MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Standard Software Training

Montelektro
Croatia, HR-51215 Kastav, Kudeji 53
http://www.montelektro.com/

Introduction

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

- **Purpose**
  - to present the Standard Software system and its functionality to end users (operators, technologists, automation department)

- **Expectation**
  - To familiarize end users with automation system
  - In the end you should be able to execute everyday tasks with new automation system

Automation system Concept

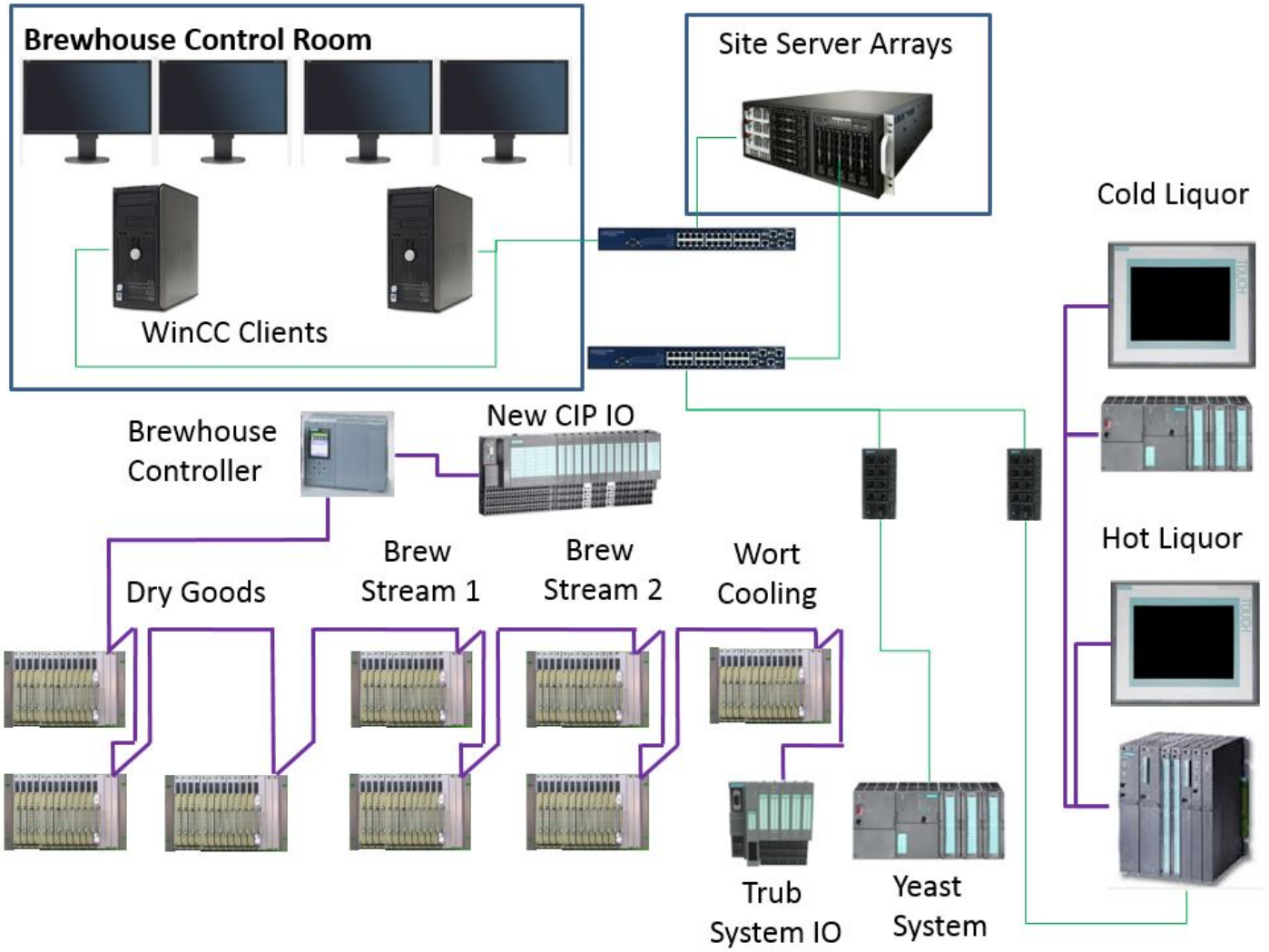
MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Standard Software system design

- The automation control system is based on physical, procedural and recipe model of the plant
- The Standard Software system follows the ISA-88.01 standard used for controlling batch-oriented processes.

