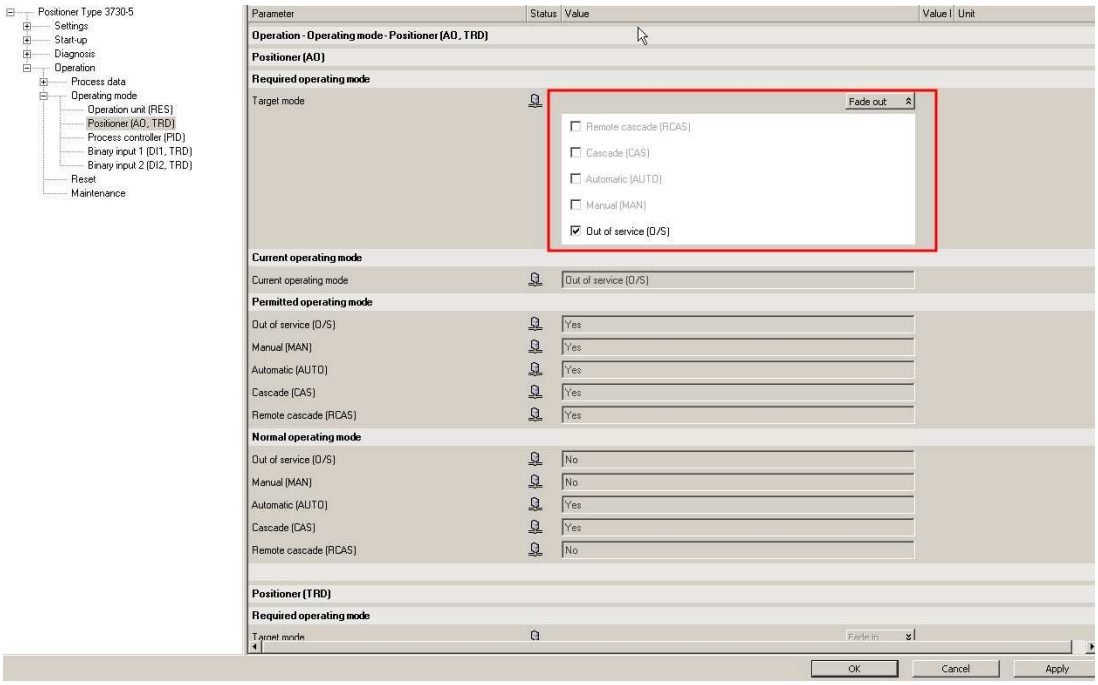

Fig. 25: Changing the current operating mode

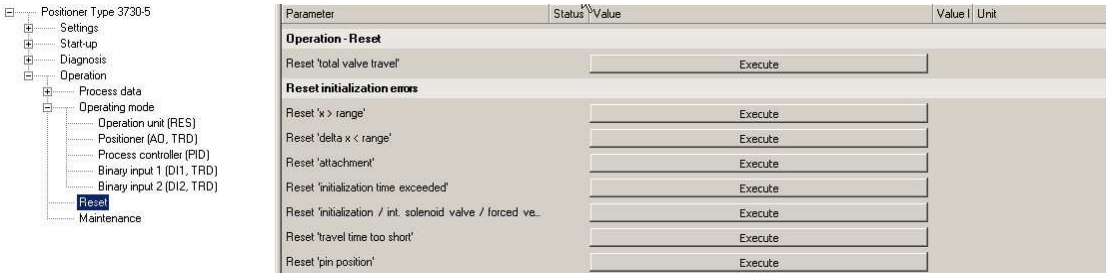

Fig. 26: Resetting single error messages

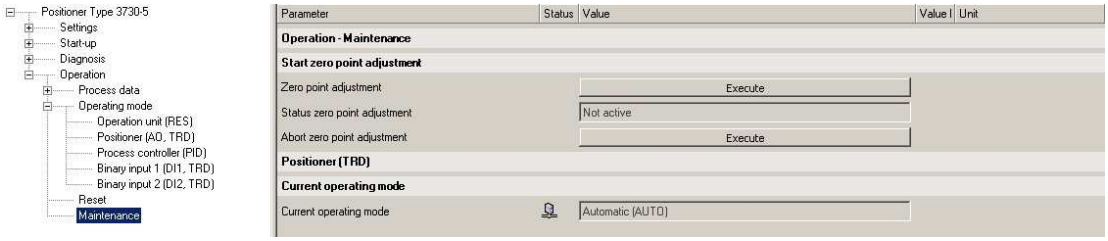

Fig. 27: Starting zero calibration

6. Parameter folders – Diagnostics integrated in the positioner

Note:
The most commonly used folders are described here. Refer to Mounting and Operating Instructions EB 8384-5 EN and Operating Instructions EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for other parameters and functions listed.

