


FUNCTIONAL DESCRIPTION

RATIO01

Ratio Station

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Contents

1	General	4
2	Configuration	4
3	Function Block RATIO01	5
4	RATIO01 Datatypes	7
4.1	RATIO01_InPar.....	7
4.2	RATIO01_OutPar.....	7
4.3	RATIO01_Opr.....	8
5	Function	9
5.1	Basic Properties	9
5.2	Ratio Algorithm.....	9
5.3	Control Modes.....	10
5.3.1	Control Mode Command Signals and Priority	10
5.3.2	Balance	11
5.3.3	Manual.....	11
5.3.4	Auto	11
5.3.5	E1	12
5.4	Interlocks.....	12
5.5	Start-up	12
5.6	Process connections	12
5.7	Reverse Action.....	12
5.8	Ramp Functions	13
5.9	Ratio Selection, Mode transitions and Tracking.....	13
5.9.1	Selection of External Reference.....	13
5.9.2	Tracking.....	13
5.9.3	Ratio Limitations	13
5.10	Forced Control.....	13
5.10.1	Selection of Control Signal.....	14
5.10.2	Tracking.....	14
5.10.3	Output Ramp Functions.....	14
5.10.4	Output Limitations.....	14
5.11	Output Signal Control	14
5.11.1	Selection of Output Signal	15
5.11.2	Output Limiting.....	15
5.12	Scaling and Units	15
5.13	Alarm and Alarm Limitation Functions	15
5.13.1	Alarm Limits.....	16
5.13.2	Alarm Blocking.....	16
5.13.3	Event Handling	16
5.14	Interaction Window.....	17
5.14.1	Ratio01 Interaction Window.....	17
5.14.2	General Parameters	17
5.14.3	Direction & Intl. Blockings	17
5.14.4	Units and Range.....	18
5.14.5	Limits & Control	19
5.14.6	Alarm & Event handling	19
5.14.7	Event handling.....	19
5.14.8	Text	20
5.14.9	Parameters.....	20
6	Operator Functions	21
6.1	Presentation	21

6.1.1	Display Elements.....	21
6.1.2	Time-logged Properties.....	24
6.2	Faceplate(Dialog).....	24
6.3	Alarm and Event Handling.....	26
6.3.1	General.....	26
6.3.2	Alarm and Event Message.....	27
6.4	Faceplate tabs.....	27
6.4.1	Alarm and Event Blocking.....	27
6.4.2	Limits.....	28
6.4.3	Ratio station Parameters.....	28
6.4.4	Info Text.....	29
REVISION	30

1 General

RATIO01 is a functional unit intended for ratio control (the control of the relation between, for example different flows). This ratio control is performed in cooperation with a process controller PID01. RATIO01 is an independent functional unit which is motivated by the requirement for operator-friendly entry of ratio factors in suitable process-related units and own dialog with operator's displays.

The functional unit has many optional capabilities which increase its operational flexibility. RATIO01 normally performs its control function without help from other elements.

RATIO01 has the following functions and properties:

- Ratio Control function from the operator station or controlled from program logic.
- Bias of output signal.
- Control parameters can be set from the operator station or by control logic.
- Different control modes, set by operator or by control logic.
- Controllable rate of change of output signal.
- Limiting of ratio and output signals.
- Function for bumpless change between different control modes.
- Alarm and event handling of important control signals.

2 Configuration

RATIO01 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.

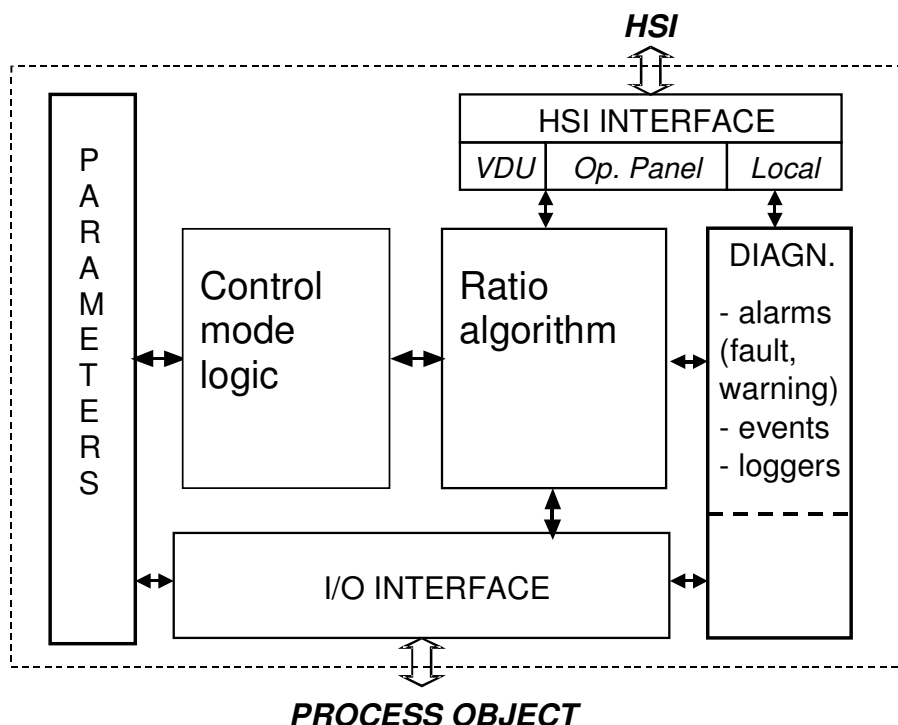


Figure 1. The Structure of the Functional Unit

3 Function Block RATIO01

FUNCTION OF INPUT TERMINALS	RATIO01		FUNCTION OF OUTPUT TERMINALS
Object name	Name	RatioRef	Ratio Reference
Object description	Description	WRatio	Working ratio
Enable object	Enable	Out	Output
Selection of tracking ref	Track_A	Out_EQ_LL	Output less than or equal to Low Limit
Measured Value	MV	Out_EQ_HL	Output greater than or equal to High Limit
Max output change rate (unit/s)	Speed4	Bal	Balance mode
Enable Man mode	ManEnbl	Man	Man mode
Enable Auto mode	AutoEnbl	Auto	Auto mode
Enable E1 mode	E1Enbl	E1	E1 mode
External ratio in E1 mode	ExtRatio	BalOut	Balance Out
Order mode to E1	SeqE1	Ratio_EQ_LL	Ratio less than or equal to Low Limit
Order mode to Local	Local	Ratio_EQ_HL	Ratio greater than or equal to High Limit
Order mode to Balance	BalIn	MV_GT_H2	MV greater than or equal to High High Limit (H2)
Order mode to Man	SeqMan	MV_GT_H1	MV greater than or equal to High Limit (H1)
Order mode to Auto	SeqAuto	MV_LT_L1	MV less than or equal to Low Limit (L1)
Balance Reference	BalRef	MV_LT_L2	MV less than or equal to Low Low Limit (L2)
Order mode to Clamp	Clamp	NoInt	No Interlocks
Clamp Reference	ClampRef	OutPar	Out Parameter
Enable external output limit	EOLim	Opr	Operator order
External Output Low Limit	EOLL		
External Output High Limit	EOHL		
External Gain Enable	EGainE		
External Gain	EGain		
External Bias Enable	EBiasE		
External Bias	EBias		
Process Interlock 1	IB1		
Process Interlock 2	IB2		
Process Interlock 3	IB3		
Process Interlock 4	IB4		
Reference for Process Interlock 1	IB1Ref		
Reference for Process Interlock 2	IB2Ref		
Reference for Process Interlock 3	IB3Ref		
Reference for Process Interlock 4	IB4Ref		
Block alarm	AlcBik		
Acknowledge alarm	AlarmAck		
MV alarm configuration	MVAlarms		
In Parameter	InPar		
Event name	EventName		

Figure 3-1. Function Block Type, Complete symbol

Table 3-1 below illustrates the default properties of each terminal of the RATIO01 function block.

