


FUNCTIONAL DESCRIPTION

AOS01

Analog Output Signal

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1 General

AOS01 is a functional unit for analog output signals in Control^{IT}, to be operated from Operate^{IT}, Operator Station. An AOS01 normally performs a complete function independently.

AOS01 has the following functions and properties:

- Different control modes, set by operator or by control logic.
- Limiting of output signal.
- Function for bumpless change between different control modes.
- Alarm and event handling of important control signals.

2 Configuration

AOS01 comprises a function block type for control and logic functions in Control^{IT}, a faceplate and an object display in Operate^{IT} for operator functions and control parameters.

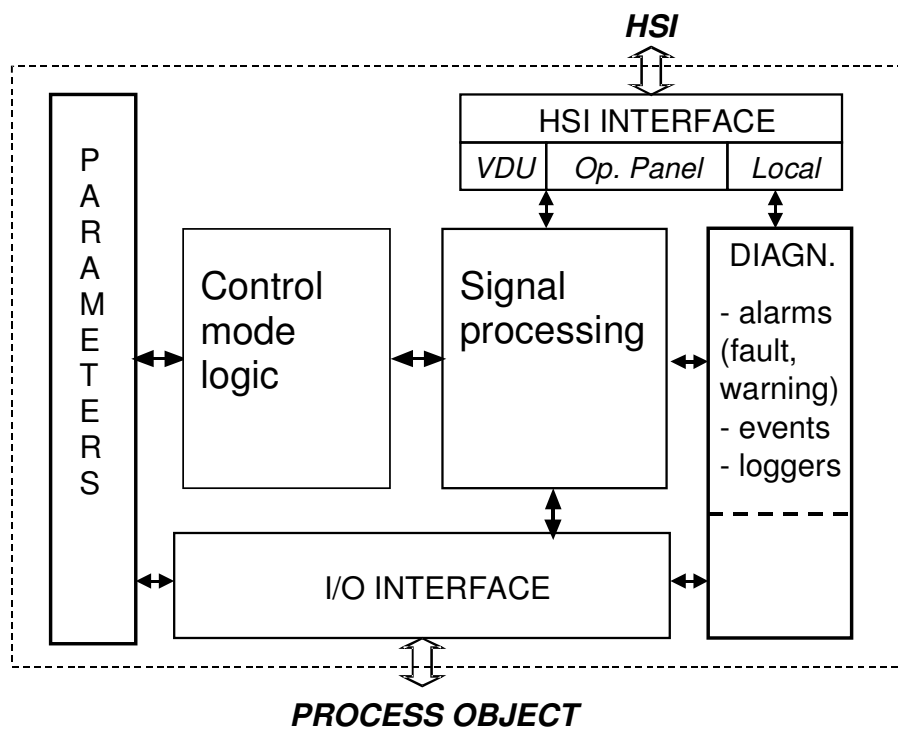


Figure 1. The Structure of the Functional Unit

3 Function Block AOS01

FUNCTION OF INPUT TERMINALS	AOS01		FUNCTION OF OUTPUT TERMINALS
	----- IOSignal -----		Signal to I/O-board
Object name	Name	Value	Value
Object description	Description	Err	Error
Enable object	Enable	Err_Type	Error type
E1 Reference	MV	Man	Man mode
Order mode to Man	SeqMan	E1	E1 mode
Order mode to E1	SeqE1	Forced	Channel is forced
Profibus device status	Status	Out_EQ_HL	Output greater than or equal to High Limit
In Parameter	InPar	Out_EQ_LL	Output less than or equal to Low Limit
Event name	EventName	OutPar	Out Parameter
		Opr	Operator order

Figure 3-1. Function Block Type, Complete symbol

Table 3-1 below illustrates the default properties of each terminal of the AOS01 function block.

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
IOSignal	RealIO		in_out	yes		Signal from I/O-board(s)
Name	string	coldretain	in	yes	'AOS01'	Object name
Description	string	coldretain	in	yes	'Descr'	Object description
Enable	bool	coldretain	in	yes	true	Enable object
MV	real	retain	in	yes		E1 Reference
SeqMan	bool	retain	in	yes		Order mode to Man
SeqE1	bool	retain	in	yes		Order mode to E1
Status	PB_Status	by_ref	in	yes		Profibus device status
InPar	AOS01_InPar	by_ref	in	yes		In Parameter
EventName	string	coldretain	in	yes	' AOS01_ '	Event name
Value	real	retain	out	yes		Value
Err	bool	retain	out	yes		Error
Err_Type	string[20]	retain	out	yes		Error type
Man	bool	retain	out	yes		Man mode
E1	bool	retain	out	yes		E1 mode
Forced	bool	retain	out	yes		Channel is forced
Out_EQ_HL	bool	retain	out	yes		Output greater than or equal to High Limit
Out_EQ_LL	bool	retain	out	yes		Output less than or equal to Low Limit
OutPar	AOS01_OutPar	by_ref	out	yes		Out Parameter
Opr	AOS01_Opr	by_ref	out	yes		Operator order

Table 3-1. Terminal properties.

