
Functional Description
UMC22_Act02 - Positioning Motorized Valve
Version 5.2-0

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Table of Contents

Section 1 - Introduction	5
General	5
Section 2 - Function Block & Data Types	7
Function Block.....	7
Data Types	9
UMC22_Act02_InPar	9
UMC22_Act02_OutPar.....	10
UMC22_Act02_Opr.....	11
Permission	12
Section 3 - Function	13
Control Modes	13
Panel Mode	13
Jog Mode	13
Local Mode	13
Manual Mode	14
Auto Mode.....	14
E1 and E2 Mode.....	14
E3 Mode	14
Interlocks	15
Safety Interlocks.....	15
Process Interlocks	15
Sequence Interlocks	15
Ready for Start.....	16
Open, Close and Stop	16
Control Circuit Faults.....	16
Motor Current Supervision	16
Simulation	17
Interaction Window	17
Text Configuration.....	21
Section 3 - Operator Function.....	23
Process Display.....	23
Faceplate.....	24
Aspect Link.....	24
Reduced Faceplate and Faceplate	24
Extended Faceplate.....	25
Interlock Display.....	27
Object Display.....	28
Object Trend Display.....	29
Diagnostics Display	30

Alarm & Event	31
Alarm & Event List	31
Alarm Message	31
Event Message	31

Section 5 - UMC22 Actuator Device	35
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Data Mapping.....	35
Control Function.....	35
Test Mode.....	36

Section 1 - Introduction

General

UMC22_Act02 is a functional unit for UMC22 position motorized valve control in Control^{IT}, to be operated from 800xA System. An UMC22_Act02 normally performs a complete function independently.

UMC22_Act02 has the following functions and properties:

- Different control modes, set by operator or by control logic
- Control circuits supervision
- Interlocks function
- Open, close & stop control
- Controllable pulse length & frequency
- Motor current supervision
- High & low actuator position limit supervision
- Diagnostics information
- Alarm & Event detection and handling

Section 2 - Function Block & Data Types

Function Block

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
Name	string	coldretain	in	yes	'UMC22_Act02'	Object name
Description	string	coldretain	in	yes	'Descr'	Object description
Enable	bool	coldretain	in	yes	true	Enable object
MCC	UMC22_DP		in_out	yes		Communication with MCC
UMCUnitStatus	HwStatus	by_ref	in	yes		UMC22 unit status
UnitStatus	dint	retain	in	yes		Profibus status
ActuatorType	dint	coldretain	in	yes	1	Actuator type
ME	bool	retain	in	yes	true	Enable control circuit alarm
M1	bool	retain	in	yes	true	Control voltage
M2	bool	retain	in	yes	true	Overload
M3	bool	retain	in	yes	true	Motor breaker
M4	bool	retain	in	yes	true	Emergency stop
M5	bool	retain	in	yes	true	Short Circuit
IC1	bool	retain	in	yes	true	Safety Interlock 1
IC2	bool	retain	in	yes	true	Safety Interlock 2
ICs	ICConn	by_ref	in	yes		Safety Interlocks
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
IBs	IBConn	by_ref	in	yes		Process Interlocks
IA1	bool	retain	in	yes	true	Sequence Interlock 1
IA2	bool	retain	in	yes	true	Sequence Interlock 2
IAs	IAConn	by_ref	in	yes		Sequence Interlocks
T1	time	coldretain	in	yes	60s	Maximum travelling Time
T2	time	coldretain	in	yes	4s	Supervision Time
TRevLockOut	time	coldretain	in	yes	2s	Reverse lock-out time
Ext1Ref	real	retain	in	yes		External reference setpoint in E1 mode
Ext2Ref	real	retain	in	yes		External reference setpoint in E2 mode
E3Opn	bool	retain	in	yes		Open order in E3 mode
E3Cls	bool	retain	in	yes		Close order in E3 mode
Stop	bool	retain	in	yes		Stop order in external mode
ActPos	real	retain	in	yes		Actuator position
PosErr	bool	retain	in	yes		Position transmitter error
JogEnbl	bool	retain	in	yes		Order mode to Jog
JogOpn	bool	retain	in	yes		Open order in Jog mode
JogCls	bool	retain	in	yes		Close order in Jog mode
JogFunc	bool	retain	in	yes		Jog start hold function
LEnbl	bool	retain	in	yes		Order mode to Local
LOpn	bool	retain	in	yes		Open order in Local mode
LCls	bool	retain	in	yes		Close order in Local mode
LStop	bool	retain	in	yes	true	Local Stop order
SeqMan	bool	retain	in	yes		Order mode to Man
SeqAuto	bool	retain	in	yes		Order mode to Auto

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
SeqE1	bool	retain	in	yes		Order mode to E1
SeqE2	bool	retain	in	yes		Order mode to E2
SeqE3	bool	retain	in	yes		Order mode to E3
SetTest	dint	coldretain	in	yes	-1	Set Test Mode from MCC (0 = DI0, 1 = DI1, 2 = DI2, 3 = DI3, 4 = DI4, 5 = DI5)
TrackA	bool	coldretain	in	yes	true	Auto setpoint tracking Ext1 or Ext2
SpeedA	real	coldretain	in	yes	1.0	Max Auto setpoint change rate when transfer from E1 or E2 (unit/s)
DevDB	real	coldretain	in	yes	5.0	Deviation between setpoint and position transmitter
PF	dint	coldretain	in	yes	1	Pulse frequency factor in the CON_PU1
K	real	coldretain	in	yes	0.5	Pulse length factor in the CON_PU1
DeadB	real	coldretain	in	yes	0.7	DeadBand in the CON_PU1
AlcBlk	bool	retain	in	yes		Block alarm
AlarmAck	bool	retain	in	yes		Acknowledge alarm
Reset	bool	retain	in	yes		Reset command to UMC
ActPosAlarms	Alarm2Limit	by_ref	in	yes		Actuator position alarm configuration
InPar	UMC22_Act02_InPar	by_ref	in	yes		In Parameter
EventName	string	coldretain	in	yes	' UMC22Act2_'	Event name
NoInt	bool	retain	out	yes		No Interlocks
NoICInt	bool	retain	out	yes		No Safety Interlocks (IC)
NoIBInt	bool	retain	out	yes		No Process Interlocks (IB)
NoIAInt	bool	retain	out	yes		No Sequence Interlocks (IA)
NoJogInt	bool	retain	out	yes		No Jog Interlocks
Trip	bool	retain	out	yes		Trip
Blk	bool	retain	out	yes		Standby
RFS	bool	retain	out	yes		Ready for start
Ack1	bool	retain	out	yes		Main contactor acknowledge open
Ack2	bool	retain	out	yes		Main contactor acknowledge close
IPOS	bool	retain	out	yes		Intermediate position
LSOpn	bool	retain	out	yes		Limit Switch Open
LSCls	bool	retain	out	yes		Limit Switch Close
TorqOpn	bool	retain	out	yes		Torque Limit Switch Open
TorqCls	bool	retain	out	yes		Torque Limit Switch Close
OPN	bool	retain	out	yes		Open order
OPNL	bool	retain	out	yes		Limit switch open is reached
CLS	bool	retain	out	yes		Close order
CLSL	bool	retain	out	yes		Limit switch close is reached
SAck	bool	retain	out	yes		Start order acknowledgement
Run	bool	retain	out	yes		Running
Sim	bool	retain	out	yes		Simulation mode
TestMode	bool	retain	out	yes		Test mode
PanelMode	bool	retain	out	yes		Panel mode
JogInd	bool	retain	out	yes		Jog mode
LocalInd	bool	retain	out	yes		Local mode
ManInd	bool	retain	out	yes		Man mode
AutoInd	bool	retain	out	yes		Auto mode
E1Ind	bool	retain	out	yes		E1 mode
E2Ind	bool	retain	out	yes		E2 mode
E3Ind	bool	retain	out	yes		E3 mode
AutoSP	real	retain	out	yes		Auto setpoint
WSP	real	retain	out	yes		Working setpoint

Name	Data Type	Attributes	Direction	FD Port	Initial value	Description
Deviation	real	retain	out	yes		Deviation
PosError	bool	retain	out	yes		Position Error
Curr	real	retain	out	yes		Actual current (%)
Current	real	retain	out	yes		Actual current (in unit)
OutPar	UMC22_Act02_OutPar	by_ref	out	yes		Out Parameter
Opr	UMC22_Act02_Opr	by_ref	out	yes		Operator order

Data Types

UMC22_Act02_InPar

UMC22_Act02_InPar data type contains all configuration parameter available in UMC22_Act02. Configuration can be entered by writing value to this structured data type and connecting it to input **InPar** of UMC22_Act02 function block.

