


# FUNCTIONAL DESCRIPTION

## DOS01

### Digital Output Signal

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## 1 General

DOS01 is a functional unit for digital output signals in Control<sup>IT</sup>, to be operated from Operate<sup>IT</sup>, Operator Station. DOS01 normally performs a complete function independently.

DOS01 has the following functions and properties:

- Different control modes set by operator or by control logic.
- Alarm and event handling of important control signals.

## 2 Configuration

DOS01 comprises a function block type for control and logic functions in Control<sup>IT</sup>, a faceplate and an object Display in Operate<sup>IT</sup> for operator functions and control parameters.

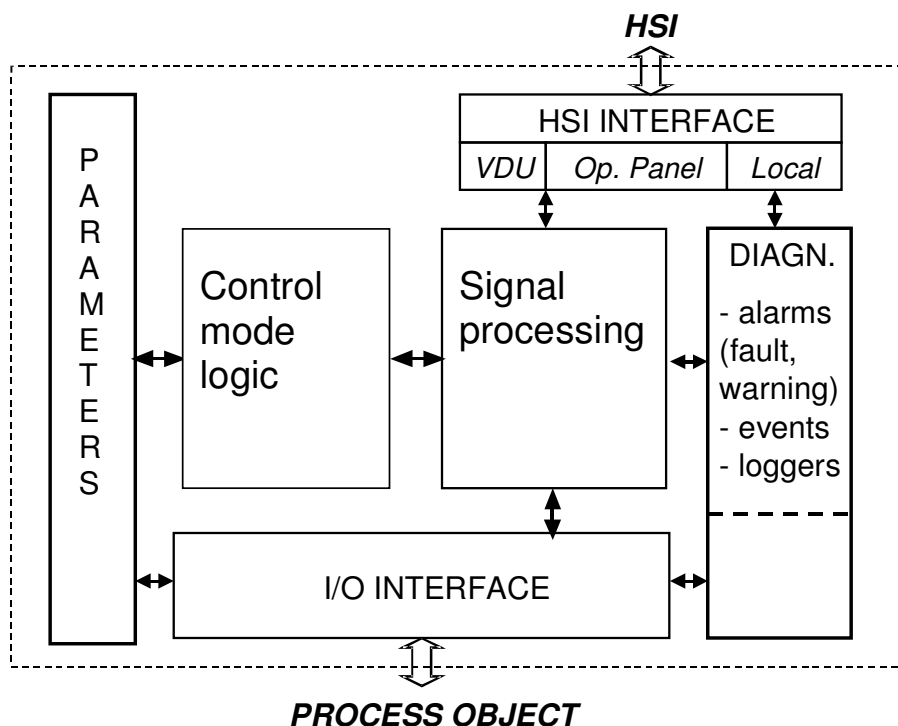


Figure 1. The Structure of the Functional Unit

### 3 Function Block DOS01

FUNCTION OF INPUT TERMINALS	DOS01		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
In Parameter	InPar	OutPar	Out Parameter
Event name	EventName	Opr	Operator order

Figure 3-1. Function Block Type, Complete symbol

Table 3-1 below illustrates the default properties of each terminal of the DOS01 function block.

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
IOSignal	BoolIO		in_out	yes		Signal from I/O-board(s)
Name	string	coldretain	in	yes	'DOS01'	Object name
Description	string	coldretain	in	yes	'Descr'	Object description
Enable	bool	coldretain	in	yes	true	Enable object
MV	bool	retain	in	yes		E1 Reference
SeqMan	bool	retain	in	yes		Order mode to Man
SeqE1	bool	retain	in	yes		Order mode to E1
InPar	DOS01_InPar	by_ref	in	yes		In Parameter
EventName	string	coldretain	in	yes	'  DOS01_ '	Event name
Value	bool	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
OutPar	DOS01_OutPar	by_ref	out	yes		Out Parameter
Opr	DOS01_Opr	by_ref	out	yes		Operator order

Table 3-1. Terminal properties.

## 4 DOS01 Datatypes

### 4.1 DOS01\_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)
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

### 4.2 DOS01\_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
IOStatus	dint	retain			Hardware I/O status quality

### 4.3 DOS01\_Opr

Name	Data Type	Attributes	Initial value	ISP value	Description
Man	bool	retain			Operator order Manual mode
E1	bool	retain			Operator order E1 mode
Ord_On	bool	retain			Operator order ON command
Ord_Off	bool	retain			Operator order OFF command

## 5 Function

### 5.1 Basic Properties

The DOS01 functional unit is designed for an operator entry of a digital output.