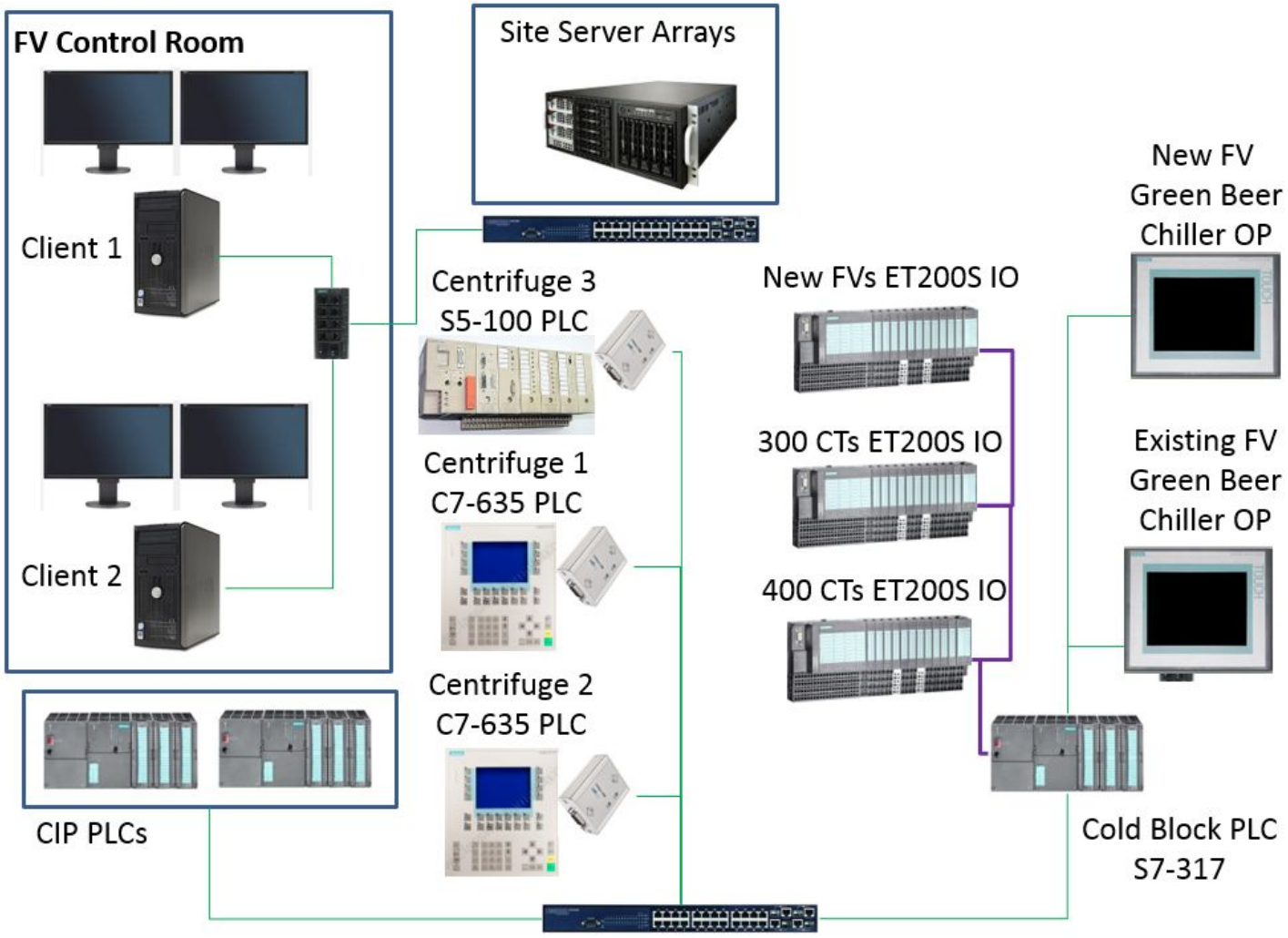
Automation system Concept

Brewhouse Control Architecture



Automation system Concept

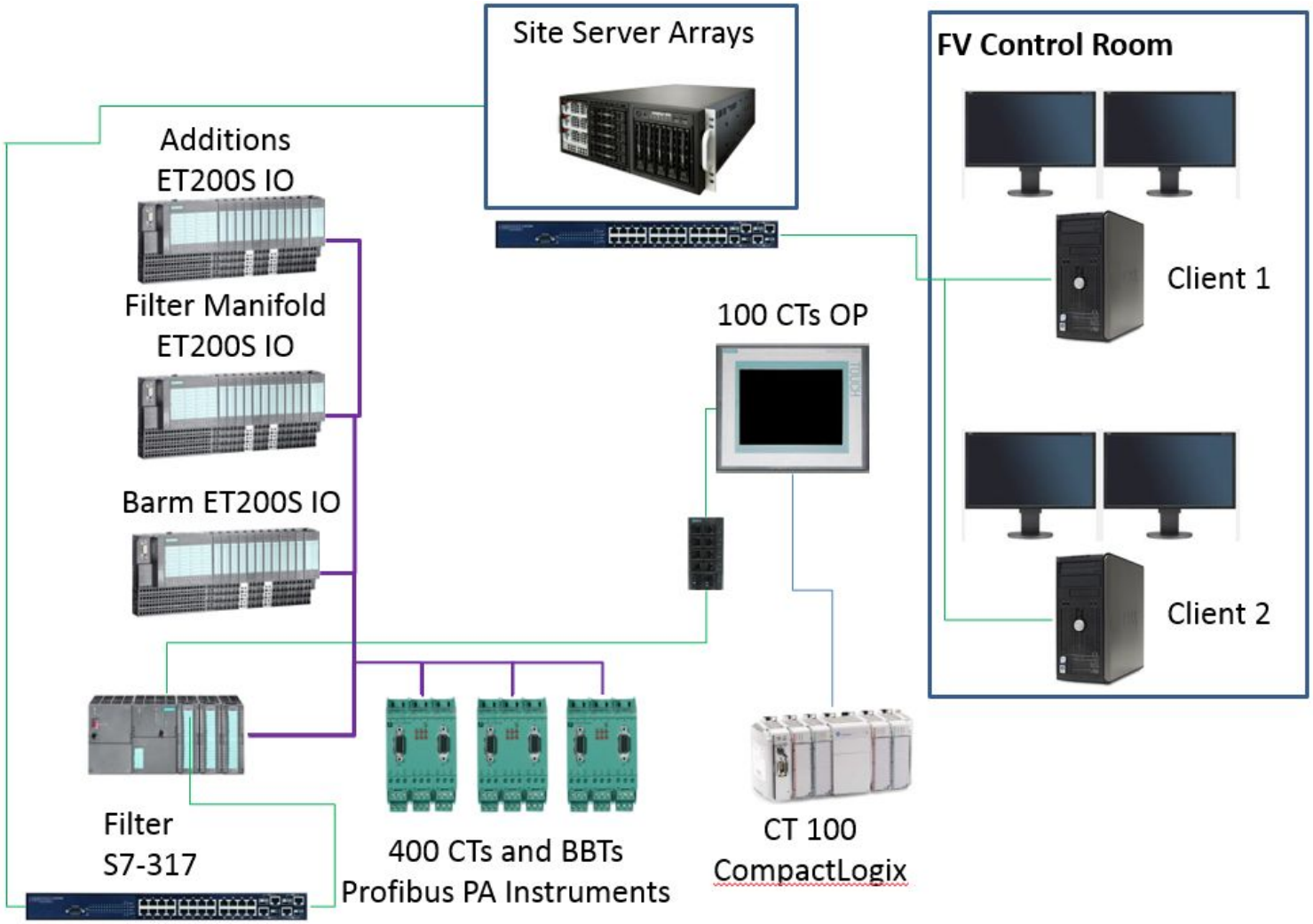
FV/Filter Control Architecture 1



Automation system Concept

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

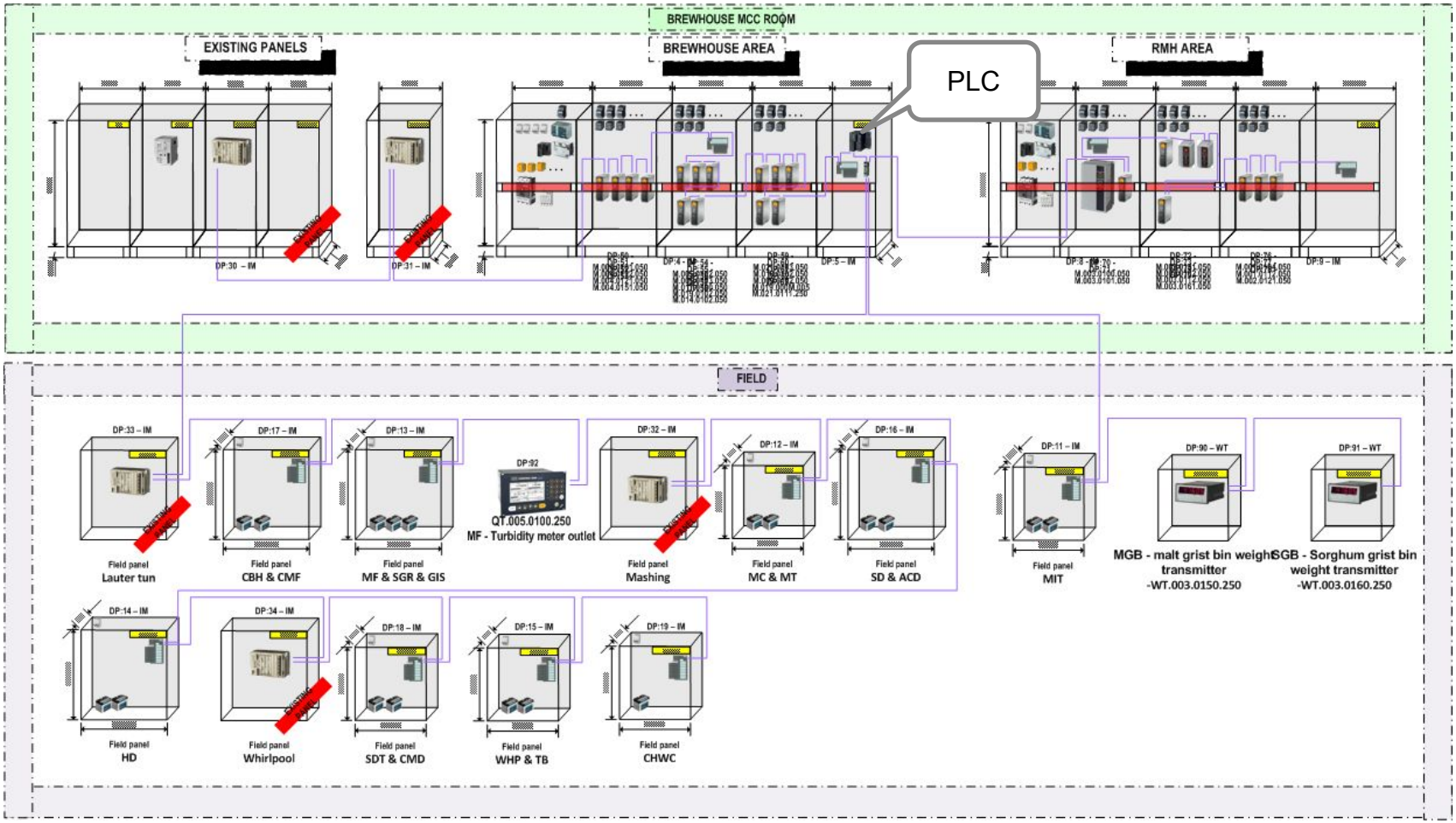
FV/Filter Control Architecture 2



Automation system Concept

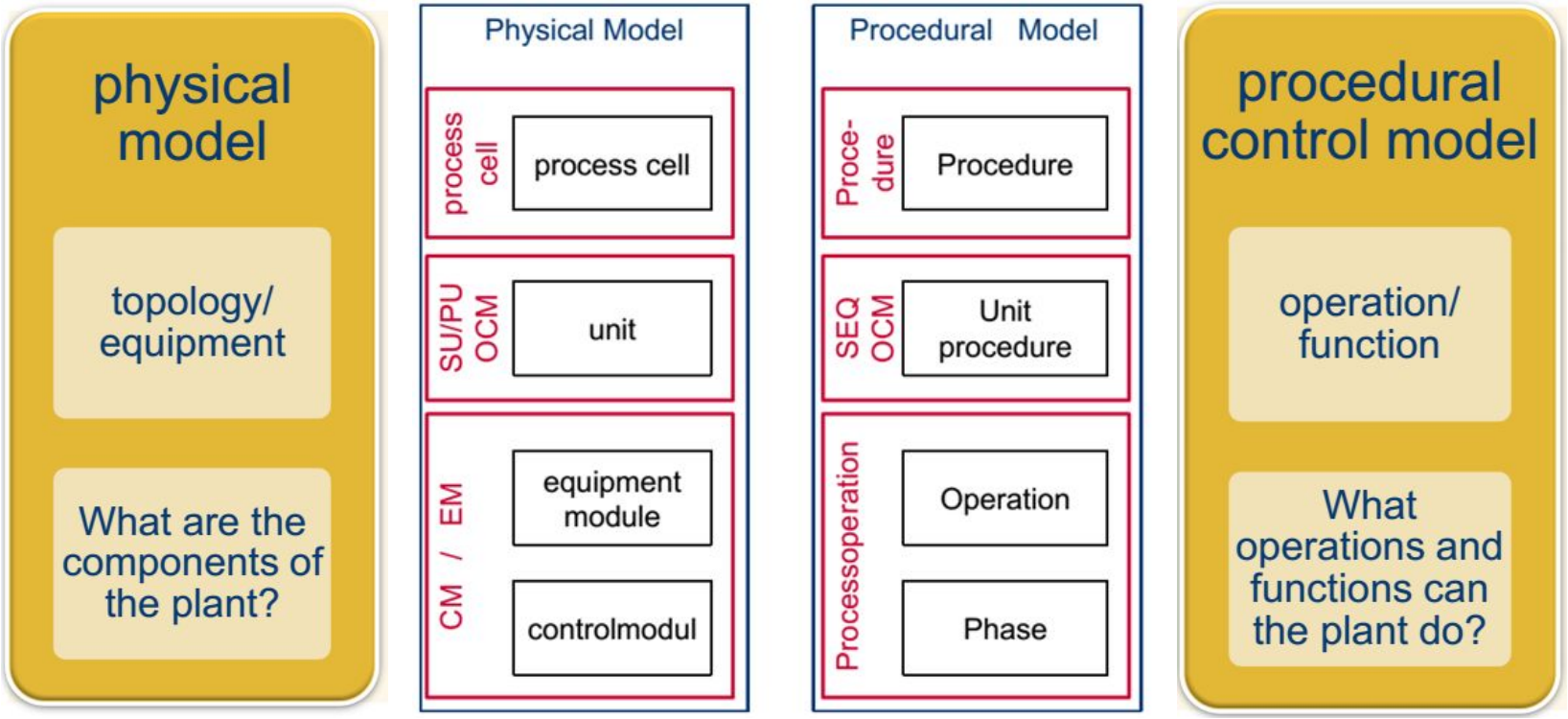
MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

PLC Profibus network



ISA S88 Model

Introduction

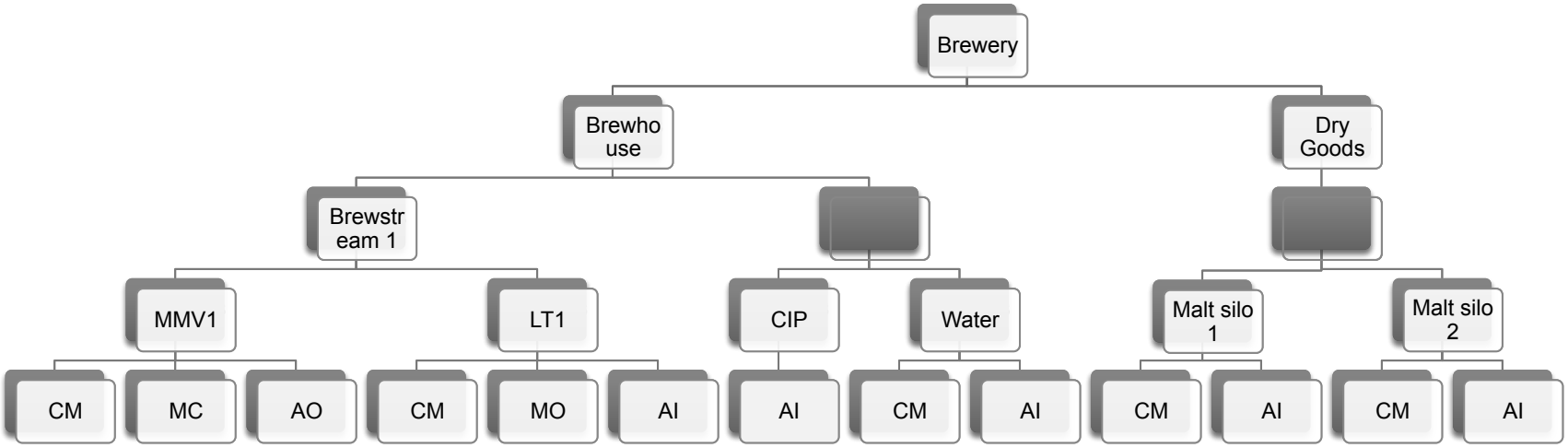


- ISA S88 - standard for batch control, represents a design philosophy for software, equipment and process flow
- Batch control – ordered set of processing activities over a time using equipment to process finite quantities of input materials

ISA S88 Physical Model

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Physical model



- **Process cell** (logical grouping of equipment)
  - required for production of one or more batches
- **Process unit** (technologically independent part of the control system)
  - contains or operates on a complete batch of material at some point in the processing sequence of that batch
- **Control module**
  - smallest part of the control system that can perform basic control as single entity

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Control module definition

- smallest part of the control system that can perform basic control
- can be physical (valve, pump, measuring instrument, ...) but also software elements (PID regulator, ...)

- CM modes and states:
  - Automatic/Manual
    - Automatic – commands for control (start/stop..) from PLC
    - Manual - commands for control from the HMI
  - Maintenance – all commands disabled (used during repair of equipment)
  - Standard/Simulation
    - Standard – feedbacks for switch *on* or *off* expected and monitored
    - Simulation – expected feedbacks are simulated
  - Fault/Alarm – expected feedback not present, output state depends on CM type
  - Bypass interlock – software interlock overridden, output activation allowed
  - Interlocked – disables output activation on component

ISA S88 Physical Model

CM types in Standard Software


Valve


Double seat valve


Two way flap


Motorized valve

Proportional valve


Manual valve


pump, motor

pump, motor on frequency controller on Profibus network


digital output

digital switch, contains one digital input

PID controller

analog input/output

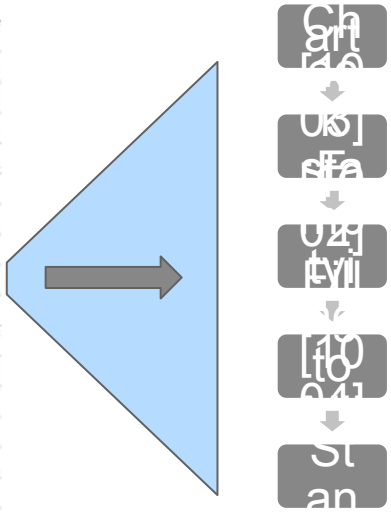
totalizer, pulse counter

ISA S88 Procedural Model

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Procedural model

0	Shared
1	Batch starting unit
2	Malt Silos 1
3	Malt Silos 2
4	Malt Silos 3
5	Malt Silos 4
6	Malt Silos 5
7	Malt Silos 6
8	Malt Silos 7
9	Malt Intake
10	Malt Transfer
11	Milling
12	Big Bag System
13	Grist Case 1
14	Grist Case 2
15	Maize Grist Silo
16	Broken Rice Silo



Parameters

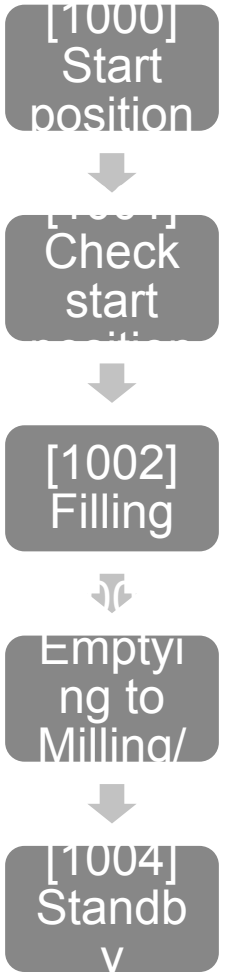
Nui	Name	ID	Egu	Min	Max	Default	Sec. Level
1	Malt Silo 1 In-Flight Weight	11	kg	0,000	999,000	0,000	10
2	Malt Silo 2 In-Flight Weight	12	kg	0,000	999,000	0,000	10
3	Malt Silo 3 In-Flight Weight	13	kg	0,000	999,000	0,000	10
4	Malt Silo 4 In-Flight Weight	14	kg	0,000	999,000	0,000	10
5	Malt Silo 5 In-Flight Weight	15	kg	0,000	999,000	0,000	10
6	Malt Silo 6 In-Flight Weight	16	kg	0,000	999,000	0,000	10
7	Malt Silo 7 In-Flight Weight	17	kg	0,000	999,000	0,000	10
8	Malt Silo 1 Discharge Rate	18	kg/s	0,000	99,900	0,000	10
9	Malt Silo 2 Discharge Rate	19	kg/s	0,000	99,900	0,000	10
10	Malt Silo 3 Discharge Rate	20	kg/s	0,000	99,900	0,000	10
11	Malt Silo 4 Discharge Rate	21	kg/s	0,000	99,900	0,000	10
12	Malt Silo 5 Discharge Rate	22	kg/s	0,000	99,900	0,000	10
13	Malt Silo 6 Discharge Rate	23	kg/s	0,000	99,900	0,000	10
14	Malt Silo 7 Discharge Rate	24	kg/s	0,000	99,900	0,000	10
15	Weigher Weight per Pulse	25	kg	0,000	99,900	0,000	10
16	Transition Time Malt Silo to Weig	26	sec	0,000	99,000	0,000	10
17	Weigher Rate Check Interval	27	sec	0,000	99,000	0,000	10
18	Minimum Weigher Weight Rise	28	kg	0,000	99,900	0,000	10
19	Minimum Big Bag Weight Rise	29	kg	0,000	99,900	0,000	10
20	Minimum Grain Silo Weight Rise	30	kg	0,000	99,900	0,000	10
21	Malt Transfer Clear Time	31	sec	0,000	99,000	0,000	10
22	Big Bag Transfer Clear Time	32	sec	0,000	99,000	0,000	10
23	Grain Transfer Clear Time	33	sec	0,000	99,000	0,000	10

- **Recipe Procedure** - strategy for a major processing action (making a batch)
- **Unit procedure** – within unit ordered set of operations that causes a contiguous production sequence
- **Recipe Operation** - ordered set of phases
  - processing sequence that takes the material being processed from one state to another, usually involving a chemical or physical change
- Phase - smallest element that can accomplish process-oriented task

ISA S88 Procedural Model

Definition ROP & Recipe procedure

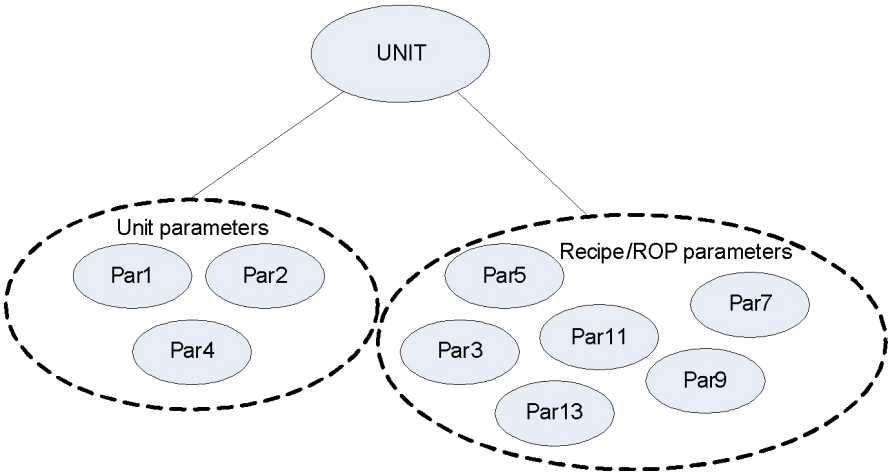
- **Recipe operations** or **ROPs**
  - operations which are a part of the procedure
  - assigned to units
  - each contains activations (activities) and transition conditions
- sequence performs process operations in an order defined by the **procedure** to perform a certain production activity
- procedure also contains the **values** of unit and recipe parameters
- a **recipe** is a set of values to be used with a certain procedure



ROP ID	Name_Lang1	Name_Lang2	Rev	Parameters						
				Num	Name	ID	Egu	Min	Max	Default
1000	Start position		0.00	1				0,000	0,000	0,000
1001	Check start position		0.00	1	Control time	1	min	0,000	0,000	0,000
1002	Filling		0.00	1	Control time	1	min	0,000	0,000	0,000
1003	Emptying to Milling/Reject		0.00	1	Control time	1	min	0,000	0,000	0,000
1004	Standby		0.03	1	Control time	1	min	0,000	0,000	0,000