Name	Data Type	Attributes	Initial value	ISP value	Description
Class	dint	coldretain	500		AE class
Severity	dint	coldretain	1000		AE severity
ActPosRange	RangeReal	coldretain			Actuator Range
InitMode	dint	coldretain	5		Init mode (5 = Man ; 6 = Auto ; 7 = E1 ; 8 = E2 ; 9 = E3)
JogBlk	bool	coldretain	false		Block operator order Jog mode
LocalBlk	bool	coldretain	false		Block operator order Local mode
ManBlk	bool	coldretain	false		Block operator order Man mode
AutoBlk	bool	coldretain	false		Block operator order Auto mode
E1Blk	bool	coldretain	false		Block operator order E1 mode
E2Blk	bool	coldretain	false		Block operator order E2 mode
E3Blk	bool	coldretain	false		Block operator order E3 mode
OpenBlk	bool	coldretain	false		Block operator order Open command
CloseBlk	bool	coldretain	false		Block operator order Close command
StopBlk	bool	coldretain	false		Block operator order Stop command
AlcBlkEvBlk	bool	coldretain	true		Block event for AlcBlk
LEnblEvBlk	bool	coldretain	true		Block event for LEnbl
JogEnblEvBlk	bool	coldretain	true		Block event for JogEnbl
SeqManEvBlk	bool	coldretain	true		Block event for SeqMan
SeqAutoEvBlk	bool	coldretain	true		Block event for SeqAuto
SeqE1EvBlk	bool	coldretain	true		Block event for SeqE1
SeqE2EvBlk	bool	coldretain	true		Block event for SeqE2
SeqE3EvBlk	bool	coldretain	true		Block event for SeqE3
PanelEvBlk	bool	coldretain	true		Block event for Panel
LSOpnEvBlk	bool	coldretain	true		Block event for LSOpn
LSClsEvBlk	bool	coldretain	true		Block event for LSCls
ExtOpenEvBlk	bool	coldretain	true		Block event for ExtOpen
ExtCloseEvBlk	bool	coldretain	true		Block event for ExtClose
ExtStopEvBlk	bool	coldretain	true		Block event for ExtStop
IABlockNotExtMode	bool	coldretain	true		IA blocked when not in E1 or E2 mode
IA1	IAInParType2	coldretain			Configuration for IA1
IA2	IAInParType2	coldretain			Configuration for IA2
IAS1	IAInParType2	coldretain			Configuration for IAs.IA1
IAS2	IAInParType2	coldretain			Configuration for IAs.IA2

Name	Data Type	Attributes	Initial value	ISP value	Description
IB1	IBInParType2	coldretain			Configuration for IB1
IB2	IBInParType2	coldretain			Configuration for IB2
IB3	IBInParType2	coldretain			Configuration for IB3
IB4	IBInParType2	coldretain			Configuration for IB4
IBs1	IBInParType2	coldretain			Configuration for IBs.IB1
IBs2	IBInParType2	coldretain			Configuration for IBs.IB2
IBs3	IBInParType2	coldretain			Configuration for IBs.IB3
IBs4	IBInParType2	coldretain			Configuration for IBs.IB4
IBs5	IBInParType2	coldretain			Configuration for IBs.IB5
IBs6	IBInParType2	coldretain			Configuration for IBs.IB6
IBs7	IBInParType2	coldretain			Configuration for IBs.IB7
IBs8	IBInParType2	coldretain			Configuration for IBs.IB8
IC1	ICInParType2	coldretain			Configuration for IC1
IC2	ICInParType2	coldretain			Configuration for IC2
ICs1	ICInParType2	coldretain			Configuration for ICs.IC1
ICs2	ICInParType2	coldretain			Configuration for ICs.IC2
CurrRange	RangeCurr	coldretain			Current range
ShowCurrent	dint	coldretain	0		Current presentation (0 = no current shown ; 1 = current shown in percent ; 2 = current shown in unit)
AEConfigCommErr	dint	coldretain	1		AE configuration for Communication Error
AEConfigFault	dint	coldretain	1		AE configuration for Fault
AEConfigM1	dint	coldretain	1		AE configuration for M1
AEConfigM2	dint	coldretain	1		AE configuration for M2
AEConfigM3	dint	coldretain	1		AE configuration for M3
AEConfigM4	dint	coldretain	1		AE configuration for M4
AEConfigM5	dint	coldretain	1		AE configuration for M5
AEConfigMCErr	dint	coldretain	1		AE configuration for Main Contactor Error
AEConfigPosErr	dint	coldretain	1		AE configuration for Position Error
AEConfigWarning	dint	coldretain	1		AE configuration for Warning
OUTIncDec	real	coldretain	2.0		Increase/Decrease step of output (in seconds)
SPIncDec	real	coldretain	1.0		Increase/Decrease step of setpoint (In percentage of range)

UMC22_Act02_OutPar

UMC22_Act02_OutPar data type contains all information on the object which not available on the output parameter of the function block.

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)
IA1Ind	bool	retain			IA1 interlocked
IA2Ind	bool	retain			IA2 interlocked
IAs1Ind	bool	retain			IAs1 interlocked
IAs2Ind	bool	retain			IAs2 interlocked
IB1Ind	bool	retain			IB1 interlocked
IB2Ind	bool	retain			IB2 interlocked
IB3Ind	bool	retain			IB3 interlocked

Name	Data Type	Attributes	Initial value	ISP value	Description
IB4Ind	bool	retain			IB4 interlocked
IBs1Ind	bool	retain			IBs1 interlocked
IBs2Ind	bool	retain			IBs2 interlocked
IBs3Ind	bool	retain			IBs3 interlocked
IBs4Ind	bool	retain			IBs4 interlocked
IBs5Ind	bool	retain			IBs5 interlocked
IBs6Ind	bool	retain			IBs6 interlocked
IBs7Ind	bool	retain			IBs7 interlocked
IBs8Ind	bool	retain			IBs8 interlocked
IC1Ind	bool	retain			IC1 interlocked
IC2Ind	bool	retain			IC2 interlocked
ICs1Ind	bool	retain			ICs1 interlocked
ICs2Ind	bool	retain			ICs2 interlocked
ActPosH	AlarmInd	retain			Alarm Indication for ActPosH
ActPosL	AlarmInd	retain			Alarm Indication for ActPosL
CommErr	AlarmInd	retain			Alarm Indication for CommErr
Fault	AlarmInd	retain			Alarm Indication for Fault
M1	AlarmInd	retain			Alarm Indication for M1
M2	AlarmInd	retain			Alarm Indication for M2
M3	AlarmInd	retain			Alarm Indication for M3
M4	AlarmInd	retain			Alarm Indication for M4
M5	AlarmInd	retain			Alarm Indication for M5
MCErr	AlarmInd	retain			Alarm Indication for MCErr
PosErr	AlarmInd	retain			Alarm Indication for PosErr
Warning	AlarmInd	retain			Alarm Indication for Warning
RevLockOut	bool	retain			Reverse lock out
Ack	bool	retain			Running feedback indication
ActPos	real	retain			Position indication
TorqueCls	bool	retain			Torque close indication
LSCls	bool	retain			Limit close indication
LSOpn	bool	retain			Limit open indication
TorqueOpn	bool	retain			Torque open indication
MC	real	retain			Motor current indication

UMC22_Act02_Opr

UMC22_Act02_Opr data type contains all operator order.

Name	Data Type	Attributes	Initial value	ISP value	Description
BlockAlarm	bool	retain			Operator block alarms
Jog	bool	retain			Operator order Jog mode
Local	bool	retain			Operator order Local mode
Man	bool	retain			Operator order Manual mode
Auto	bool	retain			Operator order Auto mode
E1	bool	retain			Operator order E1 mode
E2	bool	retain			Operator order E2 mode
E3	bool	retain			Operator order E3 mode
Open	bool	retain			Operator order Open command
Close	bool	retain			Operator order Close command
Stop	bool	retain			Operator order Stop command
Incr	real	retain			Operator order Increase SP command
Decr	real	retain			Operator order Decrease SP command
Reset	bool	retain			Operator order Reset command
SelfTest	bool	retain			Operator order Self Test

Name	Data Type	Attributes	Initial value	ISP value	Description
EmergencyStart	bool	retain			Operator order Emergency Start
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
IBs1Override	bool	retain			Operator override IBs.IB1 interlock
IBs2Override	bool	retain			Operator override IBs.IB2 interlock
IBs3Override	bool	retain			Operator override IBs.IB3 interlock
IBs4Override	bool	retain			Operator override IBs.IB4 interlock
IBs5Override	bool	retain			Operator override IBs.IB5 interlock
IBs6Override	bool	retain			Operator override IBs.IB6 interlock
IBs7Override	bool	retain			Operator override IBs.IB7 interlock
IBs8Override	bool	retain			Operator override IBs.IB8 interlock
IA1Override	bool	retain			Operator override IA1 interlock
IA2Override	bool	retain			Operator override IA2 interlock
IAS1Override	bool	retain			Operator override IAs.IA1 interlock
IAS2Override	bool	retain			Operator override IAs.IA2 interlock
AutoSP	real	coldretain	0.0		Operator enter auto SP
EnableSim	bool	retain			Enable simulated running feedback

Permission

All variables in **UMC22_Act02_InPar** data type are set with *Configure* permission in 800xA system. All variables in **UMC22_Act02_Opr** data type are set with *Operate* permission.