DOS01 has the following basic functions:

- Control Modes and Updating.
- Error Handling.
- Event handling.
- Operator Functions.

### 5.2 Control Modes and Updating

The digital 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 DOS01, where the value is obtained from the input terminal: MV. The control mode E1 can be commanded from the operator's station. Enabling the blocking function from the interaction window blocks the E1 order.

The control mode E1 is activated by:

- Clicking on the E1 button on the operator's faceplate. E1 is indicated on the object Display and Faceplate.
- A program activating the input terminal: SeqE1.

#### 5.2.2 Manual

In this mode the operator directly sets the output value from the operator station. Enabling the blocking function from the interaction window blocks the Man order.

The control mode MAN is activated by:

- Clicking on the Man button on the operator's faceplate activates the control mode MAN. Man is indicated on the object Display and on the Faceplate.
- A program activating the input 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 for value testing etc.

### 5.3 Error handling

The control function of a DO 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 DO-module are copied to the error handling function of the DOS01 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 DOS01 function block can be connected to programs where the desired function may be built.

### 5.4 IO Status

The status of the connected IO devices can be indicated of the faceplate of the DIS01 object on tab "Status".

### 5.5 Alarm Functions

The DOS does not have any alarm functions only events.

#### 5.5.1 Event handling

Event are generated for status change on the signals defined in interaction window in chapter 6.3

The layout of the event is described in 5.4.1

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.

### 5.6 Process connections

The DOS01 is connected to the process via the following terminals.

- IOSignal Connection for output to the I/O module e.g. to open an On/Off valve.
- Value Connection for output value, which also can be forced.
- MV External Reference input is connected.

## 5.7 Interaction Window

The interaction window is available in the Control<sup>IT</sup> 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<sup>IT</sup>.

### 5.7.1 DOS01 Interaction Window

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

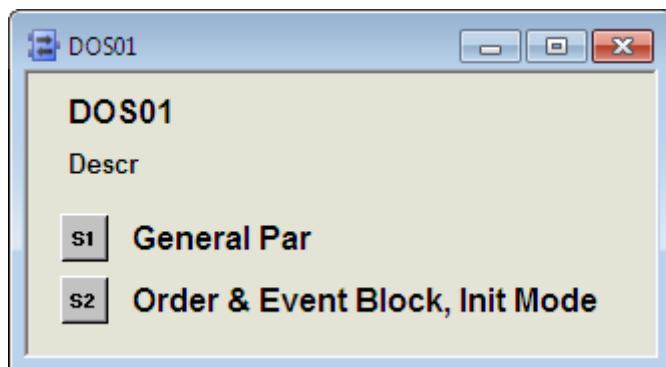


Figure 4-1 Main Interaction Window.

### 5.7.2 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. Valid values are 1 –1000 where 1 is the lowest priority.

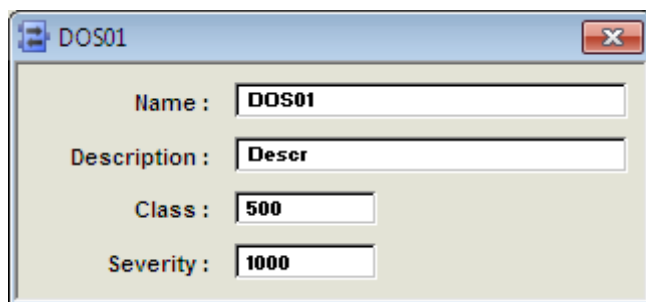


Figure 4-2 General Parameters.

### 5.7.3 Order and Event Blocks

Order Block:

"Manual Mode" blocks the input signal. A value can then be entered from faceplate. Mode is Man.

"E1 mode" reads the input signal MV and displayed the value on the faceplate. Mode is E1.

