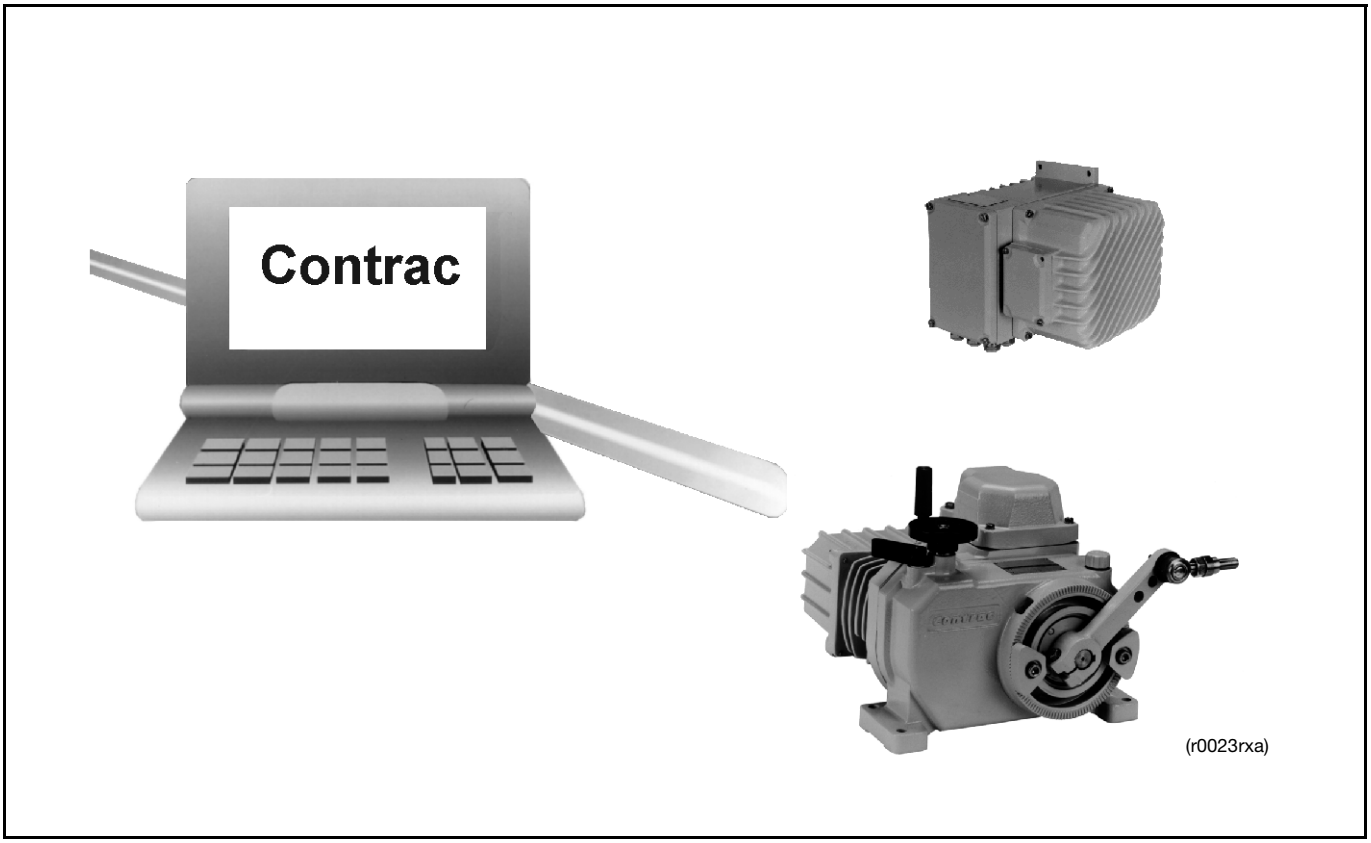
Device Type Manager for Contrac

Graphical User Interface for digital Communication with Contrac Actuators

SW Release 4.2.1

Manual

42-68-502EN Rev. 4



Content

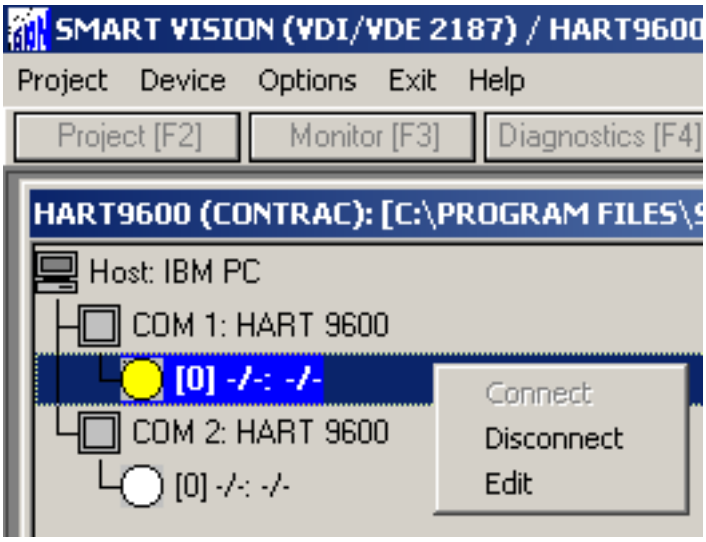
1 General

The DTM - Device Type Manager - is the basis of the DTM concept. It is a component which the manufacturer supplies together with the smart field device.

The DTM „knows“ all device features and limits. It contains all user dialogs, takes care for the device configuration and diagnosis and generates the device specific documentation.

Upgrading with new field devices is possible since the DTM can be supplementaryly loaded.

2 Start DTM



- click the related actuator with the right mouse button
- on selecting „more“ initializes the Contrac DTM
- again click (right) on the related actuator in the menu tree and select „edit“; this opens a second window with the device specific dialogues for configuration and parameter setting.

3 File

3.1 Open

Loads the data, which are saved on a volume, into the user interface

3.2 Save

Saves the data of all offline windows on a volume.

3.3 Save as

Saves the data of all offline windows on a volume. Enter path and file name.

3.4 Print

Prints the content of the active window. Not available for all windows.

3.5 End

Closes the current main window.

4 Edit

4.1 Copy

Copies the text, highlighted with the mouse cursor, into the clipboard.

4.2 Paste

Pastes the clipboard content.

5 Device

5.1 Connect

Communication setup to connected device. Use the pulldown menu or the symbol.

After a successful connection setup the user will be requested for loading the data from the device. Select „Yes“ to load all data of the connected device into the user interface. If then other windows will be opened (e. g. <Configure>, <Operation>) the current values and parameters of the device will be displayed in the related fields or menus.

If you select „No“ the following windows display after the start either default data or data of a previously connected device. These data are not associated with the currently connected device.

5.2 Disconnect

Disconnects the communication to the actuator. Use the pulldown menu or the symbol.

5.3 Load from Device

Loads data from the actuator and displays the data in the graphical user interface. Use the pulldown menu or the symbol to load the data, if they had not been loaded immediately after the communication setup.

5.4 Save to Device

Saves the data of the active window to the actuator. In order to save the parameters of Use file type *.ops to save offline data to the disk

5.5 Reset

Disconnects an existing communication to the device and re-starts the micro processor. <Reset> requires a new communication setup to the device.

5.6 Load Factory Settings

The manufacturer saves the parameters according to the order specification into a memory, which is not editable by the user. Load the data from this memory in case some or all parameters have been changed by an error. This resets the actuator to the initial delivery status.

