


FUNCTIONAL DESCRIPTION

DIS01

Digital Input Signal

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1 General

DIS01 is a functional unit for digital input signals in Control^{IT}, to be operated from Operate^{IT}, Operator Station. DIS01 normally performs a complete function independently.

- DIS01 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

DIS01 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.

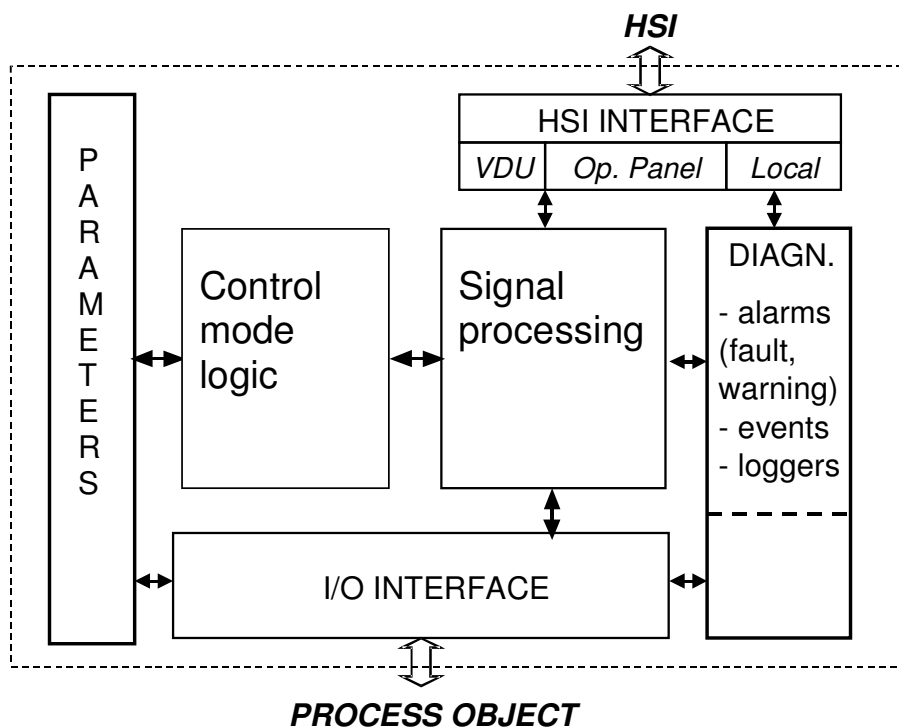


Figure 1. The Structure of the Functional Unit

3 Function Block DIS01

FUNCTION OF INPUT TERMINALS	DIS01		FUNCTION OF OUTPUT TERMINALS
Signal from I/O-board	----- IOSignal -----		
Object name	Name	Value	Value
Object description	Description	IO_Value	I/O value
Enable object	Enable	Err	Error
Signal inverted	Inverted	Err_Type	Error type
Hardware address, for SOE I/O	SignalID	Man	Man mode
Block alarm	AL_P_Blk	E1	E1 mode
Acknowledge alarm	AlarmAck	Forced	Channel is forced
In Parameter	InPar	Disturb	Alarm
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 DIS01 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	'DIS01'	Object name
Description	string	coldretain	in	yes	'Descr'	Object description
Enable	bool	coldretain	in	yes	true	Enable object
Inverted	bool	coldretain	in	yes	false	Signal inverted
SignalID	string	coldretain	in	yes		Hardware address, for SOE I/O
AL_P_Blk	bool	retain	in	yes		Block alarm
AlarmAck	bool	retain	in	yes		Acknowledge alarm
InPar	DIS01_InPar	by_ref	in	yes		In Parameter
EventName	string	coldretain	in	yes	' DIS01_'	Event name
Value	bool	retain	out	yes		Value
IO_Value	bool	retain	out	yes		I/O 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
Disturb	bool	retain	out	yes		Alarm
OutPar	DIS01_OutPar	by_ref	out	yes		Out Parameter
Opr	DIS01_Opr	by_ref	out	yes		Operator order

Table 3-1. Terminal properties.