A 1 will remove the possibility to select the mode form the faceplate

Init Mode define the mode of the object when is started in Cold start

Event Block is used for blocking the event message. A 1 will block the event messagefaceplate. Mode is E1

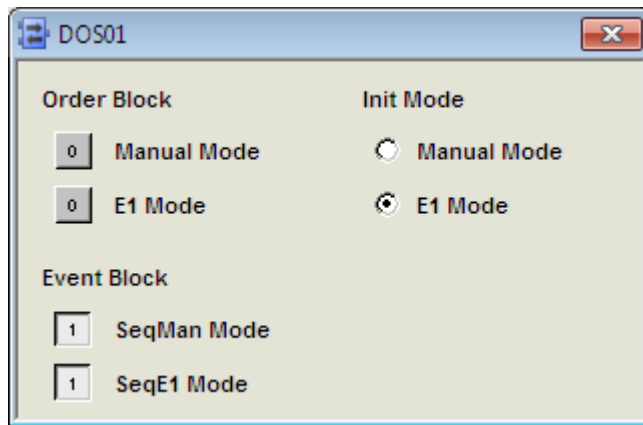


Figure 4-3 Order Block.

#### 5.7.4 Text

The screenshot shows a window titled 'DOS01 : Text Configuration'. It contains a table with the following data:

Name	Value	Type	Description	Readable?	R/Permission	Writable?	W/Permission	Deploy Scheme
ONText		String	ON Text	Yes		Yes	Configure	Always Repla
OFFText		String	OFF Text	Yes		Yes	Configure	Always Repla
Info1Text		String	Info 1 Text	Yes		Yes	Configure	Always Repla
Info2Text		String	Info 2 Text	Yes		Yes	Configure	Always Repla

At the bottom of the window, there are buttons for 'Cancel', 'Apply', and 'Help'.

Figure 4-4 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 DOS01.

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

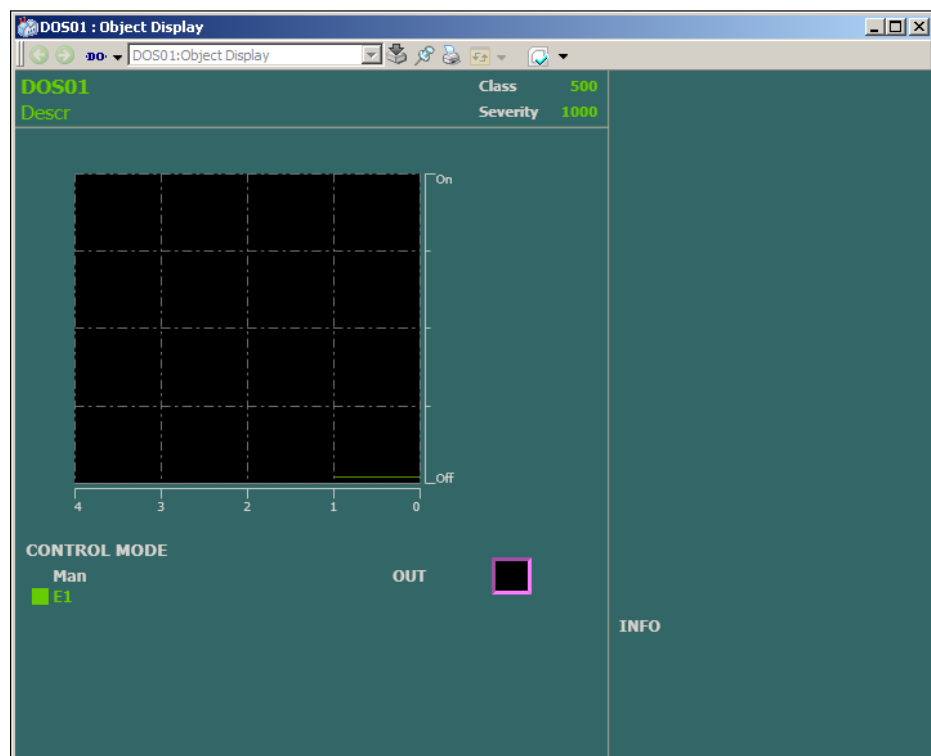


Figure 5-1 Object Display.

6.1.1.2 Process Display



Figure 5-2 Process Display Elements.

6.1.2 Time-logged Properties

Digital values stored can be presented graphically in the form of traces on the display screen. Such a display, a **Trend Display**, can consist of 1- 4 traces as standard. All properties for the object DOS01 are available to be logged on the trend curves.