The variable permission can be configured according to the plant requirement. This can be done by adding **Property Attribute Override** aspect for the object in Control Structure or for the object type in Object Type Structure.

Section 3 - Function

Control Modes

There are eight different control modes are available in priority order: Panel, Jog, Local, Man, Auto, E1, E2 and E3. Active mode is indicated on the faceplate and object display. These modes can also be blocked individually from operator access. When motorized valve is in one particular mode, control from other location is blocked.

Panel Mode

Panel mode is activated when the motorized valve control is switched to MCC control. The information to switch to Panel mode is obtained from MCC via profibus interface. Control from other location is blocked. However, it is still possible to reset the alarm / fault using the **Reset** button on the faceplate.

When the Panel control is released, it will go to Manual mode.

Jog Mode

Jog mode is suitable for testing motorized valve in the field. The valve is controlled from open / close station adjacent to the valve. Jog mode can be activated from the **Jog** button on the faceplate or by setting the input **JogEnbl** of the function block.

When motorized valve is in Jog mode, control from other location is blocked. The interlocks supervision is limited. Only the safety interlocks **IC** and faults in **M1 - M5** will be monitored. When the motorized valve is leaving Jog mode, a stop order is generated automatically. It will then resume the last control mode from operator station.

The motorized valve is opened and closed through input **JogOpn**, **JogCls** and **JogFunc**. **JogOpn** is for receiving open order and **JogCls** is for receiving close order while **JogFunc** is for receiving the stop or hold order from field. The function of these inputs is set as follow:

JogOpn	JogCls	JogFunc	
0	0	0	Stop order
0	0	1	No change
1	0	0	Open and stop order on JogOpn
0	1	0	Close and stop order on JogCls
1	0	1	Open order on JogOpn and stop order on JogFunc
0	1	1	Close order on JogCls and stop order on JogFunc

Local Mode

The motorized valve is controlled from a local desk or panel. As long as **JogEnbl** is not active, Local mode can be activated from the **Local** button on the faceplate or by setting the input **LEnbl** of the function block.

When motorized valve is in Local mode, control from other location is blocked. When the motorized valve is leaving Local mode, it will resume the last control mode from operator station.

The motorized valve is opened with a rising edge pulse to **LOpn** and is closed with a rising edge pulse to **LCls** while **LStop** must be in *True* condition. Motorized valve can be stopped with a falling edge pulse to **LStop**.

Manual Mode

In this mode the operator directly open / close and stop motorized valve from the faceplate button **Open / Close** and **Stop**. As long as **JogEnbl** and **LEnbl** is not active, Manual mode can be activated from the **Man** button on the faceplate or with a rising edge pulse to the input **SeqMan** of the function block.

Auto Mode

In this mode the operator control the opening or closing of the valve by entering the setpoint from the faceplate's dialog entry window. The valve will then open or close automatically until it reach the position defined in the setpoint.

As long as **JogEnbl** and **LEnbl** is not active, Auto mode can be activated from the **Auto** button on the faceplate or with a rising edge pulse to the input **SeqAuto** of the function block.

E1 and E2 Mode

The motorized valve is controlled from external signals, i.e.: a process signal, group start or sequence. As long as **JogEnbl** and **LEnbl** is not active, E1 or E2 mode can be activated from the **E1** or **E2** button on the faceplate or with a rising edge pulse to the input **SeqE1** or **SeqE2** of the function block.

The motorized valve is controlled with the setpoint **ExtRef1** for E1 mode or **ExtRef2** for E2 mode. It will open or close automatically until the position defined in setpoint is reached.

Operator can also stop the motorized valve by pressing the faceplate button **Stop**. Control mode will then change to Manual to prevent motorized valve from being opened or closed again automatically.

E3 Mode

The motorized valve is controlled from external signals, i.e.: a process signal, group start or sequence. As long as **JogEnbl** and **LEnbl** is not active, E3 mode can be activated from the **E3** button on the faceplate or with a rising edge pulse to the input **SeqE3** of the function block.

The motorized valve is opened or closed with a rising edge pulse to **E3Opn** while **Stop** must be in *True* condition. Motorized valve can be stopped with a falling edge pulse to **Stop**.

Operator can also stop the motorized valve by pressing the faceplate button **Stop**. Control mode will then change to Manual to prevent motorized valve from being opened or closed again automatically.

The table below describes the commands at the different control modes of UMC22_Act02.

Order	Jog	Local	Manual	Auto	E1	E2	E3
Input <i>JogOpn</i>	Open / Stop	-	-	-	-	-	-
Input <i>JogCls</i>	Close / Stop	-	-	-	-	-	-
Input <i>LOpn</i>	-	Open	-	-	-	-	-

Order	Jog	Local	Manual	Auto	E1	E2	E3
Input <i>LCls</i>	-	Close	-	-	-	-	-
Input <i>LStop</i>	-	Stop	-	-	-	-	-
Operator open	-	-	Open	-	-	-	-
Operator close	-	-	Close	-	-	-	-
Operator stop	-	-	Stop	-	Stop	Stop	Stop
Operator setpoint	-	-	-	0-100%	-	-	-
Input <i>ExtRef1</i>	-	-	-	-	0-100%	-	-
Input <i>ExtRef2</i>	-	-	-	-	-	0-100%	-
Input <i>E3Opn</i>	-	-	-	-	-	-	Open
Input <i>E3Cls</i>	-	-	-	-	-	-	Close
Input <i>Stop</i>	Stop*	-	-	-	-	-	Stop

*Only when *JogFunc* is used.

Interlocks

The motorized valve control can be interlocked by signals from the process or control logic. Interlocks are active when the value is *False*. The interlocks are divided into three groups with the following designations and functions. All interlocks are blocked when motorized valve in Jog mode except for Safety Interlocks.

All interlocks can be configured on how the valve will react when an interlock is occurred. The reaction can be configured in 3 different ways:

- Valve will remain in its position, unable to open / close
- Valve will move to open position
- Valve will move to close position

Safety Interlocks

Safety interlocks are used to interlock the motorized valve for safety purposes. There are 4 safety interlocks available: **IC1**, **IC2**, **ICs.IC1** and **ICs.IC2**. These interlocks cannot be blocked.

Process Interlocks

Process interlocks are used for normal process interlocks. There are 12 process interlocks available: **IB1** - **IB4** and **IBs.IB1** - **IBs.IB8**. All can be configured to accept blocking by the operator.

Sequence Interlocks

Sequence interlocks are used if the motorized valve is to be interlocked against other objects such as a pump motor or a group start or other conditions in an automatic sequence. There are 4 sequence interlocks available: **IA1**, **IA2**, **IAs.IA1** and **IAs.IA2**. These interlocks are configurable as blocked or not when motorized valve is not in E1 or E2 mode.

If **IA blocked when not Ext** is equal to 1

Motorized valve interlocked if **IA1** or **IAs.IA1** is 0 and in E1 mode

Motorized valve interlocked if **IA2** or **IAs.IA2** is 0 and in E2 mode

If **IA blocked when not Ext** is equal to 0

Motorized valve interlocked if **IA1**, **IA2**, **IAs.IA1** or **IAs.IA2** is 0 and in Local, Man, E1 or E2 mode.

Ready for Start

Ready for Start means all condition is cleared for motorized valve to open or close. There is no Safety and Process interlocks, Sequence interlocks are not included. No faults / unacknowledged faults alarms exists. Motorized valve is not in Jog mode.

Ready for Start is indicated by the output parameter **RFS** in the function block.

Open, Close and Stop

Open, close and stop commands may come from faceplate button or input parameter, depending on the selected control mode.

When an open command is issued, the open order *OPN* is sent to the MCC via profibus interface. Similarly, when a close command is issued, the close order *CLS* is sent to the MCC via profibus interface too.

The motor's main contactor acknowledges the open order by activating the running open feedback *Ack1* or running close feedback *Ack2* via profibus interface. The main contactor must acknowledge within *T2* time.

If main contactor acknowledges the open order *OPN* or close order *CLS* within the time *T2*, UMC22_Act02 will keep *OPN* / *CLS* high. Otherwise, the attempt is deemed abortive and an alarm about the contactor failure is issued. The contactor failure alarm indication disappears when the operator acknowledges the alarm. A new attempt to open or close the motorized valve then can be made.

UMC22_Act02 also issues an alarm about main contactor failure when the contactor acknowledges open or close orders falsely, i.e. when it sets the inputs *Ack1* / *Ack2* high without any open / close order being issued or after stop order is given. Alarm will be generated after *T2* time.