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
Name	string	coldretain	in	yes	'Ratio01'	Object name
Description	string	coldretain	in	yes	'Descr'	Object description
Enable	bool	coldretain	in	yes	true	Enable object
Track_A	bool	coldretain	in	yes	false	Selection of tracking ref. (0= No tracking, 1=Ratioref is tracking ExtRe
MV	real	retain	in	yes		Measured Value

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
Speed4	real	coldretain	in	yes	20	Max output change rate (unit/s)
ManEnbl	bool	coldretain	in	yes	true	Enable Man mode
AutoEnbl	bool	coldretain	in	yes	true	Enable Auto mode
E1Enbl	bool	coldretain	in	yes	true	Enable E1 mode
ExtRatio	real	retain	in	yes		External ratio in E1 mode
SeqE1	bool	retain	in	yes		Order mode to E1
Local	bool	retain	in	yes		Order mode to Local
BalIn	bool	retain	in	yes		Order mode to Balance
SeqMan	bool	retain	in	yes		Order mode to Man
SeqAuto	bool	retain	in	yes		Order mode to Auto
BalRef	real	coldretain	in	yes	0.0	Balance Reference
Clamp	bool	retain	in	yes		Order mode to Clamp
ClampRef	real	coldretain	in	yes	0.0	Clamp Reference
EOLim	bool	retain	in	yes		Enable external output limit
EOLL	real	coldretain	in	yes	0.0	External Output Low Limit
EOHL	real	coldretain	in	yes	100.0	External Output High Limit
EGainE	bool	retain	in	yes		External Gain Enable
EGain	real	coldretain	in	yes		External Gain
EBiasE	bool	retain	in	yes		External Bias Enable
EBias	real	coldretain	in	yes		External Bias
IB1	bool	retain	in	yes	true	Process Interlock 1
IB2	bool	retain	in	yes	true	Process Interlock 2
IB3	bool	retain	in	yes	true	Process Interlock 3
IB4	bool	retain	in	yes	true	Process Interlock 4
IB1Ref	real	coldretain	in	yes	0.0	Reference for Process Interlock 1
IB2Ref	real	coldretain	in	yes	0.0	Reference for Process Interlock 2
IB3Ref	real	coldretain	in	yes	0.0	Reference for Process Interlock 3
IB4Ref	real	coldretain	in	yes	0.0	Reference for Process Interlock 4
AlcBlk	bool	retain	in	yes		Block alarm
AlarmAck	bool	retain	in	yes		Acknowledge alarm
MVAlarms	Alarm4Limit	by_ref	in	yes		MV alarm configuration
InPar	Ratio01_InPar	by_ref	in	yes		In Parameter
EventName	string	coldretain	in	yes	' Ratio01_'	Event name
RatioRef	real	retain	out	yes		Ratio Reference
WRatio	real	retain	out	yes		Working ratio
Out	real	retain	out	yes		Output
Out_EQ_LL	bool	retain	out	yes		Output less than or equal to Low Limit
Out_EQ_HL	bool	retain	out	yes		Output greater than or equal to High Limit
Bal	bool	retain	out	yes		Balance mode
Man	bool	retain	out	yes		Man mode
Auto	bool	retain	out	yes		Auto mode
E1	bool	retain	out	yes		E1 mode
BalOut	bool	retain	out	yes		Balance Out
Ratio_EQ_LL	bool	retain	out	yes		Ratio less than or equal to Low Limit
Ratio_EQ_HL	bool	retain	out	yes		Ratio greater than or equal to High Limit
MV_GT_H2	bool	retain	out	yes		MV greater than or equal to High High Limit (H2)
MV_GT_H1	bool	retain	out	yes		MV greater than or equal to High Limit (H1)
MV_LT_L1	bool	retain	out	yes		MV less than or equal to Low Limit (L1)
MV_LT_L2	bool	retain	out	yes		MV less than or equal to Low Low Limit (L2)
NoInt	bool	retain	out	yes		No Interlocks
OutPar	Ratio01_OutPar	by_ref	out	yes		Out Parameter
Opr	Ratio01_Opr	by_ref	out	yes		Operator order

Table 3-1. Terminal properties.

4 RATIO01 Datatypes

4.1 RATIO01_InPar

Name	Data Type	Attributes	Initial value	ISP value	Description
Class	dint	coldretain	500		AE class
Severity	dint	coldretain	1000		AE severity
MVRange	RangeReal	coldretain			MV Range
SPRange	RangeReal	coldretain			SP Range
OUTRange	RangeReal	coldretain			OUT Range
SPLimit	RangeLimit	coldretain			SP limit
OUTLimit	RangeLimit	coldretain			OUT limit
InitMode	dint	coldretain	5		Init mode (5 = Man ; 6 = Auto ; 7 = E1)
SeqManEvBlk	bool	coldretain	true		Block event for SeqMan
SeqAutoEvBlk	bool	coldretain	true		Block event for SeqAuto
SeqE1EvBlk	bool	coldretain	true		Block event for SeqE1
AlcBlkEvBlk	bool	coldretain	true		Block event for AlcBlk
EOLimEvBlk	bool	coldretain	true		Block event for EOLim
LocalEvBlk	bool	coldretain	true		Block event for Local
BallnEvBlk	bool	coldretain	true		Block event for Balln
ClampEvBlk	bool	coldretain	true		Block event for Clamp
IB1	IBInParType3	coldretain			Configuration for IB1
IB2	IBInParType3	coldretain			Configuration for IB2
IB3	IBInParType3	coldretain			Configuration for IB3
IB4	IBInParType3	coldretain			Configuration for IB4
OUTIncDec	real	coldretain	2.0		Increase/Decrease step of output (In percentage of range)
SPIncDec	real	coldretain	1.0		Increase/Decrease step of setpoint (In percentage of range)
Gain	real	coldretain	1.0		Gain
Bias	real	coldretain	0.0		Bias
FunctionType	bool	coldretain			Function (0 = multiply ; 1 = divide)

4.2 RATIO01_OutPar

Name	Data Type	Attributes	Initial value	ISP value	Description
AlarmBlk	bool	retain			Alarm blocked
IntlkBlk	bool	retain			Interlock blocked
IntlkBlkActive	bool	retain			Interlock blocked active
EnOverrideAll	bool	retain			Override All button enabled
Mode	dint	retain			Active mode
NormalMode	bool	retain			Normal mode (Active mode = Init mode)
IB1Ind	bool	retain			IB1 interlocked
IB2Ind	bool	retain			IB2 interlocked
IB3Ind	bool	retain			IB3 interlocked
IB4Ind	bool	retain			IB4 interlocked
AU_MVH2	bool	retain			UnAcknowledge Alarm for MV > H2
AU_MVH1	bool	retain			UnAcknowledge Alarm for MV > H1
AU_MVL1	bool	retain			UnAcknowledge Alarm for MV < L1
AU_MVL2	bool	retain			UnAcknowledge Alarm for MV < L2
ALB_H2	bool	retain			High High MV alarm blocked
ALB_H1	bool	retain			High MV alarm blocked
ALB_L1	bool	retain			Low MV alarm blocked
ALB_L2	bool	retain			Low Low MV alarm blocked

4.3 RATIO01_Opr

Name	Data Type	Attributes	Initial value	ISP value	Description
BlockAlarm	bool	retain			Operator block alarms
ALB_H2	bool	retain			Operator block alarm limit H2
ALB_H1	bool	retain			Operator block alarm limit H1
ALB_L1	bool	retain			Operator block alarm limit L1
ALB_L2	bool	retain			Operator block alarm limit L2
Man	bool	retain			Operator order Manual mode
Auto	bool	retain			Operator order Auto mode
E1	bool	retain			Operator order E1 mode
Incr	real	retain			Operator order Increase SP command
Decr	real	retain			Operator order Decrease SP command
OverrideAll	bool	retain			Operator override all interlocks
IB1Override	bool	retain			Operator override IB1 interlock
IB2Override	bool	retain			Operator override IB2 interlock
IB3Override	bool	retain			Operator override IB3 interlock
IB4Override	bool	retain			Operator override IB4 interlock
AutoSP	real	coldretain		real	Operator enter Auto Ratio
ManOUT	real	coldretain			Operator enter Man OUT

5 Function

5.1 Basic Properties

The RATIO01 functional unit is designed for ratio control in different processes.