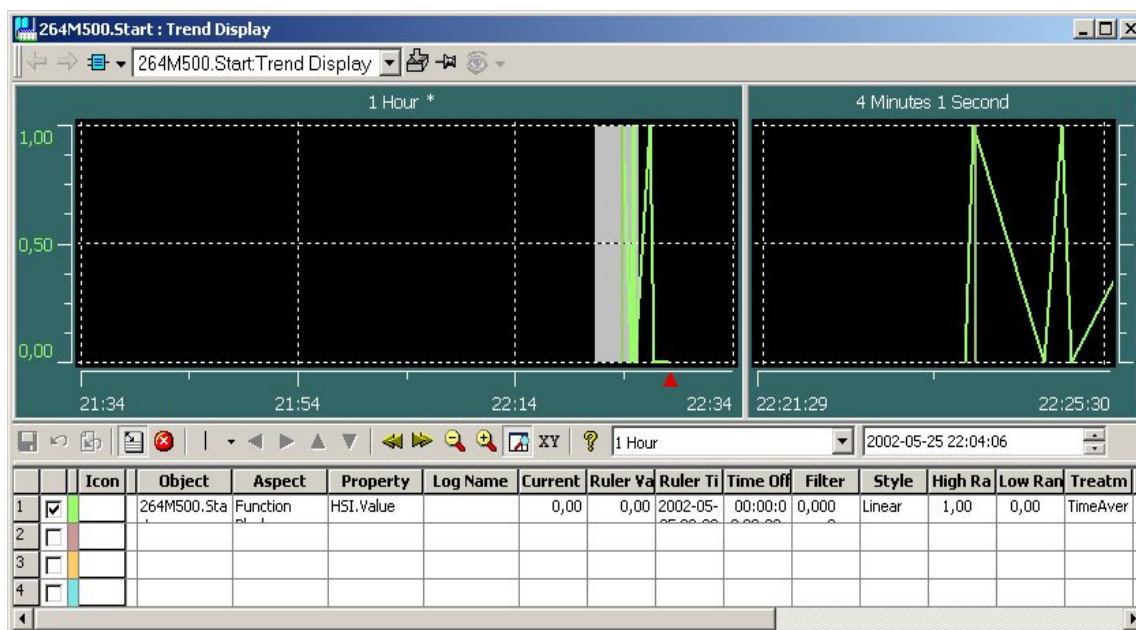


Figure 5-3 Trend Curve

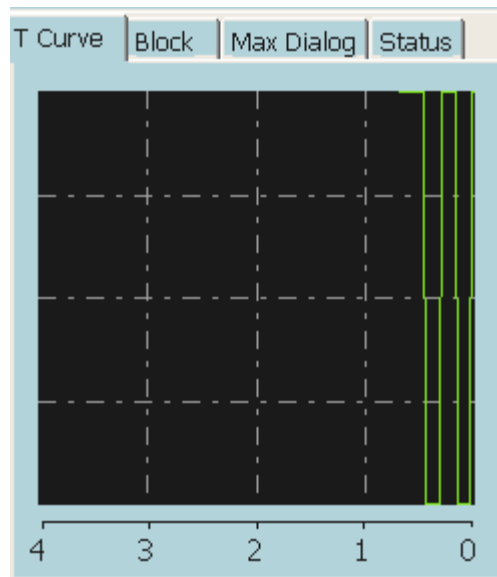


Figure 5-4 Extended Faceplate (T Curve)

## 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<sup>IT</sup> 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.

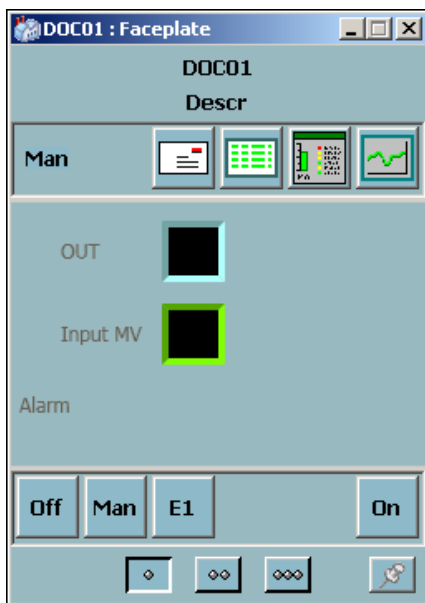


Figure 5-5 Reduced Faceplate.