Control Circuit Faults

Fault supervision is performed in the priority order **M1**, **M2**, **M5**, **M3** and **M4**. This means that if input **M1** is in fault condition, then inputs **M2** - **M5** are not regarded. When a number of faults occur in series, only the first fault will be reported in the alarm. Value at inputs **M1** - **M5** is 1 when there are no faults. Faults are indicated on the output **Trip**. When faults occur, the motorized valve will stay still, cannot be opened or closed.

M1 - **M5** have Alarm & Event configuration to define the alarm treatment. The input **ME** can be used to block the alarm from being generated. No alarm will be issued if motorized valve is not moving.

Motor Current Supervision

The current measurement for UMC22_Act02 is obtained from MCC via profibus interface. The value is shown on output parameter **Curr**, measured in percentage.

The output parameter **Current** presents the measured current in unit such as *Amp*. It is obtained by comparing the **Curr** value against the **Rated Current**. **Rated Current** is a value that corresponds to 100% load.

There is no current supervision in UMC22_Act02 function block. The supervision is obtained directly from MCC via profibus interface.

Simulation

The function block support internal simulation. Simulation can be activated by enabling the simulation button in Interaction Window or by setting the **Opr.EnableSim** to *True* using the bulk tool. The simulation will be reset when cold download is performed.

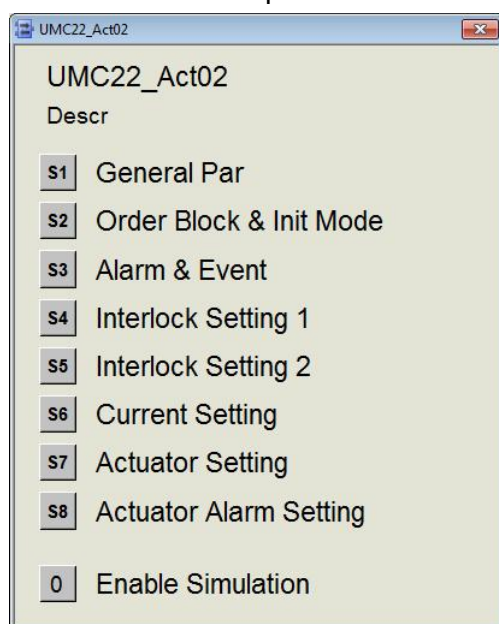
Object in simulation mode will be indicated with a frame on the graphic elements. The default color is flashing yellow as defined by *ppSimulation* in **Pulp & Paper Library Colors** aspect. It also indicates **Sim** next to the mode indication in faceplate.

Running feedback will be activated 1 second after open order **OPN** or close order **CLS** is *True*. The current will be simulated at 50%. The actuator position will be increased or decreased by 1.0 per cycle time. Limit Close and Limit Open are defined by position of 1.0 and 99.0, while TorqueClose and TorqueOpen are defined by position of -1.0 and 101.0.

Interaction Window

Interaction Window is used to configure the object's parameter in the Control Builder. It is only accessible when Control Builder is in *Online* mode by right clicking the function block.

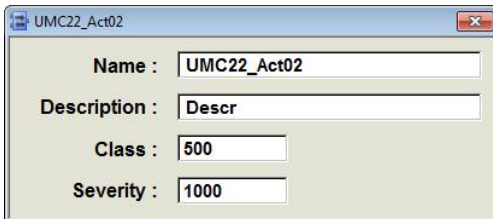
The main Interaction Window shows the name and description of the function block. The buttons are link to open the sub-window.



1. General Par

Name and **Description** can be entered from interaction window or from the function block parameters directly. After performing *Name Uploader*, these values will be used as Object Name and Description and shown in faceplate.

Class defines the process section or area in which alarms are grouped. By utilizing **Class**, the alarms can be filtered. Valid values are 1 - 9999. **Severity** defines the alarm priority for general alarms. Valid values are 1 - 1000 where 1000 is the highest priority.

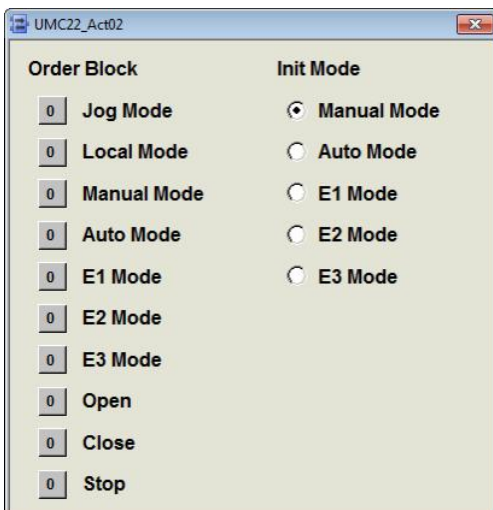


The screenshot shows a configuration window titled "UMC22_Act02". It contains four input fields: "Name" with the value "UMC22_Act02", "Description" with the value "Descr", "Class" with the value "500", and "Severity" with the value "1000".

2. Order Block & Init Mode

Order Block is used to prevent operator from giving an order of certain activity. The faceplate button will be dimmed if order block is activated (set to 1).

Init Mode defines the initial mode of the object when cold download is performed. By default, the init mode for UMC22_Act02 is Manual mode.



The screenshot shows a configuration window titled "UMC22_Act02" with two columns: "Order Block" and "Init Mode".

Order Block	Init Mode
☐ Jog Mode	☒ Manual Mode
☐ Local Mode	☐ Auto Mode
☐ Manual Mode	☐ E1 Mode
☐ Auto Mode	☐ E2 Mode
☐ E1 Mode	☐ E3 Mode
☐ E2 Mode	
☐ E3 Mode	
☐ Open	
☐ Close	
☐ Stop	

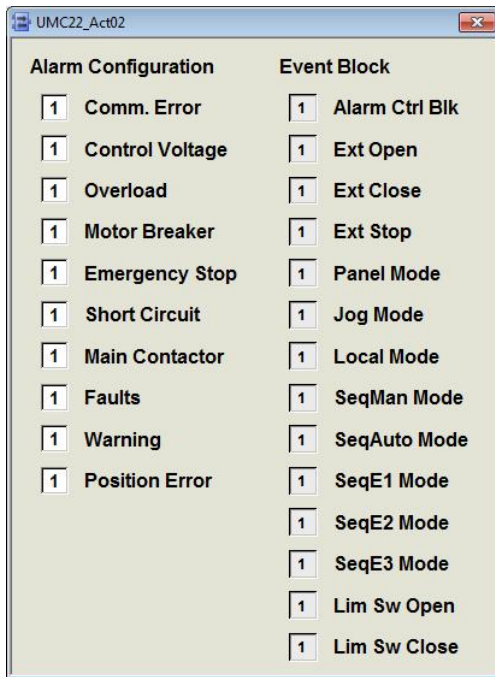
3. Alarm & Event

Alarm Configuration is used to configure how to present status changes of certain conditions. Alarm Configuration can be set in 3 different ways:

- 0 = No alarm or event will be generated
- 1 = Alarm and event will be generated
- 2 = Only event will be generated

Event Block is used to block the event message generated due to changes in value from logic connection. To enable event for selected message, press the button to set the value to 0.

The text message for each alarm / event is stored in the **AE Translator** aspect. List of events for all operator activity is managed in 800xA system with Audit Trail functionality.



4. Interlock Setting 1 & 2

Interlock Setting is split into two. Interlock Setting 1 is for standard interlock **IC1 - IC2**, **IB1 - IB4** and **IA1 - IA2**. Interlock Setting 2 is for extended interlock **ICs.IC1 - ICs.IC2**, **IBs.IB1 - IBs.IB8** and **IA2.IA1 - IAs.IA2**.

When **Block Event** is disabled (set to 0), changes in value of the interlock will generate an event message. The text message for each event is stored in the Alarm and Event Translator aspect.

Enabling the **Opr Block** (set to 1) will give operator the possibility to override the interlock(s) from faceplate.

Direction refers to how the valve will react when an interlock is occurred. Direction can be configured in 3 different ways:

- 0 = Valve will remain in its position, unable to open / close
- 1 = Valve will move to open position
- 2 = Valve will move to close position

By configuring **IA Blocked when not Ext** to 1, IA interlocks will not be monitored when the object is not in E1 or E2 mode. By setting the value to 0, IA interlocks will be observed in all modes.

UMC22_Act02

Interlock Setting 1

	Block Event	Opr Block	Direction
IC1	1		0
IC2	1		0
IB1	1	0	0
IB2	1	0	0
IB3	1	0	0
IB4	1	0	0
IA1	1	0	0
IA2	1	0	0

1 IA Blocked when not Ext

UMC22_Act02

Interlock Setting 2

	Block Event	Opr Block	Direction
ICs.IC1	1		0
ICs.IC2	1		0
IBs.IB1	1	0	0
IBs.IB2	1	0	0
IBs.IB3	1	0	0
IBs.IB4	1	0	0
IBs.IB5	1	0	0
IBs.IB6	1	0	0
IBs.IB7	1	0	0
IBs.IB8	1	0	0
IAs.IA1	1	0	0
IAs.IA2	1	0	0

1 IA Blocked when not Ext

5. Current Setting

Current Presentation determines how the current is presented in the faceplate. Three options available are no current presentation, current to be presented in percentage (%) and current to be presented in unit as defined in **Current Range**.