4 DIS01 Datatypes

4.1 DIS01_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
AlcBlkEvBlk	bool	coldretain	true		Block event for AlcBlk
AEConfigStatus	dint	coldretain	0		AE configuration for Disturbance
NormPos	bool	coldretain	false		Normal position
AlarmDelay	time	coldretain	0s		Alarm delay
AlarmText	string	coldretain	'Alarm'		Alarm text

4.2 DIS01_OutPar

Name	Data Type	Attributes	Initial value	ISP value	Description
AlarmBlk	bool	retain			Alarm blocked
Mode	dint	retain			Active mode
NormalMode	bool	retain			Normal mode (Active mode = Init mode)
Status	AlarmInd	retain			Alarm indication for Status
HWStatus	HwStatus	retain			Hardware status
SubStatus	dint	retain			Hardware substatus
IOStatus	dint	retain			Hardware I/O status quality

4.3 DIS01_Opr

Name	Data Type	Attributes	Initial value	ISP value	Description
BlockAlarm	bool	retain			Operator block alarms
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 DIS01 functional unit is designed for a standard digital input signal.

DIS01 has the following basic functions:

- Control Modes and Updating
- Filtering
- Error Handling
- Alarm and 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 DIS01, where the value is obtained from the I/O-module at input terminal :IOSignal. The control mode E1 can be commanded from the operator's station.

The control mode E1 is activated by:

- By clicking on the E1 button on the operator's faceplate. E1 is indicated on the object display and Faceplate.

5.2.2 Manual

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

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.

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 Filtering

A filter time is set directly on the I/O module, which can be used to remove noise. The value may be 2ms, 4ms, 8ms or 16ms.

5.4 Error handling

The control function of a DI 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 DI-module are copied to the error handling function of the DIS01 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 DIS01 function block can be connected to programs where the desired function may be built.

5.5 IO Status

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

5.6 Alarm Functions

The following alarms are monitored in the function block:

- OPC Status.
- Input I/O Signal if changing state from the normal position.

When an alarm state is activated, an alarm, which must be acknowledged, is transmitted to the operator station (and printer, if provided). The Alarm is also available as an output on the disturbance terminal of the Function Block. The inverted input terminal of the function block can be used to invert the presentation of the signal.

The time stamping of the alarm is done when the function block is executed.

With SOE I/O-units e.g. DI830 the time stamping is done in the hardware unit. To transfer this time stamp to the FB, the hardware address of the I/O-channel is entered in terminal "SignalID".

5.6.1 Alarm Blocking

The Alarm Block function disables the alarm supervision of the input value.

The alarm and event handling function makes it possible to block alarms from the operator's station or from the function block.

By blocking alarms, the printer and operator's stations updating of the Alarm list are blocked.

5.6.2 Event handling

Event are generated for status change on the signals defined in interaction window in chapter 4.9.4

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.

5.7 Process connections

The DIS01 is connected to the process via the following terminals.

- IOSignal Connection for input value e.g. a pressure switch.

5.8 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}.

5.8.1 DIS01 Interaction Window

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

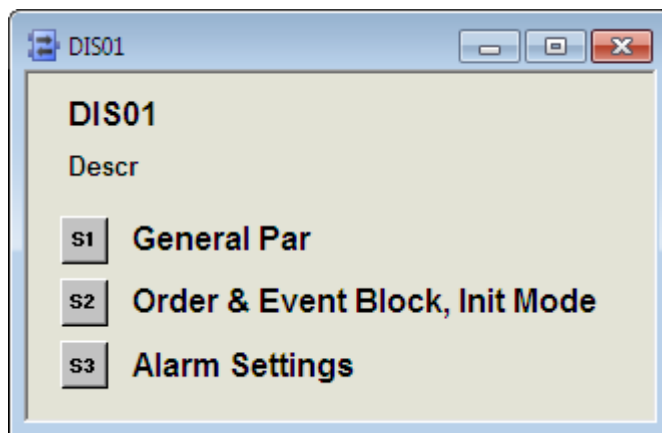


Figure 4-1 Main Interaction Window.

5.8.2 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.