Parameters

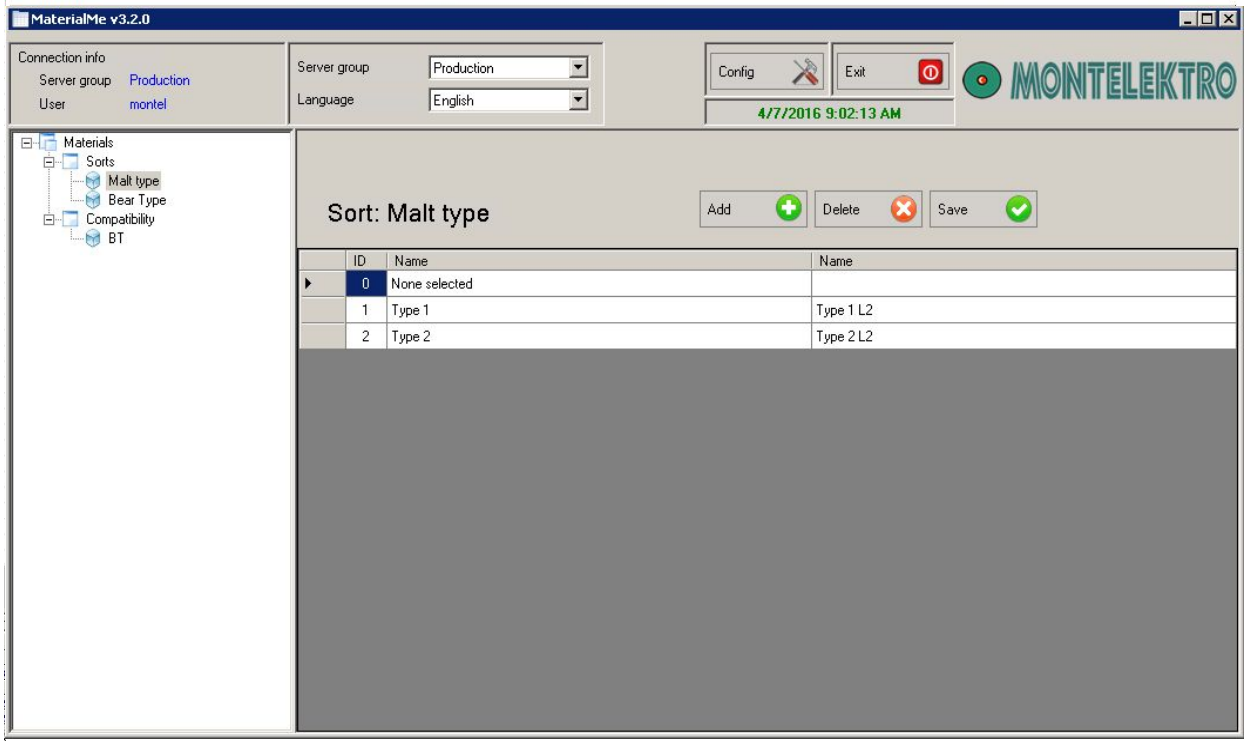
- The course of the production process is defined by the values of **parameters** in different moments in time
- These parameters can be either Unit parameters, ROP parameters or Recipe parameters



- Parameters are defined as one of the following types:
  - Manual
  - Proc. Timer
  - Proc. Totalizer
  - ROP Timer
  - ROP Totalizer
  - Value
  - Selection
  - ParDiff
  - Par Set Dev

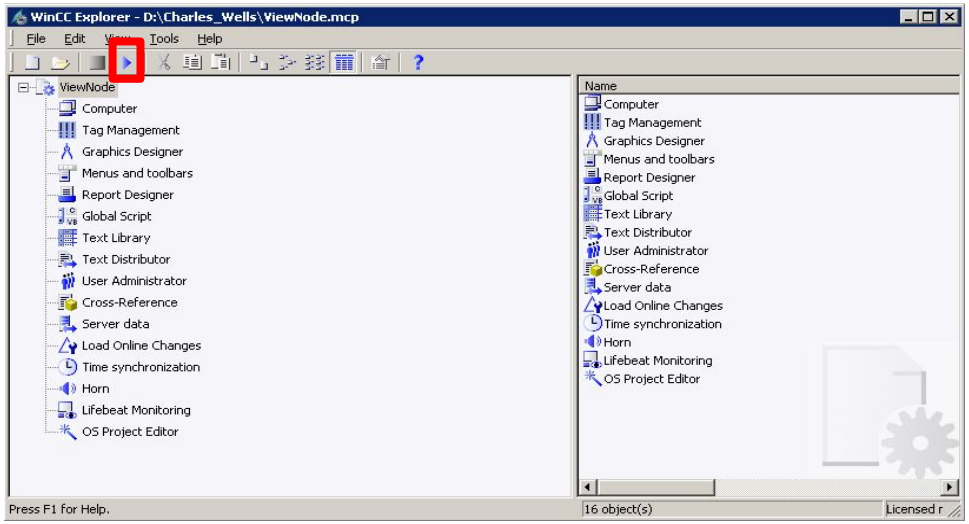
Standard Software applications

- Process control and supervision
- Detailed overview of trends and message history
- Creating and editing of procedures and recipes
- Order management, reports
- Material management



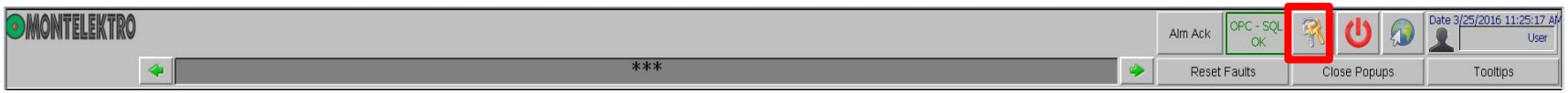
Starting WinCc Runtime

- SIMATIC WinCC Explorer icon
  - Located on desktop
  - Starts WinCC Runtime containing the **H**uman **M**achine **I**nterface - **HMI**



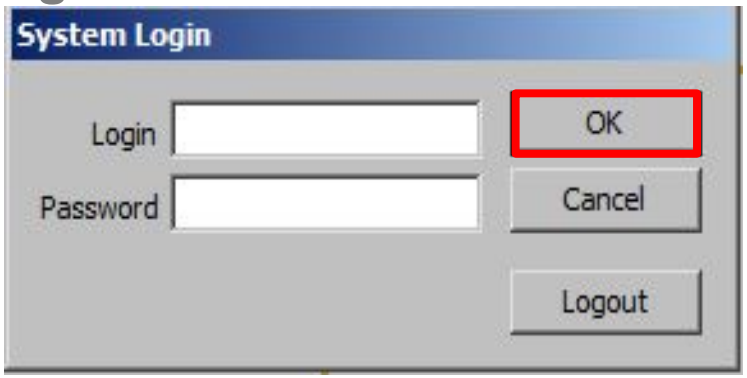
- Manual start:
  - Click on the activation button in SIMATIC explorer - 

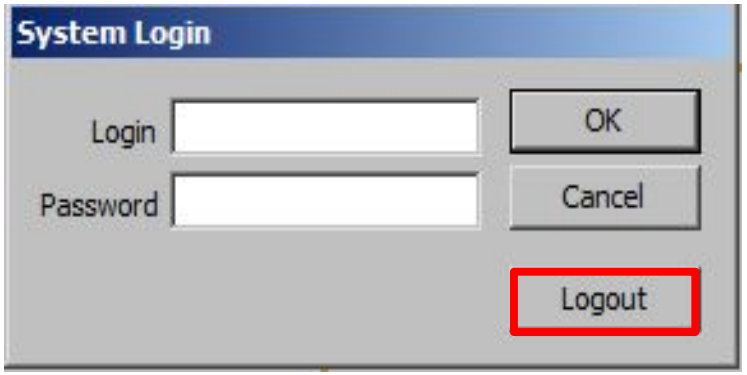
User log on



- To open the log on window, click on the headers's right corner where the currently logged-on user is displayed

Log on window

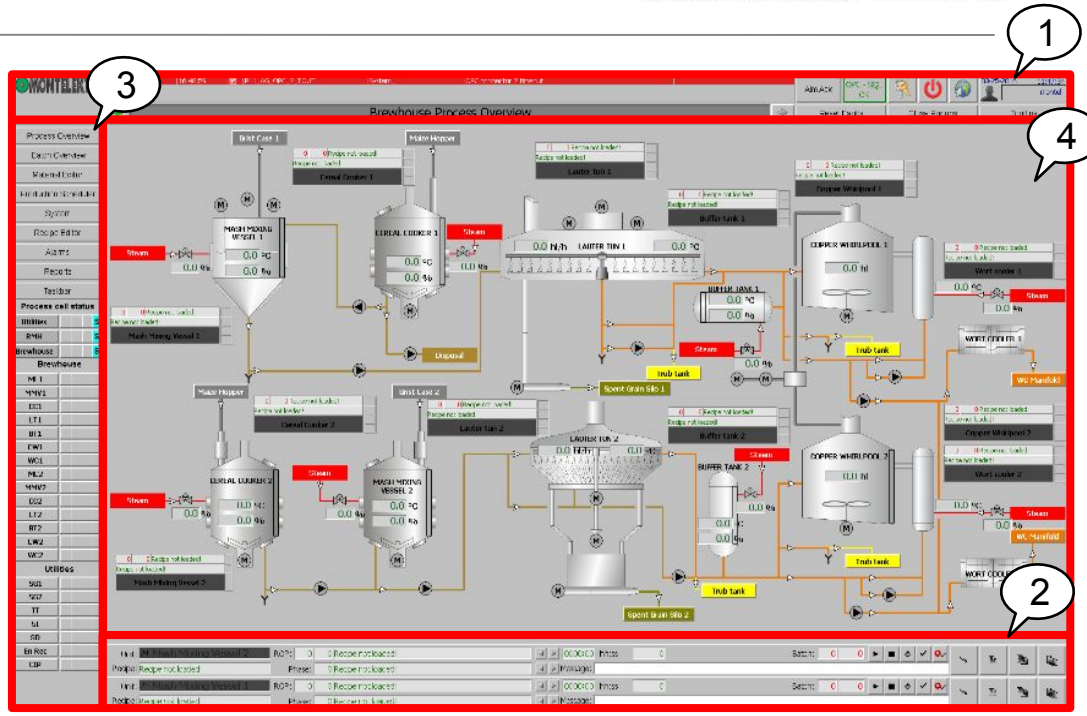




- Log on, change or log off user in the Standard Software system

Operation Manager – Process screen

- **1) Header**
  - title, customer logo, supplier logo, the last active alarm, actual user name, alarm indicator, date, day and time
- **2) Footer**
  - Contains shortcut buttons for most used functions
- **3) Sidebar (show)**
  - Direct navigation to process screens via buttons containing unit names
  - Call the functions (access of material management, messages, recipes…)
- **4) Working area**
  - Depends on the opened tab
  - Process screen
    - Enables operators to click on every component and open its own popup window.



Operation Manager – Process screen

Header – Process screen tab

- Following commands are available in header:

Button name	Symbol	Button Description
Navigation button	MONTELEKTRO	Opens a navigation pop up window which includes links to all process screens.
Backward button		Opens the previous screen in the list of recently viewed screens.
Forward button		Opens the next screen in the list of recently viewed screens.
Alarm acknowledge button	Alm Ack	Acknowledges all displayed alarms.
Reset Faults button	Reset Faults	Resets all faults.
OPC status	OPC - SQL OK	Displays the SQL database connection status.
User login button		Opens the user login pop up window.
Exit runtime button		Exits runtime.
Close popups button	Close Popups	Closes all pop-up windows.
Close tooltips button	Tooltips	Shows/Hides names of all components.
	03-25-2016 11:47:34 montel	Shows date, time and currently logged on user.