Current Range covers maximum range, unit, decimal and rated current. Max refers to the maximum range of the current I/O signal. **Rated Current** refers to the current value equal 100%.

UMC22_Act02

Current Presentation

☐ No current
 ☒ Current in %
 ☐ Current in unit

Current Range

Max : 125.0 A
 Unit : A
 Decimal : 0
 Rated Current : 100.0 A

6. Actuator Setting

Actuator Setting covers minimum and maximum range, unit and decimal number for Actuator.

Limit Control defines percentage value of changes for SP (in Auto mode) and the pulse time of Output (in Manual mode) when faceplate button **Dec** or **Inc** is pressed.

UMC22_Act02

Actuator Setting

Max : %

Min : %

Unit :

Decimal :

Limit Control

SP OUT

Inc/Dec : % s

7. Actuator Alarm Setting

Two actuator alarm limits can be configured, high limit and low limit. Each alarm limit has its own configuration and can be defined individually. AE Config can be set in 3 different ways:

- 0 = No Alarm or Event will be generated
- 1 = Alarm and Event will be generated
- 2 = Only Event will be generated

If AE Config is set to 1, alarm will be generated if the limit stays active longer than alarm delay time. Otherwise, alarm will not be generated.

UMC22_Act02

Actuator Alarm Setting

	Act L	Act H
AE Config :	1	1
Limit :	2.0 %	98.0 %
Hyst :	0.0	0.0
Severity :	1000	1000
Alarm Delay :	0d0h0m5s0ms	0d0h0m5s0ms

Text Configuration

Text Configuration aspect is used to define the text properties of the object, such as control circuit faults, interlocks and info texts. It is accessible in the Control Structure. The length of the each text should not exceed more than 50 characters.

PP_UMC22_Act02 : Text Configuration

PP_UMC22_Act02:Text Configuratio

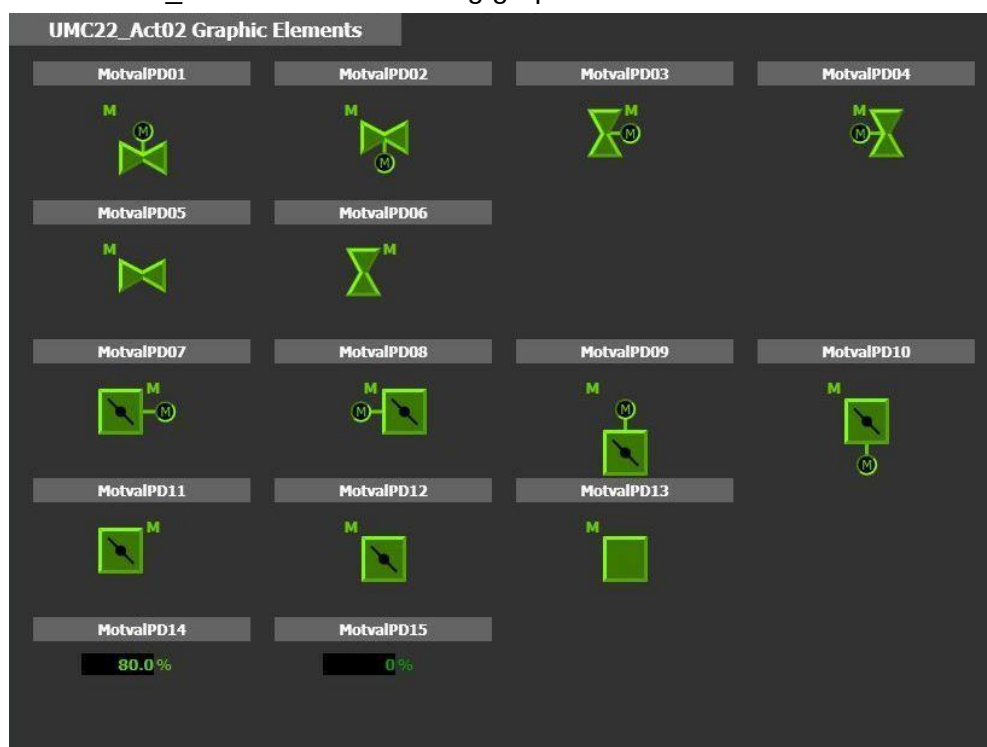
Name	Value	Type	Description	Readable?	R/Permission	Writable
M1Text	Control Voltage	String	M1 Text	Yes		Yes
M2Text	Overload	String	M2 Text	Yes		Yes
M3Text	Motor Breaker	String	M3 Text	Yes		Yes
M4Text	Emergency Stop	String	M4 Text	Yes		Yes
M5Text	Short Circuit	String	M5 Text	Yes		Yes
IC1Text	IC1 Text	String	IC1 Interlock Text	Yes		Yes
IC2Text	IC2 Text	String	IC2 Interlock Text	Yes		Yes
ICs						
IC1Text	ICs.IC1 Text	String	ICs.IC1 Interlock Te	Yes		Yes
IC2Text	ICs.IC2 Text	String	ICs.IC2 Interlock Te	Yes		Yes
IB1Text	IB1 Text	String	IB1 Interlock Text	Yes		Yes
IB2Text	IB2 Text	String	IB2 Interlock Text	Yes		Yes
IB3Text	IB3 Text	String	IB3 Interlock Text	Yes		Yes
IB4Text	IB4 Text	String	IB4 Interlock Text	Yes		Yes
IBs						
IB1Text	IBs.IB1 Text	String	IBs.IB1 Interlock Te	Yes		Yes
IB2Text	IBs.IB2 Text	String	IBs.IB2 Interlock Te	Yes		Yes
IB3Text	IBs.IB3 Text	String	IBs.IB3 Interlock Te	Yes		Yes
IB4Text	IBs.IB4 Text	String	IBs.IB4 Interlock Te	Yes		Yes
IB5Text	IBs.IB5 Text	String	IBs.IB5 Interlock Te	Yes		Yes
IB6Text	IBs.IB6 Text	String	IBs.IB6 Interlock Te	Yes		Yes
IB7Text	IBs.IB7 Text	String	IBs.IB7 Interlock Te	Yes		Yes
IB8Text	IBs.IB8 Text	String	IBs.IB8 Interlock Te	Yes		Yes
IA1Text	IA1 Text	String	IA1 Interlock Text	Yes		Yes
IA2Text	IA2 Text	String	IA2 Interlock Text	Yes		Yes
IAs		String	RunInt1 Interlock Te	Yes		Yes
IA1Text	IAs.IA1 Text	String	IAs.IA1 Interlock Te	Yes		Yes
IA2Text	IAs.IA2 Text	String	IAs.IA2 Interlock Te	Yes		Yes
Info1Text	Info1 Text	String	Info 1 Text	Yes		Yes
Info2Text	Info2 Text	String	Info 2 Text	Yes		Yes

Cancel Apply Help

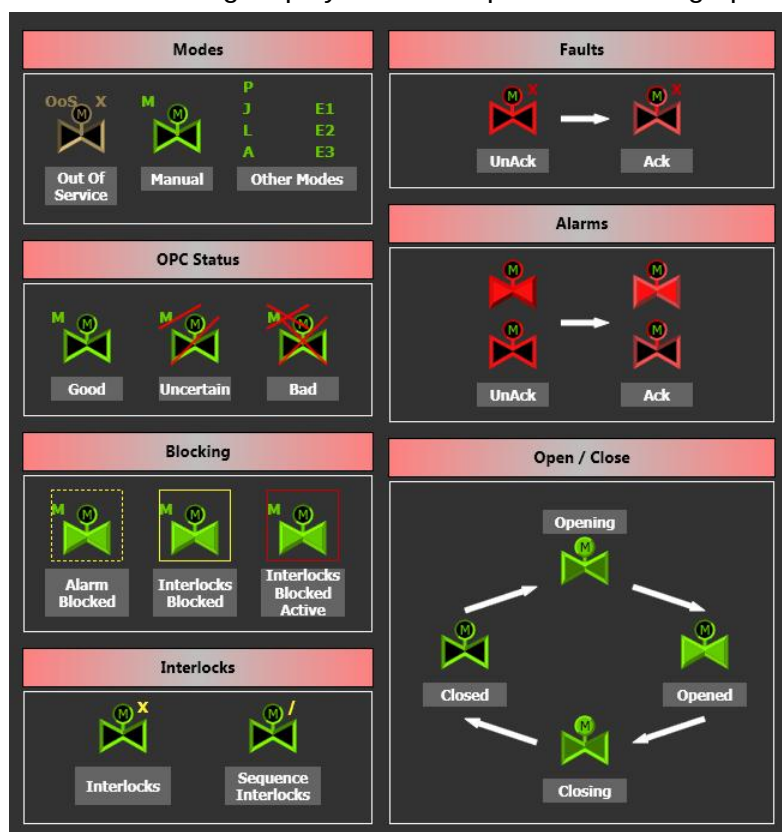
Section 3 - Operator Function

Process Display

UMC22_Act02 has the following graphic elements which can be inserted into graphic displays.