RATIO01 Ratio Station can function independently, but are normally used together with other functions. Such cases can include

- Ratio Control, where the Ratio Station RATIO01 supplements a PID01 Controller.
- Increase/Decrease control, where a three state controller CON-PU1 supplements the RATIO01.
- For special control applications additional logic can be used to supplement RATIO01.

RATIO01 has the following basic functions.

- Ratio control with additional Gain.
- External control parameters for bias.
- Control modes: BAL, Man, Auto and E1.
- Logic for allocation of priority in the selection of control mode.
- Rate of change limiting of the output signal.
- The possibility to limit ratio and output signals.
- Functions for bumpless transfers between the different control modes.
- Possibility to Forced the control of the output signal.
- Alarm and event handling.

5.2 Ratio Algorithm

The ratio algorithm has two basic functions:

- Output signal = Measured value * (Ratio factor * Gain) + Bias value
- Output signal = Measured value / (Ratio factor * Gain) + Bias value

The working ratio factor consists of either an internal ratio factor (control mode AUTO) or of an external ratio factor (control mode E1). If required, the ratio factors can be subjected to amplitude limitations in Min-Max.

The operator can write in a new value for the internal ratio factor at all times except when the control mode is E1 and tracking is commanded.

Direct (multiply) or reversed (divide) control action is selectable.

5.3 Control Modes

5.3.1 Control Mode Command Signals and Priority

The signals for control mode change are placed in order of priority. LOCAL has the highest priority and SEQE1 has the lowest priority. The current control mode is determined by the active inputs with the highest priority by a pulse. The inputs are of three different types; static, set-reset and dynamic.

- The static input must be activated for the corresponding control mode to be applied. If the signal at the input disappears, the control mode changes over to MAN, provided no static input with a lower priority takes over the selection of the control mode.
- Set-Reset means that the control mode is selected when the input is activated. If the input is reset to zero, the control mode remains in effect until some other input is activated. If the SR-input is kept active, only inputs with a higher priority can assume the selection of control mode.
- The dynamic input is only initiating. The control mode is selected when a change from 0 to 1 occurs at the input.

The control mode can be enabled individually. Input terminals ManEnbl, AutoEnbl, and E1Enbl can be set in the function block with constants or by application logic. By enabling a single control mode under certain conditions it is possible to lock the control mode to prevent switching to another control mode.

Table 4-1 overleaf illustrates control mode activation and priority when selected from either an application program or from the operator station.

Commands		Mode selected			
Signal	Source	Balance	Manual	Auto	E1
Local ⁽¹⁾	Program				
Balln ⁽¹⁾	Program				
Clamp ⁽¹⁾	Program				
Interlocks	Program	Remains unchanged			
Man	Operator				
SeqMan ↑ ⁽²⁾	Program				
Auto	Operator				
SeqAuto ↑ ⁽²⁾	Program				
E1	Operator				
SeqE1 ↑ ⁽²⁾	Program				

Table 4-1. Control modes selection and priority.

- (1) On leaving mode Balance (i. e. when the command signal returns to zero), mode Manual is always obtained, unless any signal commands another mode.
- (2) The arrow ↑ indicates that only the positive transition of the signal is relevant for commanding a mode change.

The purpose and function of each control mode is described below.

5.3.2 Balance

Balance control mode is used to force the control output to a value present at the input terminal BalRef. The operator cannot override this mode.

When the ratio station is operating in Balance mode the output signal follows the balance reference signal. This mode is used when the control signal is disconnected and the station is balanced for a bumpless return to control.

Control mode BAL is activated by:

- The activation of input terminal LOCAL. An indication of BAL LOCAL is presented on the object display and Bal on the Faceplate mode indicator.
- The activation of input terminal BALIN. An indication of BAL is presented on the object display and Bal on the Faceplate mode indicator.

Examples of use can be as follows:

- Manual emergency control, which has the highest priority. An operator, working centrally at the display screen cannot take over control from a local backup station located adjacent to the process function.
- When another function block or other logic other than the ratio station is to take over the control. An example is cascade coupling of several process controllers.

5.3.3 Manual

Manual is the initial control mode of the ratio station. In this mode the operator directly sets the output value from the operator station. The rate of output value is limited by the value at terminal Speed4. Manual mode is enabled by input terminal ManEnabl.

The control mode MAN is activated by:

- Input terminal CLAMP gives the indication MAN CLAMP in the object display.
- By clicking on the Man button on the operator's faceplate. Man is indicated on the object display and Faceplate.

Examples of use:

- Manual control of an actuator under abnormal operation conditions e.g. in connection with a malfunction.
- Manual control at start and stop.

5.3.4 Auto

Auto is the automatic control mode, where the operator sets the ratio. Auto mode is enabled by input terminal AutoEnabl.

The control mode AUTO is activated by:

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

- Input terminal SEQAUTO when activated by a pulse.

5.3.5 E1

E1 is an automatic control mode, where the ratio is obtained from an external source. E1 mode is enabled by input terminals E1Enabl.

With control mode E1 (External 1) the ratio consists of a signal received from an external source at input terminal ExtRatio. The control mode E1 can be commanded from the operator's keyboard, from another application logic or from an external control device.

The control mode E1 is activated by:

- By clicking on the E1 button on the operator's faceplate. Ext1 is indicated on the object display and Faceplate.
- Input terminal SEQE1 when activated by a pulse.

Examples of use:

- Ratio control from an optimizing function.
- Local setting of ratio.
- Recipe-controlled ratio.

5.4 Interlocks

The ratio station can be interlocked by using IB1 and IB2 input terminals. Deactivation of these terminals set the output value to a fixed value, which is present at the IB1Ref and IB2Ref input terminals. These interlocks do not change the current control mode, and can not be overridden by the operator. If the control mode is "Manual" when the interlock is released, the output will stay at the "interlock-value".

5.5 Start-up

An initialisation phase begins at start of the AC800M system. Manual is the default control mode at system initialisation or after a download. It is possible to force the control mode to other modes at system initialisation.

5.6 Process connections

The RATIO01 is connected to the process via the following two input terminals.

- MV Connection for measured value e.g. a level transmitter.
- OUT Control output to e.g. a process controller PID01 or a control valve.

5.7 Reverse Action

The following control functions are activated when the Action parameter is enabled with the values as shown below.

- 0 Multiply function of WRatio and MV.
- 1 Divide function of WRatio and MV.

5.8 Ramp Functions

Ramp functions are introduced into the signal paths to determine the maximum permitted rate of change of certain signals. The maximum permitted rate of change is determined by the operational parameter SPEED (X) and is specified in process-related variables/second or percentage units/second, depending on the signal.

5.9 Ratio Selection, Mode transitions and Tracking

The term “working ratio” is the ratio that the ratio station uses in its algorithm in all modes. The “auto ratio” is the ratio that the operator enters in auto mode. In auto mode the auto ratio is transferred to the working ratio.

RATIO SELECTION contains the following functions:

- Selection of external reference (1)
- Tracking
- Ramp functions
- Limitations

5.9.1 Selection of External Reference

The working ratio is external reference 1(E1) in control mode Ext1.