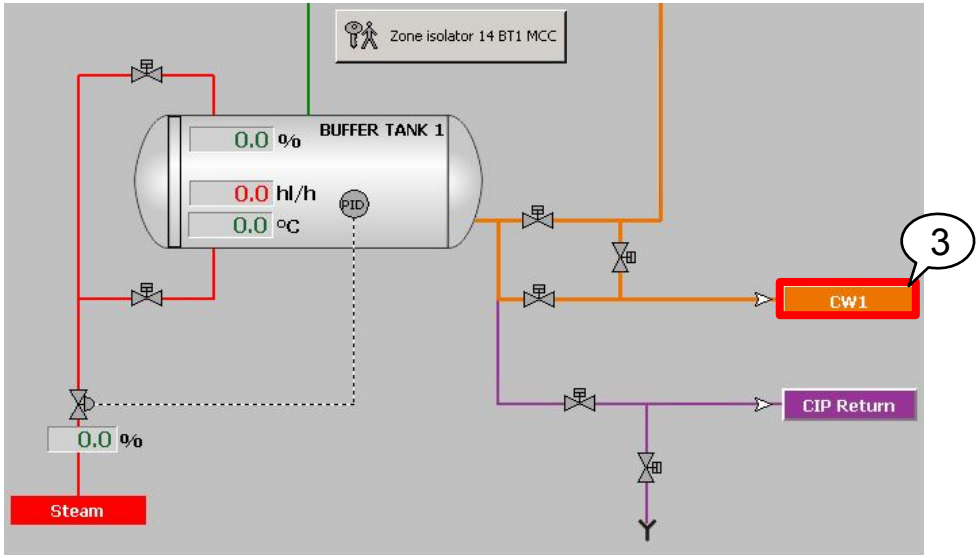
Operation Manager – Navigation

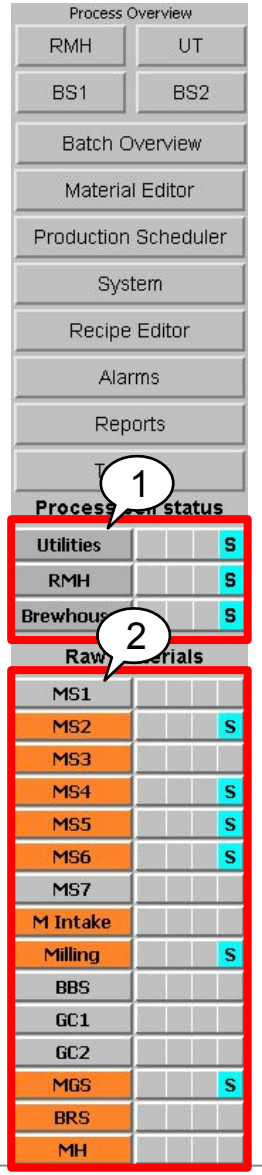
Navigation between process cells

1. Select process cell in sidebar

Navigation within process cell

2. Clicking on a process screen button in the sidebar
3. Clicking labeled buttons on screen itself

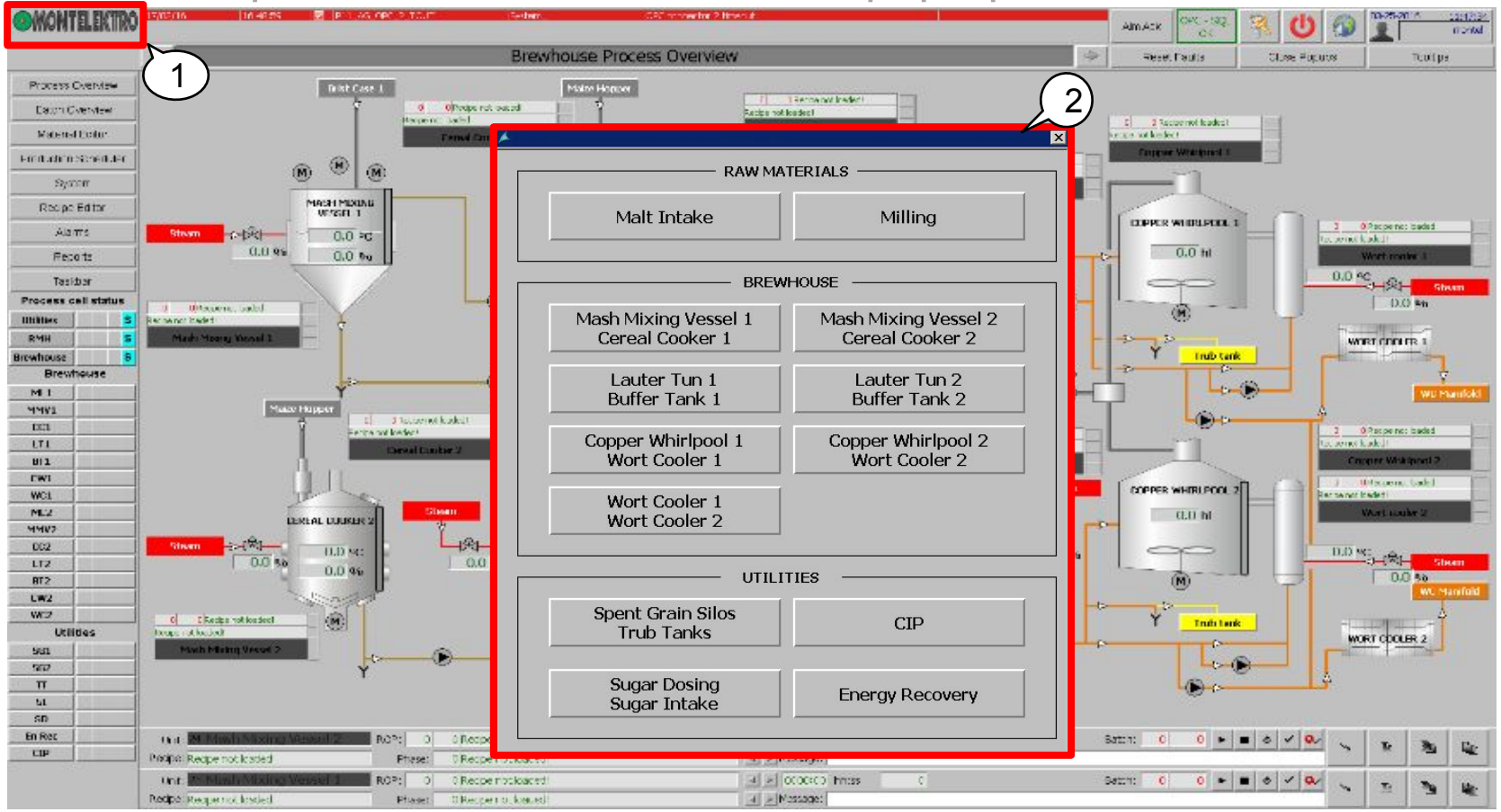




Operation Manager – Navigation

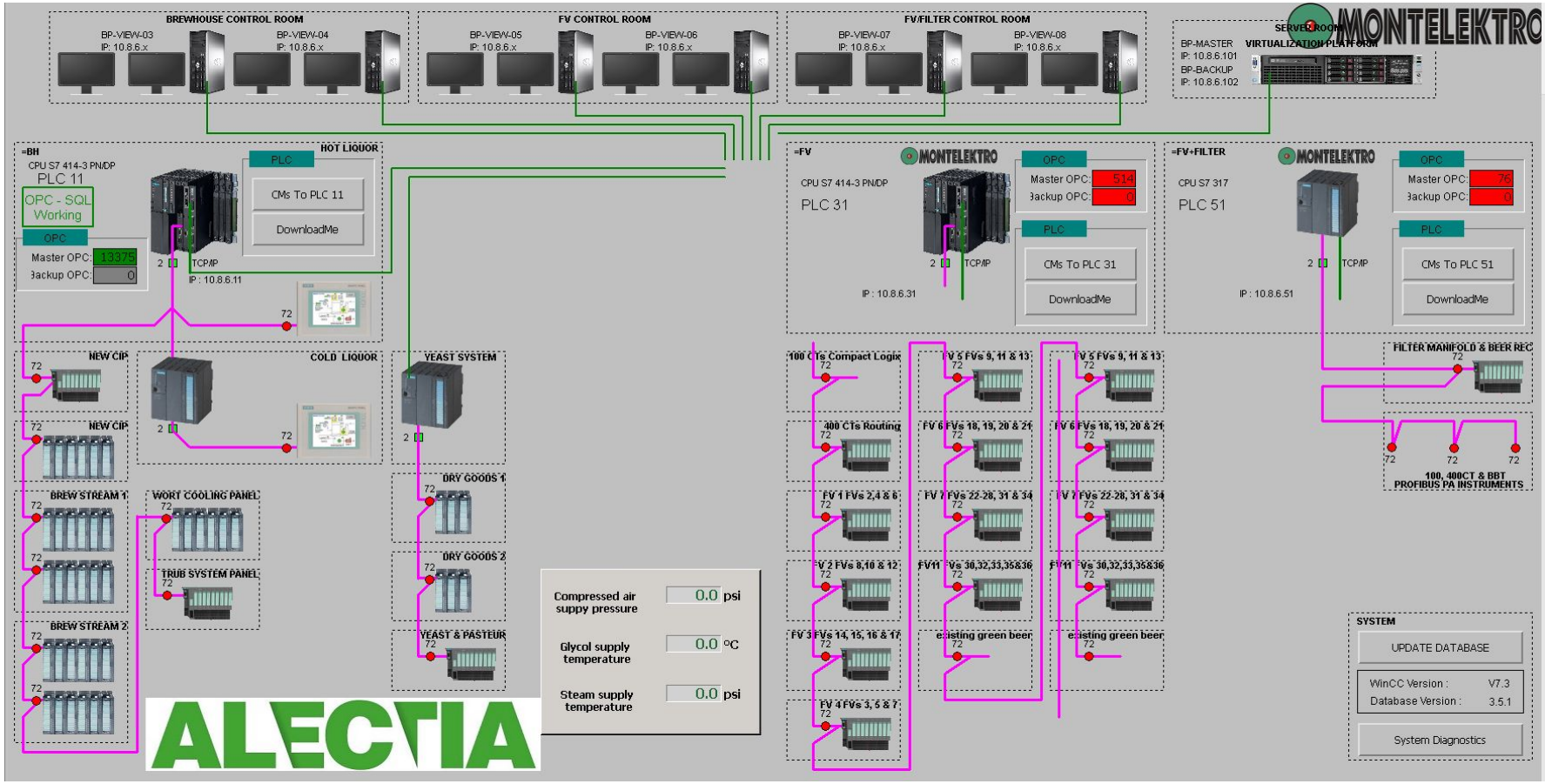
Navigation between process screens

1. Click on the Montelektro logo on header
2. Select process screen button in the pop-up window



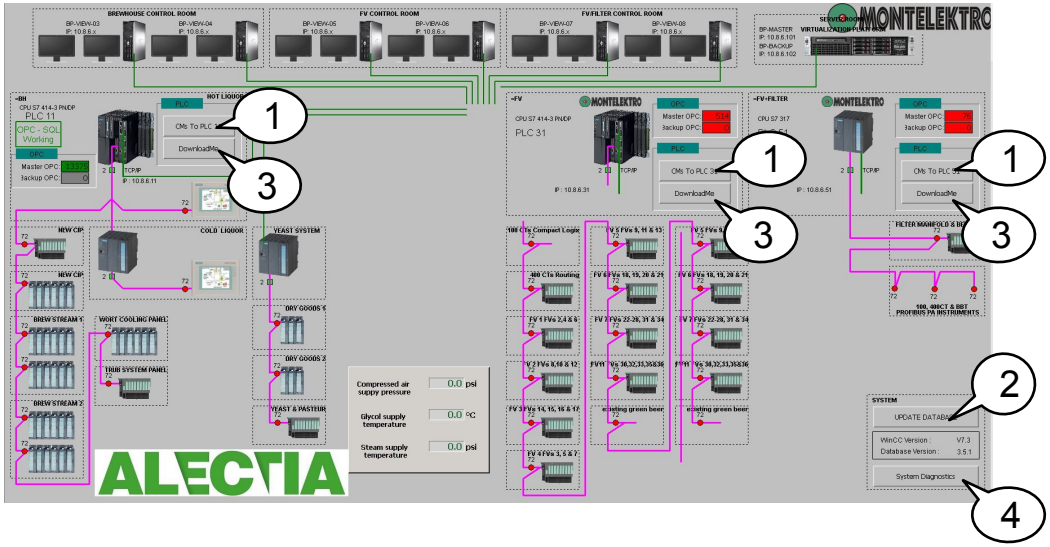
Operation Manager – System Screen

- Screen shows configuration of automation system.
- The purpose of screen is more informative then operational.



Operation Manager – System Screen

- Available commands on System screen:



- 1 

- 2 

- 3 

- 4 

- Restores all control modules parameterization from SQL database to specified PLC.
- Restores unit parameters from the database.
- Stores unit parameters (parameters not depending on recipe) and compatibility tables to database.
- Opens a window showing specific system parameters of the master computer. (Memory utilization, CPU utilization, Disk space, opened project, …).

Operation Manager – Unit control

Unit control window

- Normally placed on the bottom of the process screen
- Shows all general sequence information and it is used to control the unit
- Some process screens have more than one unit control window and operators are able to select which one will be shown on the screen

1. **Unit**: contains number, name and status of the particular unit. The status is shown by different background color of the field:

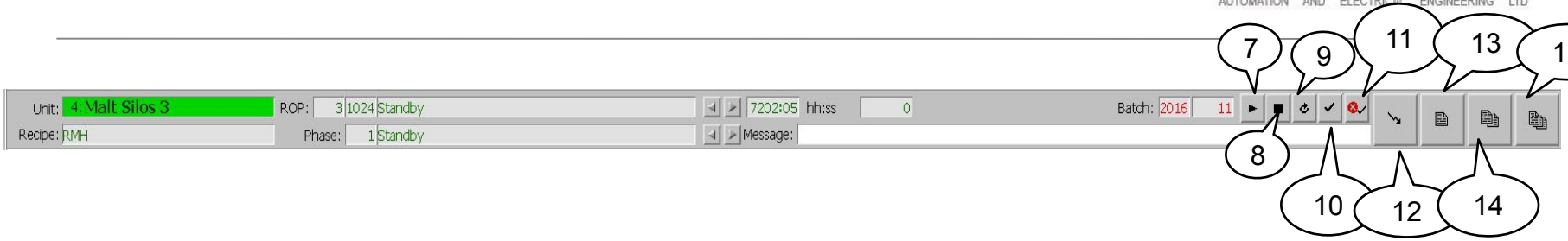
Color	Status
Gray	Idle
Green	Run
Red	Held
Red/Gray	Holding
Green/Gray	Restarting
Red/Green	Holding from Restart
Orange	Suspended

Color	Status
Orange/Gray	Suspending
Orange/Green	Suspending from Restart
Purple	Completed
Yellow	Aborted
Dark Green	Paused
Dark Green/Green	Pausing

Operation Manager – Unit control

2. **Recipe:** The field shows the actual active recipe for particular unit.
3. **Batch**: The field shows active batch number in the unit. Batch number is automatically. incremented every time the unit starts. It is reset to zero at the beginning of year.
4. **Message**: Message line shows the message to the operator. Message tells the operator which manual action has to be done or what condition is missing to start/continue process.
5. **ROP**: The sequential number, ID and name of the active Recipe Operation are displayed. Also the running time (mm:ss) is shown. On the right side of ROP name the icons for commands ROP + 1 and ROP – 1 are present.
6. **Phase**: The sequential number and name of the active Phase are displayed. On the right side of Phase name the icons for commands Phase + 1 and Phase - 1 are present.

Operation Manager – Unit control



Unit Commands

7. Start
8. Hold
9. Restart
10. Confirm
11. Fault reset

Pop-up Windows

12. Unit Commands Window
13. Unit Parameters Window
14. Recipe Parameters Window
15. ROP Parameteres Window

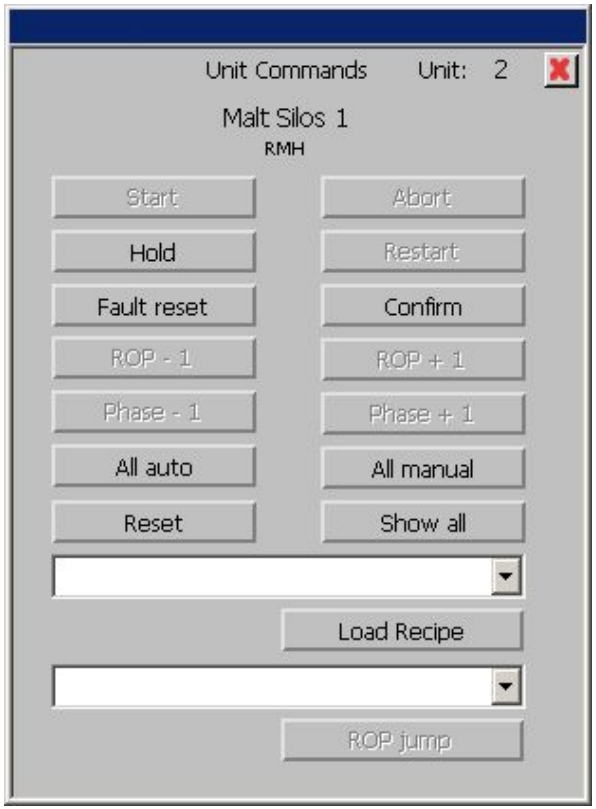
Operation Manager – Unit commands Window

MONTELEKTRO AUTOMATION AND ELECTRICAL ENGINEERING LTD

- Contains the whole set of operator commands to unit (sequence).

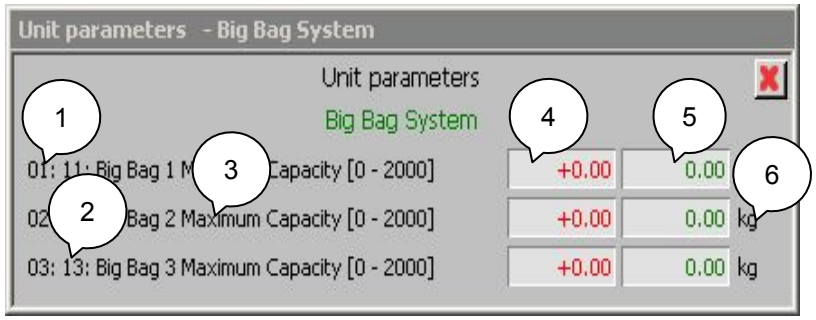
Functions:

1. **Confirm:** Confirms the operator action.
2. **Start:** Switches the unit to “Pausing” state.
3. **Resume:** Switches the unit from “Pausing” state to “Run”.
4. **ROP-1:** Unit sequence jumps one ROP backward (previous ROP).
5. **ROP+1:** Unit sequence jumps one ROP forward (next ROP).
6. **Phase – 1:** Unit sequence jumps one phase backward (previous phase).
7. **Phase + 1:** Unit sequence jumps one phase forward (next phase).
8. **All auto:** Switches all unit’s Control Modules to automatic mode.
9. **All manual:** Switches all unit’s Control Modules to manual mode.
0. **Reset:** Resets actual unit state “Completed” or “Aborted”.
1. **Show all:** Shows all control modules belonging to this unit.
2. **Load recipe:** Selected recipe is loaded to the control program.
3. **ROP jump:** Unit sequence jumps to the ROP pre-selected in the combo box above the button.



Operation Manager – Unit parameters Window

- Window shows particular unit “Unit parameters”.
- Unit parameters do not depend on the actual recipe.

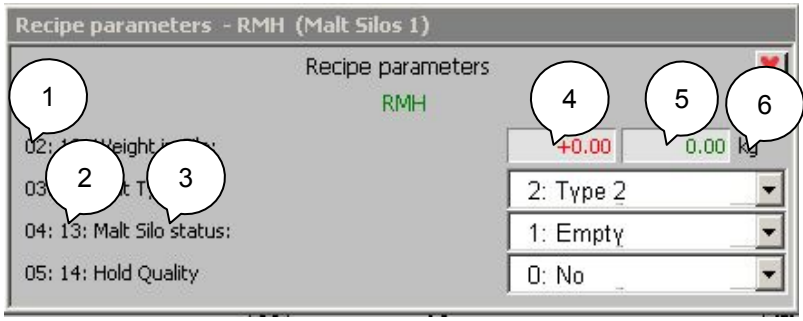


Window explanation:

1. Consecutive parameter number
2. Internal control program parameter ID
3. Parameter name
4. Parameter setpoint value: This parameter can be changed inside predefined limits
5. Parameter actual value
6. Parameter engineering unit

Operation Manager – Recipe parameters Window

- Window shows particular unit “ROP parameters”.
- ROP parameters are parameters specific for actual operation.