5.7 Identification

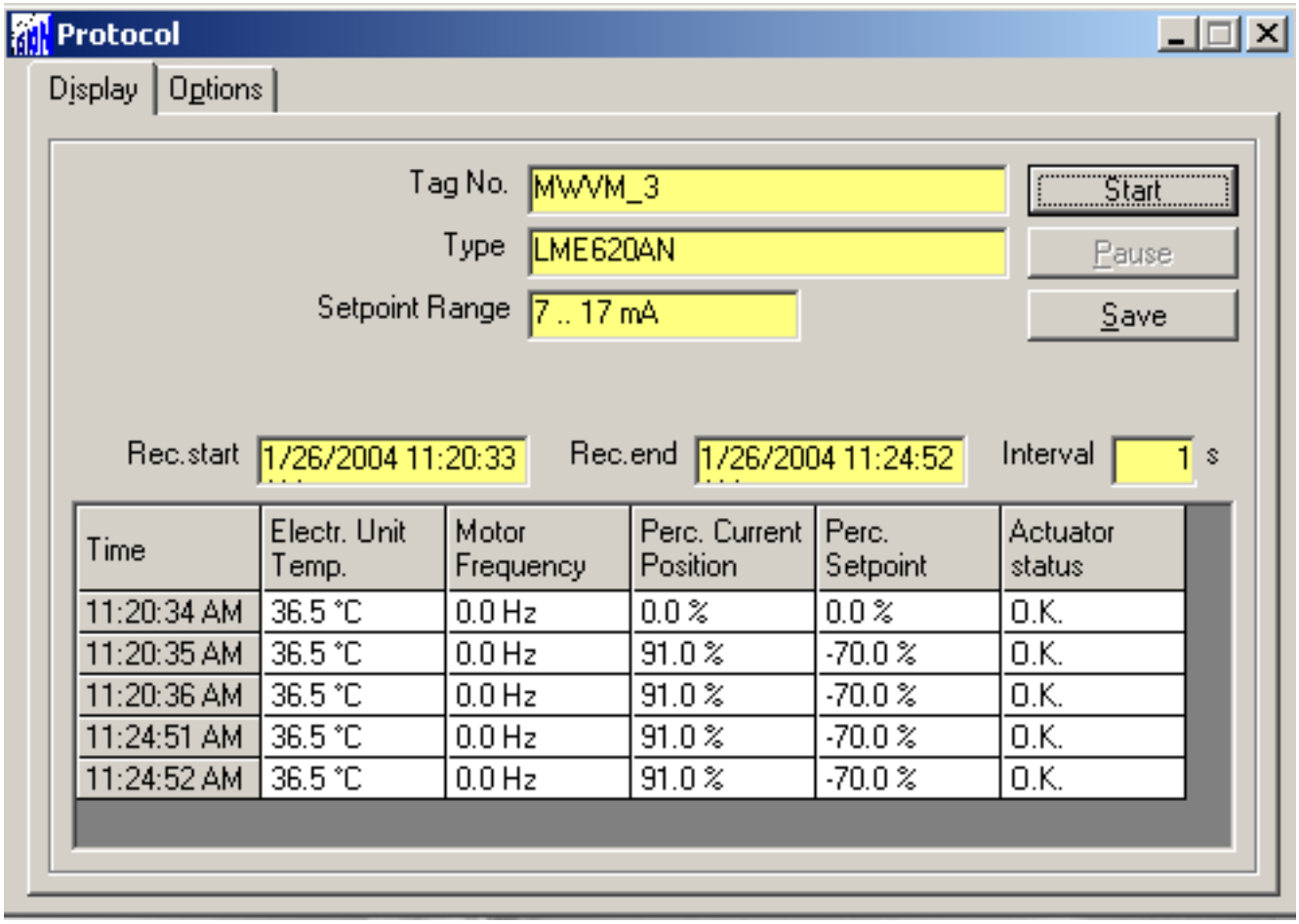
Communication tag:	enter communication name (e. g. FSK bus)
HART ID:	device specific ID specified by the HART user group

6 Display

6.1 Protocol

Protocol allows to record various actuator parameters during the operation. Show these data in the user interface or save the data to your harddisk. Saved data can be exported e. g. to MS EXCEL for further use.

6.1.1 Display



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The upper part of this file card shows the basic actuator data

- Tag No.
- Type
- (Adjusted) Setpoint Range)

Further text fields inform about the start / end of the recording as well as about the scanning rate, which can be selected under the „Options“ menu.

A mouse click on the „Start“ Button starts the record procedure and the values are displayed in a table. Once the procedure is started, the „Start“ button converts into „Stop“ and vice versa. The left-most column shows the record time and the right-most column shows the related actuator status.

Use the „Pause” button to interrupt the recording. The interruption is also displayed in the text field „Rec. End“. Use the „Start“ button again to continue the recording. A mouse click on the „Stop“ button ends a running or interrupted recording.

Once the recording is finished, save the data in any directory using the „Save“ button.

6.1.2 Options

6.1.2.1 Measured value 1 … Measured value 4

Select one of 8 parameters in the 4 combo boxes for recording:

- gearing temperature
- electronics temperature
- control (position) deviation
- motor frequency

- current analog position value
- perc. current position value
- analogue setpoint
- perc. setpoint

6.1.2.2 Interval

Enter the scanning rate (1 ... 3600 sec) into the text field.

7 Operate

7.1 Positioner

Use the „Manual“ or „Automatic“ radio button to select the operating mode. The „Automatic Mode“ requires additionally a DC 24 V high signal at the hardware input (BE1). Actuators for the communication protocol „PROFIBUS DP“ generally follow the digital setpoint without the option to select the MAN mode.

A changeover becomes active after approx. 2 sec.

Use the text field in order to enter the new setpoint in the „Manual“ mode or click onto the << or >> button, which changes the setpoint in 1% steps. These elements are located in the „Position Setpoint (MAN) section“.

A text field below this section displays the current position value (AUT mode) in % (bar graph and text field) and mA (text field).

An additional bar graph and a text field display the current positional deviation within a range of max. +/- 10%.

Use the scrollbar in the „Status“ field to get information about the current actuator status such as current alarms or failures.

The adjacent field displays the selected ranges for current position and setpoint value.

A short message occurs, if you leave the window and the status had been changed (MAN / AUT).

7.2 Controller

Use this window to drive the actuator in MAN or AUT mode if the in Contrac integrated controller is activated. The current process value is displayed in text fields (mA and %) and a bargraph. The current control deviation is displayed in a bargraph and a text field (%).

8 Diagnosis

8.1 Status

Six non-editable text fields inform about the general actuator status.