4 AOS01 Datatypes

4.1 AOS01_InPar

Name	Data Type	Attributes	Initial value	ISP value	Description
Class	dint	coldretain	500		AE class
Severity	dint	coldretain	1000		AE severity
InitMode	dint	coldretain	7		Init mode (5 = Man ; 7 = E1)
OUTLimit	RangeLimit	coldretain			OUT limit
ManBlk	bool	coldretain	false		Block operator order Man mode
E1Blk	bool	coldretain	false		Block operator order E1 mode
SeqManEvBlk	bool	coldretain	true		Block event for SeqMan
SeqE1EvBlk	bool	coldretain	true		Block event for SeqE1
EnOUTLimH	bool	coldretain	false		Enable OUT Limit High
EnOUTLimL	bool	coldretain	false		Enable OUT Limit Low

4.2 AOS01_OutPar

Name	Data Type	Attributes	Initial value	ISP value	Description
Mode	dint	retain			Active mode
NormalMode	bool	retain			Normal mode (Active mode = Init mode)
HWStatus	HwStatus	retain			Hardware status
SubStatus	dint	retain			Hardware substatus
TypeStrLength	dint	retain			Hardware str length
IOStatus	dint	retain			Hardware I/O status quality

4.3 AOS01_Opr

Name	Data Type	Attributes	Initial value	ISP value	Description
Man	bool	retain			Operator order Manual mode
E1	bool	retain			Operator order E1 mode
ManOut	real	coldretain	0.0		Operator enter value

5 Function

5.1 Basic Properties

The AOS01 functional unit is designed for a standard analog output signal.

AOS01 has the following basic functions:

- Control Modes and Updating.
- Scaling and Units.
- Output Limit Check.
- Error Handling.
- Alarm and event handling.
- Operator Functions.

5.2 Control Modes and Updating

The analog signal is read at intervals determined by the controllers task scan-time. You should set scan time to the requirements of your system.

The control modes can individually be blocked for operator access.

5.2.1 E1

E1 is the initial control mode of the AOS01, where the value is obtained from the I/O-module at input terminal :MV. The control mode E1 can be commanded from the operator's keyboard.

The control mode E1 is activated as follows:

- By clicking on the E1 button on the operator's faceplate. E1 is indicated on the object display and Faceplate.
- By another part of the program activating the terminal : SeqE1

5.2.2 Manual

In this mode the operator directly sets the output value from the operator station.

The control mode MAN is activated as follows:

- By clicking on the Man button on the operator's faceplate. Man is indicated on the object display and Faceplate. A dialog entry window becomes available for the operator to enter the required value.
- By another part of the program activating the terminal : SeqMan.

5.2.3 Manual Forced

Manual Forced is a control mode, where the operator blocks the I/O-module input and can write directly to the I/O-module input variable.

- Enabling the Forced check box in the I/O Hardware section of the controller activates the control mode FORCED.

Examples of use:

During a plant stop I/O conditions could prevent opening of e.g. a valve. ManFd enables the operator to still use the I/O value for testing etc.

5.3 Scaling and Units

All values are used in the system are represented as engineering units.

5.3.1 Nominal output range

With "Signal range" on the hardware unit you select the output range, using the nominal limits for the physical signal expressed in volts or mA.

See the manuals *S800 I/O User's Guide*, for setting the hardware for voltage or current.

5.3.2 Engineering units

The AOS01 function block automatically reads the Max, Min, Unit and Fraction (Decimal) entered in the I/O-modules configuration. Using the Control IT offline editor on the hardware module itself will change the engineering values.

5.4 Limit check

In the Limit check part of the function block you determine if a limit check will be performed. The result is always stored in the output terminals and is thus available to other programs.

5.5 Fieldbus Device Status

The status of fieldbus devices can be indicated of the faceplate of the AOS01 object. A separate FB, with the decoding of fieldbus data, is connected to the input "Status".

5.6 Error handling

The control function of an AO signal indicates errors via Err and Err_Type. Different types of errors can occur, that are caused by the system.

This occurs if the I/O-module function is determined non-functional. Typical causes of this type of error are:

- Missing or faulty hardware
- Incorrectly installed hardware or software
- Error in the bus communication.

Errors in the AO-module are copied to the error handling function of the AOS01 and the error flag Err is set to 1 and the type of error can be read at terminal Err_Type.

The Err and Err_Type terminals of the AOS01 function block can be connected to programs where the desired function may be built.

5.7 Alarm Functions

The following alarms are monitored in the function block:

- I/O Hardware status.

5.7.1 Event Handling

Event are generated for status change on the signals defined in interaction window in chapter 4.10.5.

The layout of the event is described in chapter 6.3 .

All Operator Events are reported by Audit Trail Functionality and not included in the FunctionBlock.

The individual text string for each event is stored in the Alarm and Event Translator aspect. This text can be NLS handled.