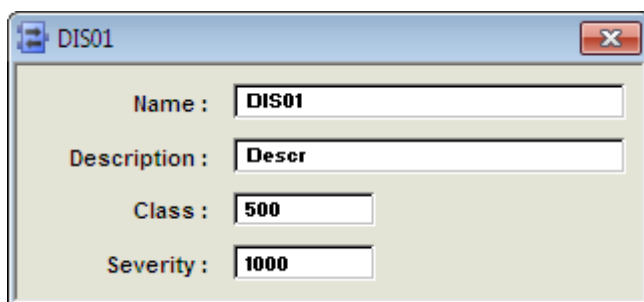


Figure 4-2 General Parameters.

5.8.3 Orders and Events Block

“Manual Mode” blocks the possibility to enter input signal from faceplate.

“ E1 Mode “blocks the possibility to enter input signal from application program.

The “Alarm Ctrl Blk” controls the sending of an Event when the Input parameter AL_P_Blk is activated. If Event Block is set to 1 no Event is send.

Init Mode define the mode of the object when is cold started

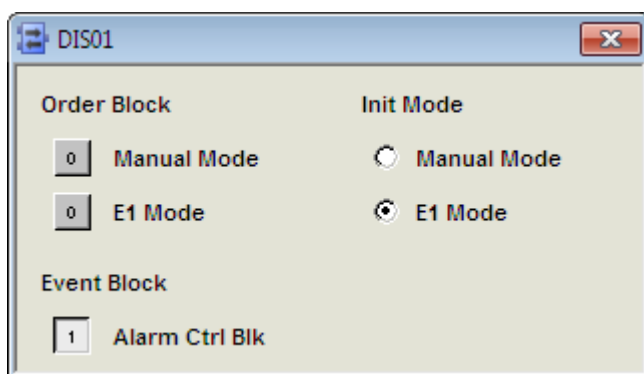


Figure 4-3 Orders and Events.

5.8.4 Alarm & Event

Alarm handling, Normal position and alarm delay time is entered in this window.

For Alarm Treatment config the following values are valid

- 0 No Alarm or Event are generated
- 1 Alarm and Event are generated
- 2 Event is generated

Alarm text is defining the text that will be presented in the message field in the alarm list.

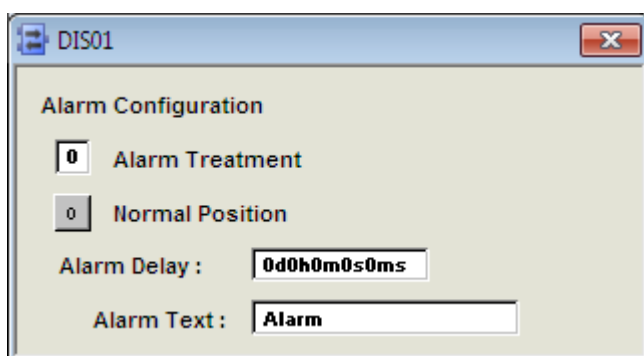


Figure 4-4 Alarm

5.8.5 Texts

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

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 DIS01.