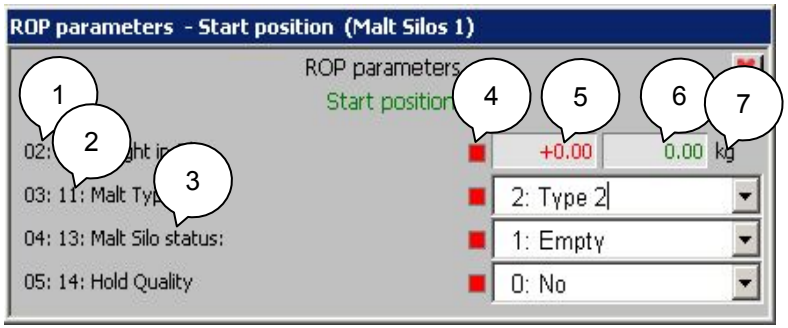


Window explanation:

1. Consecutive parameter number
2. Internal control program parameter ID
3. Parameter name
4. Parameter setpoint value: This parameter can be changed inside predefined limits
5. Parameter actual value
6. Parameter engineering unit

Operation Manager – Unit ROP parameters Window

- Window shows particular unit “ROP parameters”.



Window explanation:

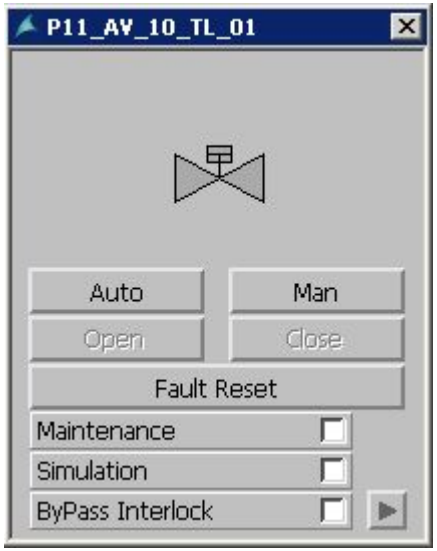
1. Consecutive parameter number
2. Internal control program parameter ID
3. Parameter name
4. Parameter status; red if parameter actual value is not OK for „ROP end condition“
5. Parameter setpoint value: this parameter can be changed inside predefined limits
6. Parameter actual value
7. Parameter engineering unit

Control modules

- Smallest part of the control system that can perform basic control
- Can be physical but also software elements (e.g. valve, pump, measuring instrument, PID regulator...)
- Clicking a CM on the process screen opens its operator dialog box
- Operation modes:
  - **Automatic:** module takes commands from the control software and no operator actions are possible.
  - **Manual:** operator completely controls the module from the HMI – system ignores the commands from the control program.
  - **Local:** the module is controlled by meaning of field control buttons.
  - **Maintenance:** the module is blocked for control and no alarms are shown in the system. It is used when maintenance personnel performs work on the module.
  - **PID manual**: module ignores set point value and gives fixed output set by operator.
  - **Simulation mode:** all module feedbacks are simulated (use only for temporary solution i.e. valve positioner need to be replaced). Module can be switched to simulation mode only by password level 50 (maintenance) or higher.
  - **Bypass interlocks:** all software interlocks are by-passed.

CM Type 01: Valve ON/OFF with Actuator

- This CM represents the valve with one solenoid. It can be equipped with 2 position feedback switches (opened and closed). In the case a switch does not exist, the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Open	Opens the valve
Close	Closes the valve
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Actuator color	Symbol	Meaning
Gray	Gray		Closed
Green	Green		Opened
White	Gray		Closing
White	Green		Opening
Gray	Green		Closed and opening
Green	Gray		Opened and closing
White	Gray		Undefined position
Yellow	Gray		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2
Cyan		Simulation mode ON	3
Yellow		Interlock Bypass	4
Magenta		Local Mode ON	5
Orange		Maintenance	6

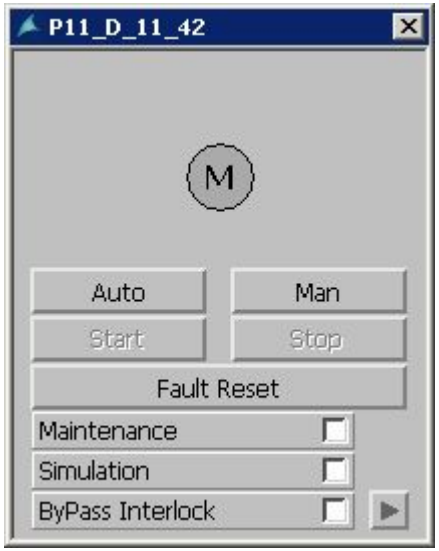
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 02: Motor ON/OFF

- This CM represents the direct controlled motors and pumps. It can be equipped with run feedback switch, ready switch and safety switch (CIB). In the case switch does not exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Start	Starts the motor.
Stop	Stops the motor.
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Symbol	Meaning
Gray	M	Stopped
Green	M	Running
Gray/White		Stopping
Green/White		Starting
White		Undefined state
Yellow		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue	M	Manual mode ON	2
Cyan	M	Simulation mode ON	3
Yellow	M	Interlock Bypass	4
Magenta		Local Mode ON	5
Orange	M	Maintenance	6

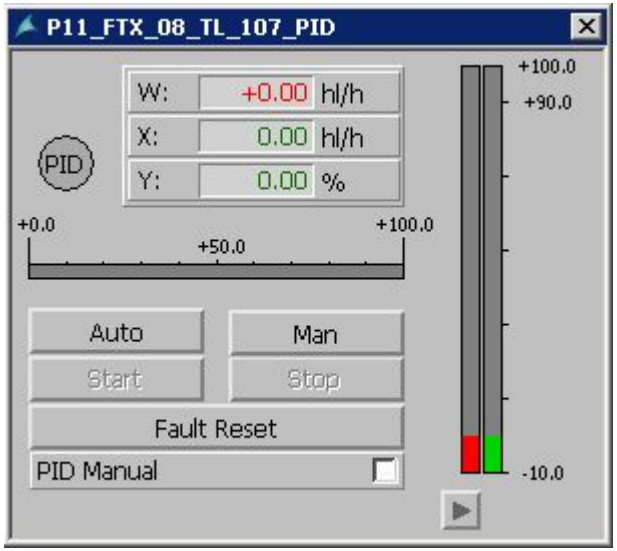
Alarm status & Additional information symbols:

Color	Symbol	Meaning
Red	M	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 03: PID regulator

- This CM represents the PID regulator.
- Operation modes:
  - Automatic, manual, PID manual



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Start	Starts the PID regulator.
Stop	Stops the PID regulator.
Fault reset	Resets the fault on the CM once the fault is gone.
PID manual	Switch PID manual mod ON/OFF.
Slidebar-vertical	Manually set PID setpoint.
Slidebar-horizontal	Manually set PID output value.

Status of the modul:

Color	Symbol	Meaning
Gray	PID 0,0 mbar	Not Active
Green	PID 0,0 mbar	Active in regulation
Dark Green	PID 0,0 mbar	Active in direct output control (PID manual)
White		Undefined state
Yellow		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue	M PID	Manual mode ON	2

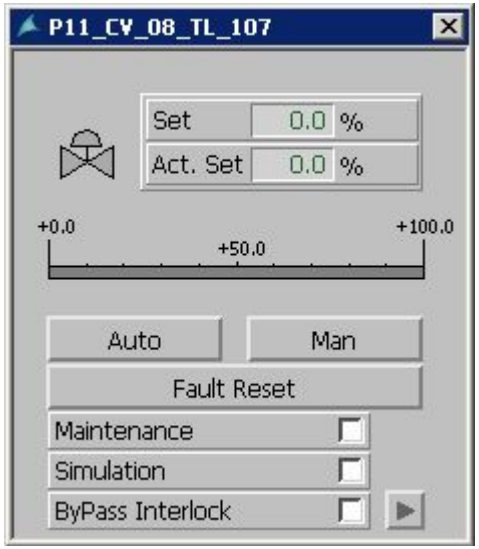
Alarm status & Additional information symbols:

Color	Symbol	Meaning
Red	PID	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON

CM Type 05: Proportional Valve

- This CM represents the proportional valve with one solenoid. It can be equipped with 2 position feedback switches (opened and closed). In the case a switch does not exist, the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.
Slidebar - horizontal	Manually set proportional valve output value.

Status of the modul:

Color	Symbol	Meaning
Gray	0,0 %	Closed
Green	100,0 %	Opened
Gray/White		Closing
Green/White		Opening
Yellow		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue	M 0,0 %	Manual mode ON	2
Cyan	0,0 %	Simulation mode ON	3
Yellow	0,0 %	Interlock Bypass	4
Magenta		Local Mode ON	5
Orange	0,0 %	Maintenance	6

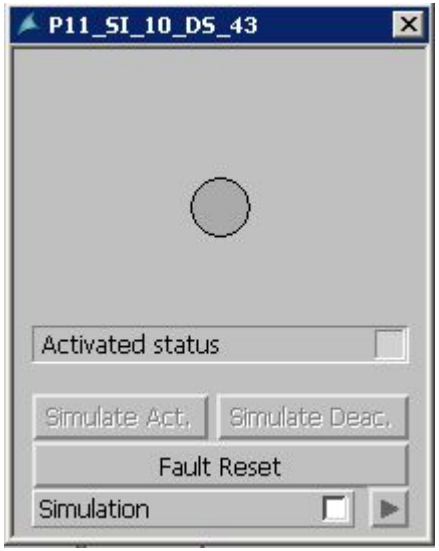
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 06: Digital Switch

- This CM represents the digital switches. Module contains only one digital input.
- Operation modes:
  - Automatic, simulation



Button	Action
Simulate Act.	Switch the module status to activated
Simulate Deact.	Switch the module status to deactivated.
Fault reset	Resets the fault on the CM once the fault is gone.
Simulation	Switch ON/OFF simulation mode.

Status of the modul:

Color	Symbol	Meaning
Gray		Closed
Green		Opened
Red		

Mode of operation:

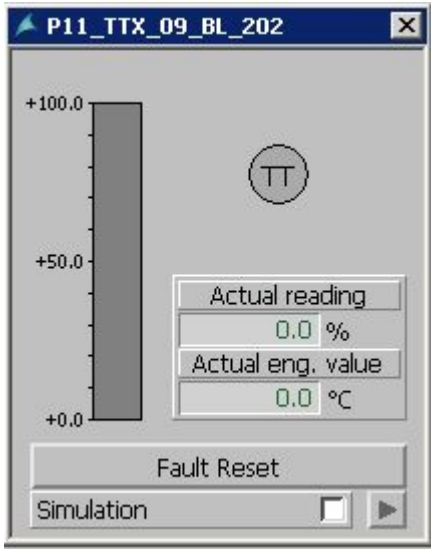
Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2

Alarm status

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

CM Type 09: Analog Measurement

- This CM represents the analog transmitter. Module contains only one analog input.
- Operation modes:
  - Automatic, simulation



Button	Action
Fault reset	Resets the fault on the CM once the fault is gone.
Simulation	Switch ON/OFF simulation mode.
Slidebar – vertical	Manually set actual engineer value

Status of the modul:

Color	Symbol	Meaning
Gray		Closed
Green		Opened
Red		

Mode of operation:

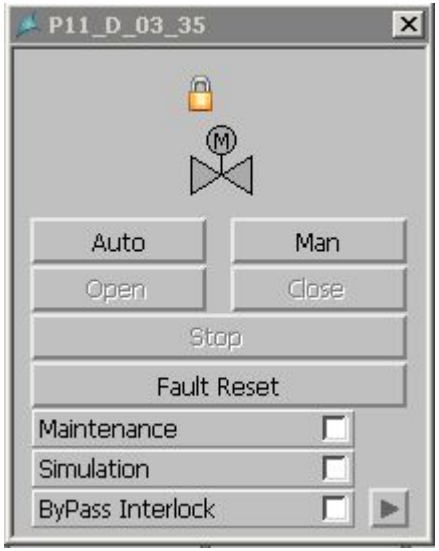
Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2

Alarm status

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

CM Type 11: Motorized valve

- This CM represents the motorized valve. It can be equipped with 2 position feedback switches (opened and closed). In the case switch doesn't exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Open	Opens the valve
Close	Closes the valve
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Actuator color	Symbol	Meaning
Gray	Gray		Closed
Green	Gray		Opened
White	Gray		Closing
White	Green		Opening
Gray	Green		Closed and opening
Green	Gray		Opened and closing
Gray	Green		Undefined position
Green	Gray		Automation error
White	Gray		
Yellow	Gray		

Mode of operation:

Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2
Cyan		Simulation mode ON	3
Yellow		Interlock Bypass	4
Magenta		Local Mode ON	5
Orange		Maintenance	6

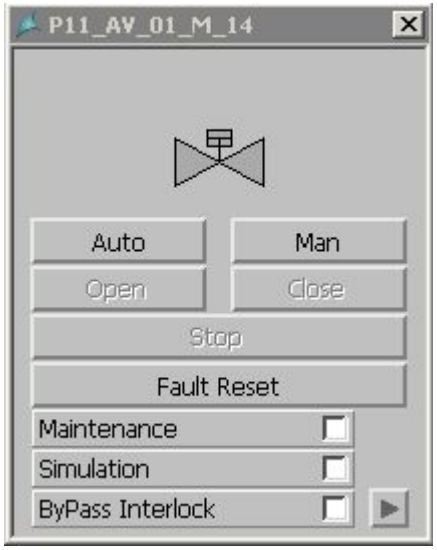
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 13: Valve (double solenoid) with actuator

- This CM represents the valve with two solenoids. It can be equipped with 2 position feedback switches (opened and closed). In the case switch doesn't exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Open	Opens the valve
Close	Closes the valve
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Actuator color	Symbol	Meaning
Gray	Gray		Closed
Green	Gray		Opened
White	Gray		Closing
White	Green		Opening
Gray	Green		Closed and opening
Green	Gray		Opened and closing
Gray	Green		Undefined position
Green	Gray		Automation error
White	Gray		
Yellow	Gray		

Mode of operation:

Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2
Cyan		Simulation mode ON	3
Yellow		Interlock Bypass	4
Magenta		Local Mode ON	5
Orange		Maintenance	6

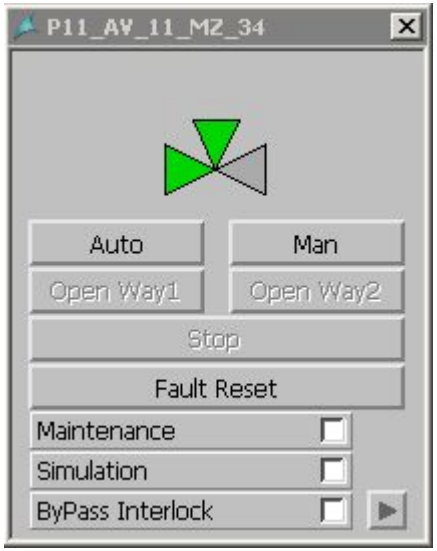
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 15: Two Way Flap (double solenoid)

- This CM represents two way flap with two solenoids. It can be equipped with 4 position feedback switches (2 for opened and 2 for closed). In the case switch doesn't exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Open	Opens the valve
Close	Closes the valve
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Actuator color		Symbol	Meaning
Green	Green	Gray		Open way 1
Green	Gn/Wh	Green		Opening way 1 and opened way 2
Green	Gn/Wh	Gray		Opening way 1
Green	Green	Gn/Wh		Opening way 2 and opened way 1
Green	Gray	Gn/Wh		Opening way 2
Green	Gray	Green		Open way 2
White	White	White		undefined
Yellow	Yellow	Yellow		undefined

Mode of operation:

Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2
Cyan		Simulation mode ON	3
Yellow		Interlock Bypass	4
Magenta		Local Mode ON	5
Orange		Maintenance	6

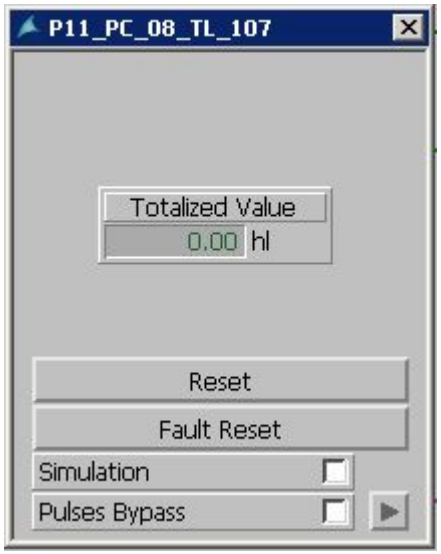
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 16: Totalizer

- This CM represents pulse counting. Module contains only one digital input.
- Operation modes:
  - Automatic, simulation, pulse bypass (integration of continous measurement instead of pulses)



Button	Action
Reset	Reset the totalized value
Fault reset	Resets the fault on the CM once the fault is gone.
Simulation	Switch ON/OFF simulation mode.
Pulses Bypass	Switch ON/OFF pulses bypass.