The following display shows the presentation in graphic elements under different states.



Faceplate

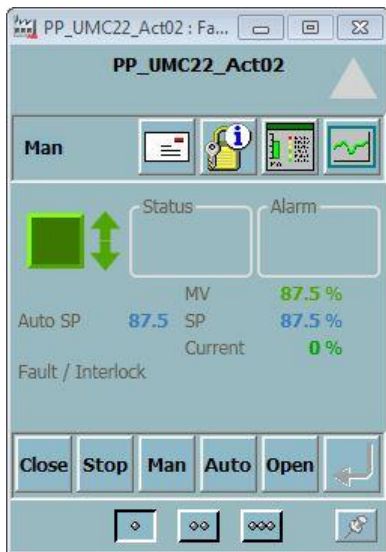
Aspect Link

Icon	Aspect View
	Operator Note
	Interlocks Display
	Object Display
	Object Trend Display
	Diagnostics Display

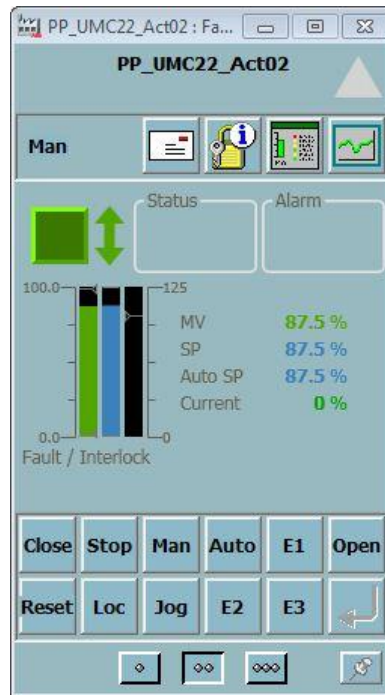
Reduced Faceplate and Faceplate

Reduced Faceplate and **Faceplate** give basic information about the object. Size and contents have been optimized to cover most of the normal process operator action. Process values presented in bargraph are available in **Faceplate**.

Reduce Faceplate is the default view.



Reduced Faceplate



Faceplate

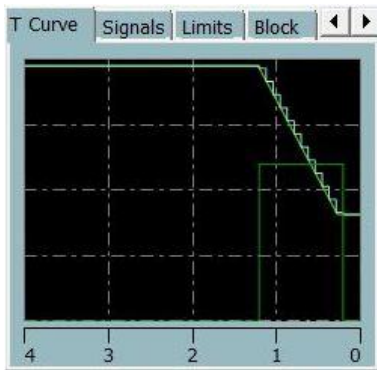
Extended Faceplate

The extended faceplate gives more detailed information about the object. Additional information about the object is available in tabs.



1. T Curve

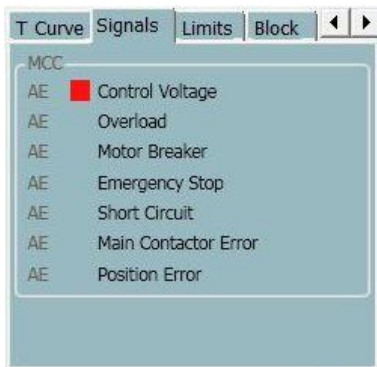
Trim Curve is used to present value in the last 4 minutes period. It contains 3 traces: **ActPos** (for Actuator MV), **WSP** (for Actuator SP) and **Curr** (for Current in percentage) or **Current** (for Current in unit) depending on current presentation.



2. Signals

Fault signal can be configured as no alarm & event (no indication), alarm & event (indicated with **AE**) or event only (indicated with **E**). If alarm is blocked, then it will be indicated with **B**.

When a fault is active, a red square indication is shown in front of the fault signal. It will be indicated with the blinking red square indication as long as not acknowledged.



3. Limits

MV alarm limit, hysteresis and alarm delay can be defined in this tab. Alarm limit will be visible if configured as alarm & event (indicated with **AE**) or event only (indicated with **E**). If alarm is blocked, then it will be indicated with **B**.

When alarm limit is active, a red square indication is shown in front of the limit. Alarm will be generated if the limit stays active for more than the alarm delay time. It will be indicated with the blinking red square indication as long as not acknowledged.

User with *Tune* permission can change the alarm limit, while hysteresis and alarm delay can be adjusted by user with *Configure* permission.

Rated Current refers to the current value equal to 100%.

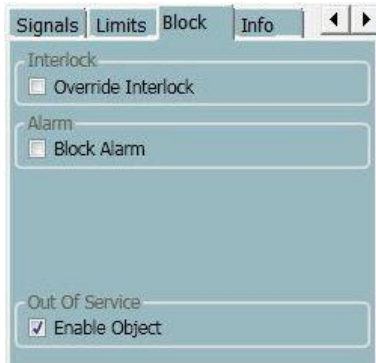


4. Block

Checkbox **Override Interlock** will override all blockable interlocks. It is enabled when at least one interlock is configured blockable.

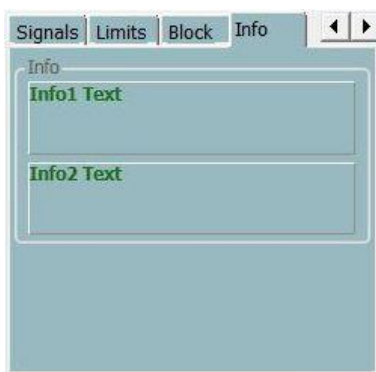
Operator can block the all alarms by ticking on the checkbox **Block Alarm**.

Un-ticking checkbox **Enable Object** will bring the object to **Out Of Service** mode.



5. Info

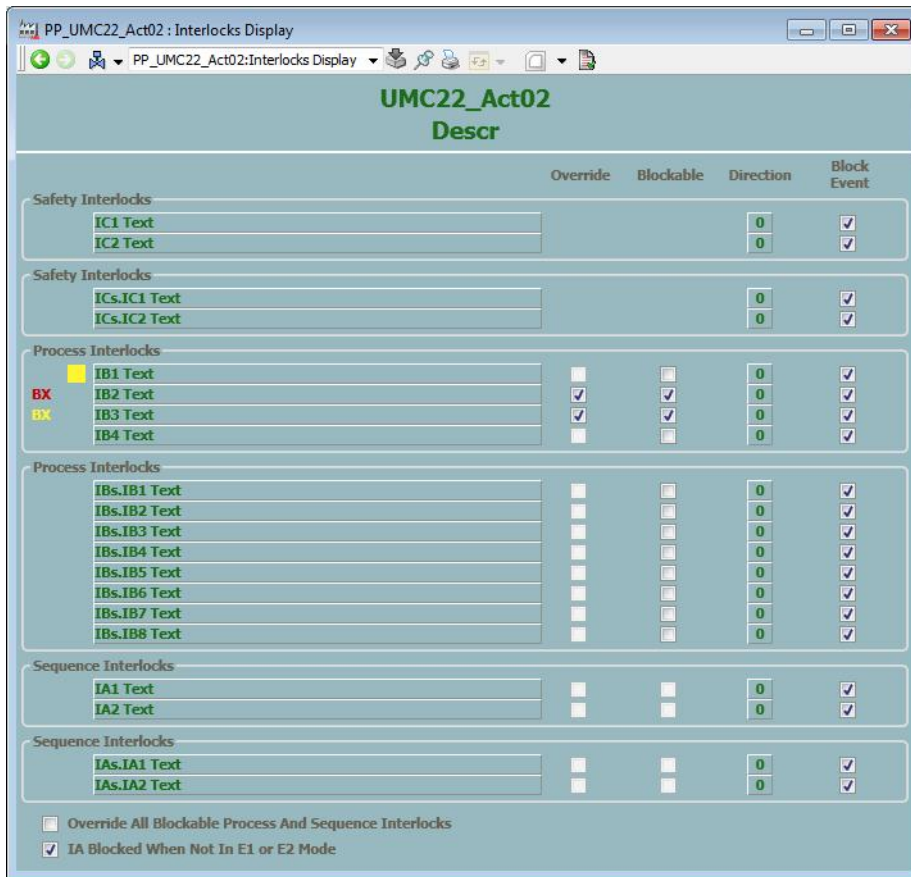
Relevant information about the object can be entered here.