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

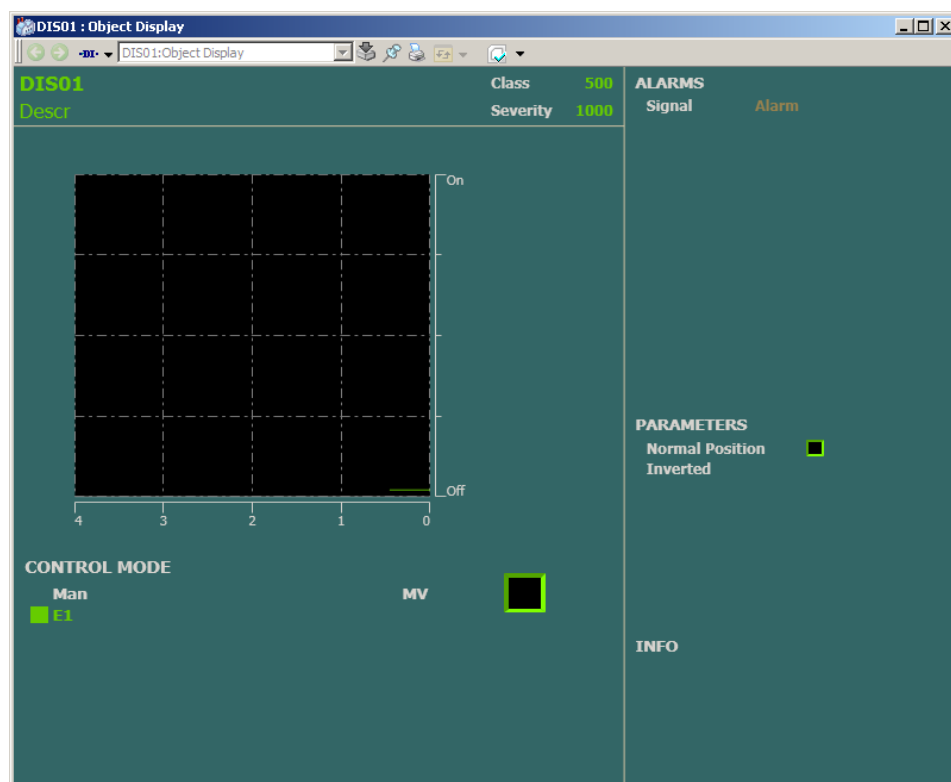


Figure 5-1 Object Display.

6.1.1.2 Process Display

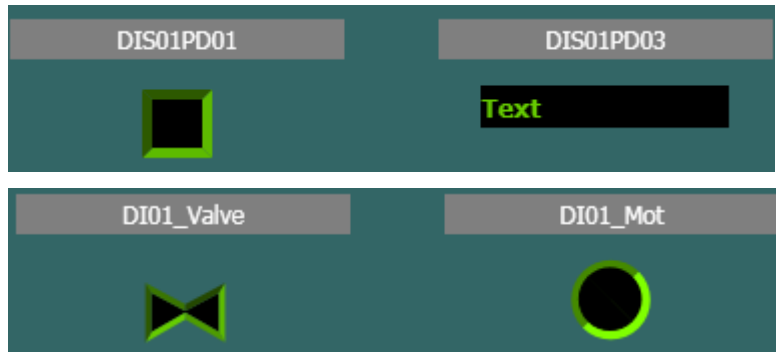


Figure 5-2 Process Display Elements.

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 DIS01 are available to be logged on the trend curves.