Status of the modul:

Color	Symbol	Meaning
Gray	0,00	Automatic
Cyan	0,00	Simulation mode
Yellow	0,00	Pulses bypass

Alarm status

Color	Symbol	Meaning
Red	0,00	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

CM Type 17: Digital Output

- This CM represents one digital output.
- Operation modes:
  - Automatic, manual, maintenance, activated, deactivated

Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
On	Switch module ON.
Off	Switch module OFF.
Maintenance	Switch ON/OFF maintenance mode.

Status of the modul:

Color	Symbol	Meaning
Gray		
Green		
Red		
Yellow		

Mode of operation:

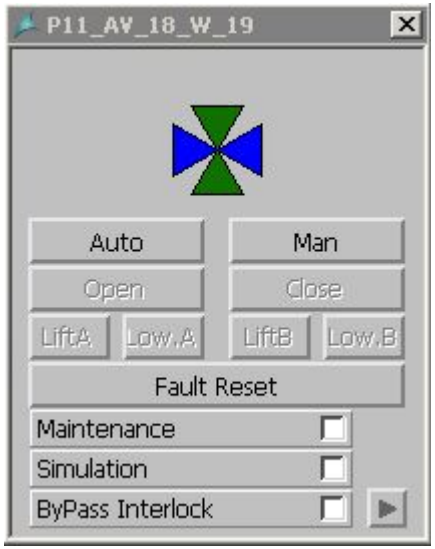
Color	Symbol	Meaning	Priority
Blue		Manual mode ON	
Orange		Maintenance mode ON	

Alarm status

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

CM Type 21: Double Seat Valve

- This CM represents the valve with one solenoid for valve activation and two solenoids for seats. It can be equipped with 2 position feedback switches (opened and closed). In the case switch doesn't exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Open	Opens the valve
Close	Closes the valve
Lift A	Lift seat A.
Lower A	Lower seat A.
Lift B	Lift seat B.
Lower B	Lower seat B.
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode

Status of the modul:

Color	Symbol	Meaning
DarkGreen		Closed
Green		Opened
DarkGreen/White		Closing
Green/White		Opening
DarkGreen/White		Closed and opening
Green/White		Opened and closing
White		Undefined position
Yellow		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue		Manual mode ON	2
Cyan		Simulation mode ON	3
Yellow		Interlock Bypass	4
Magenta		Local Mode ON	5
Orange		Maintenance	6

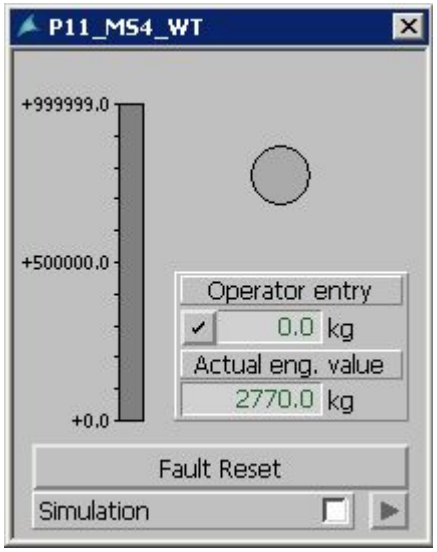
Alarm status &
Additional information symbols:

Color	Symbol	Meaning
Red		CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 29: Analog Value

- This CM represents the Input/Output analog value.
- Operation modes:
  - Automatic, simulation



Button	Action
Fault reset	Resets the fault on the CM once the fault is gone.
Simulation	Switch ON/OFF simulation mode.
Operator entry	Manually set actual engineer value.

Status of the modul:

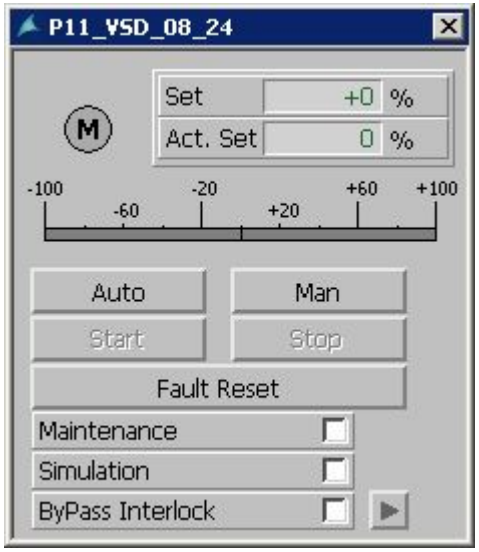
Color	Symbol	Meaning
Gray	0 hl	Automatic
Yellow	0 hl	Low/High warning
Gray/Cyan	0 hl	Simulation

Alarm status

Color	Symbol	Meaning
Red	0 hl	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

CM Type 34: Motor VS Gen

- This CM represents the motors and pumps that can run with various range of speed. It can be equipped with run feedback switch, ready switch and safety switch (CIB). In the case switch doesn't exist the feedback is simulated by control system.
- Operation modes:
  - Automatic, manual, local, maintenance, simulation, bypass interlocks.



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Start	Starts the motor.
Stop	Stops the motor.
Fault reset	Resets the fault on the CM once the fault is gone.
Maintenance	Switch ON/OFF maintenance mode.
Simulation	Switch ON/OFF simulation mode.
Bypass Interlock	Switch ON/OFF bypass interlock mode.

Status of the modul:

Color	Symbol	Meaning
Gray	M	Stopped
Green	M	Running
Gray/White		Stopping
Green/White		Starting
White		Undefined state
Yellow		Automation error

Mode of operation:

Color	Symbol	Meaning	Priority
Blue	M	Manual mode ON	2
Cyan	M	Simulation mode ON	3
Yellow	M	Interlock Bypass	4
Magenta		Local Mode ON	5
Orange	M	Maintenance	6

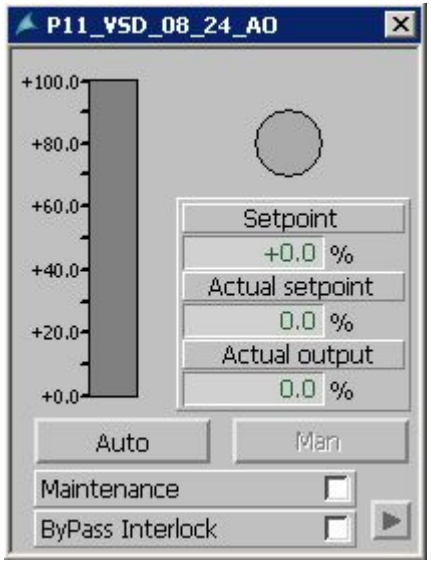
Alarm status & Additional information symbols:

Color	Symbol	Meaning
Red	M	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Symbol	Meaning
M	Manual mode ON
L	Local Mode ON
	Interlock (Hardware or Software)

CM Type 35: Analog Output

- This CM represents the analog output value. Module contains only one analog output.
- Operation modes:
  - Automatic, simulation



Button	Action
Auto	Switch the module to automatic mode.
Man	Switch module to manual mode.
Maintenance	Switch ON/OFF maintenance mode.
ByPass Interlock	Switch ON/OFF bypass interlocks mode.

Status of the modul:

Color	Symbol	Meaning
Gray	0 hl	Automatic
Gray/Orange	0 hl	Maintenance
Gray/Yellow	0 hl	ByPass Interlock

Alarm status

Color	Symbol	Meaning
Red	0 hl	CM is alarm status
Red (flashing)		CM in alarm that has to be reset (Fault reset button)

Authorisation level example – CM01

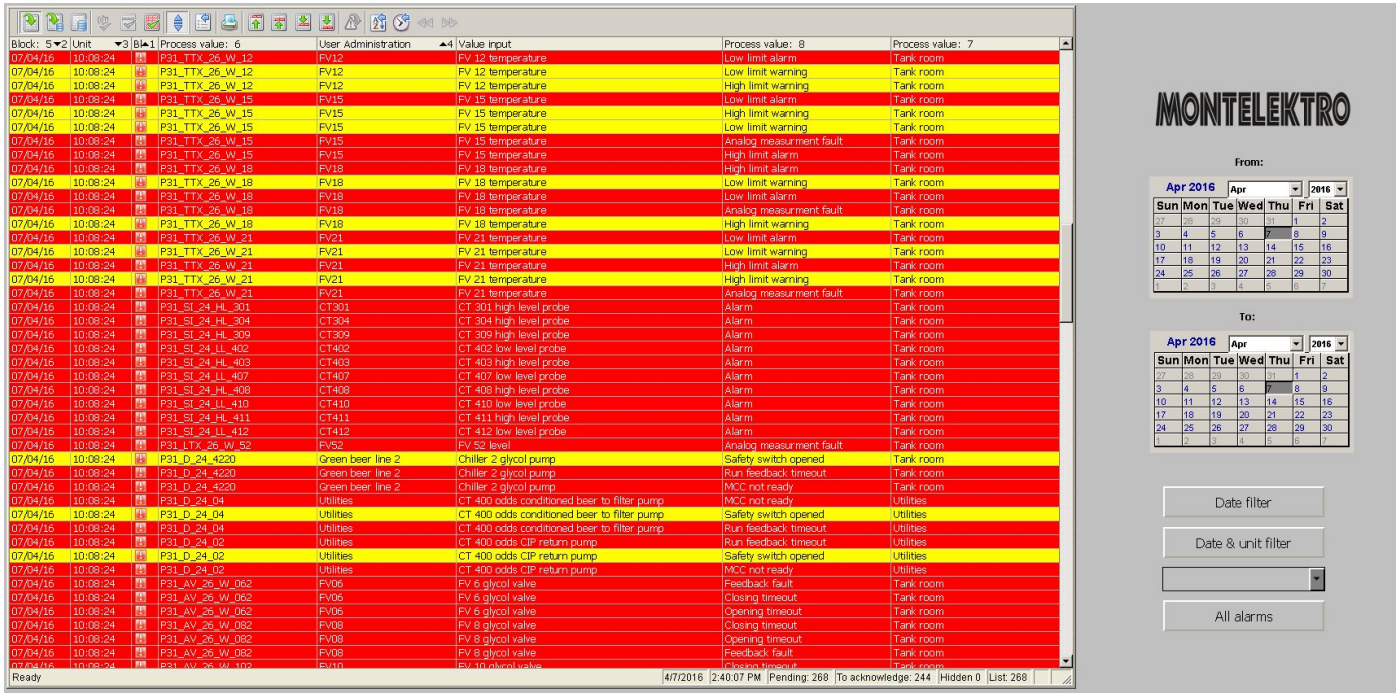
MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Button	Action	Explanation	Enabled	Password level
Auto	Switch the module to automatic mode.	CM is controlled by program and no operator action is permitted.	Always.	10 – Operator
Man	Switch module to manual mode.	Module is controlled by operator from the HMI.	When control is not disabled from the control program (status 'Manual disabled').	10 - Operator
Open	Opens the valve		Module is in manual mode and there is no interlock.	10 – Operator
Close	Closes the valve		Module is in manual mode and there is no interlock.	10 – Operator
Fault reset	Resets the fault on the CM once the fault is gone.	The button is blinking red when there is the condition for fault reset.	Always.	10 – Operator
Maintenance	Switch ON/OFF maintenance mode.	Maintenance mode is ON when the box is checked.	Always.	50 – Maintenance
Simulation	Switch ON/OFF simulation mode.	Simulation mode is ON when the box is checked.	Always.	50 – Maintenance
Bypass Interlock	Switch ON/OFF bypass interlocks mode.	Bypass interlocks mode is ON when the box is checked.	Always.	50 – Maintenance

Operation Manager - Alarms

MONTELEKTRO AUTOMATION AND ELECTRICAL ENGINEERING LTD

Alarms screen

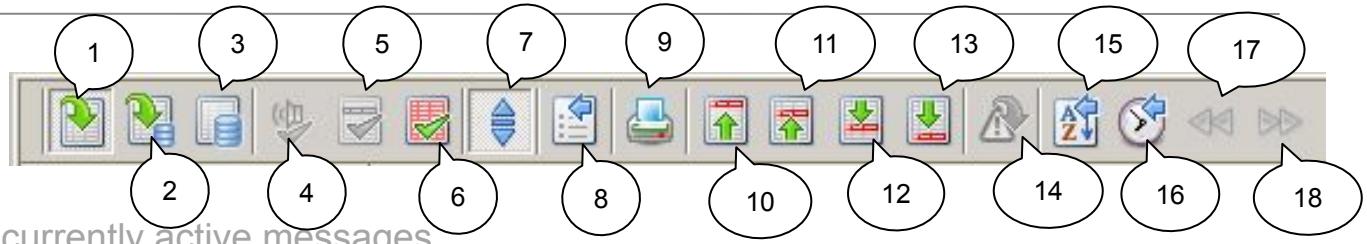


- Alarm information consists of:
  - Alarm acknowledged or not information
  - Alarm appearance date and time
  - Alarm description
  - Area to which the alarm belongs
  - Alarm tag name (for software specialist)

- Displays active or not confirmed alarms in entire system.
- Alarm types:
  - **High priority alarms** are shown in red color and their appearance means that something is wrong in process
  - **Low priority alarms** are shown in yellow color and their appearance means that system has the message or warning for operator

Operation Manager - Alarms

Alarms toolbar



Commands explanation:

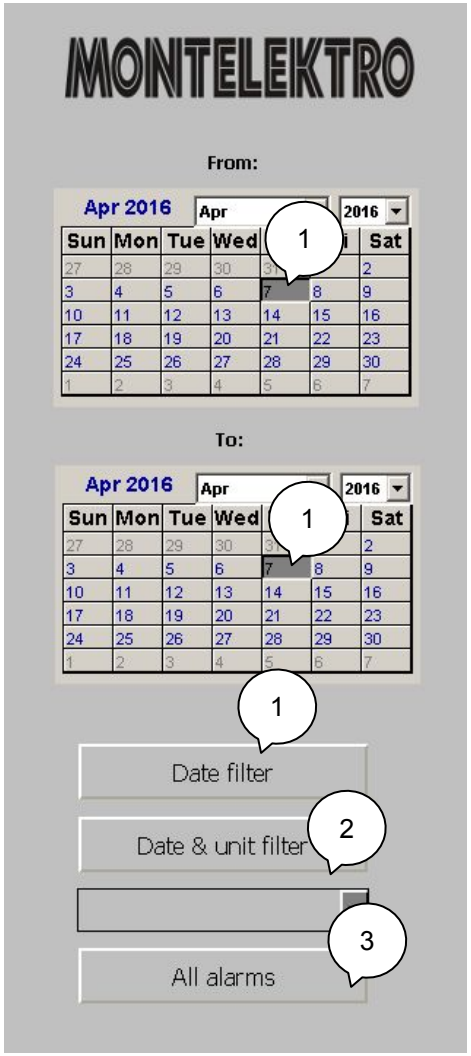
1. **Message list**: Shows currently active messages
2. **Short-term archive list**: Shows archived messages (short-term)
3. Long-**term archive list**: Shows archived messages (long-term)
4. **Acknowledge central signaling services**
5. **Single acknowledgment**: acknowledges a single message
6. **Group acknowledgmenet**: acknowledges a group of messages
7. **Autoscroll**
8. **Selection dialog**: Creates a filter for message displaying
9. **Printing**: Sends a message log for printing
10. **First message**: Shows the first message
11. **Previous message**: Shows the previous message
12. **Next message**: Shows the next message
13. **Last message**: Shows the last message
14. **Loop in alarm**
15. **Sort dialog**: Sorts message dialog by specified filters
16. **Time base dialog**: Changes the system time base
17. **Previous page**: Shows previous message page
18. **Next page**: Shows next message page

Operation Manager - Alarms

Alarm filtering options

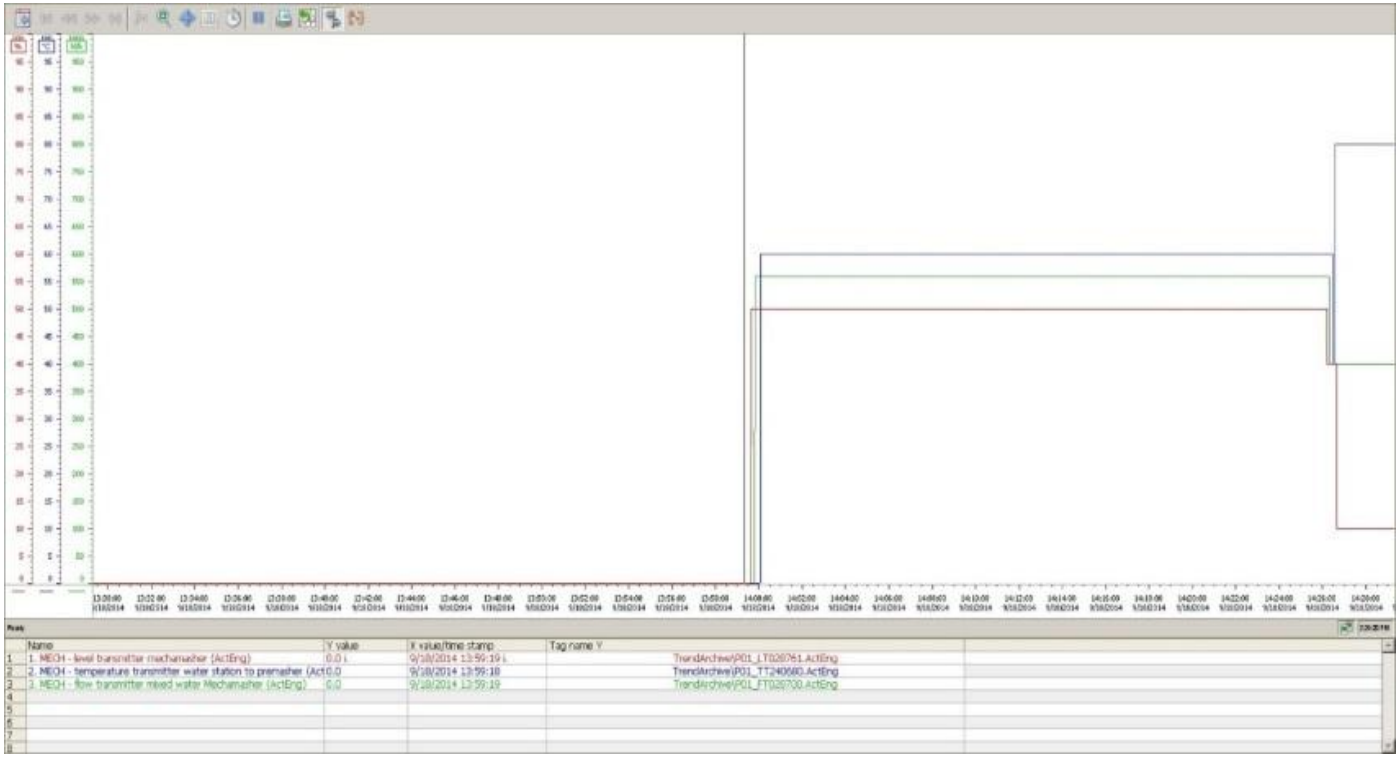
Commands explanation:

1. Displays messages between selected date
2. Displays messages between selected dates and for specific unit.
3. Displays all messages



Operation Manager - Trends

Trends screen

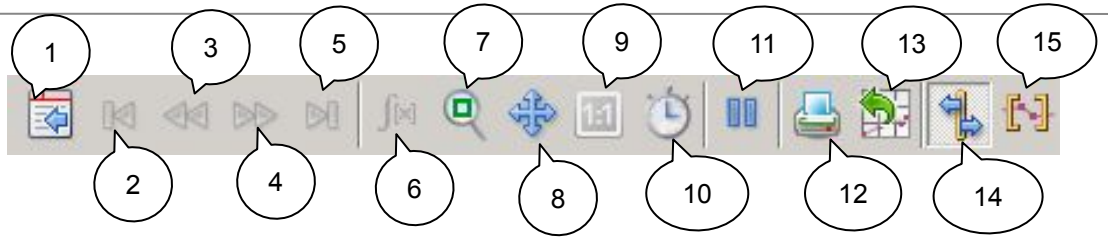


- Called via Trends: icon on process screens.

- Each process screen contains a desired number of Trend buttons.
- Each trend button opens a specific screen that contains predefined analog measurements.
- Trend itself shows dependence of particular process value, measurement on the time.
- The trend screen, once open, shows the last two hours for defined values.
- Scrolling through time, zooming and printing are standard trend screen features.

Operation Manager - Trends

Trends header



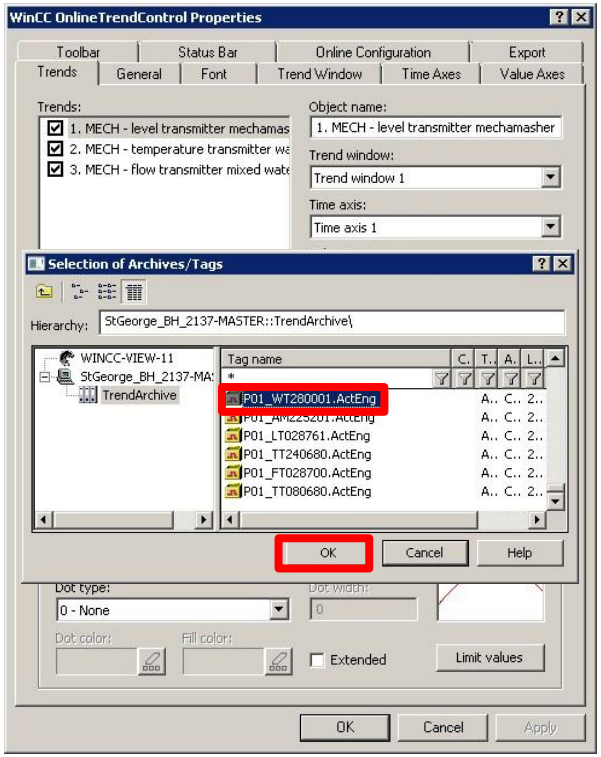
Commands explanation:

1. Trend window properties
2.
3.
4.
5.
6.
7. Zoom trend
8. Scroll through timeline
9.
10. Define time interval
11. Pause trends
12. Print trend window
13. Export trends
14. Show ruler
15. Set statistics range

Operation Manager - Trends

Adding trends

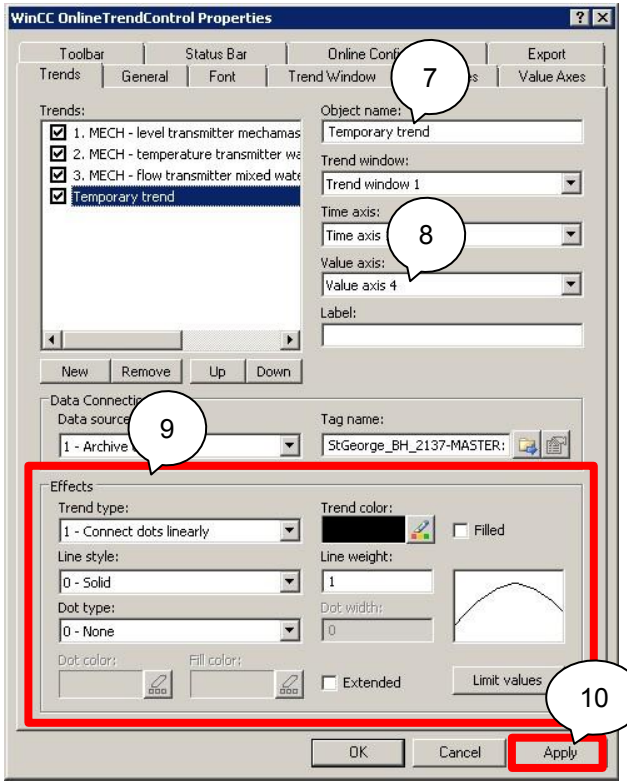
- Historical trend properties window is called via icon on trend screen header.
- Trend tab allows adding and removing trends.
- To add a trend, click the button (1), then click in the field „Tag name”: browse button (2)
- Select a tag from *TrendArchive* and click ok



Operation Manager - Trends

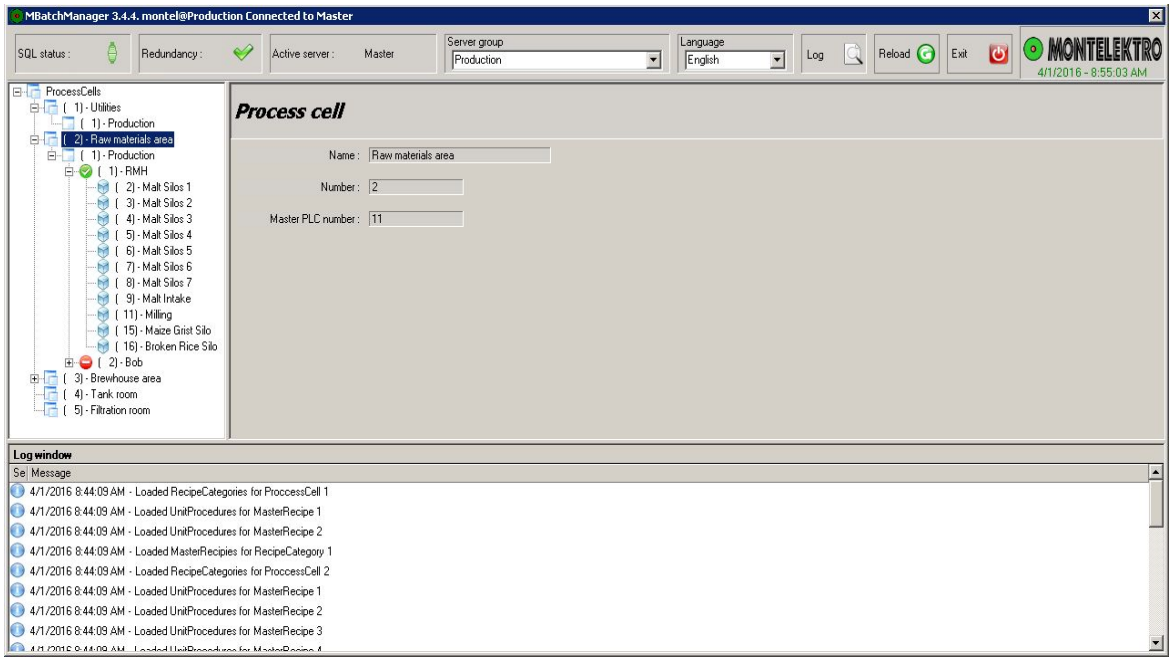
Value axes tab

- To add a new axis, click button (1).
- Change parameters according to the new trend:
  2. Object name – set axis name
  3. Label – set new label
  4. Value from – set tag low limit
  5. Value to – set tag high limit
  6. Decimal places – set number of decimal places
- Return to *Trends* tab and set new trend options:
  7. Object name – set trend name
  8. Value axis – select new axis defined in previous step
  9. Effects – set trend line appearance
- Click *Apply* (10) to confirm changes.



Operation Manager – Recipe Editor

Recipe editor screen



- Called by the Recipe Editor button from the system header.
- The recipe that we create is consisted from recipe operations (ROPs) that are grouped into unit procedures.
- Recipe form is defined by order of recipe operation (ROPs) execution.