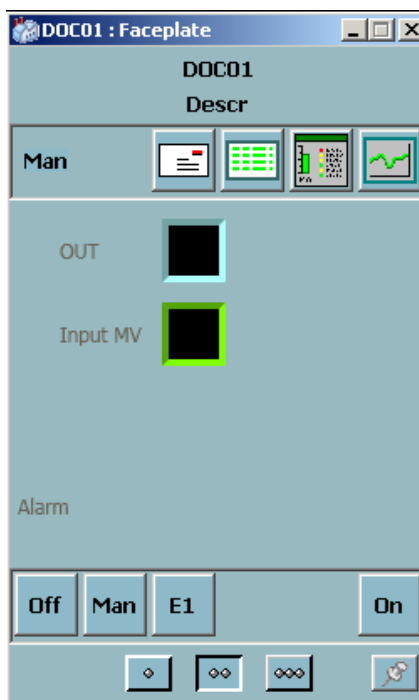


Figure 5-6 Faceplate.

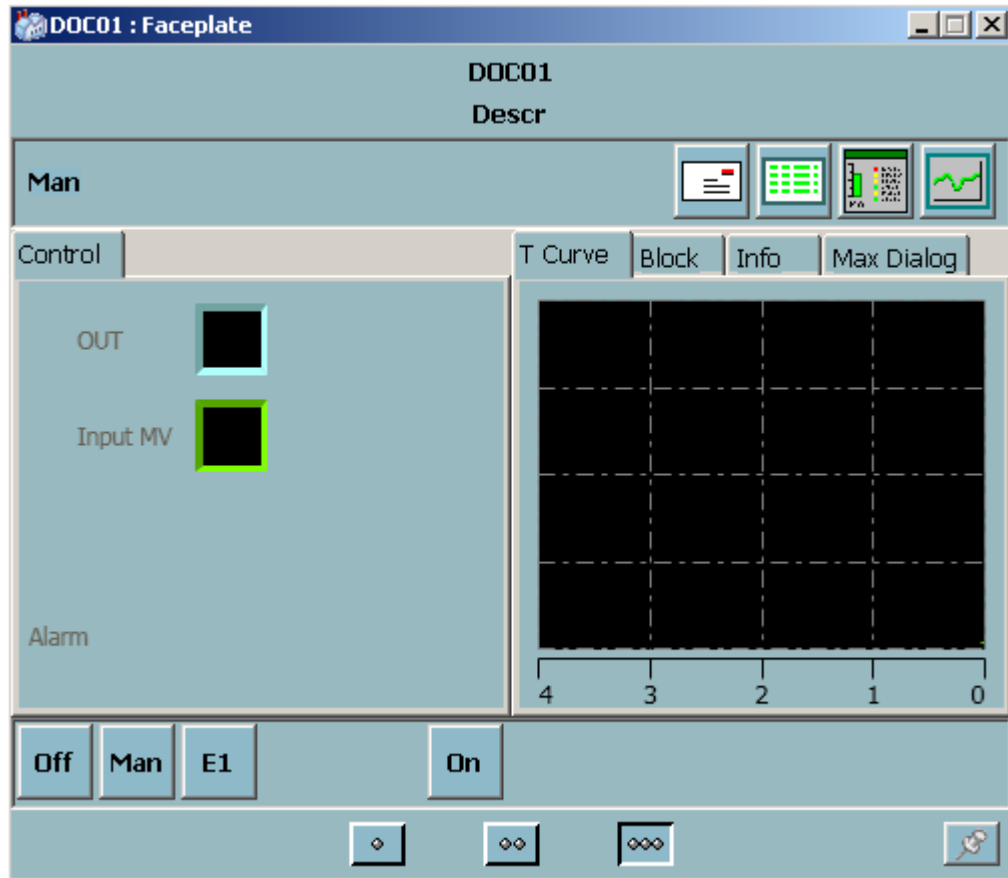


Figure 5-7 Extended Faceplate

## 6.3 Event Handling

### 6.3.1 General

This section contains a description of all alarms and events in the functional unit DOS01. When an output value changes state an event is generated and can be viewed on the Operate<sup>IT</sup> Operator Station. The events are indicated in the event list.

The following Event texts are generated by the functional unit DOC01. The “Message Description” text are stored in the Alarm and Event Translator aspect and can be NLS handled.