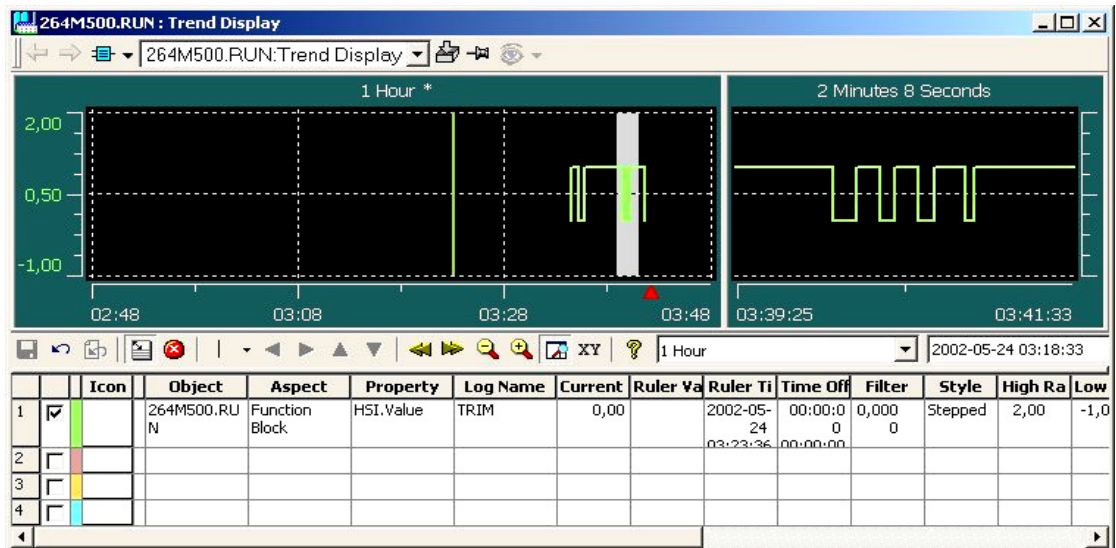


Figure 5-3 Trend Curve

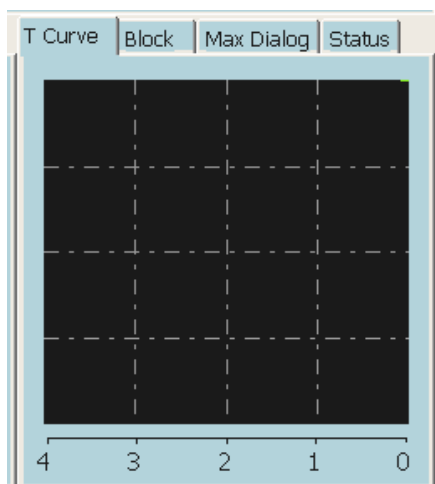


Figure 5-4 Extended Faceplate (T Curve)

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.

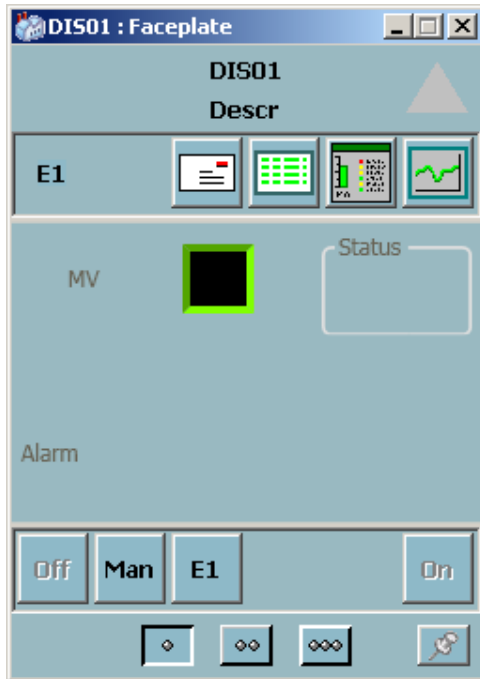


Figure 5-5 Reduced Faceplate.

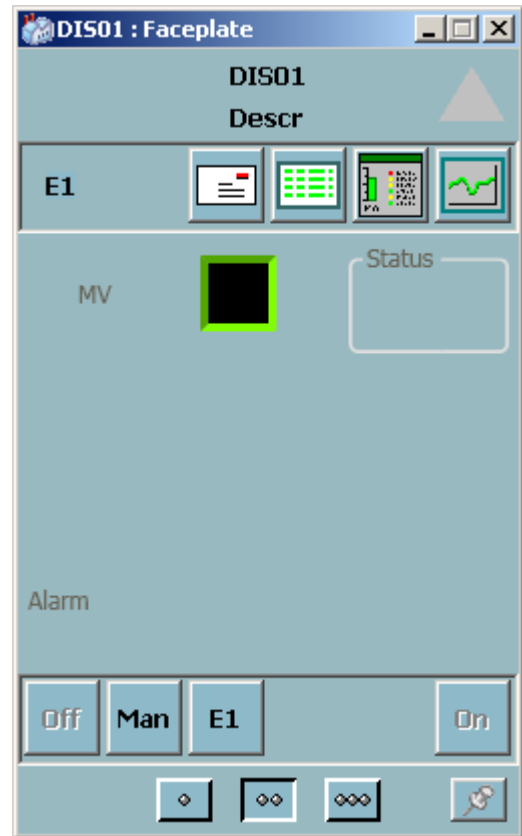


Figure 5-6 Faceplate.