5.9.2 Tracking

The tracking functions are intended to eliminate abrupt changes of the ratio reference on return to the different control modes. Tracking functions are available for both auto and external modes and are activated during mode transfers.

During a mode transfer the working ratio will ramp to selected ratio if Track_A (External Ratio Track Reference) are enabled.

5.9.2.1 Tracking of AUTO ratio

Two tracking functions are included for the AUTO ratio (RatioRef). The tracking functions can be activated with other control modes than AUTO. Their purpose is to permit bumpless connection of the AUTO ratio or connection with constant signal value.

The function is selected with the parameter Track_A.

- Track_A: Selection of tracking reference.
0 No tracking.
1 RatioRef is tracking ExtRatio.

5.9.3 Ratio Limitations

The limiting values Ratio H and Ratio L apply for both AUTO ratio and the external reference E1. The ratio limits are set in the Extended Faceplate on the faceplate element “Limits2”.

5.10 Forced Control

Forced control may also be initiated to a reference value i.e. on receiving an incorrect signal from an analog input (AI), the output signal for example ramps down to zero.

The function block contains the following functions:

- Selection of control signal
- Tracking
- Ramp functions
- Limitations

5.10.1 Selection of Control Signal

There are three forms to force the control of the output signal:

- Manual is selected with the control mode MAN
- Clamping is selected with the clamping function (control mode MAN)

The following inputs are be used for forced control.

Speed4 Highest permitted rate of change of the output signal.

Clamp Command signal for clamping. The mode changes to MAN. When the Clamp signal is released the mode will still be MAN.

ClampRef Clamping reference value when terminal Clamp is activated.

5.10.2 Tracking

Tracking functions are integrated to eliminate abrupt output signal changes at change-over to and from the control modes MAN, Clamp (MAN).

5.10.3 Output Ramp Functions

The input terminals described below determine the maximum permitted rate of change as follows:

- Speed 4 Output ramp speed. Specified in percent units/second.

5.10.4 Output Limitations

The limiting values Out H and Out L limit the value of the output signal. The output limits are set in the Extended Faceplate on the faceplate element "Limits1".

5.11 Output Signal Control

Output signal control includes the following functions.

- Selection of output signal
- Output signal limitation

5.11.1 Selection of Output Signal

The output signal is selected in accordance with the control mode as follows:

- AUTO, E1 output control signal
- MAN, Clamp (MAN), output control signal
- BAL control signal, the value of balance reference is transferred to the output.

The following input terminals are be used for output control.

BALREF	Balance reference
EOHL	Upper external limiting value
EOLL	Lower external limiting value
EOLIM	Signal for selection of external limitation
OUT	Output signal

5.11.2 Output Limiting

The ratio station output signal is normally limited to Max and Min values of the Real IO signal, connected to the output but limiting values on this signal can be determined either from the operator's station or externally.

The limiting upper and lower values Out H and Out L limit the value of the output signal. The output limits are set in the Extended Faceplate on the faceplate element "Limits1".

The activation of input terminal EOLIM determines whether the external limits EOLL and EOHL or internal limits Out H and Out L are applied to the output limitation. The operator-entered limiting values are not affected when external limits are used. The limiting values currently active are presented on the faceplate and object display.

The limiting values from the operator Out H and Out L can be set equal but Out L cannot be set greater than Out H. If the external limiting value EOLL is greater than EOHL then only the upper value EOHL applies. The output signal can thereby be force controlled to the value for EOHL.

5.12 Scaling and Units

The ratio station works internally with process-related units. This means that measured values and ratios, both internal and external are specified in process-related units and other signals in percentage units.

The output signal have a default range of 0% to +100%. Scaling is possible. The output signal (OUT) scaling is possible except in the Operator Station bargraph which shows 0 - 100%.

5.13 Alarm and Alarm Limitation Functions

The following alarms are monitored in the function block:

- Measured value MV with two upper and two lower alarm limits

When an alarm limit is exceeded, an alarm, which must be acknowledged, is transmitted to the operator station (and printer, if provided). Alarms are also available as outputs on the Function Block.

5.13.1 Alarm Limits

When determining the MV alarm limits, the following equation applies:

$$H\ 2 \geq H\ 1 \geq L\ 1 \geq L\ 2$$

If an attempt is made to cross the alarm limits with each other, the operator is notified that the operation is not permitted. There is no change of the limit.

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

5.13.2 Alarm Blocking

Supervision of the measured value (MV) is blocked by activating the input connection ALCBLK.

Automatic alarm blocking can be suitable in connection with start and stop and with anticipated events, the so-called sequential fault blocking. The signal outputs are also affected by this blocking (as to differentiate from operator's blockings which are only blocked on the operator's station and printer).

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

The following errors can be blocked:

$$MV \geq H\ 2$$

$$MV \geq H\ 1$$

$$MV \leq L\ 1$$

$$MV \leq L\ 2$$

Using Event handling to block alarms means that the printer and operator's station and updating of the error list are blocked. The FB outputs are not affected.

The following terminals are used for alarm handling.

ALCBLK	Blocking of alarm on MV
MV_GT_H2	Measured value exceeds H2
MV_GT_H1	Measured value exceeds H1
MV_LT_L1	Measured value less than L1
MV_LT_L2	Measured value less than L2
Ratio=HL	Ratio limit, high
Ratio=LL	Ratio limit, low
OUT=HL	Output signal limit, high
OUT=LL	Output signal limit low

5.13.3 Event Handling

Event are generated for status change on the signals defined in interaction window in chapter 5.14.7

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.

5.14 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}.

5.14.1 Ratio01 Interaction Window

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

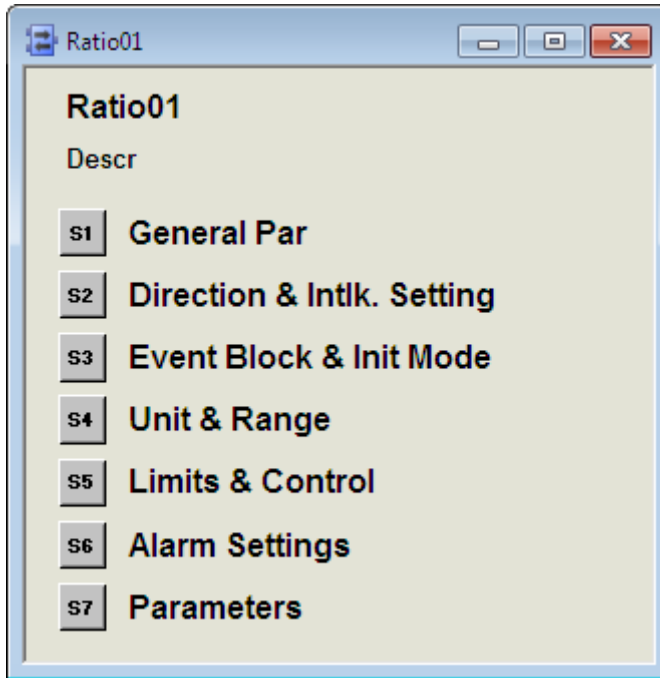


Figure 4-1 Main Interaction Window.

5.14.2 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.

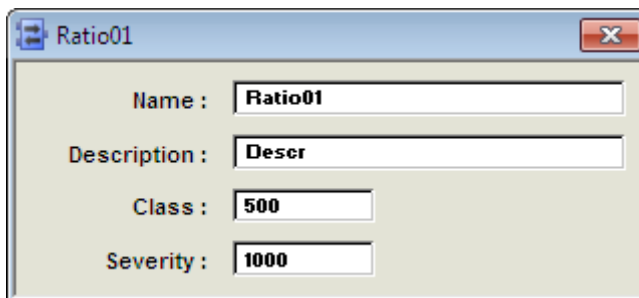


Figure 4-2 General Parameters.