8.2 Alarms / Failures

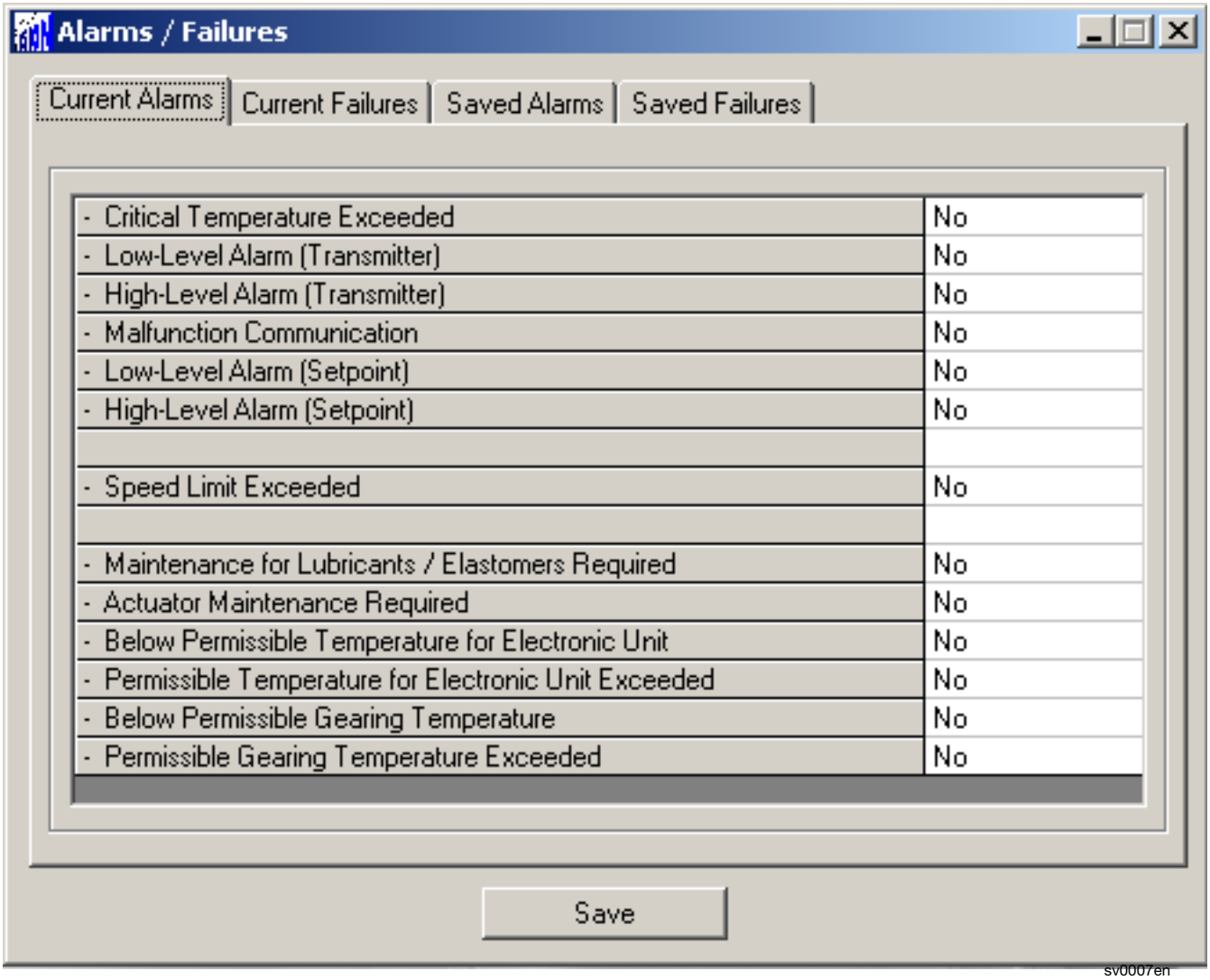
Alarms describe critical conditions which make an actuator breakdown likely, if these conditions linger. The actuator remains in operation.

The alarm is reset automatically if the conditions change to an uncritical level. It is saved in the alarm memory and can be individually reset.

Failures describe dangerous conditions which make a further operation impossible.

Clicking the <Save> button saves the parameters of the current alarms / malfunctions as well the parameters of the saved alarms / malfunctions in a *.txt file.

8.2.1 Current Alarms



This file card shows the parameters, which are of importance for the operation. The right-most column indicates (yes/no), whether there is currently an alarm for the related parameter.

Once an alarm message occurs, it is also saved in „Saved Alarms“ memory. It remains here until it is specifically reset.

8.2.2 Current Failures

Current failure messages can only be reset, if the reason for the failure is fixed.

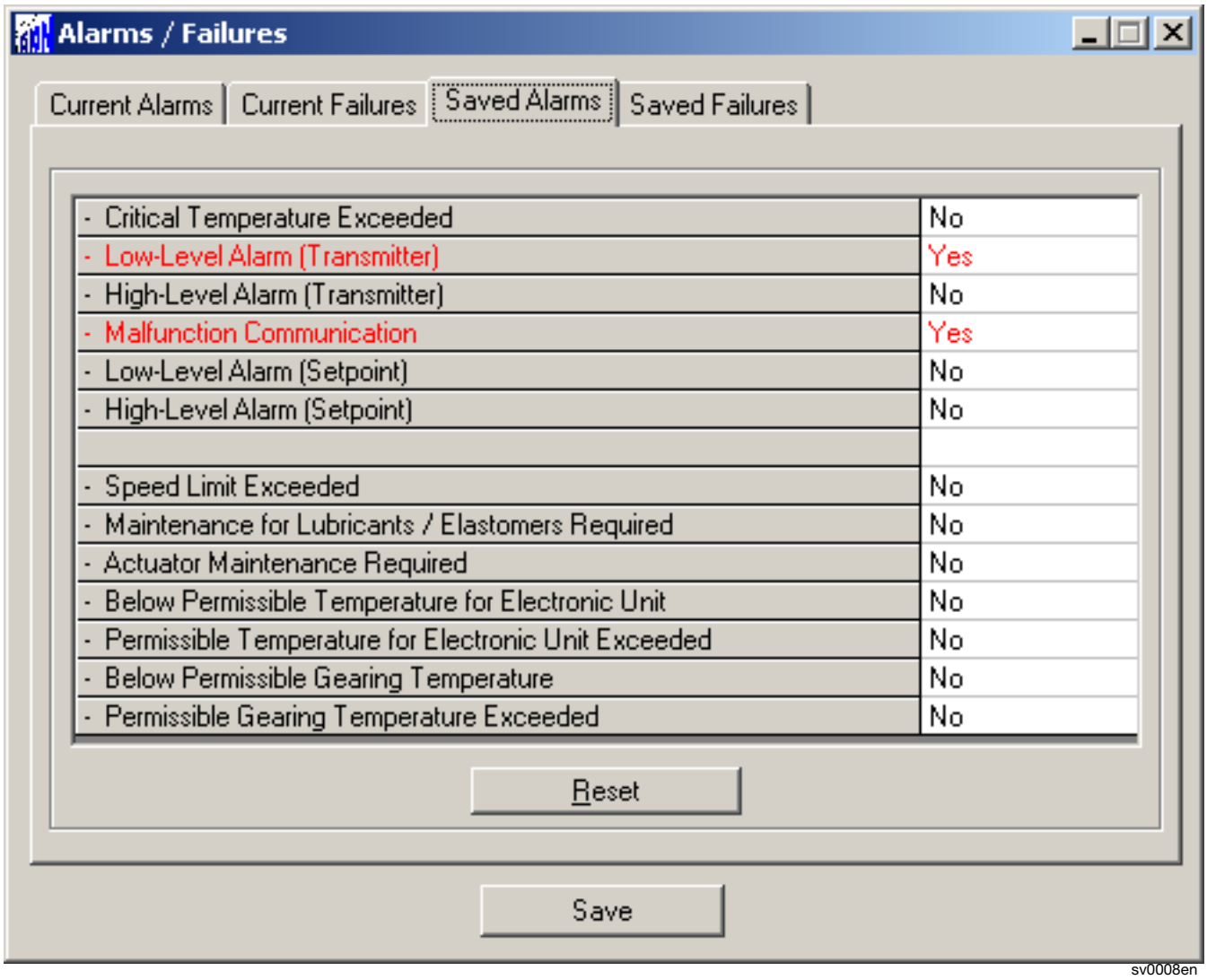
Exception:

Failures, caused by an activated positioning loop monitoring, can be reset with an a new drive command. This applies for:

- speed monitoring
- limit value at stand still
- rough-running in the end positions
- wrong direction

Once a failure message occurs, it is also saved in the „Saved Failures“ memory. It is displayed here until reset.