6.1. Classification of diagnostic messages

The majority of error messages can be classified in the positioner. The messages are subdivided into two groups: standard FOUNDATION fieldbus error notification (block errors) and the classification of the condensed state according to the NAMUR Recommendation NE 107 (Self-Monitoring and Diagnosis of Field Devices), which can be read out from one of the DI Function Blocks *(see section 4.4)*. The different notification texts for both types of messages are listed in Table 1 and Table 2.

No message
Device needs maintenance soon
Device needs maintenance now

Table 1: Classification of the FOUNDATION fieldbus block errors

	No message
	Maintenance demanded
	Maintenance required
	Maintenance alarm
	Function check

Table 2: Classification according to NE 107 (condensed state)

The classification report listing the error messages is contained in the 'Classification report' subfolder in 'Settings' -> 'Positioner (AO,TRD)' -> 'Error control' *(Figs. 28 and 29)*.

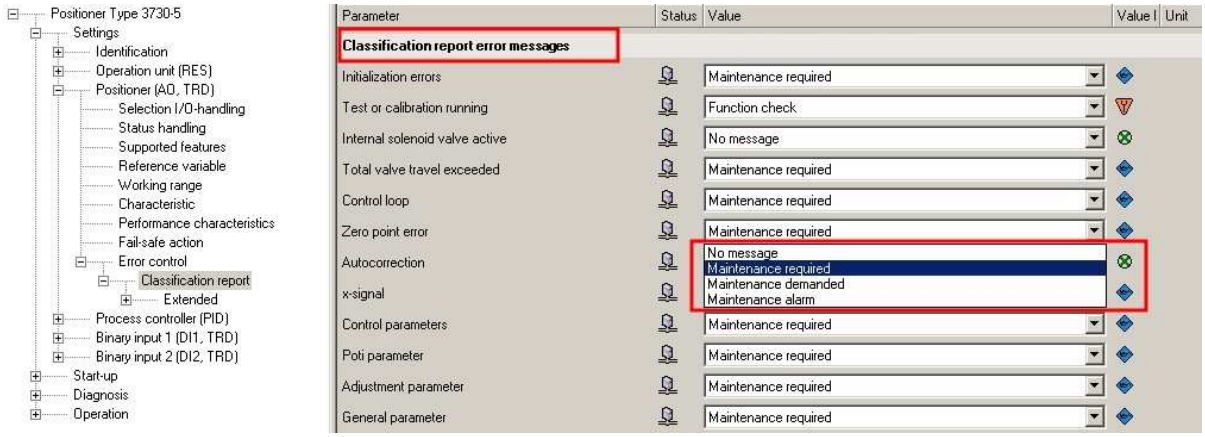

Fig. 28: Classification report of the condensed state

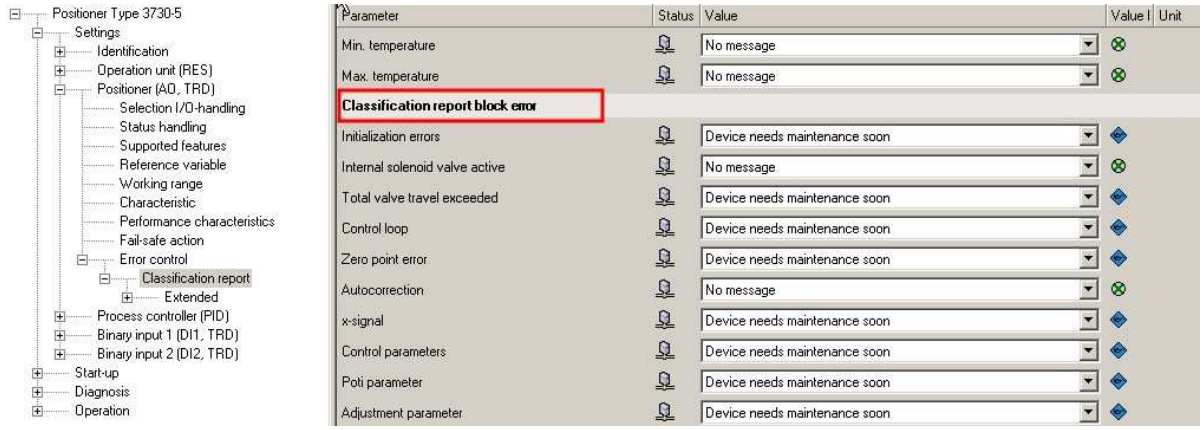

Fig. 29: Classification report of the block error

6.2. Standard diagnostics – EXPERT

The 'Status messages' subfolder in 'Diagnosis' contains the states monitored by the standard diagnostics, such as system deviation, zero point error etc. *(Fig. 30)*. This subfolder provides an overview of the valve condition. The executed parameters or error groups of the folders are listed below them. For cyclic data exchange, we recommend to activate the online mode of the DTM in this window.