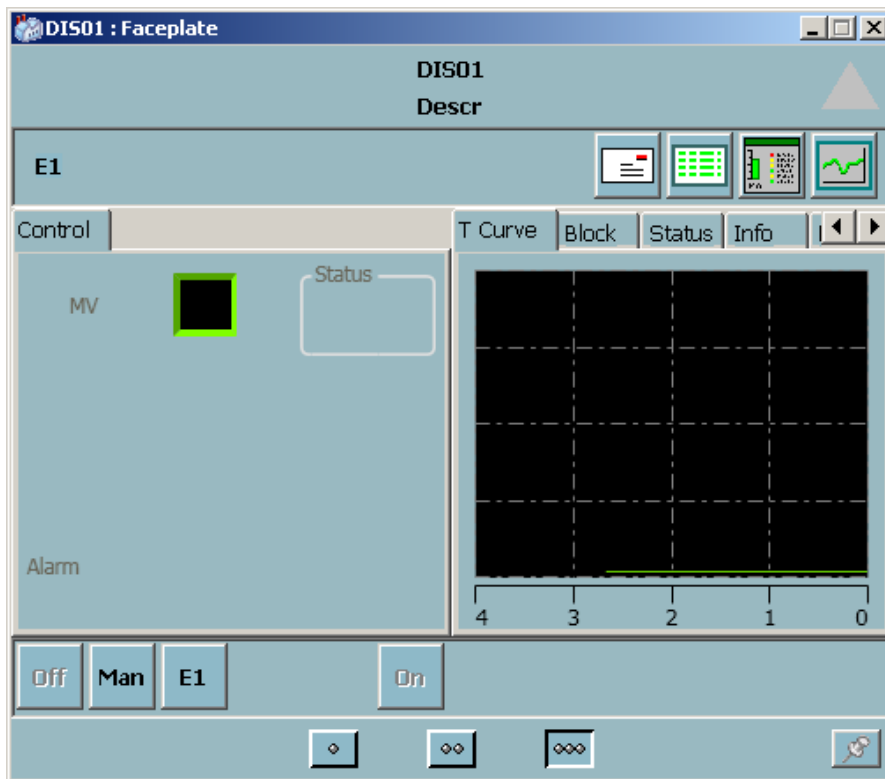


Figure 5-7 Extended Faceplate

6.3 Alarm and Event Handling

6.3.1 General

This section contains a description of all alarms and events in the functional unit DIS01.

When an input value fails or changes state an alarm and 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.

The alarm limits for DIS01 can be controlled individually.

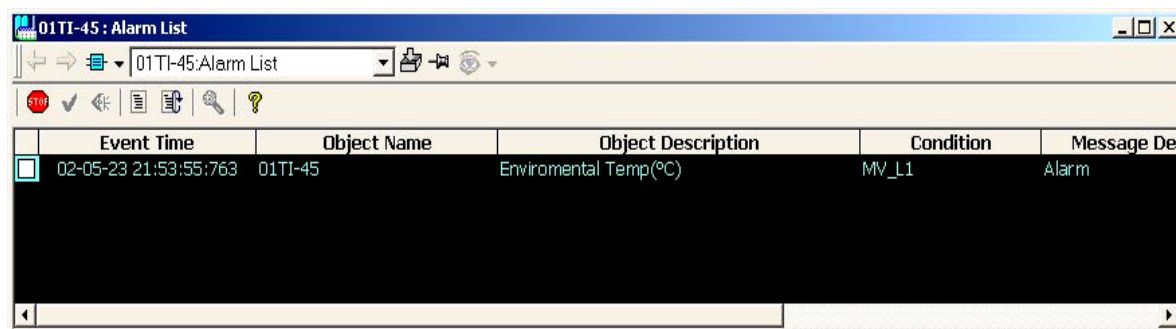


Figure 5-8 Alarm List

6.3.2 Alarm and Event Message

The following alarm texts are generated by the functional unit DIS01. The “Message Description” text is hard coded and can not be changed. The “Condition” text are stored in the Alarm and Event Translator aspect and can be NLS handled.