Interlock Display

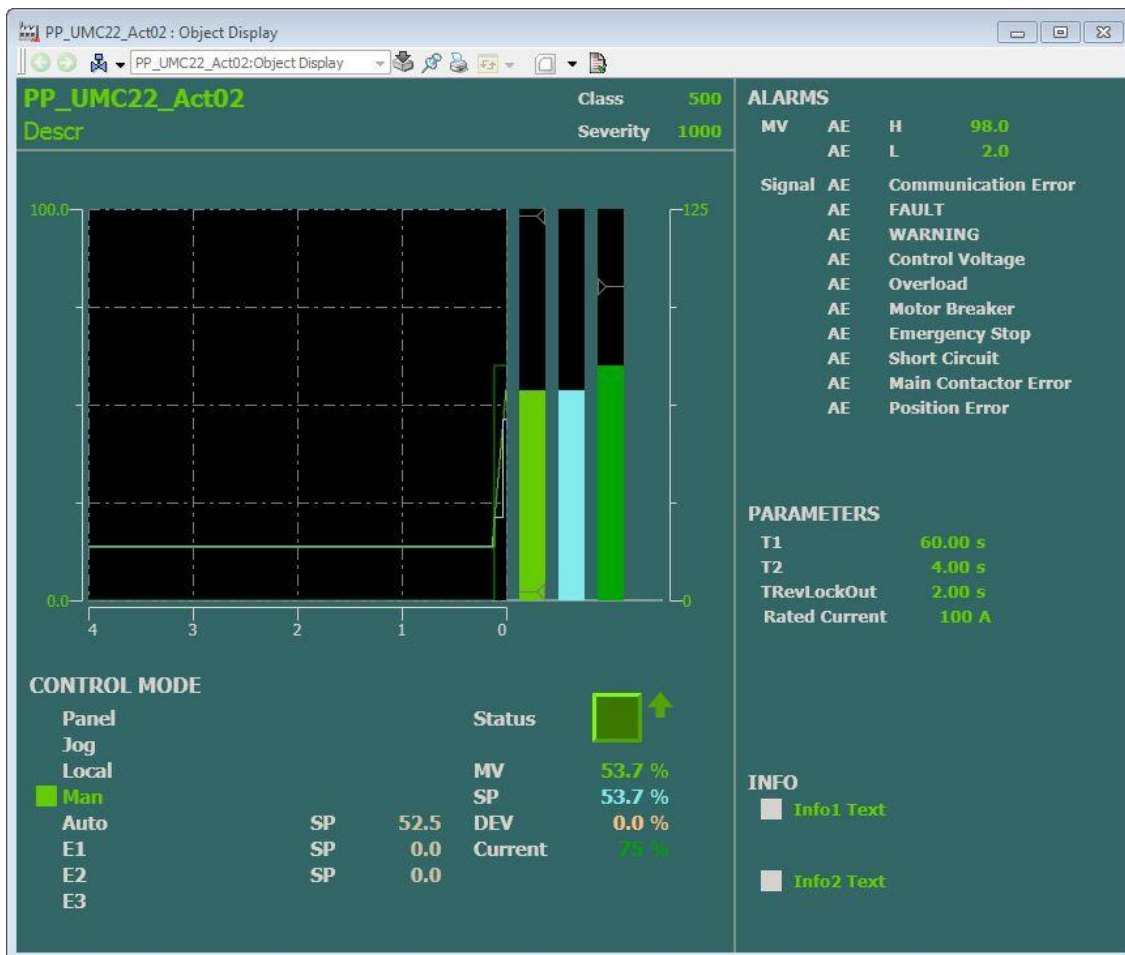
Interlock Display shows the actual status of all interlocks. Operator can override individual interlock or all interlocks which is blockable. **Blockable**, **Direction**, **Block Event** and **Interlock Texts** are set with *Configure* permission.

When interlock is active, a yellow square indication will be shown in front of the interlock. When operator blocks an interlock, a **BX** text indication will be shown. If the interlock is active, it will be in red color. Otherwise it will be in yellow color.



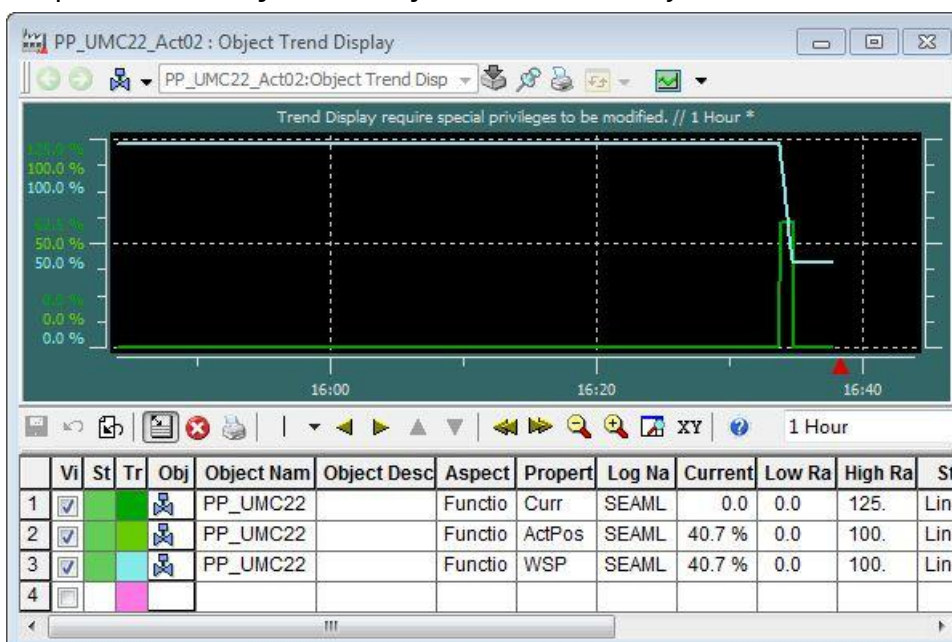
Object Display

Object Display can be used to get the complete overview of the object. It has detailed information of the motor status, actuator value and range, current value and range, signal status, parameters and available control modes.



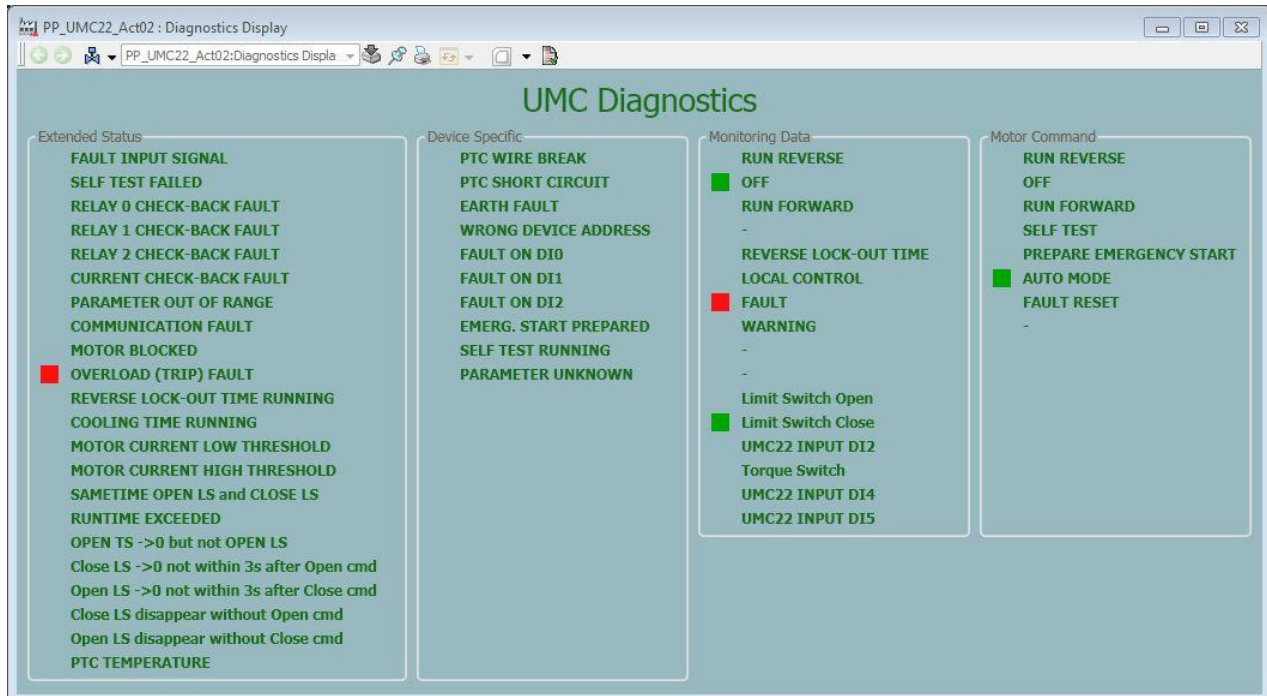
Object Trend Display

Values stored can be presented graphically in the form of curves in **Object Trend Display** aspect. By default, UMC22_Act02 presents 3 traces: **Curr**, **ActPos** and **WSP**. It uses the trend template **PP Library Motor Object Trend** in Library Structure.