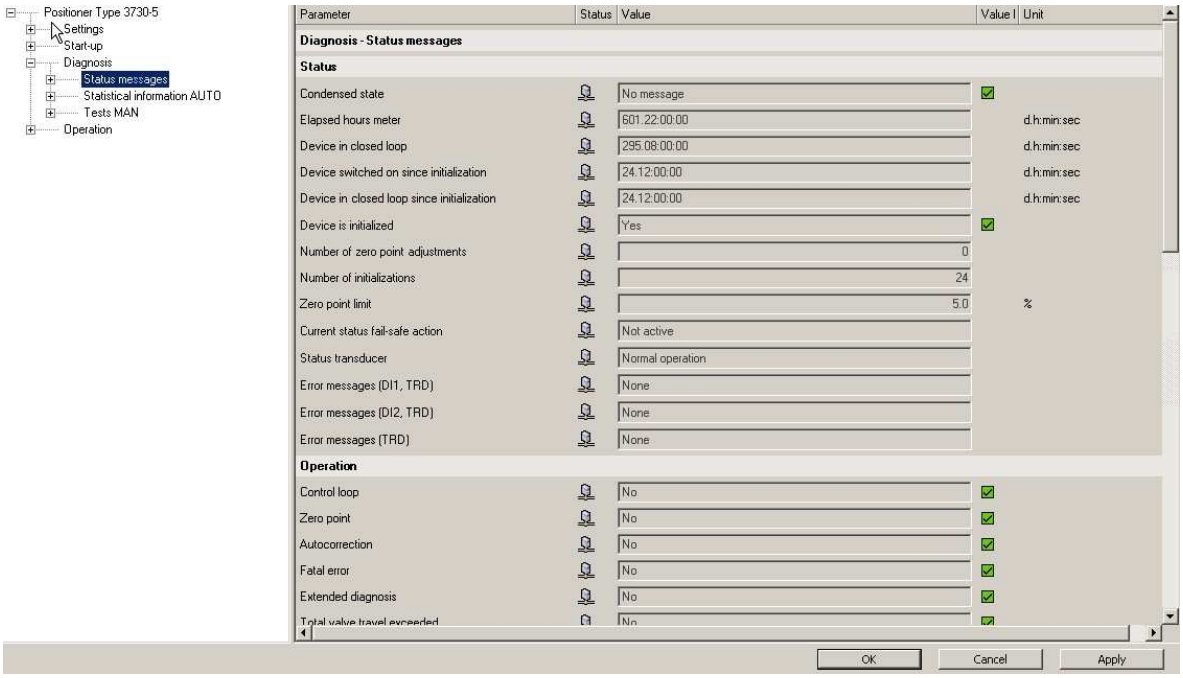

Fig. 30: Device data reset/restart

Condensed state [RB – CONDENSED_STATE]
Current condensed state of the positioner
Elapsed hours meter [AO TRD – ELAPSED_HOURS_METER]
Operating hours counter – Positioner switched on
Device in closed loop [AO TRD – ELAPSED_HOURS_METER]
Operating hours counter – Positioner in closed-loop operation
Device switched on since installation [AO TRD – ELAPSED_HOURS_METER]
Operating hours counter – Positioner switched on since the last initialization
Device in closed loop since installation [AO TRD – ELAPSED_HOURS_METER]
Operating hours counter – Positioner in closed-loop operation since the last initialization
Device is initialized [AO TRD – DEVICE_INIT_STATE]
Indicates whether the positioner has been initialized
Number of zero point adjustments [AO TRD – NO_OF_ZERO_POINT_ADJ]
Number of zero point calibrations since the last initialization
Number of initializations [AO TRD – COUNTER_INIT_START]
Number of initializations performed

Zero point limit [AO TRD – ZERO_POINT_LIMIT]
Specifies the zero point limit in %
Current status fail safe action [RB – FAULT_STATE]
Current status of the fault state of the AO Function Block
Status transducer [AO TRD – TRANSDUCER_STATE]
Status of the Transducer Block
Error messages DI1,TRD / DI2,TRD / AO TRD
Error message of a Transducer Block

The errors are listed under the corresponding headings '**Operation**', '**Hardware**', '**Initialization**' and '**Data memory**'. 'Yes' indicates when an error occurs. Additionally, the corresponding classification symbol appears on the right of the error.