5.8 Process connections

The AOS01 is connected to the process via the following terminals:

- IOSignal Connection for output value e.g. a regulatory valve.

5.9 Interaction Window

The interaction window is available in the Control^{IT} Control Builder. The interaction window is an engineering aid used to simplify configuration and blocking of signals not available on the faceplates. Changes to values in the Interaction window are only available in 'Online' mode in Control^{IT}.

5.9.1 AOS01 Interaction Window

Interaction window overview. Name and description are shown. The buttons are links to sub-windows.

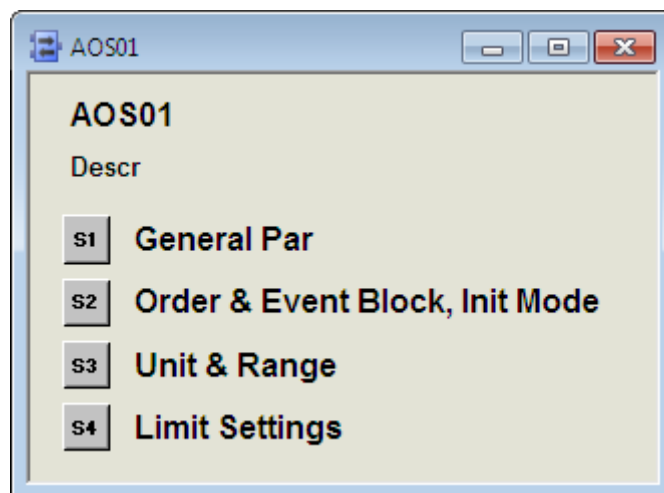


Figure 4-1 Main Interaction Window.

5.9.2 General Parameters

“Class” defines the process section or area in which alarms are grouped. By utilizing class the alarms can be filtered. Valid values are user defined. A suggestion would be to use mill area numbers as class values.

“Severity” defines the alarm priority for general alarms. The severity for MV-alarms is entered in window “Alarm & Event”. Valid values are 1 –1000 where 1000 is the highest priority.

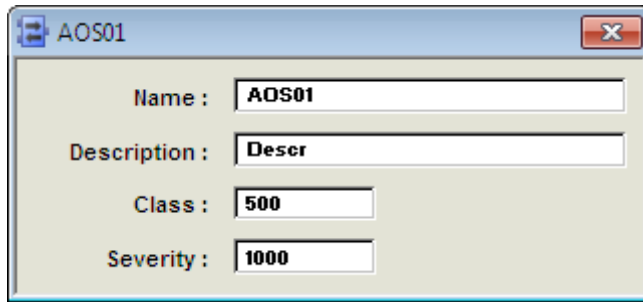


Figure 4-2 General Parameters.

5.9.3 Units and Range

Decimal resolution, engineering units and minimum and maximum range are shown in this window.

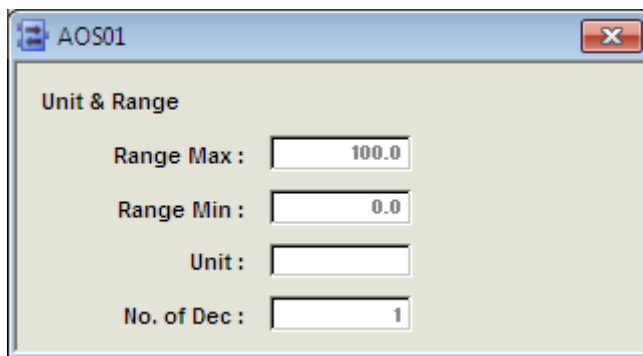


Figure 4-3 Units & Range.

5.9.4 Limits & Settings

Output limits, Name of control signal and Enabling of output limitation is entered in this window.

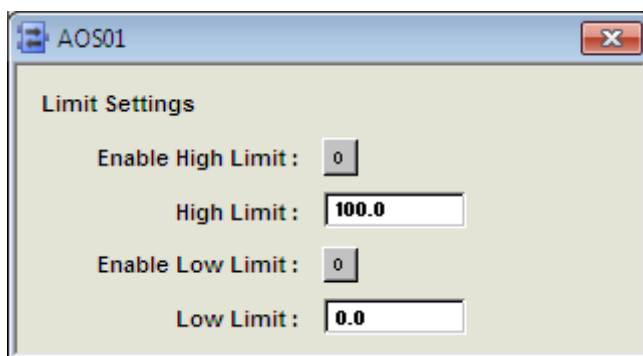


Figure 4-4 Limits & Settings.

5.9.5 Orders and Events

“Order Manual” blocks the input signal. A value can then be entered from the interaction window or faceplate. Mode is Man.

“Order E1” removes the block function. The IOSignal is then read and displayed on the faceplate. Mode is E1

“IOForced” indicates that the signal is forced from I/O-modul in Control Builder.