5.14.3 Direction & Intl. Blockings

Multiply/Divide – indication of function.

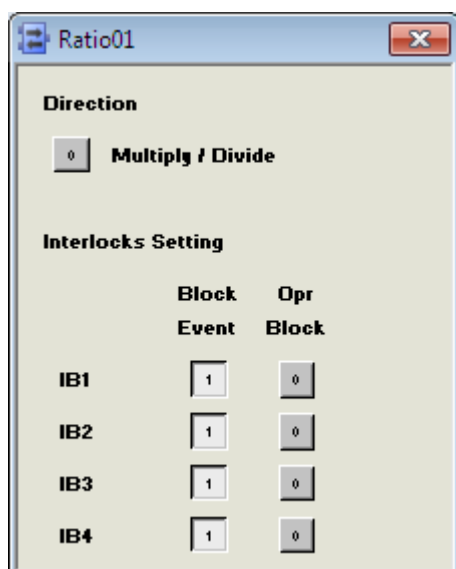


Figure 4-3 Direction & Intl. Blockings.

5.14.4 Units and Range

Measured Value and output (PO), minimum, maximum, units and decimals are entered in this interaction window. The step change for operator increase/decrease buttons is also set in this window.

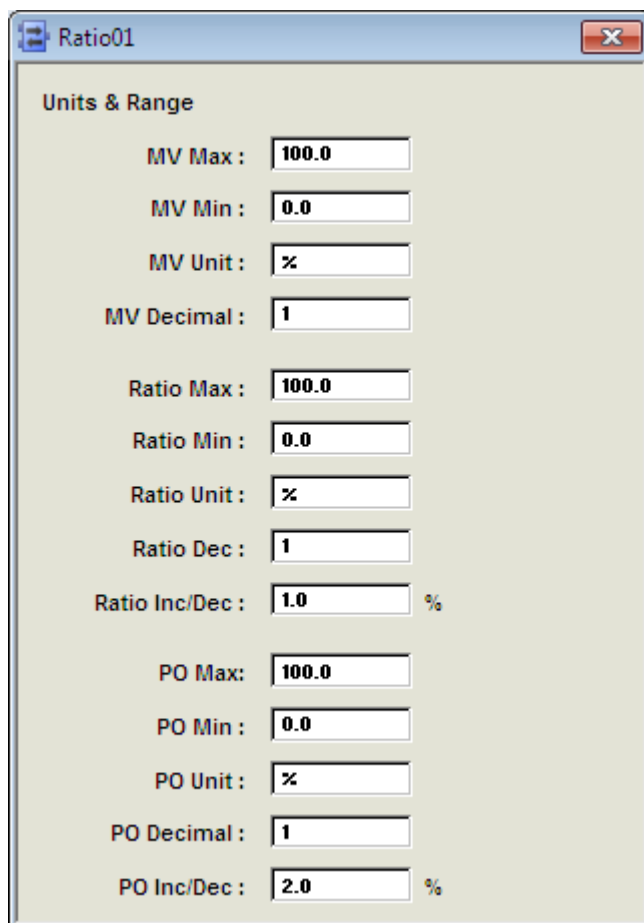


Figure 4-4 Units & Range.

5.14.5 Limits & Control

Limits for output signal and possibility to set output and/or ratio.

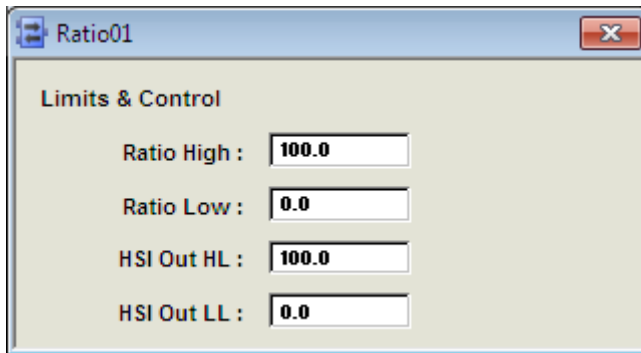


Figure 4-5 Limits & Control.

5.14.6 Alarm & Event handling

Alarm limits, Severity and Enabling of the alarms for measured value and as well as hysteresis and alarm delay time is entered in this window.

For AE config the following values are valid

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

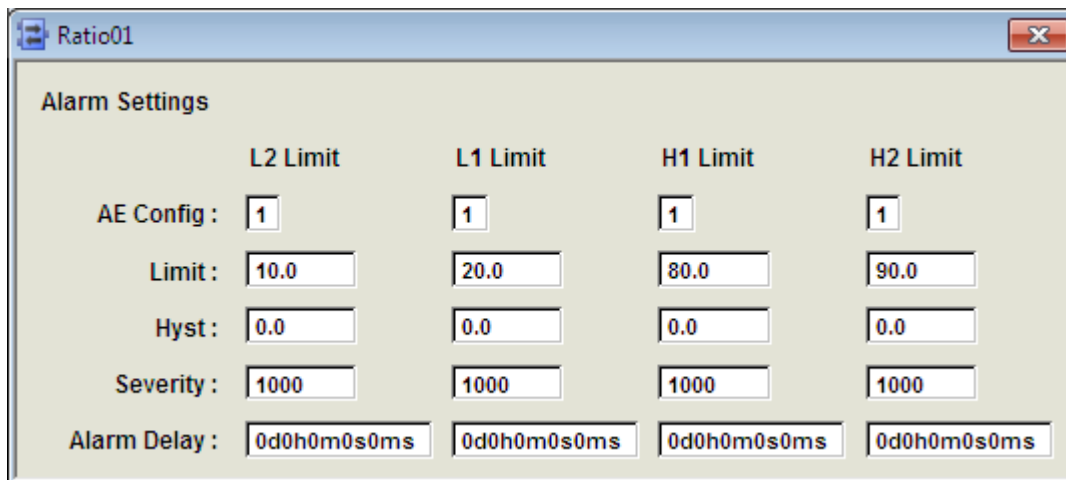


Figure 4-6 Alarm & Event Handling.

5.14.7 Event handling

The blocking of Events are entered in this Interaction Window

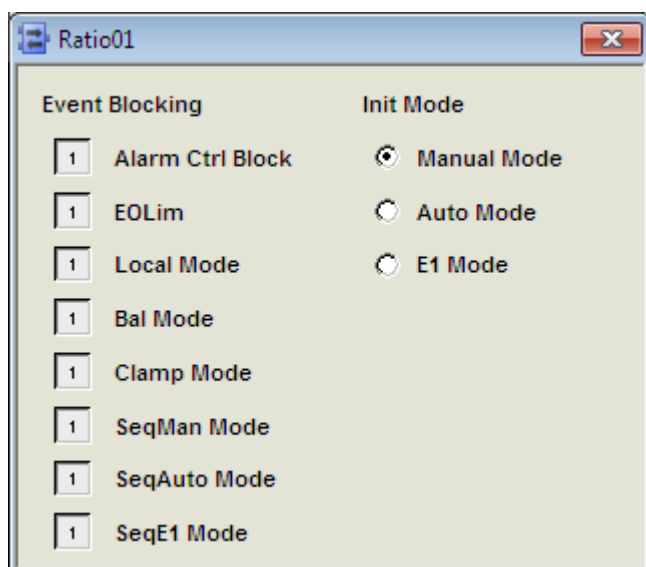


Figure 4-7 Alarm & Event Handling.

5.14.8 Text

The different interlock and information texts are entered in the aspect Text Properties. The length of the text is limited to about 60 characters, by the size of presentation element in the Interlock Display..