Min. temperature [AO TRD – HIS_TEMPERATURE]
Shows the minimum temperature
Max. temperature [AO TRD – HIS_TEMPERATURE]
Shows the maximum temperature
Min. temperature (time) [AO TRD – HIS_TEMPERATURE]
Shows how long the minimum temperature existed
Max. temperature (time) [AO TRD – HIS_TEMPERATURE]
Shows how long the maximum temperature existed
Period (time < -40°/-40F) [AO TRD – HIS_TEMPERATURE]
Shows how long the temperature stayed below –40 °C
Period (time > 80°/80F) [AO TRD – HIS_TEMPERATURE]
Shows how long the temperature stayed above 80 °C

6.2.1. 'Alarm State' folder

The subfolders to the individual function blocks of the folders 'Diagnosis' -> 'Status messages' -> 'Alarm state' contain the **BLOCK_ALARM** parameter. This parameter shows the current status of the function block and provides information on configuration, hardware and system errors.

6.2.2. 'Block errors' folder

The subfolders to the individual function blocks of the folders 'Diagnosis' -> 'Status messages' -> 'Block errors' state' contain the **BLOCK_ALARM** parameter which show active block errors *(Fig. 31).*

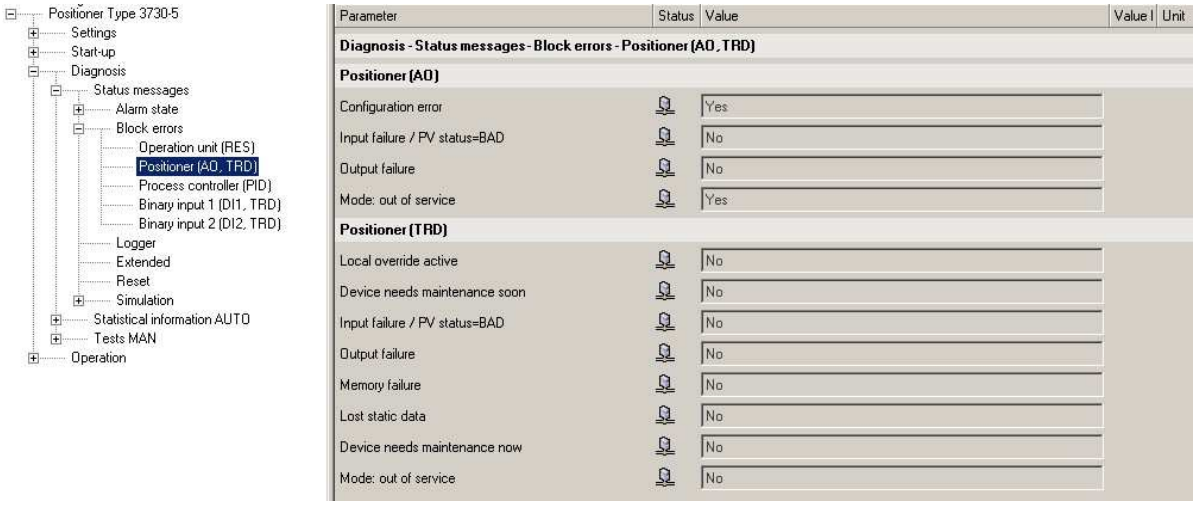

Fig. 31: Display of block errors

6.2.3. 'Logger' folder

The 'Logger' subfolder in 'Diagnosis' -> 'Status messages' contains the last 20 status messages *(Fig. 32).*

Fig. 32: Display of last 30 status messages (Logger)

6.2.4. 'Extended' folder

The 'Extended' subfolder in 'Diagnosis' -> 'Status messages' contains plain-text error messages generated by EXPERT+ *(Fig. 33).*