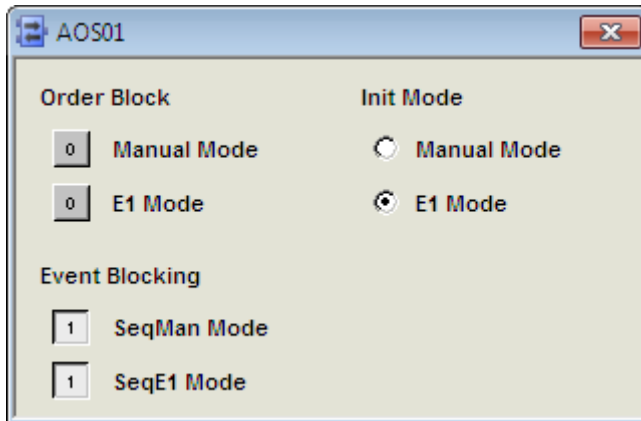


Figure 4-5 Orders and events

5.9.6 Text

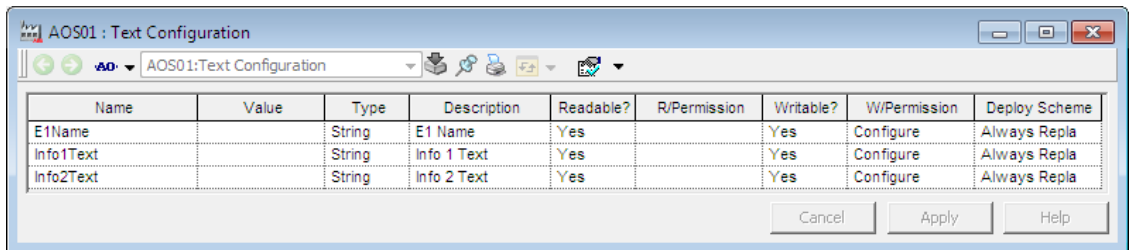


Figure 4-6 Text

6 Operator Functions

The Operator functions are divided in principle into 3 parts:

- Presentation (Display elements, Time logged properties)
- Faceplate (Dialog)
- Alarm and Event handling

6.1 Presentation

6.1.1 Display Elements

Display elements, which can be used for different display types, are available for use in the functional unit AOS01.

The display elements show the status and the controls of the process with different degrees of detail and are intended for the following displays:

- Object display
- Process display

Examples of different display elements, which could be used, are given in the following sections.