Diagnostics Display

Diagnostics Display presents the information collected from the **MCC**. **Extended Status** and **Device Specific** are derived directly from input parameter **UMCUnitStatus**, while the **Monitoring Data** and **Motor Command** are derived directly from input parameter **MCC**.



In general, there are 3 different presentation used in this display.

- Alarm or Fault indication
 - o In most cases, this is normally presented with red square indication in front of the text when the bit value is *True*. Otherwise, no indication will be shown.
 - o In rare cases, it can be presented with the red square indication in front of the text when the bit value is *True*, but it will be presented with green square indication when it is *False*.
- Information indication

This is normally presented with green square indication in front of the text when the bit value is *True*. Otherwise, no indication will be shown.

The text for **Diagnostics Display** is stored in **Diagnostics Translation** aspect. It's possible to adjust the text as required. If changes are done in **Diagnostics Translation** aspect in Object Type Structure, it will affect all instances of the object. If a change is only required for one instance, then changes should be done in the **Diagnostics Translation** aspect in Control Structure.

Name	Value	Type	Description	Readable?	R/Permission	Write
ExtStatus00	FAULT INPUT SIG	String		Yes		Yes
ExtStatus01	SELF TEST FAILE	String		Yes		Yes
ExtStatus02	RELAY 0 CHECK	String		Yes		Yes
ExtStatus03	RELAY 1 CHECK	String		Yes		Yes
ExtStatus04	RELAY 2 CHECK	String		Yes		Yes
ExtStatus05	CURRENT CHECK	String		Yes		Yes
ExtStatus06	PARAMETER OU	String		Yes		Yes
ExtStatus07	COMMUNICATIO	String		Yes		Yes
ExtStatus08	MOTOR BLOCKE	String		Yes		Yes
ExtStatus09	OVERLOAD (TRI	String		Yes		Yes
ExtStatus10	REVERSE LOCK-	String		Yes		Yes
ExtStatus11	COOLING TIME R	String		Yes		Yes
ExtStatus12	MOTOR CURREN	String		Yes		Yes
ExtStatus13	MOTOR CURREN	String		Yes		Yes
ExtStatus14	SAMETIME OPEN	String		Yes		Yes
ExtStatus15	RUNTIME EXCEE	String		Yes		Yes
ExtStatus16	OPEN TS ->0 but	String		Yes		Yes

Alarm & Event

Alarm & Event List

All alarm & event list aspect is configured to follow the templates defined in **PP Library Alarm & Event List Configurations** in Library Structure.

Alarm Message

The **Message Description** is hardcoded in the function block and cannot be modified. The **Condition** text is stored in the **AE Translator** aspect in Object Type Structure and support NLS functionality.

Resource Id	Condition	Message Description
AH	ActPos > H	Alarm
AL	ActPos < L	Alarm
CE	Communication Error	Fault
F	Fault	Fault
M1	M1, Control Voltage	Fault
M2	M2, Overload	Fault
M3	M3, Motor Breaker	Fault
M4	M4, Emergency Stop	Fault
M5	M5, Short Circuit	Fault
MCE	Main Contactor Error	Fault
PE	Position Error	Alarm
W	Warning	Alarm

Event Message

The **Message Description** is stored in the **AE Translator** aspect in Object Type Structure and support NLS functionality.

Resource Id	Message Description
AlarmAck	Alarm acknowledged by program
AlcBlk	Alarm blocked by program

Resource Id	Message Description
DS01	PTC Wire Break
DS02	PTC Short Circuit
DS03	Earth Fault
DS04	Wrong Device Address
DS05	Fault on DI0
DS06	Fault on DI1
DS07	Fault on DI2
DS08	Emergency Start Prepared
DS09	Self Test Running
DS10	Parameter Unknown
ES00	Fault Input Signal
ES01	Self-test Failed
ES02	Relay 0 Check-back Fault
ES03	Relay 1 Check-back Fault
ES04	Relay 2 Check-back Fault
ES05	Current Check-back Fault
ES06	Parameter Out of Range
ES07	Communication Fault
ES08	Motor Blocked
ES09	Overload (trip) Fault
ES10	Reverse Lockout Time Running
ES11	Cooling Time Running
ES12	Motor Current Low Threshold
ES13	Motor Current High Threshold
ES14	Sametime Open LS and Close LS
ES15	Run-time Exceeded
ES16	Open TS ->0 but not Open LS
ES17	Close LS ->0 not within 3s after Open cmd
ES18	Open LS ->0 not within 3s after Close cmd
ES19	Close LS disappear without Open cmd
ES20	Open LS disappear without Close cmd
ES21	PTC Temperature
ExtClose	Ext Close
ExtOpen	Ext Open
ExtStop	Ext Stop
IA1Off	IA1 Off
IA1On	IA1 On
IA2Off	IA2 Off
IA2On	IA2 On
IAs1Off	IAs.IA1 Off
IAs1On	IAs.IA1 On
IAs2Off	IAs.IA2 Off
IAs2On	IAs.IA2 On
IB1Off	IB1 Off
IB1On	IB1 On
IB2Off	IB2 Off
IB2On	IB2 On
IB3Off	IB3 Off
IB3On	IB3 On
IB4Off	IB4 Off
IB4On	IB4 On
IBs1Off	IBs.IB1 Off
IBs1On	IBs.IB1 On
IBs2Off	IBs.IB2 Off
IBs2On	IBs.IB2 On

Resource Id	Message Description
IBs3Off	IBs.IB3 Off
IBs3On	IBs.IB3 On
IBs4Off	IBs.IB4 Off
IBs4On	IBs.IB4 On
IBs5Off	IBs.IB5 Off
IBs5On	IBs.IB5 On
IBs6Off	IBs.IB6 Off
IBs6On	IBs.IB6 On
IBs7Off	IBs.IB7 Off
IBs7On	IBs.IB7 On
IBs8Off	IBs.IB8 Off
IBs8On	IBs.IB8 On
IC1Off	IC1 Off
IC1On	IC1 On
IC2Off	IC2 Off
IC2On	IC2 On
ICs1Off	ICs.IC1 Off
ICs1On	ICs.IC1 On
ICs2Off	ICs.IC2 Off
ICs2On	ICs.IC2 On
JogEnblOff	JogEnbl Off
JogEnblOn	JogEnbl On
LEnblOff	LEnbl Off
LEnblOn	LEnbl On
LSCOn	Limit Switch Close
LSOOn	Limit Switch Open
PanelOff	Panel Off
PanelOn	Panel On
SeqAuto	SeqAuto
SeqE1	SeqE1
SeqE2	SeqE2
SeqE3	SeqE3
SeqMan	SeqMan

Section 5 - UMC22 Actuator Device

Data Mapping

UMC22_Act02 function block is created based on the following data structure.

Inputs:

UMC_Input: 2 bytes

Bit No	7	6	5	4	3	2	1	0
Byte 0	Warning	Fault	Local Control	-	-	Opening	Off	Closing
Byte 1	UMC DI5	UMC DI4	UMC DI3	UMC DI2	LS Close	LS Open	-	-

UMC_MotorCurrent:2 bytes

Bit No	7	6	5	4	3	2	1	0
Byte 0	Motor Current (%)							
Byte 1								

Output:

UMC_Output : 2 bytes

Bit No	7	6	5	4	3	2	1	0
Byte 0	-	Reset Fault	Auto Mode	Prepare Emergency Start	Self Test	Open	Off	Close
Byte 1	-	-	-	-	-	-	-	-

Control Function

There are 4 control functions can be configured in UMC22 Actuator. The control functions Actuator 1, 2, 3 and 4 provide different use of and reaction on the limit switches Closed and Open and on the Torque switches (DI0, DI1 and DI3).

Control Function	Open ↔ Close			
	Torque Open	Limit Open	Limit Close	Torque Close
ActuatorType = 1	-	Stop	Stop	-
ActuatorType = 2	Stop	Prepare	Prepare	Stop
ActuatorType = 3	-	Stop	Prepare	Stop
ActuatorType = 4	Stop	Prepare	Stop	-

The configuration in the UMC22 Actuator should be the same as the configuration in UMC22_Act02 function block. The selection of these control function is configured on input parameter **ActuatorType** in the function block.

Test Mode

UMC22 device supports **Test Mode**, which mean starting UMC22 without starting the motor. The local switch to enable the **Test Mode** is normally connected to one of the digital inputs in UMC22.

By default, **Test Mode** in UMC22_Act function block is not enabled. To enable it, configure input parameter **SetTest** with the value of the digital input number where the local switch is connected to. If the local switch for the **Test Mode** is connected to *DI2*, then set the **SetTest** value to 2.