8.2.3 Saved Alarms



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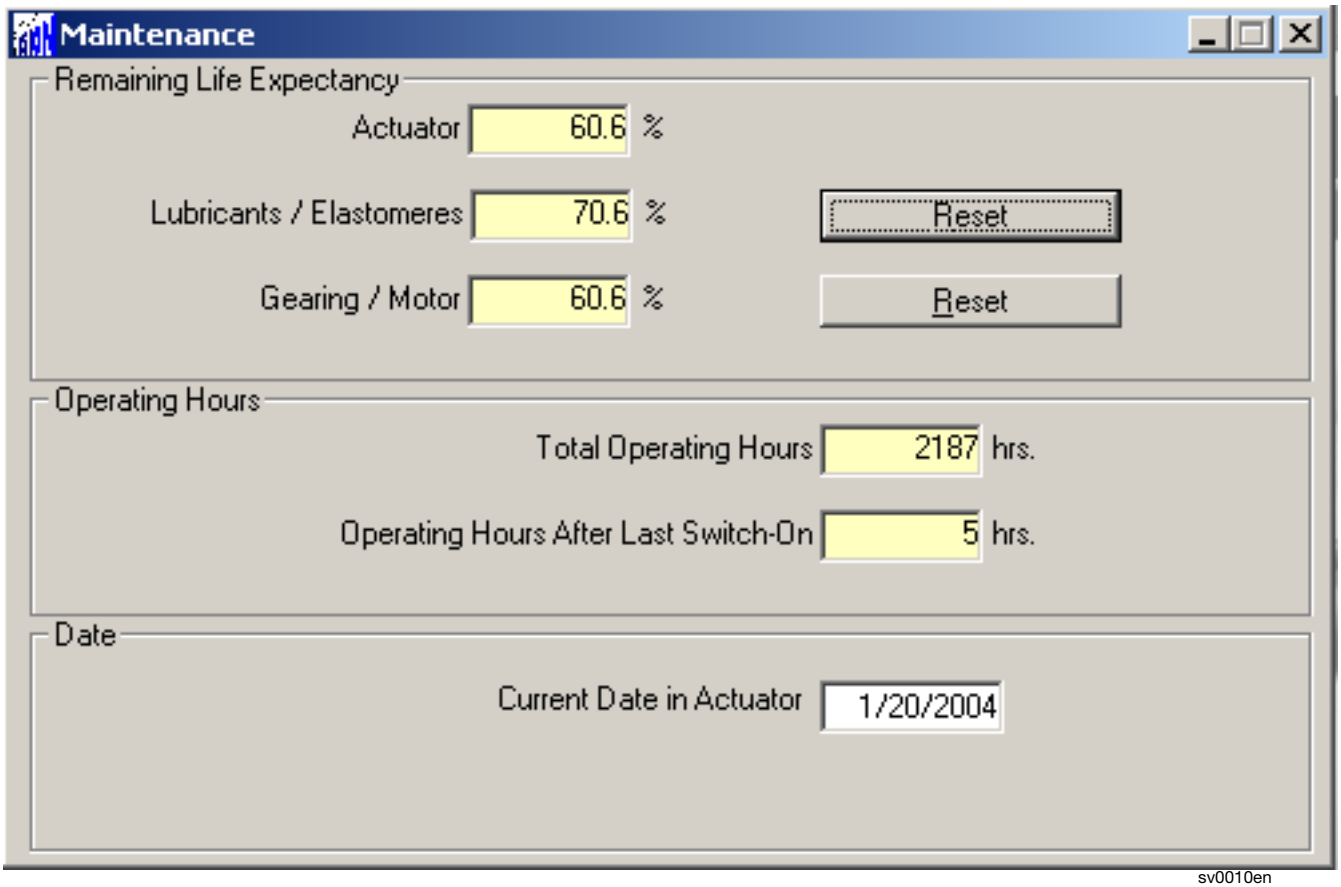
This file card contains the same information as „Current Alarms“. Use the „Reset“ button for memory reset. Make sure that the memory is not write protected (high signal at BE1 or switch at the local control panel.

8.2.4 Saved Failures

This file card contains the same information as „Current Failures“ and shows previous failures. Use the „Reset“ button for memory reset. Make sure that the memory is not write protected (high signal at BE1 or switch at the local control panel.

8.3 Maintenance



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8.3.1 Remaining life Expectancy

A microprocessor evaluates all parameters which are of importance for the actuator operation. The result is the expected remaining lifetime. Depending on the load factors the components a subject to unequal wear. This affects the remaining lifetime, which is shown for

- Actuator
- Lubricants / Elastomers
- Gearing / Motor

in text fields. The value for the actuator corresponds to the lower most value of lubricants / elastomers and gearing / motor.

All values are a rough recommendation and are not of importance for the warranty.

In case of (partial) repair the remaining life expectancy can be reset in 10% steps for lubricants / elastomers and gearing / motor in the user's sole discretion.

8.3.2 Operating Hours

The over-all operating hours and the operating hours since last switch-on are displayed in 2 text fields each.

8.3.3 Date

A text field displays the editable date. Editing is possible after the mouse cursor focus has left the field. Click another field to de-focus the date field. Then save the new date via <Device> <Save to Device>.

8.4 Load

8.4.1 Event Counter

A non-editable text field displays the no. of motor reversals max. values since the first commissioning.

8.5 Max. Values

Two text field display the max. temperatures of gearing and electronic unit. One <Reset> button each allows to reset the values to the current ambient temperature.

8.6 Frequencies

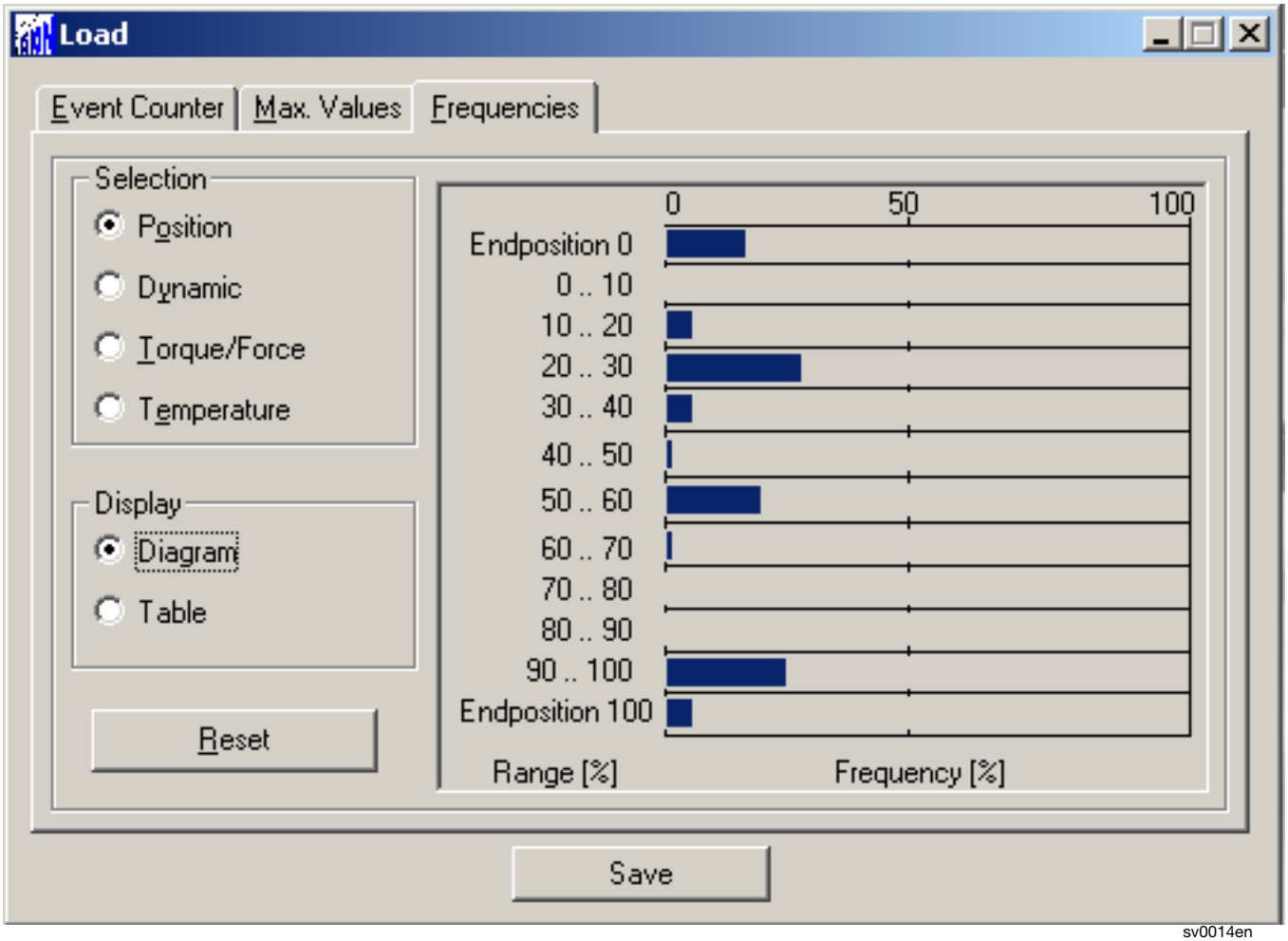
The DTM allows to determine the load frequency for the parameters:

- position
- dynamic
- torque / force
- temperature

within the overall operating time. Select the parameter to be displayed via the related radio button.