6.1.1.1 Object Display

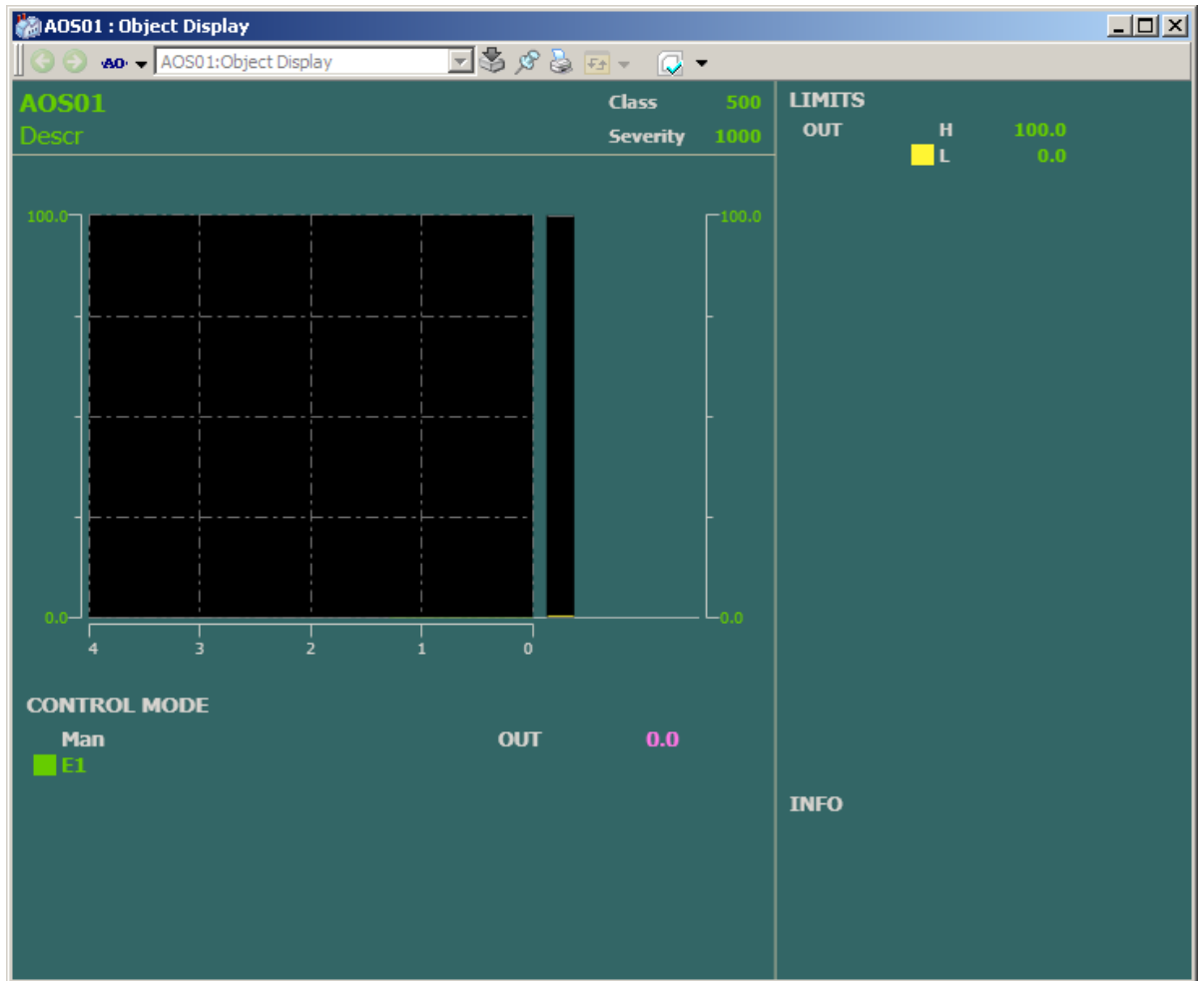


Figure 5-1 Object Display.

6.1.1.2 Process Display

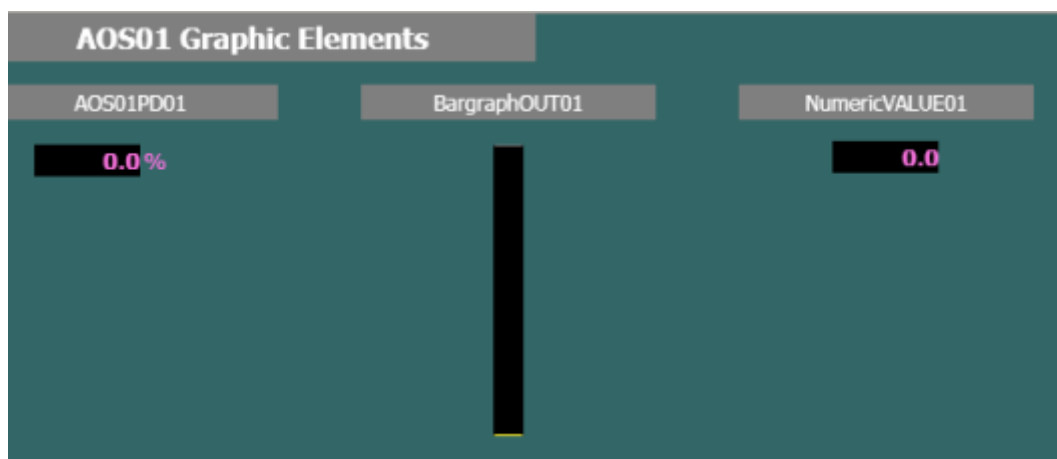




Figure 5-2 Process Display Elements.

6.1.2 Time-logged Properties

Output values stored can be presented graphically in the form of curves on the display screen. Such a display, a **Trend display**, can consist of 1- 4 curves as standard. All properties for the object AOS01 are available to be logged on the trend curves.