Source Name	Object Description	Condition	Message Description
<Name>	<Description>		SeqMan Mode
<Name>	<Description>		SeqE1 Mode

## 6.4 Faceplate tabs

### 6.4.1 Block

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

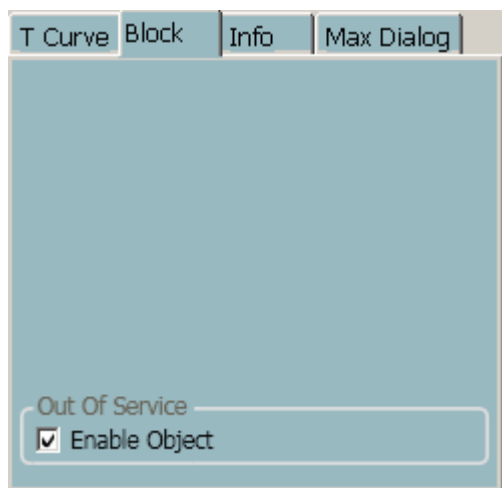


Figure 5-9 Extended Faceplate (Block)

### 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.

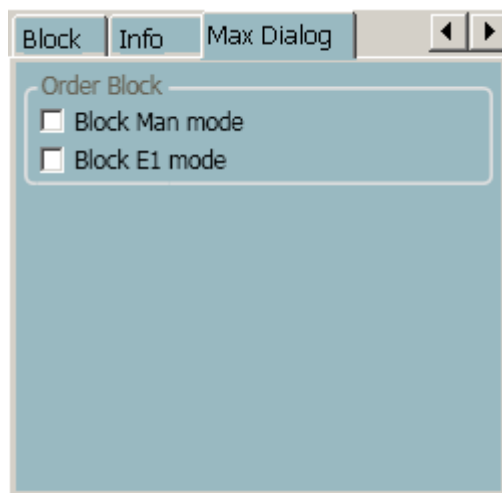


Figure 5-10 Extended Faceplate (Max Dialog)

### 6.4.3 Info

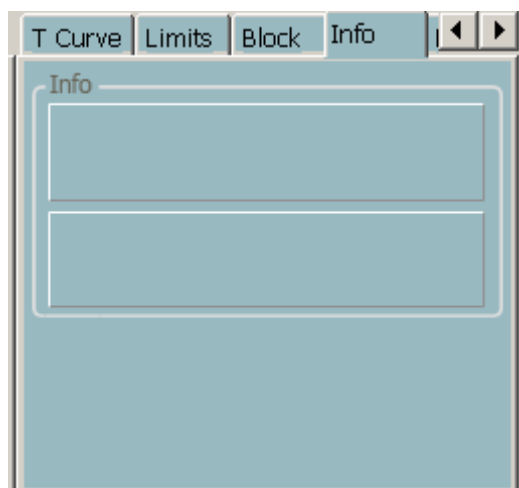


Figure 5-11 Extended Faceplate (Limits)

#### 6.4.4 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.

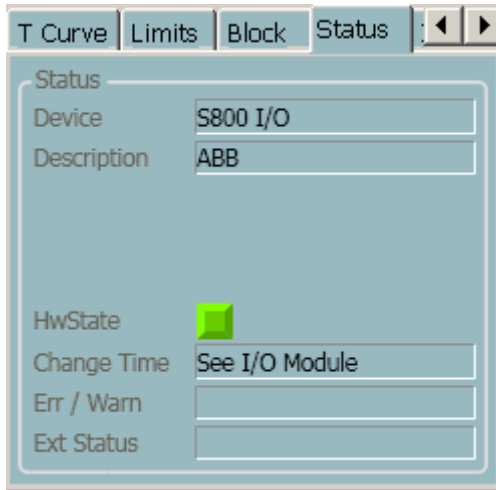


Figure 5-12 Extended Faceplate (Status)

REVISION

Rev.	Page (P) Chapt. (C)	Description	Date Dept./Init.
A		Release 2.0	030212/MP
B		Orderblock added	031106/MP
C	5, 6	Initialization	04-04-14/FM
D		Rev 3.1/2	050223/MP
E	4,5	Event handling is added. Update of faceplate and Interaction Window elements	050324/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		Updated rev 5.1/0	101102/BP