Object Name	Object Description	Condition	Message Description
<Name>	<Description>	Status	Alarm

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>		Alarm P Blk
<Name>	<Description>		Acknowledge Alarm

6.4 Faceplate tabs

6.4.1 Alarm and Event Blocking

By using the extended faceplate it is possible for the process engineer to block alarm.

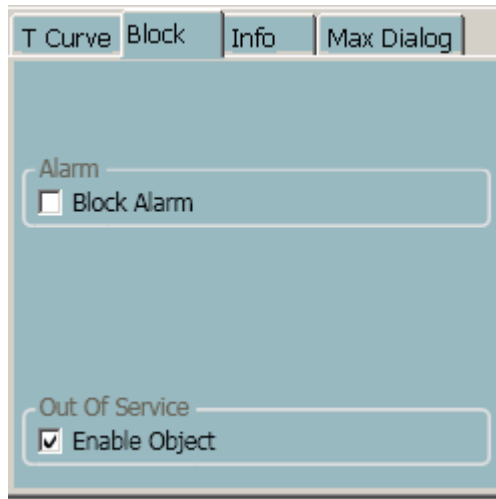


Figure 5-9 Extended Faceplate (Block)

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.

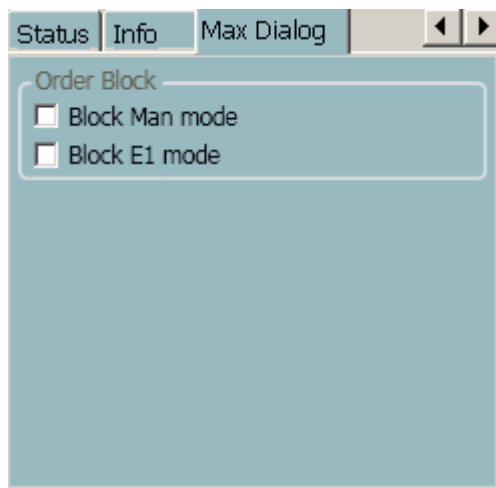


Figure 5-10 Extended Faceplate (Max Dialog)

6.4.3 Status

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

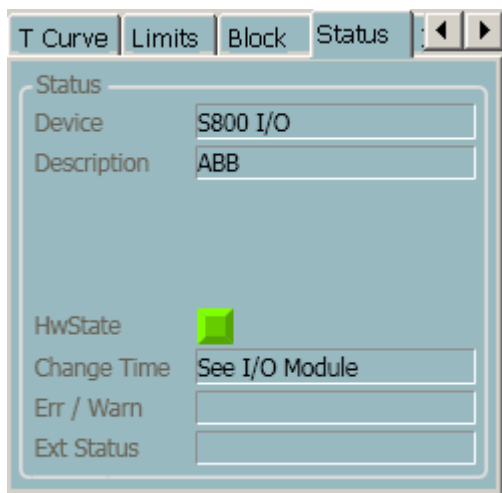


Figure 5-11 Extended Faceplate (Status)

6.4.4 Info

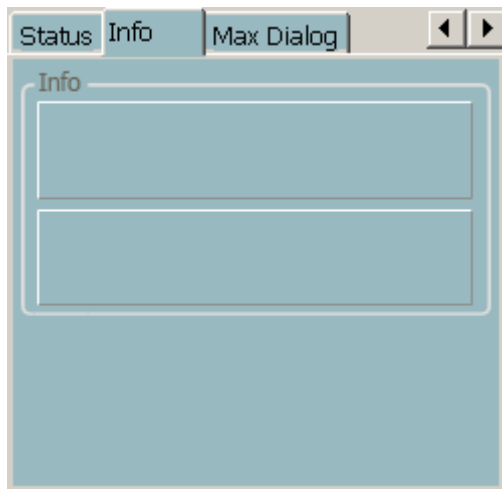


Figure 5-12 Extended Faceplate (Info)

REVISION

Rev.	Page (P) Chapt. (C)	Description	Date Dept./Init.
A		Version 2.0	03-02-10/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	05-08-26/MP
G	3	Rev 4.0/5	070510/BP
H		Rev 5.0-1	081230/BP
I		Update Rev 5.1/0	101102/BP