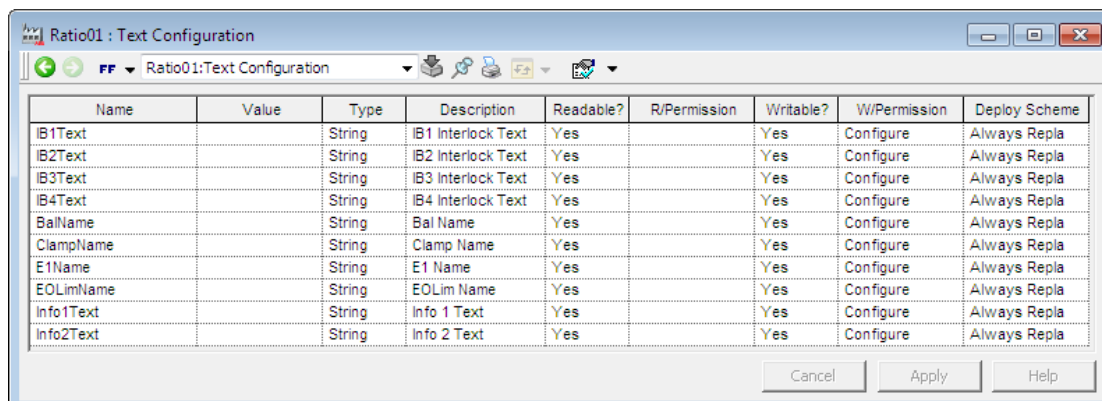


Figure 4-8 Texts.

5.14.9 Parameters

In this window the control parameters are shown and adjusted.

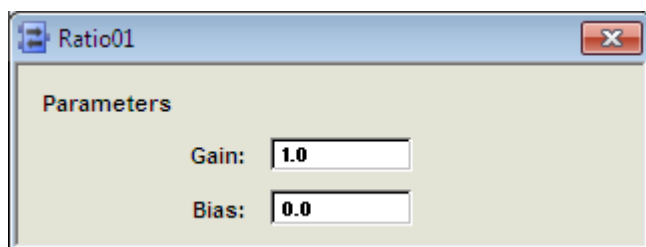


Figure 4-9 Parameters.

6 Operator Functions

The Operator functions are divided in principle into 4 parts:

- Presentation (Display elements, Time logged properties)
- Faceplate (Dialog)
- Alarm and Event handling
- Text 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 RATIO01.

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
- Interlock display

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

6.1.1.1 Object Display

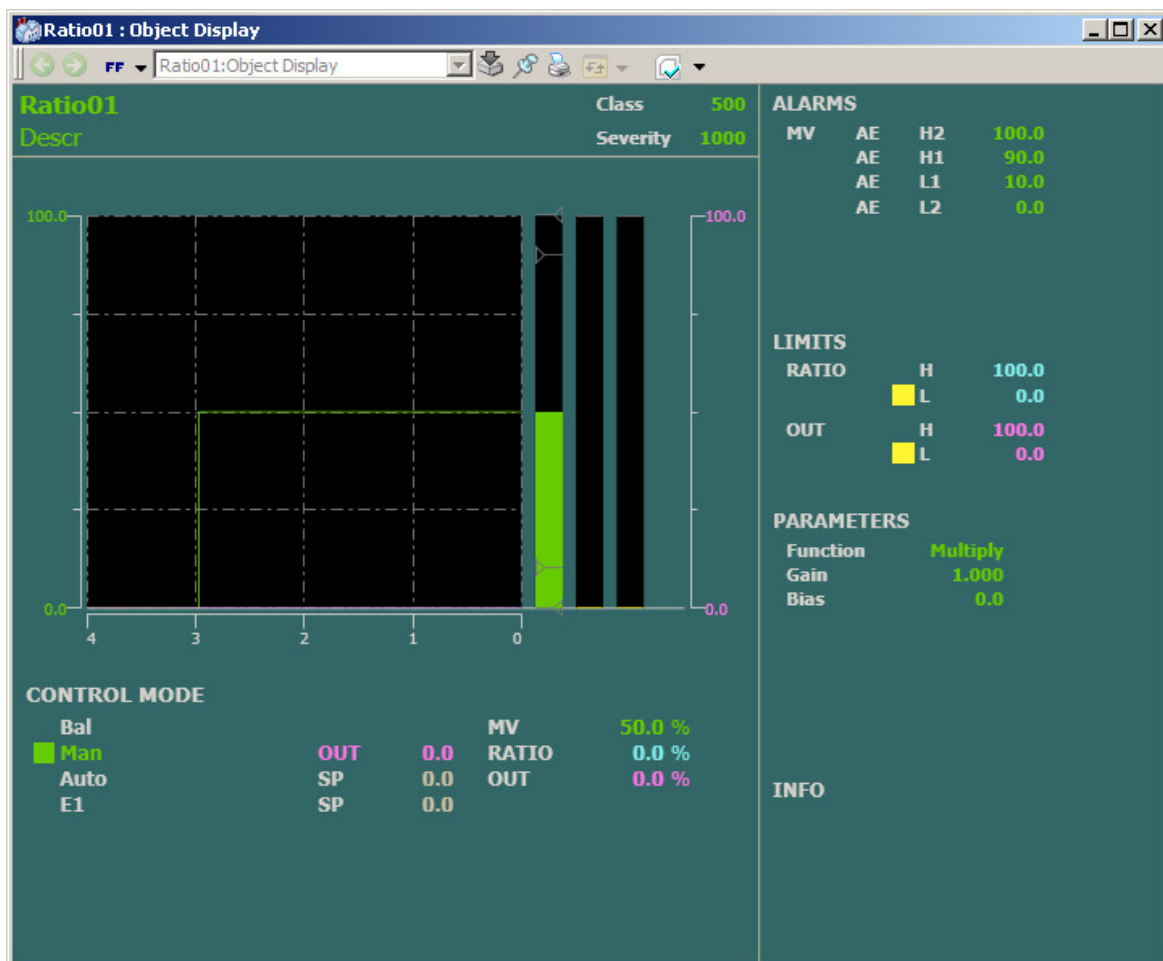


Figure 5-1 Object Display.

6.1.1.2 Process Display



Figure 5-2 Process Display Element.

6.1.1.3 Interlock Display

This display shows the actual status of all Interlock. The operator can override individual interlocks or all interlock.

Interlocks that can be overridden must be set to Blockable. This can be done from this display if the user has permission Configure or from the Interaction Window see chapter 5.14.3.

Start Interlock, Block Event and IA Blocked when no in E1 or E2 mode are parameters that can be set from this display if the user has Permission Configure or from Interaction Window



6.1.2 Time-logged Properties

Measured 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. All properties for the object RATIO01 are available to be logged on the trend curves.