The over-all operating time (100%) is splitted into 10% sections. Each section shows the load frequency for the selected parameter.

Select the display mode (tabular or bar graph) via radio buttons.



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With the Load window active the <File> <Print> command prints the content of the three file cards (Event counter, Max. values, Frequencies). The values are printed in tabular view, regardless of the selected display mode. The <Reset> button resets all values to 0.

Use the „Save“ button to save all values (Event Counter, Max. Values, Frequencies) as *.txt file in a freely selectable directory.

9 Configure

9.1 General Data

9.1.1 Device

This file card shows the following data:

tag no.:	user defined tag
description:	editable name; description within plant (e. g. superheater no.1)
device:	e. g. Contrac
actuator:	e. g. linear actuator
type:	e. g. LME 620 or RHD 250
manufacturer:	actuator manufacturer (field not editable)
software revision:	current software version in actuator
write protection:	activated write protection does not allow for data storage in actuator (field not editable)
date:	current date in actuator

9.1.2 Units

Combo boxes in this file card show basic units for the actuator. Select the required unit for your application via the related combo box.

9.1.2.1 Torque / Force

Select either:

- Nm (N)
- kNm (kN)
- Ft lbs

Values in brackets refer to linear actuators.

9.1.2.2 Positioning Speed

For linear actuator select either:

- Ft/s
- Ft/min
- In/s
- In/min
- mm/s

For part-turn actuator select either:

- Rad/s
- Deg/s
- Grad/s

9.1.2.3 Temperature

Combobox for temperature unit selection. Select either:

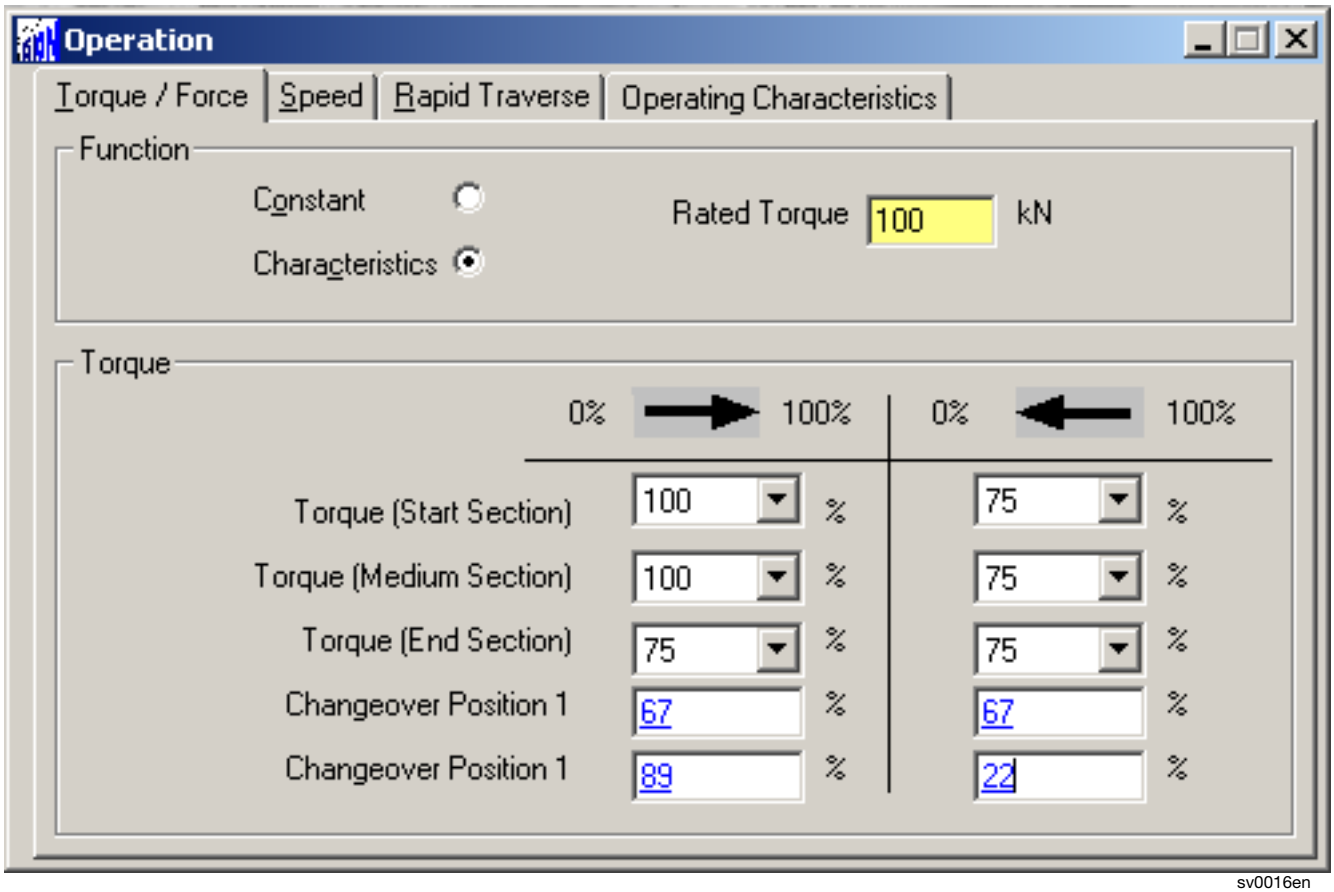
°C; °F; °R; K

9.1.3 Notes

Text field for free editable text.

9.2 Operation

9.2.1 Torque / Force



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Use the combo box to determine whether the actuator runs with a constant upper limit for torque / force or with a deviating upper limit within defined sections of the operating range.

A non-editable text field displays the rated torque / force value (100%).

Constant

Select 100%, 75% or 50% of the rated value as the upper torque / force limit for the 0...100% and 100...0% operating range. The torque values for 0 .. 100% and 100... 0% operating range can be different. The selected limit applies to the entire operating range.