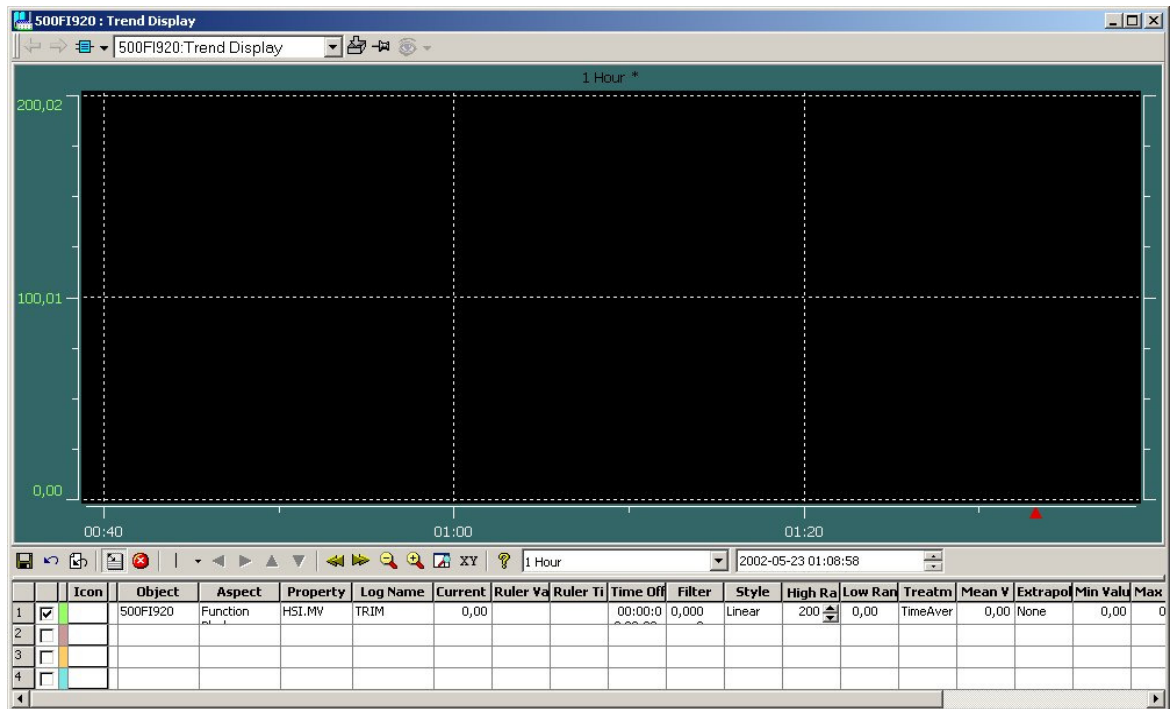


Figure 5-3 Trend Curve

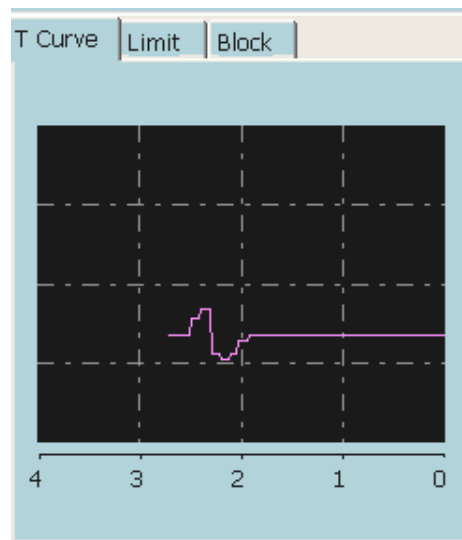


Figure 5-4 Extended Faceplate (T Curve)

6.2 Faceplate(Dialog)

The display screen is supplemented with a mouse and keyboard for operator communication with the functional unit/object.

By using Operate^{IT} Operator Station the operator can view and control the process through faceplates. The dialogue consists of buttons, indicators and graphic presentations within a Faceplate. A faceplate has three levels of dialogue, which are presented by the following three runtime views:

- Reduced Faceplate, where the size and contents typically have been optimized to cover most of the normal process operator actions. Minimum dialogue. This is the default view.
- Faceplate, which typically covers all normal process operator actions. This view is disabled as default.
- Extended Faceplate, with functions and information intended for the process engineer or the advanced operator. Maximum dialogue.

The figures 5-5 to 5-7 below and overleaf illustrate the various presentations of the faceplate.

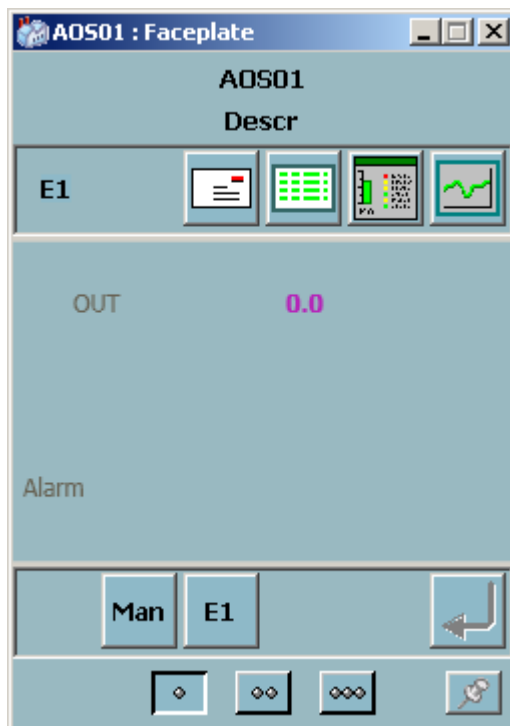


Figure 5-5 Reduced Faceplate.

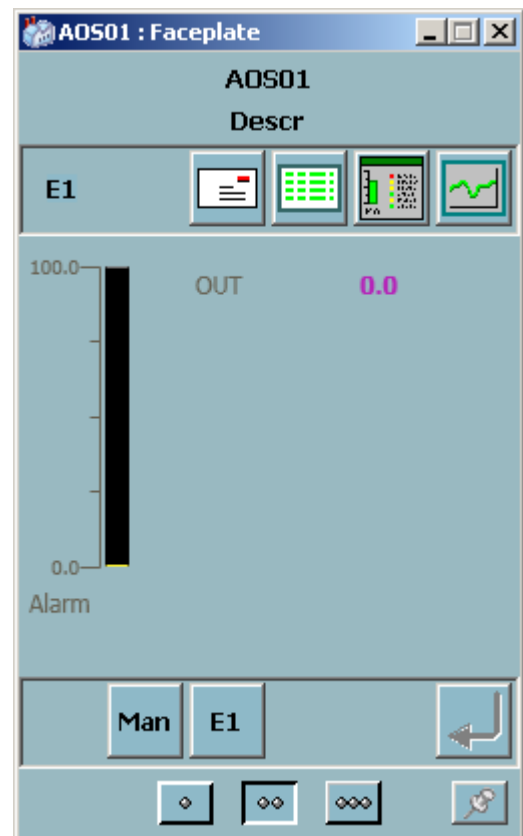


Figure 5-6 Faceplate.