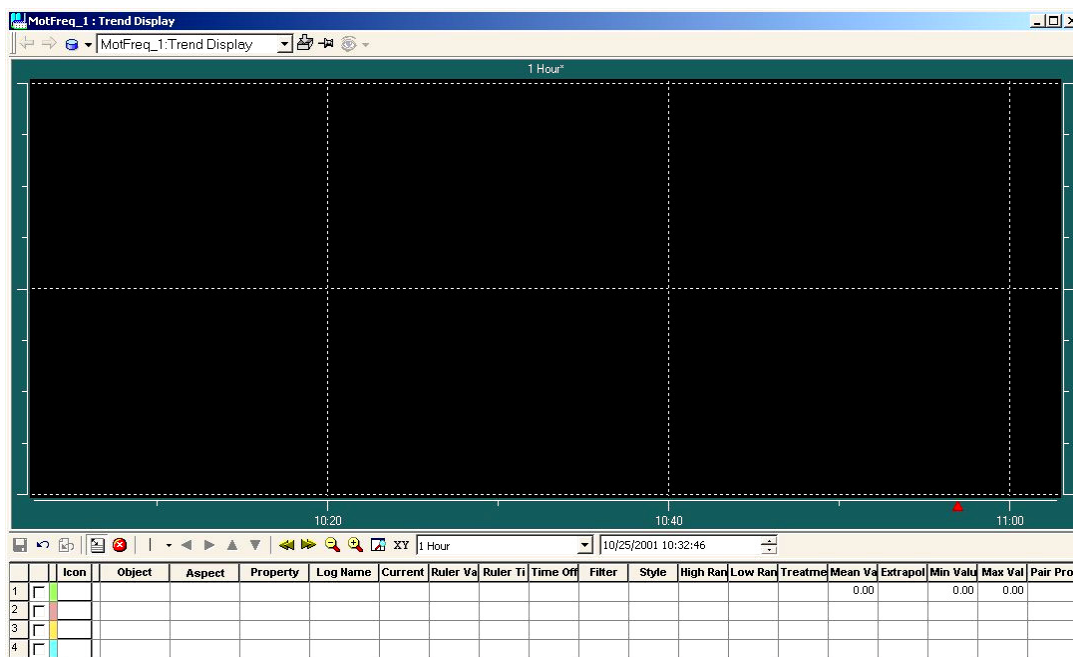


Figure 5-3 Trend Curve

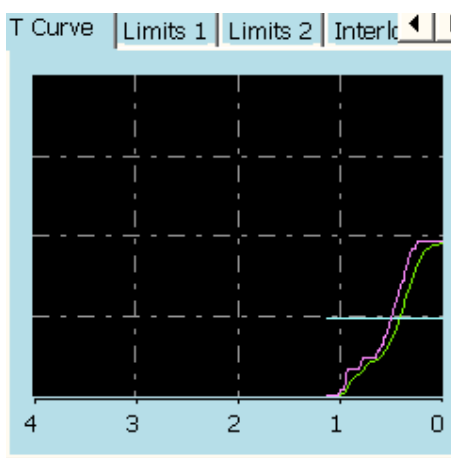


Figure 5-4 Extended Faceplate (T Curve)

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.

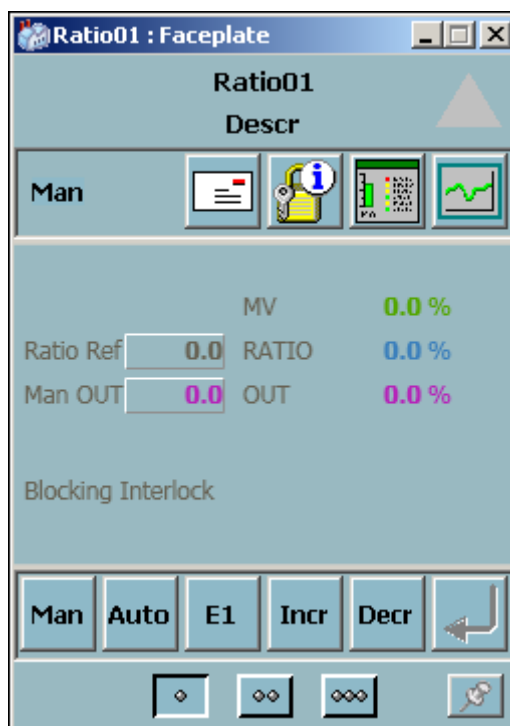


Figure 5-5 Reduced Faceplate

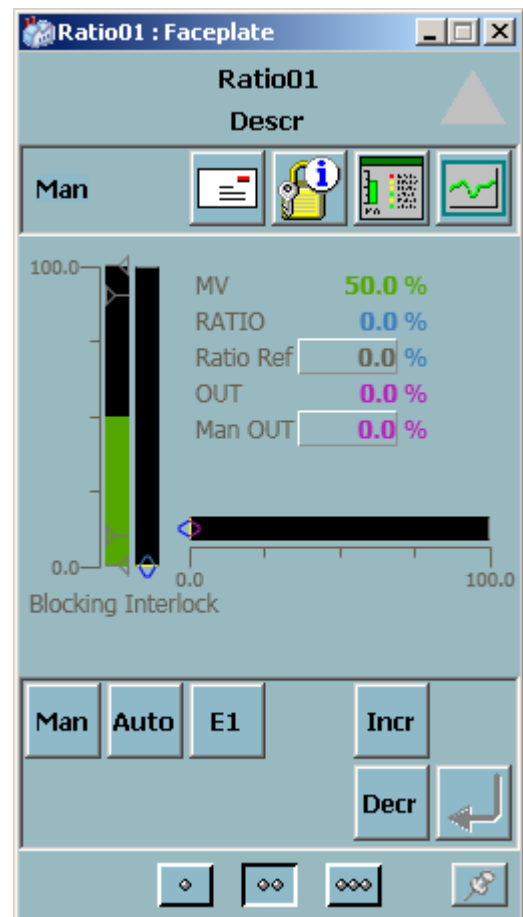


Figure 5-6 Faceplate

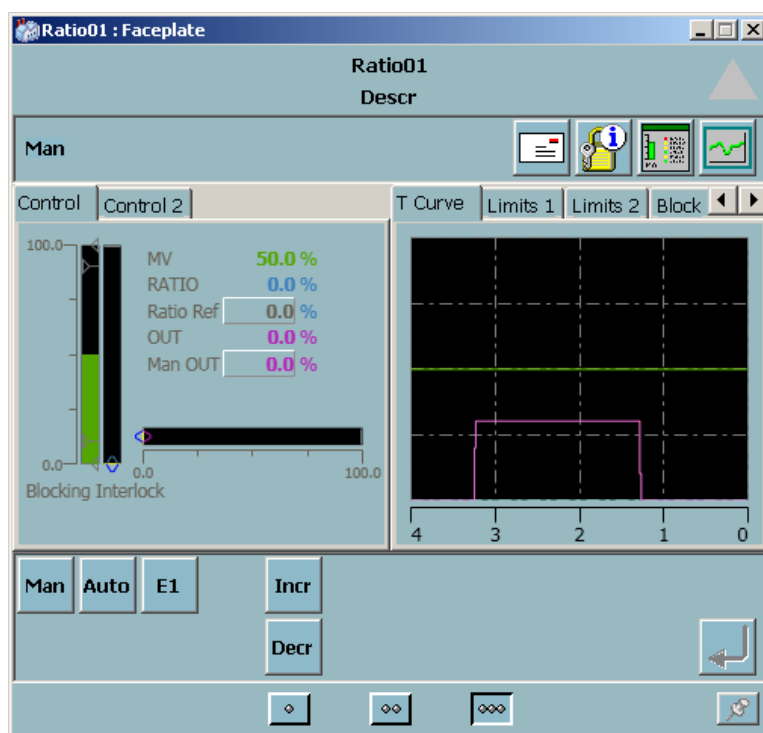


Figure 5-7 Extended Faceplate

6.3 Alarm and Event Handling

6.3.1 General

This section contains a description of all alarms and events in the functional unit RATIO01.

When a measured value deviates from the ratio stations limits or fails 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 possibilities of the operator to block alarms are shown under the heading 'Event and alarm blocking' below.

The alarm limits for RATIO01 can be controlled individually

Event Time	Object Name	Object Description	Condition	Message Description
02-05-24 03:46:16:763	264M500.RUN	Pulp Mixer Running	Status	Alarm
02-05-24 01:13:04:785	192.168.0.51-0.11.5		HWError	For info see 'Errors and
02-05-24 00:22:18:784	192.168.0.51-0.11.4		HWError	For info see 'Errors and
02-05-23 23:32:31:458	500F1920	Washing Pulp Flow	AI_Err	Alarm
02-05-23 23:32:31:458	500F1920	Washing Pulp Flow	MV_L1	Alarm
02-05-23 23:32:31:458	500F1920	Washing Pulp Flow	MV_L2	Alarm
02-05-23 23:23:01:784	192.168.0.51-0.11.3		HWError	For info see 'Errors and
02-05-23 20:00:07:762	500F1920	Washing Pulp Flow	MV_L2	Alarm
02-05-23 01:38:52:762	500F1920	Washing Pulp Flow	MV_L1	Alarm
02-05-23 00:18:26:995	500F1920	Washing Pulp Flow	AI_Err	Alarm
02-05-22 00:10:00:709	Mot01	Test Mot01	ControlV	Alarm
02-05-20 17:32:45:784	192.168.0.51-0.11.2		HWError	For info see 'Errors and

Figure 5-8 Alarm List

6.3.2 Alarm and Event Message

The following alarm texts are generated by the functional unit Ratio01. The “Message Description” is “hard coded” in the function block and can not be modified.