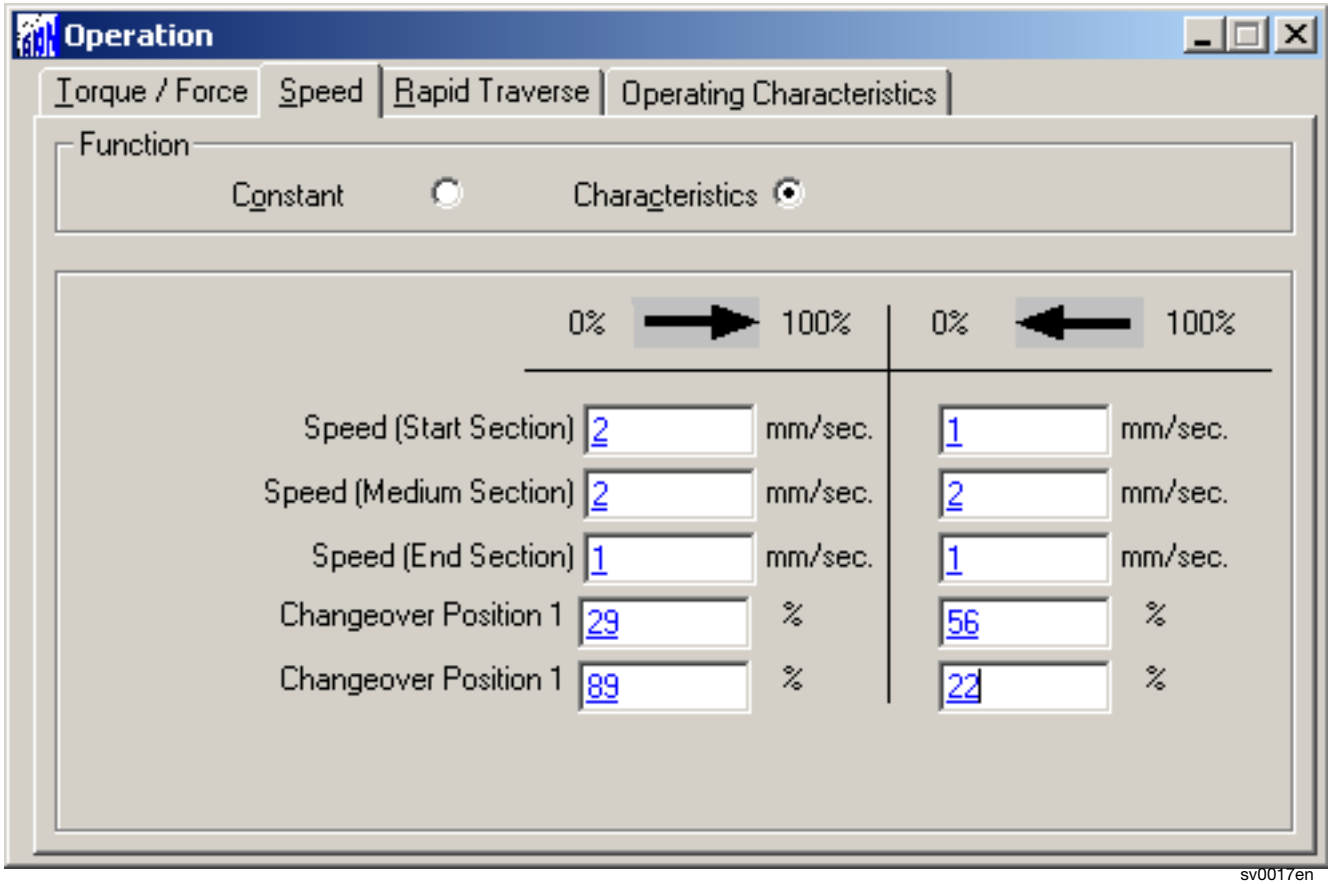
Characteristics

Divide the operating ranges 0... 100% and 100 .. 0% into max. 3 various section each, if required. Define a max. value for force / torque for each of these sections.

Determined switch-over values (SOV in the following text) provide the section separation.:

for + direction:	SOV 2 > SOV 1
for – direction:	SOV 1 > SOV 2
Scope:	
start force / torque:	0% (100%) ... SOV 1
medium force / torque:	SOV 1 ... SOV 2
end force / torque:	SOV 2 ... 100% (0%)

9.2.2 Speed



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Use the combo box to determine whether the actuator runs with a constant upper limit peed or with a deviating upper limit within defined sections of the operating range.

The speed in automatic mode and manual mode can be different.

Constant

Enter the upper limit speed for 0 ... 10% and 100... 0% into the text field. In automatic mode the torque values for 0 .. 100% and 100... 0% operating range can be different. The selected limit applies to the entire operating range. The speed, selected for the manual mode (MAN) applies for both directions.

Characteristic

(Not available with "Positioning behind step controller".)

The operating ranges 0 ... 100% and 100 .. 0% can be split up in 3 independent sub sections. Each of which can be set to a different max. speed value.

Separate the subsections using freely selectable switch-over values and consider:

For the + direction:	switch-over value 2 > switch-over value 1
For the – direction:	switch-over value 1 > switch-over value 2

The range of validity is:

start speed range:	0% (100%) until switch-over value 1
medium speed range:	switch-over value 1 until switch-over value 2
end speed range:	switch-over value 2 until 100% (0%)

9.2.3 Rapid Traverse

9.2.3.1 No Rapid Traverse

The actuator does not move in rapid traverse mode. Signals to the digital input 2 + 3 let the actuator move with the selected manual speed.

9.2.3.2 Rapid Traverse Speed with Servo Motor

Signals to the digital input 2 + 3 let the actuator move with the selected rapid traverse speed and reduced force / torque. The rapid traverse speed can be as twice as high as the rated speed. In this case the torque is approx. 50% of the rated torque.

Select „Rapid Traverse“ via the „Function“ combo box in the „Input / output digital input“ window. Now signals to digital input BE2 drive the actuator to + direction, signals to digital input BE3 drive the actuator to - direction. Each of which uses rapid traverse speed.

9.2.3.3 Rapid Traverse Mode with 2nd Motor

(Not available for all actuators)

Non-standard Contrac actuators can be equipped with a 2nd motor.

Assign the signals for BE 1 + BE2 (digital **input**) to the digital output BA2 + BA3 in order to trigger the 2nd motor via e. g. an interface relay.

In order to avoid dynamic overload in the end position, make sure that the rapid traverse command is stopped in time.

9.2.4 Operating Characteristics

9.2.4.1 Behaviour after Starting

Select "Switch to AUT" if the actuator is not used in a fieldbus application.

Select via a combo box, whether the actuator is in MAN or AUT mode after a voltage recovery.

9.2.4.2 Behaviour at Critical Temperatures

Select the operating mode at critical temperatures via a combo box. The actuator remains ready-to-run.

9.2.4.3 Frequency Selection

Select 50 hz or 60 hz via the combo box.

9.2.4.4 Monitoring Time for Setpoint Command

Only available for digital setpoint.

9.2.4.5 Delay Time for Manual Commands

The actuator accelerates within the selected time from 0 to the MAN speed which ensures a smooth start.

9.2.4.6 Anti Condensation Heater

Condensation might occur if the actuator is exposed to high temperature differences. Use the check box to de-/activate the anti condensation heater.

9.3 End Position Behaviour

9.3.1 Driving into End Position

Various end position behaviours are available for both directions (0...100% or 100...0%). Select either:

Keeping tight with MD_F	The actuator keeps the valve in endposition (+ or -) with rated force / torque.
Position dependent switch-off	The voltage is switched off, if the actuator gets to the adjusted position value. The brake locks. The switch-off value can be 20% before each end position.
Switch-off with 1 x MD_F	If the actuator must provide its rated force / torque, the voltage supply is switched off. The brake locks the actuator in this position

Switch-off with 2 x MD_F	If the actuator must provide 200% of its rated force / torque, the voltage supply is swithed off. The brake locks the actuator in this position

9.3.1.1 Positional Deviation to Keep Tight

Enter values between 0%...5% in order to compensate for setting inaccuracies or thermal impact.

Example:

3% are selected via the text field. If thermal effects disadjust the valve so, that still 2% are missing to reach 100% actuator position, the selected setting allows the actuator to overrun the 100% position by up to 3% in order to close the valve completely. In this case the position transmitter provides a higher mA signal as well which might cause a high-alarm message.

9.3.1.2 Switch-off Delay

If „Switch-off with 1 x MD_F“ or „Switch-off with 2 x MD_F“ is selected for the endposition behaviour, the actuator is switched off once the entered delay time is expired (max. 10s).

9.3.2 Leaving End Position

9.3.2.1 Break-away Function

Contrac actuators can provide an increased force / torque (up to 2-times the rated value) close to the end position. This allows for releasing even jammed final control elements. If the actuator provides the increased force / torque it runs with creeping speed (approx < 10% rated speed).

Select via combo box either:

- No break-away
- Break-away from 0%
- Break-away from 100%
- Break-away from 0% and 100%

This option is available 5% before each end position (max 0 .. 5% or 95 ... 100%). Use the text field to enter the value.