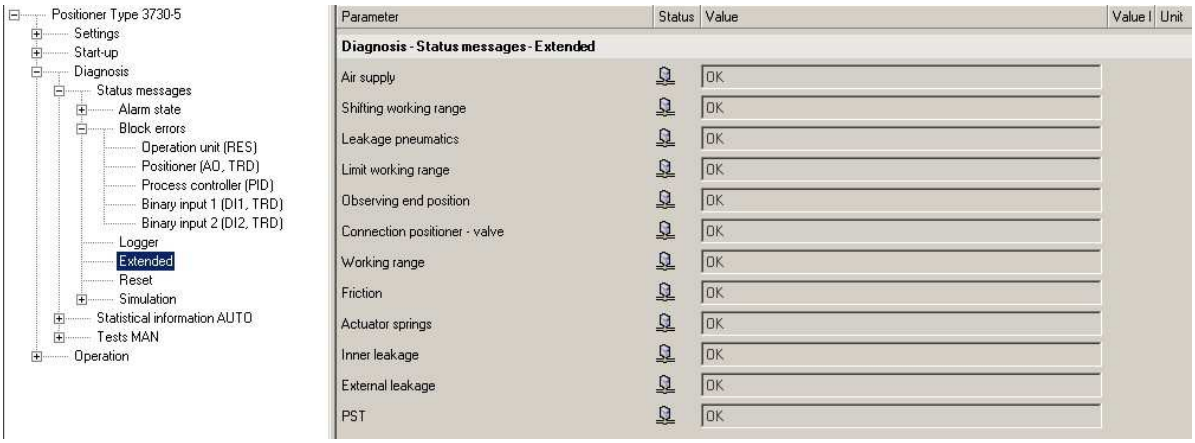

Fig. 33: Diagnosis messages generated by EXPERT+

6.2.5. 'Reset' folder

The individual diagnostic messages and the data compiled by the extended diagnostics (EXPERT+) can be reset in this folder *(see section 5.3)*.

6.3. Extended diagnostics - EXPERT+

Note:
Refer to EB 8388-5 EN (EXPERT+ with Partial Stroke Test) for more details on EXPERT+ Diagnostics.

The 'Statistical information AUTO' (in-service monitoring tests) subfolder and the 'Tests MAN' (out-of-service diagnostics) subfolder in 'Diagnosis' contain the extended diagnostic functions of EXPERT+.
To use EXPERT+, the reference graphs (valve signature) must be recorded after initialization. The positioner needs these reference graphs to continuously compare the current state of the valve

with the state of the valve when it was installed. The reference tests to plot reference graphs can be started in the 'Diagnosis' folder *(Fig. 34)*.

Fig. 34: Start reference graph plotting for EXPERT+ Diagnostics

7. Resetting the device data and restarting the positioner (warm start)

In the 'Operation unit (RES)' subfolder in 'Settings' *(Fig. 35)* the positioner can be restarted (warm start) or various device parameters can be reset. The executable functions available are described in following:

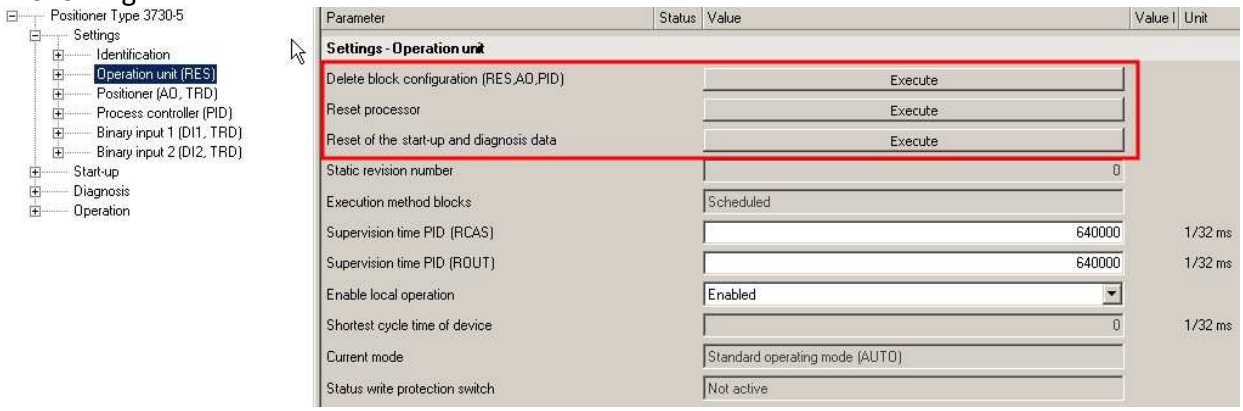

Fig. 35: Reset the device data/restart

Delete block configuration (RES, AO, PID) [RES – RESTART/DEFAULTS]
The device data and the interconnection of the function blocks are reset to the values determined in the specification.
Reset processor [RES – RESTART/PROCESSOR]
Restarts processor/positioner (warm start)
Reset of the start-up and diagnosis data [AO TRD – SELF_CALIB_CMD]
Resets the start-up and diagnosis data to their default settings (Code 36)

8. Notes