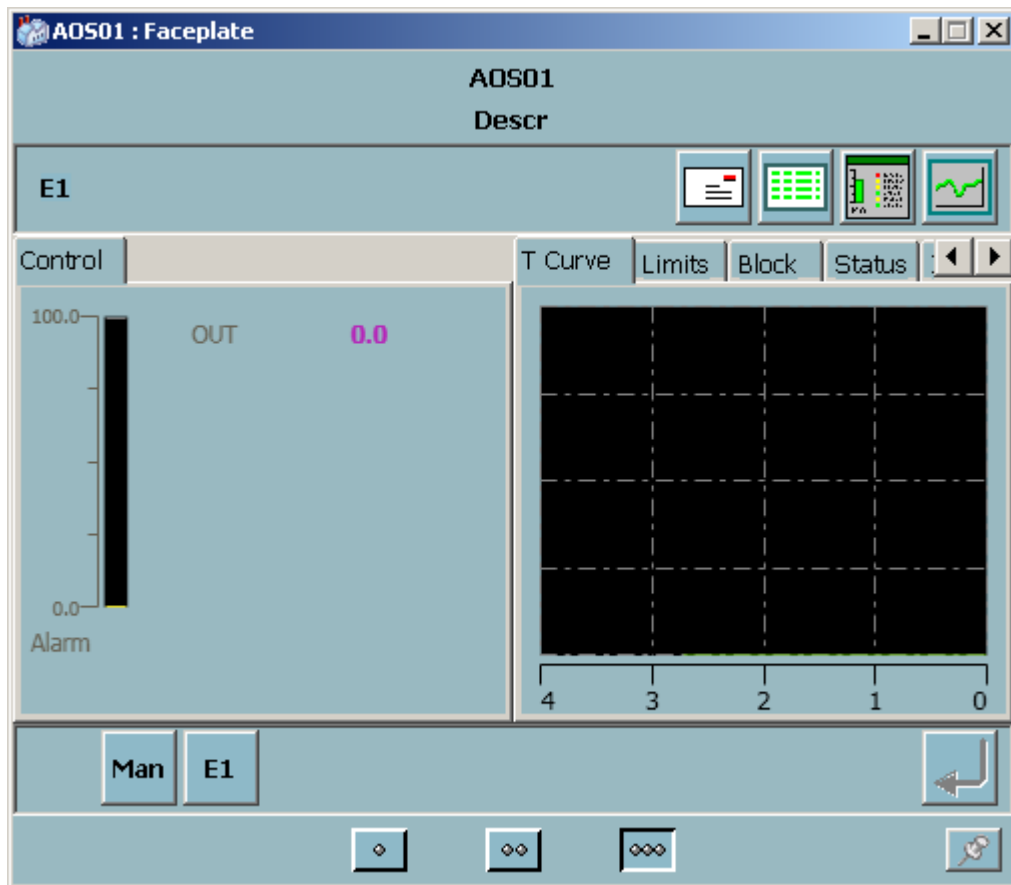


Figure 5-7 Extended Faceplate

6.3 Alarm and Event Handling

6.3.1 General

This section contains a description of all alarms and events in the functional unit AOS01.

When a value changes an event is generated and can be viewed on the Operate^{IT} Operator Station. The alarms are indicated in the faceplate, object display and in the alarm and event list. AOS has no alarm handling except for OPC error functions.

The screenshot shows the '264M500.Start : Alarm List' window. It contains a table with the following data:

Event Time	Object Name	Object Description	Condition	Message Description
02-05-25 18:58:42:685	500F1920	Washing Pulp Flow	AI_Err	Alarm
02-05-25 18:58:41:962	500F1920	Washing Pulp Flow	MV_L1	Alarm
02-05-25 18:58:41:962	500F1920	Washing Pulp Flow	MV_L2	Alarm
02-05-25 18:58:41:962	Mot01	Test Mot01	ControlV	Alarm
02-05-25 18:58:41:962	DIS		Status	Alarm
02-05-25 04:16:59:688	30		HWError	For info see 'Errors and W
02-05-25 04:16:58:689	192.168.0.51-0.11.5		HWError	For info see 'Errors and W
02-05-25 04:16:58:688	192.168.0.51-0.11.4		HWError	For info see 'Errors and W
02-05-25 04:16:58:687	192.168.0.51-0.11.3		HWError	For info see 'Errors and W

Figure 5-9 Alarm List

The following event texts are generated. The “Message Description” text are stored in the Alarm and Event Translator aspect and can be NLS handled.