9.3.3 Modulating Control Near End Position

9.3.3.1 Close Tight

This option avoids actuator / valve movements close to the end position. Activate the checkbox button and enter the limit value. Once the actuator reaches this value, it reacts as defined under „End position behaviour“. This also applies for „Position Dependent Switch-Off“.

9.3.3.2 From Position

Text field to enter the position value from which the „close-tight“ option becomes active.

9.4 Input / Output

9.4.1 Analog Input / Output

9.4.2 Signal Range

Actual value range

Select either 0 ... 20 mA or 4 ... 20 mA signal level.

Setpoint signal

Use this combo box to activate either digital or analogue setpoint.

Setpoint range

Enter the setpoint range into the text fields. Start and end value must be within 0 ... 20 mA; the difference must be ≥ 8 mA.

Analog setpoint:

Start value and end value are freely selectable, however, the difference must be > 8 mA.

Digital setpoint:

This option is used for actuators with fieldbus communication. It can also be used as constant setpoint value. The value is freely selectable between 0 to 100%. If the actuator works as positioner, the digital setpoint acts as constant setpoint. In this case the actuator moves to this setpoint and maintains it against the process counterforce.

If the actuator works with its integrated controller, the digital setpoint acts as constant controller setpoint.

9.4.2.1 Damping of Setpoint Input

There is no need for dynamic actuator damping. The non-linear filter (NIFIL) dampens the analogue input and is only active at changes >1/2 linear range.

The time constant changes the run-in characteristic. With 0 s the filter becomes ineffective.

9.4.3 Digital Input / Output

9.4.3.1 Digital Input

Functions:

The functions are not independently selectable for each digital input. The selection of an actuator function via the combo box assigns the function to each digital input. See the table below for this assignment.

	BE 1		BE 2	BE 3
Function	M/A switch-over	Write protection	+ command	- command
Off	O	O	O	O
Manual operation	x	x	x	x
Rapid travel (analogue setpoint)	x	x	x	x
Rapid travel (digital setpoint)	x	x	x	x
step controller	x	x	x	x

O = off; x = on; BE... = digital input ...

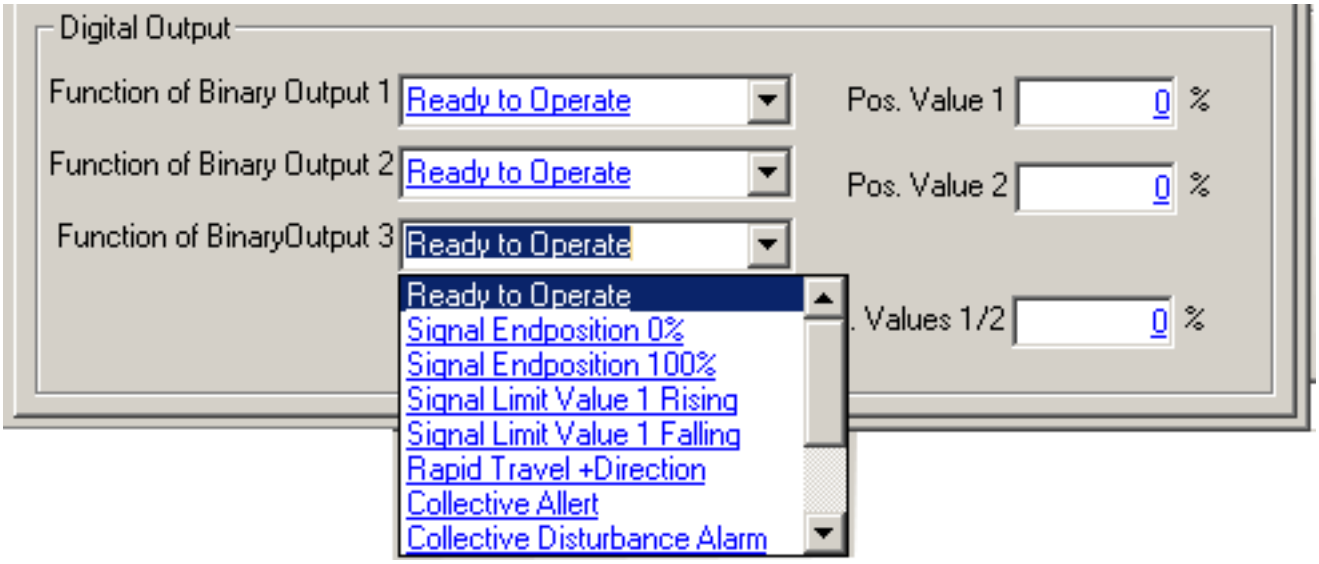
Attention:

If the digital inputs are assigned to „step controller“ the possibly selected speed characteristic (Operation / Speed) is not available,

Pulse time:

Min. time to recognize a digital signal as a pulse. The setting range is between 10...200 ms.

9.4.3.2 Digital Output



Software generated signals can be assigned to each digital output. Select one of each via a combo box.

Ready for operation	signalizes the actuator status
Signal end position 0%	actuator has reached the 0% position
Signal end position 100%	actuator has reached the 100% position
Signal limit value 1 rising	actuator has reached limit position 1 with rising signal
Signal limit value 1 falling	actuator has reached limit position 1 with falling signal
Rapid travel + direction	actuator moves with rapid-travel-speed towards + endposition (only available with additional rapid-travel motor)
Collective alert	some Contrac parameters will likely damage an actuator within the near future; (message via <Diagnosis> <Status>); the actuator is still available
collective disturbance alarm	some Contrac parameters have exceeded the limits; the actuator is no longer available; (message via <Diagnosis> <Status>)
Signal limit value 2 rising	actuator has reached limit position 2 with rising signal
Signal limit value 2 falling	actuator has reached limit position 2 with falling signal
Rapid travel - direction	actuator moves with rapid-travel-speed towards - endposition (only available with additional rapid-travel motor)
Local operation	actuator is operated via local control panel (LCP)

9.4.4 Position Signals

Define 2 limit signals for the entire operating range. The signals are comparable with mechanical switches. Depending on their assignment to the digital output they respond once the signal reaches the defined limit. Define a hysteresis in order to get an unambiguous signal.

9.4.5 Set point Characteristic

Select one of five possible set point characteristics via a combo box.

The characteristics:

- linear characteristic
- equal percentage (25%)
- equal percentage (50%)

can not be parameterized. Once the characteristic is selected, it is graphically displayed.

The programmable characteristic is graphically displayed as well. Use max. 22 values for the configuration. Value1 with 0% / 0% and value 22 with 100 % / 100 % can not be changed. A programmable characteristic requires at least 2 additional values. They can be freely chosen.

9.4.5.1 Set Point Function

Programmable Setpoint Characteristic

Once "Programmable Characteristic" is selected, a table to enter the X and Y co-ordinates appears in the left part of the window. The value may be entered in free order. On using the "Put" button the values are accepted and are graphically displayed in the right part of the window. In order to change a value double-click on it and enter a new one.

Split Range

Define an individual start point and end point to allow for more than one actuator to position with one common set point. The range between start point and end point corresponds to 100% positioning range for the individual actuator.

The value for the start point must be higher than that for the end point.

9.4.6 Failure Messages

Select via radio buttons which current level the actual value uses in case of a actuator malfunction. Select either.

Select either:

- high alarm
- low alarm
- no alarm

Enter the appropriate value into the text field if „High Level“ or „Low Level Alarm“ are selected. For „High Level Alarm“ enter 20 … 25 mA, for „Low Level Alarm“ enter 1 … 5 mA.

9.5 Monitoring

9.5.1 Setpoint Monitoring

Activate / deactivate the set point monitoring via a check box. Enter the response limit values into the appropriate text.

Behaviour in case of a setpoint failure

The combo box "Behaviour in case of set point malfunction" offers the following options:

Lock in last position

As soon as the upper or lower limit value is exceeded, the motor is switched off and the brake keeps the actuator in the current position.