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>	MV > H1	Alarm
<Name>	<Description>	MV > H2	Alarm
<Name>	<Description>	MV < L1	Alarm
<Name>	<Description>	MV < L2	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>		SeqE1 Mode
<Name>	<Description>		SeqMan Mode
<Name>	<Description>		Bal Mode
<Name>	<Description>		Clamp Mode
<Name>	<Description>		Local Mode
<Name>	<Description>		EoLim On
<Name>	<Description>		EoLim Off
<Name>	<Description>		EBias On
<Name>	<Description>		EBias Off
<Name>	<Description>		IB1 On
<Name>	<Description>		IB1 Off
<Name>	<Description>		IB2 On
<Name>	<Description>		IB2 Off
<Name>	<Description>		Alarm Acknowledge
<Name>	<Description>		Alarm Control Block

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 alarms

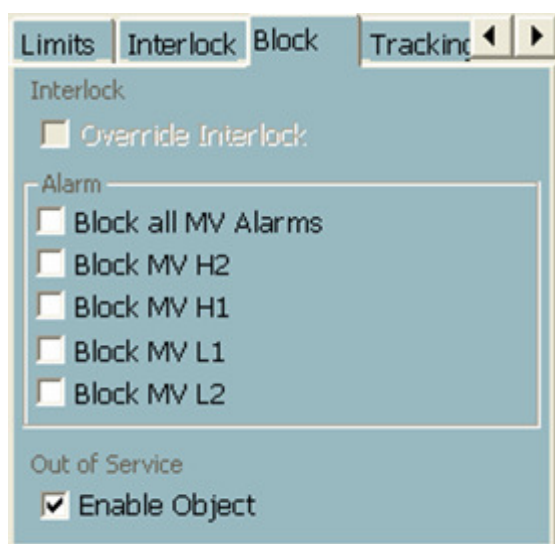


Figure 5-9 Extended Faceplate (Block1)

6.4.2 Limits

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

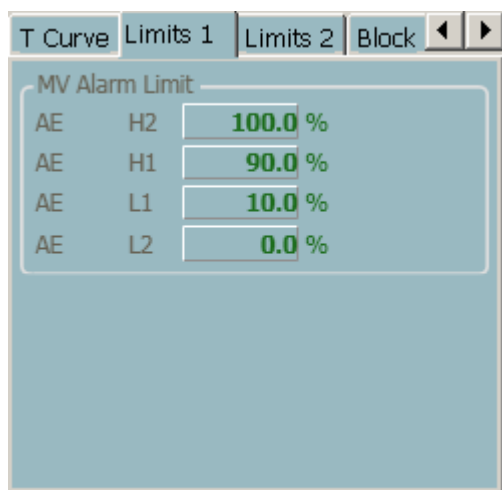


Figure 5-11 Extended Faceplate (Limits1)

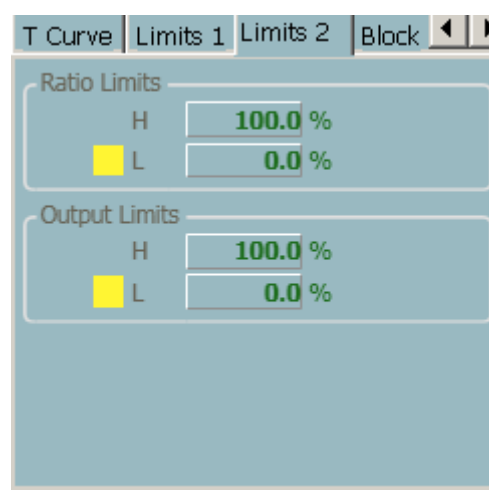


Figure 5-12 Extended Faceplate (Limits2)

6.4.3 Ratio station Parameters

The "Param" faceplate element in the extended faceplate below illustrates where it is possible to adjust the gain and bias for the ratio station. The scan time and control action is also indicated here. The "Tracking" tab shows the selected tracking settings.

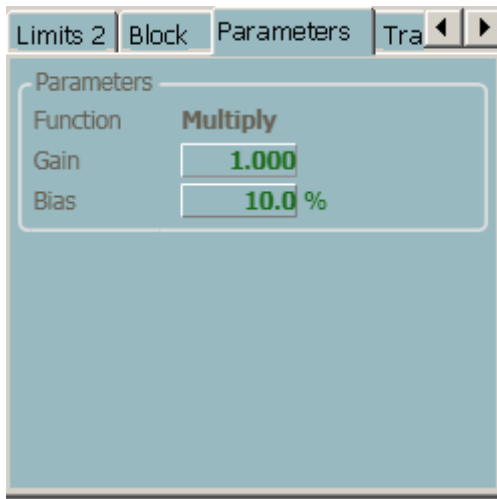


Figure 5-13 Extended Faceplate (Param)

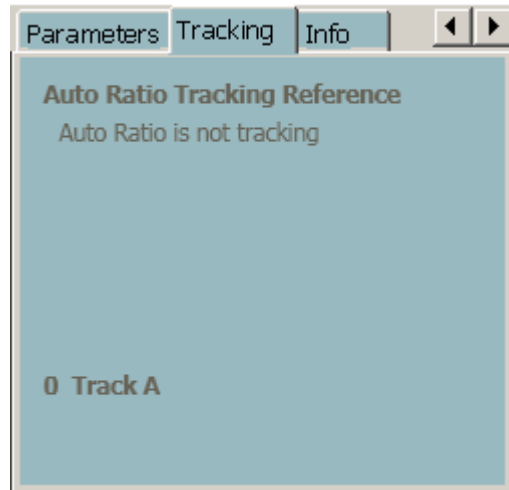


Figure 5-14 Extended Faceplate (Tracking)

6.4.4 Info Text

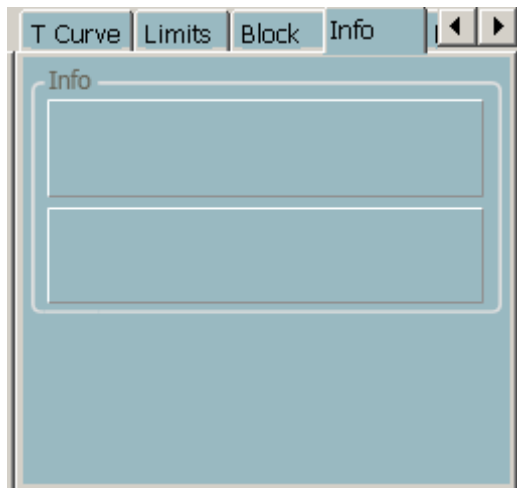


Figure 5-15 Extended Faceplate Element (Text)

REVISION

Rev.	Page (P) Chapt. (C)	Description	Date Dept./Init.
A		Release 2.0	030317/MP
B	5, 7	Initialization	04-04-15/FM
C	3	Rev 3.1/2	050319/MP
D	4,5	Event handling is added. Interaction Window updated	050401/BP
E	4, 5	Faceplate, Rev 4.0/1	050902/MP
F	3	Rev 4.0/5	070510/BP
G		Rev 5.1/0	101103/BP