SourceName	ObjectDescription	Condition	Message Description
<Name>	<Description>		SeqMan Mode
<Name>	<Description>		SeqE1 Mode

6.4 Faceplate tabs

6.4.1 Blocking

Enabling of output limits function is indicated by the yellow limit indicator on the bar graph.

The check box “Enable Object”, is used to set the object out of service.

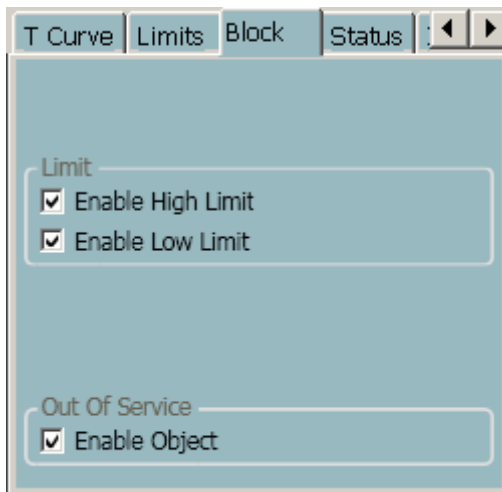


Figure 5-10 Extended Faceplate (Block)

6.4.2 Order Blocking

By using the extended faceplate it is possible for the process engineer to limit the operator access to different control modes.

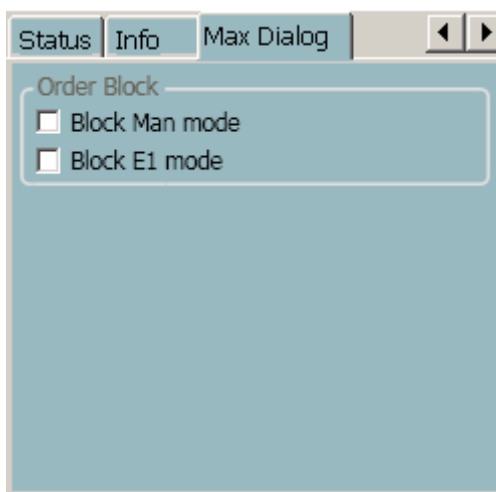


Figure 5-11 Extended Faceplate (Max Dialog)

6.4.3 Limits

By using the extended faceplate it is possible to adjust the limits for the output value. The faceplate elements in the extended faceplate below illustrate this.

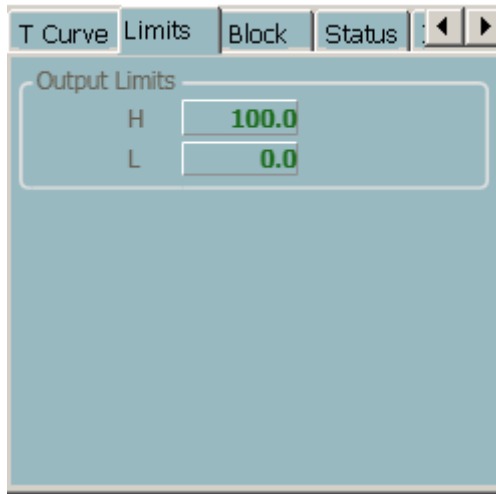


Figure 5-12 Extended Faceplate (Limit)

6.4.4 Info



Figure 5-13 Extended Faceplate (Info)

6.4.5 Status

The “Status” tab of the extended faceplate is showing the type of device and its status for the measured value. The faceplate elements in the extended faceplate below illustrate this.

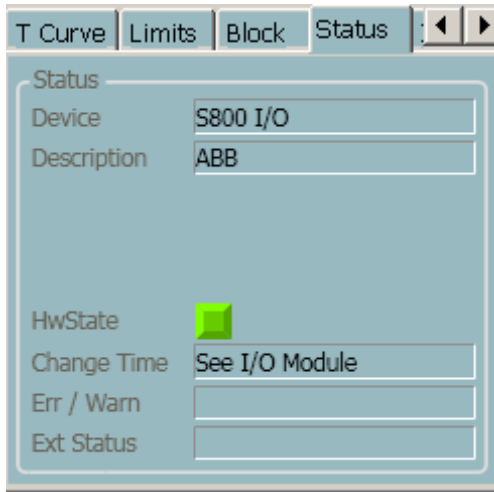


Figure 5-14 Extended Faceplate (Status)

REVISION

Rev.	Page (P) Chapt. (C)	Description	Date Dept./Init.
A		Release 2.0	030130/MP
B		Orderblock added	031106/MP
C	5, 6	Initialization	04-04-14/FM
D	4	Fieldbus status	050223/MP
E	4,5	Event handling is added. Faceplate elements and Interaction Window elements are updated	050323/BP
F	4, 5	Faceplate, Rev 4.0/1	05-08-26/MP
G	3	Rev 4.0/5	070510/BP
H		Rev 5.0-1	081230/BP
I	5.1.1.2	Update of Process Display	090909/BP
J		Update rev 5.1/0	101102/BP