Drive to safety position

As soon as the upper or lower limit value is exceeded the actuator drives into a pre-defined position. Then the motor is switched off and the brake keeps the actuator in the current position.

Positioning with last setpoint

Not available with bus communication. In case of a set point signal failure the actuator remains switched on and uses the last saved set point signal of the memory.

9.5.2 Positioning Loop Monitoring

Activate / de-activate the positioning loop monitoring with a mouse click on the check box button.

Switch-off limit value	Defines the range before the end positions, where the monitoring is not active; e. g. with a limit value of 2% the monitoring is active between 2 … 98%. Enter values between 1 … 5%.
Response threshold	Gives the permitted position deviation, before the monitoring reacts.
Limit value at stand still	If the position deviation exceeds this limit while the ac-tuator does not move the positioning loop monitoring reacts.
Limit value for wrong direction	Gives the max. permissible distance [%] which the actuator is allowed to move into the wrong direction.
Min. travel speed	Indicates the min. distance [%] the actuator has to move within a monitoring interval.
Travel time monitoring in end position.	Extension factor referring to the rated positioning time.

9.6 Controller

The controller, integrated in the Contrac actuator, gets the actual process value from the transmitter. Enter the transmitter limit values and the damping values into text fields of the transmitter tab.

9.6.1 Controller Settings

Click the radio button "Controller" to activate the controller.

9.6.1.1 Gain

Adjustment of controller gain (p-element). Enter values between 0 … 40. "0" switches off the controller.

9.6.1.2 Integral Action Time

Setting of controller integrating time I-element). Enter values between 0 and 3600 seconds. A value < 0.1 s switches off the I-element.

9.6.1.3 Derivative Gain

Derivative gain dampens the following step in the D-element with a step at the input. Enter values between 0 … 40. The value "0" switches off the controller.

9.6.1.4 Decay Time Constant

Decay time constant of the D-element dampens its decrease after a step change at the input. It would have a large gradient without this variable. The decay time is similar to a reciprocal function. Enter a value between 1 … 3600 sec.

9.6.1.5 Controller Function

Select via combo box either "Normal" (rising) or "Reciprocal" (falling). The adjustment does not influence the control algorithm but merely the characteristic (normal or reciprocal)

9.6.1.6 Behaviour in End Positions

Configure the controller behaviour in the end positions depending on the controller deviation. Select "None integr." if the actuator shall leave the end position only in case of change of sign of the control deviation. The controller will then react immediately without any delay caused by the I-element.

9.6.2 Transmitter

9.6.2.1 Monitoring

Enter the upper and lower limit value into the text fields.

9.6.2.2 Damping

A dynamic actuator damping is not required. Damping happens via a non-linear filter NIFIL. It is only active if changes are greater than ½ of the liner range.

A dynamic actuator damping is not required. Damping happens via a non-linear filter NIFIL. It is only active if changes are greater than ½ of the liner range.

Enter values for:

Linear range

Linear range LR for NIFIL; enter values between 0 … 100%

Time constant

Time constant for NIFIL; enter values between 0 … 10s

9.7 Actuator Specific Data

Displays individual information about the following components:

- Final control element
- Valve
- Certification
- Spare parts
- Documentation
- Stock of spare parts
- Service life

9.8 Data Overview

Displays entirely information about the actuator and the actuator settings. Select <Device / Load from Device> from the main menu to get the current actuator data.

10 Service

10.1 Basic Settings

Defines the operating range and the operating direction. Use either

Single Step Mode

The actuator runs, as long as one of the drive buttons is pressed.

Checkbox activated. The actuator runs, until the counter button or stop button is clicked. Click to

Run / Stop

Drive the actuator using the "<<" or ">>" button. Use "Stop" to stop the actuator.

Confirm the adjusted position as 0% or 100% by clicking onto the corresponding accept button.

Pressing the "Finish Adjustment" button saves the data in the actuator.

Attention!

The drive buttons on the local control panel have a higher priority. If they are used while the actuator is adjusted via Smart Vision, the actuator moves according to that command. Use the "Reset" button on the local control panel before continuing the adjustment with the user interface!

10.2 Test

Enables the user to detect operational wear and tear of actuator, final control element and related components (e. g. linkage components). Select <Test> in the pull-down menu and choose one of the following functions:

- torque / force measurement with 21 values
- travel time measurement with 21 values
- travel time measurement within entire test range
- brake test

Enter data into the text fields "Test Start" and "Test End" to define the test range for test 1 … 3. The span must be > 10%.

The brake test requires to enter the position value into a text field.

Save the test result in a *.txt file using the „Save“ button.

The test function requires actuator software release 1.07 or higher.

10.2.1 Torque / Force (21 points)

Once the test range is determined, click onto the <Start> button. The actuator moves to the start position and then to the end position with a test speed, which is approx. 40% of the rated speed. The range between start and end is divided into 21 sections. The test measures at each section the torque / force which is necessary to move the actuator with or without valve. A comparison with previous measurements enables the user to draw conclusions from the operational conditions (friction in final control element, actuator, etc.).

Since Smart Vision measures already during the start (acceleration) phase, the first two values have a wide scatter band and should be ignored.

10.2.2 Running Time (21 Points)

Enter test start and test end into the text fields and click start. The actuator then moves to the start position and begins the test procedure. The range between start and end is divided into 21 sections. The test measures the time the actuator needs to run from start to end position. The values are measured for each of the 21 sections. A comparison with previous tests enables the user to draw conclusions from the operational conditions (friction in final control element, actuator, etc.).

10.2.3 Running Time

Enter test start and test end into the text fields and select one of the following test speeds:

- AUT
- MAN
- Characteristic
- Rapid traverse

After clicking the start button the actuator moves to the start position and then moves over the entire test range. The test determines the total travel time which can be compared with previous measurements to draw conclusions from the operational conditions.

10.2.4 Gearing Backlash

he result of this test provides a numerical value without dimension. Repeated measurements enable conclusions about the mechanical wear and tear at the gearing.

First enter the test position into the text field. This must be within the operating range and beyond the limits which might be determined for an end position behaviour.

Click the <Start> button to move the actuator to the test position. The backlash is tested during a short movement reversal.

10.2.5 Brake Test

Checks the motor brake for sufficient torque, in case the voltage supply is switched off.

Enter the test position into the text field. This must be within the operating range and beyond the limits which might be determined for an end position behaviour.

Click the <Start> button to move the actuator to the test position. Then the brake locks the actuator locks the actuator and the motor provides a test torque.

The result is displayed in the test result text field.

10.3 Signal Simulation

Smart Vision allows for simulating various functions without any effect to the actuator. Select via the combo box the function to be simulated.

The info field displays the simulation status (on or off).

10.3.1 Digital Inputs

Select "Digital input" and click <Start>. Coloured boxes indicate input signals from the control system.

10.3.2 Digital Outputs

Select "Digital output" at the combo box and determine the digital output channel(s) to be simulated. After clicking the Start button coloured boxes indicate the available output signals.

10.3.3 Actual Value (Static)

Enter a value (0 … 100%) into the text field and click the <Start> button. The control system should receive this value.

10.3.4 Positioning with Setpoint

Start the simulation and modify the set point value. The value for the analogue output (0/4 ... 20 mA) as well as the bargraph in the window <Positioner> will follow the set point. This allows to check the DCS without any actuator movement.

Attention!

As long as the simulation remains active the actuator is not ready for operation.

10.4 Calibration of Analog Output

In some cases it might be necessary to carry out an additional calibration of the analog output (4 … 20 mA).

Enter the reference value (4 or 20 mA) into the text field and click the Start button. Then measure the analogue signal at the output terminals of the electronics. Enter this value into the text field (Correction upper value or Correction lower value) and click <Accept>. Check again the calibrated signals at the output terminals.

Repeat the calibration with the other end value (4 or 20 mA).

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