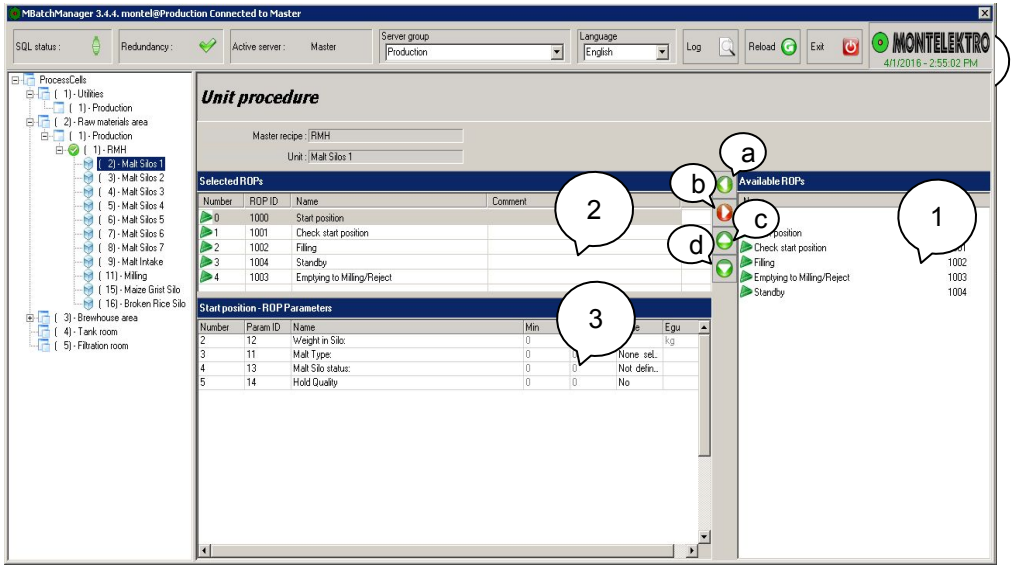
Operation Manager – Recipe Editor

Recipe editor screen

1. Main command and info area:
   a) SQL status area
   b) Redundancy state area
   c) Server group area
   d) Language area
   e) Commands area
   f) Clock and logo
2. Log area:
   a) Severity of the message:
      - Informational
      - Succesful
      - Warning
      - Error
   b) Message text
3. Object hierarchy area:
   a) Process cell
   b) Recipe categories
   c) Master recipes
   d) Unit procedures
4. Data view area

Operation Manager – Recipe Editor

Recipe editor data views



1. Main command and info area:
   - Shown at startup or on selectiong node *ProcessCells*
2. Process cell view:
   - Managing master recipes:
     a) Add
     b) Copy
     c) Delete
3. Master recipe view:

   Window areas:
   1. Master recipe details
   2. Recipe included units
   3. Units that can be included

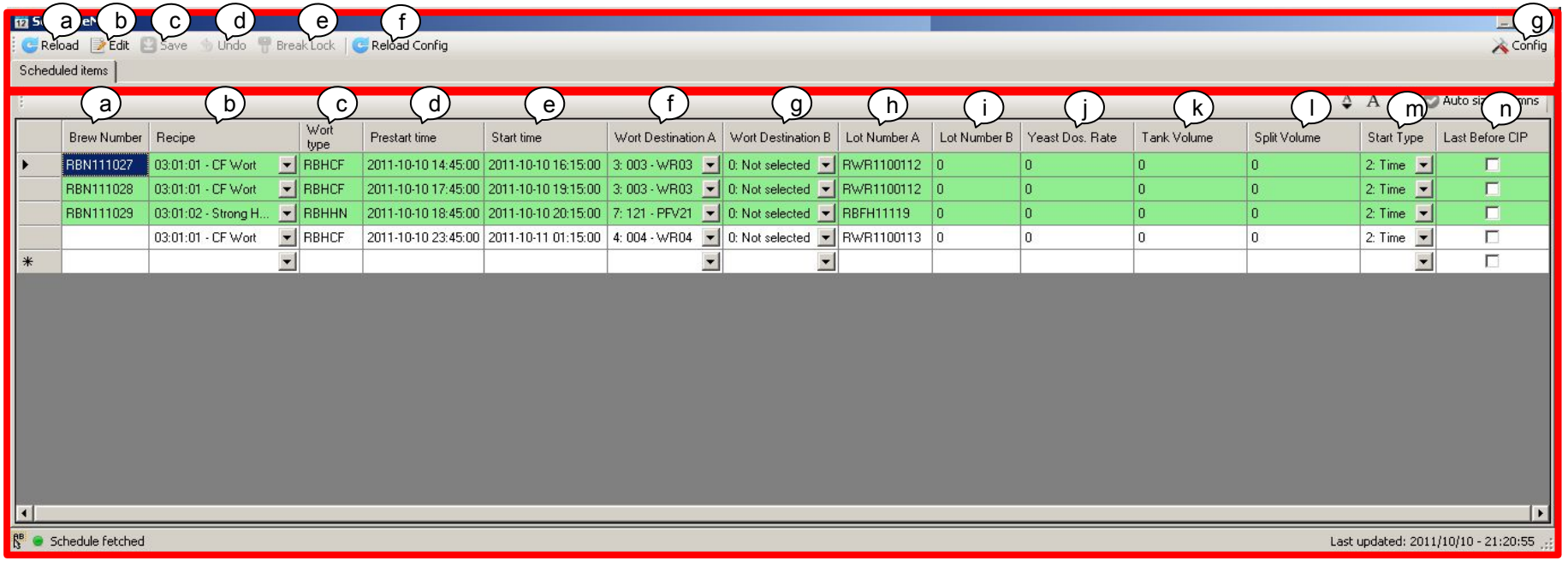
   Button functions:
   a) Add
   b) Remove
   c) Copy
   d) Export master recipe to excel
5. Unit procedure view:

   Window areas:
   1. Available ROPs
   2. Selected ROPs
   3. ROP Parameters

   Button functions:
   a) Add
   b) Remove
   c) Move above selection
   d) Move below selection

Operation Manager – Batch Manager

Production Scheduler screen



- Application used to schedule batches.

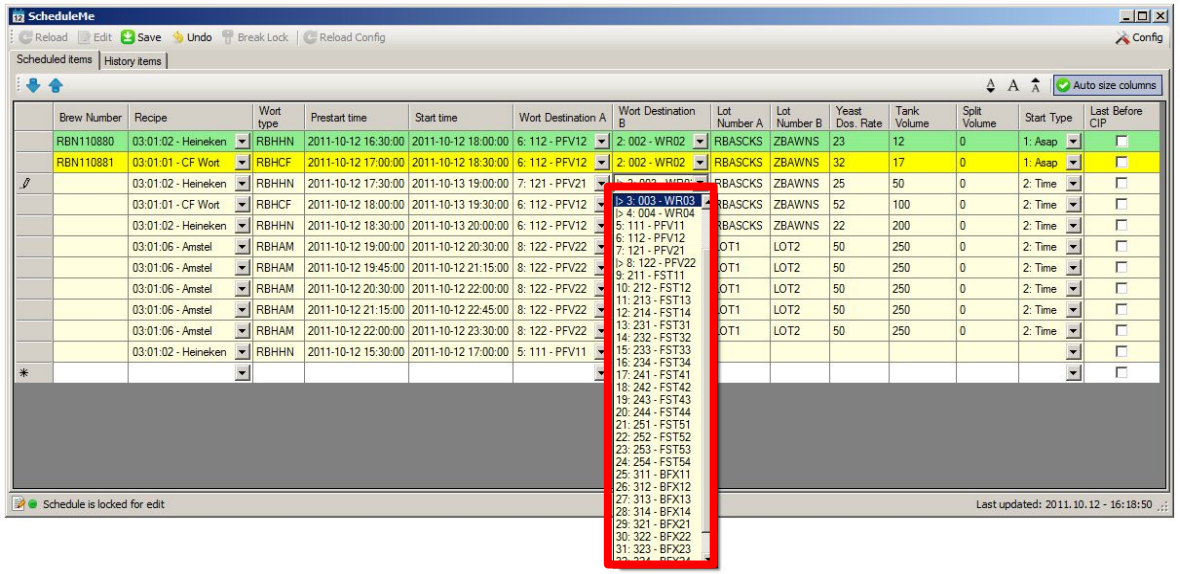
1. Main command area:
   a) Reload
   b) Edit
   c) Save
   d) Undo
   e) Break Lock
   f) Reload Config
   g) Config

2. Main command area:
   a) Brew number
   b) Recipe
   c) Wort type
   d) Milling start time
   e) Premashing start time
   f) Wort destination A
   g) Wort destination B

Operation Manager – Batch Manager

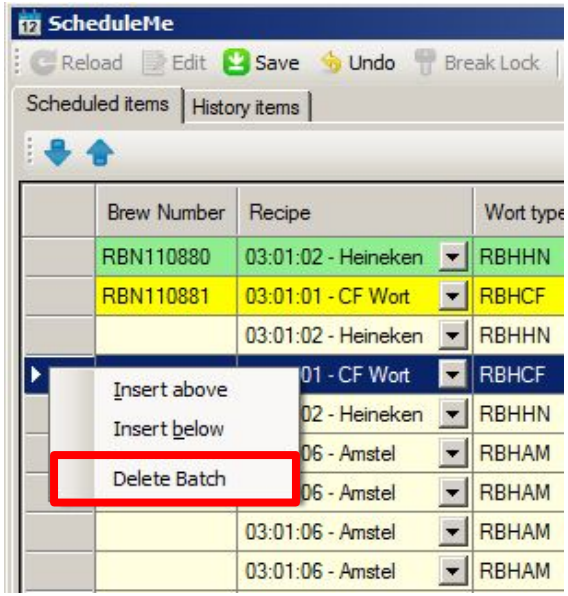
Scheduler screen – queueing new batches

- Way one:
  - Write batch data directly in the grid on the first empty line
- Way two:
  - Use „add new batch form”
    - Selected number of Batches is entered in the grid.
    - Start time is calculated automatically for every batch based on selected Batch Rhythm while all other data remains unmodified for other Brew.
    - As not every Wort Destinations combination is allowed, the application checks the validity.



Scheduler – insert/delete queued batch

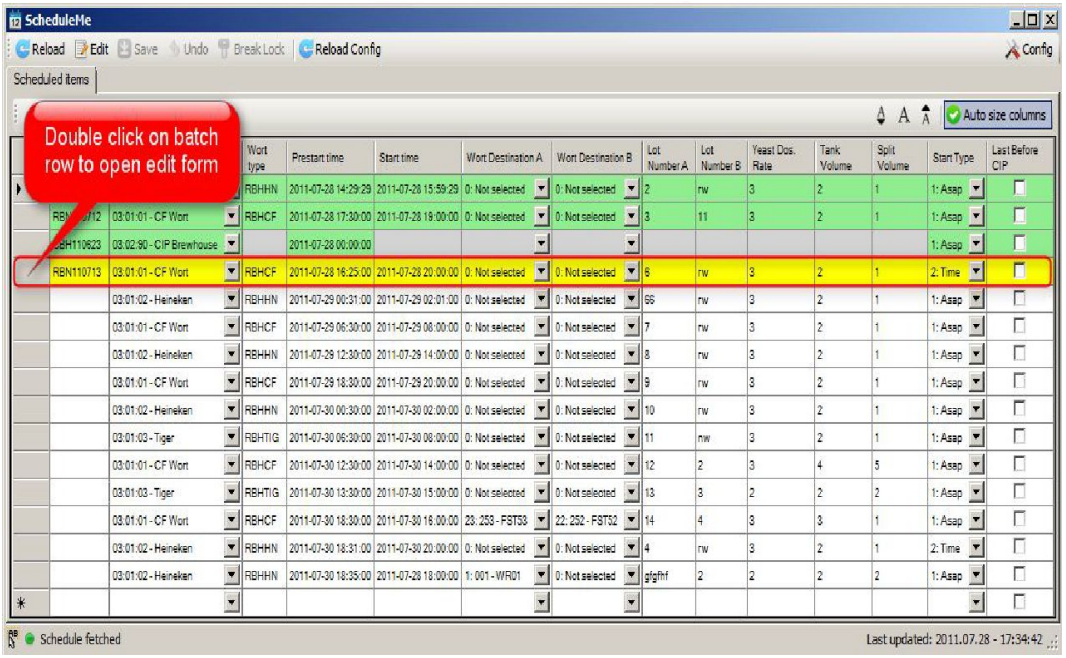
1. Insert queued batch:
   - Ne batches can be inserted between queued batches
   - Right mouse click on the gray field
   - Select „insert above” or „insert below”
2. Delete queued batch:
   - Right mouse click on the gray field
   - Select „Delete Batch”



Operation Manager – Batch Manager

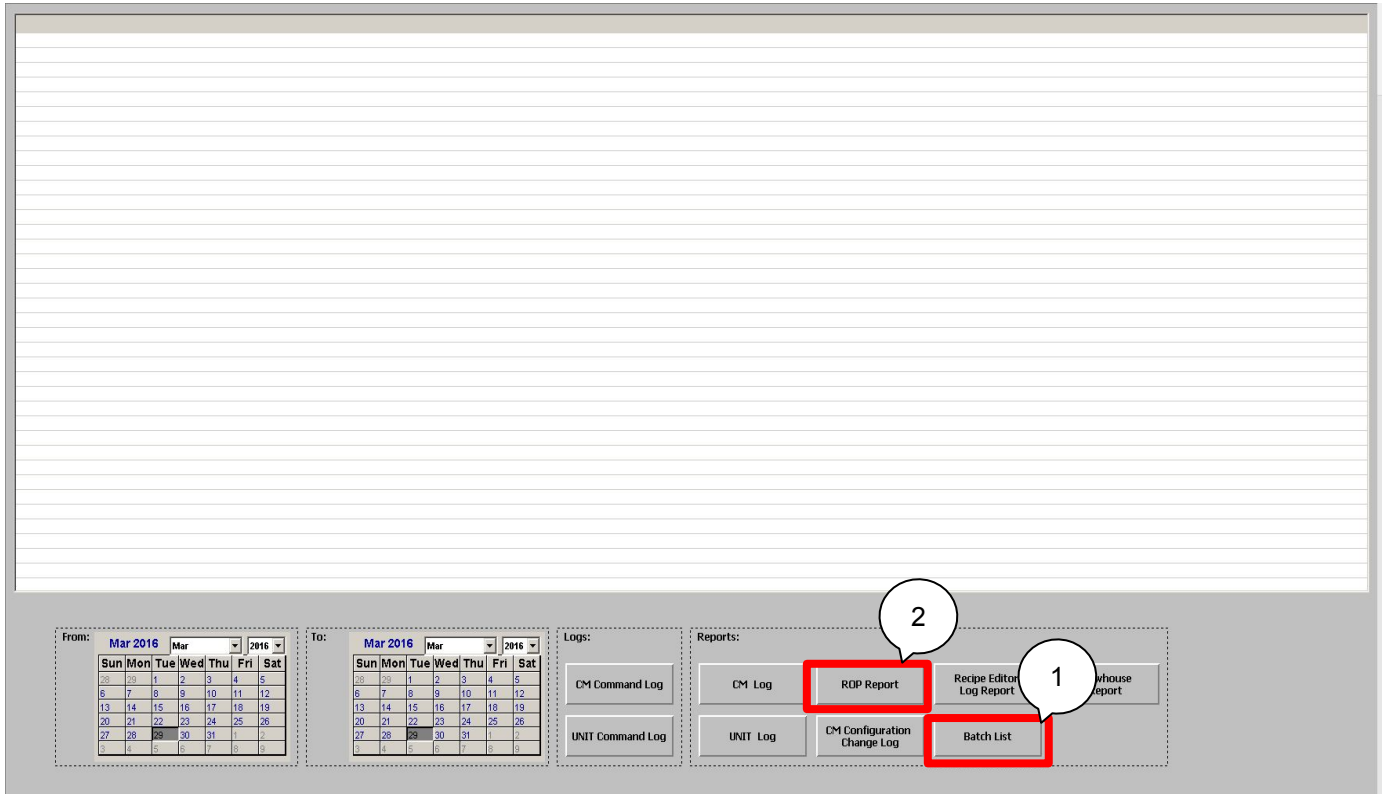
Scheduler – Modifying Batches

1. Modifying running batch:
   - The Batch that is running (colored green) cannot be modified directly in the grid.
   - Use the “Edit form” for modification.
     - left mouse click on grey filed left to the grid
   - Select „insert above” or „insert below”
2. Modifying „Next to start” batches:
   - The Batch transferred to the PLC and not started yet, is marked with yellow color.
   - Edit parameters of such a batch by using the edit form.
   - Edited batch is marked with red color.
   - Action can be canceled with “Undo” command.
   - If changes are saved, Batch will change color in next few moments, when the request is transferred to the PLC.
   - Yellow marked Batches cannot be deleted from the Scheduler. To delete this batch, it is necessary to change the start time and start type (in the case start type is ASAP) and save the changest.



Operation Manager – Reports

Reports Screen



- Report selection screen buttons::
  1. Batch list: Opens Microsoft excel sheet with Batch repots
  2. ROP Report: Opens Microsoft excel sheet with ROP reports (Step Protocol)

MONTELEKTRO AUTOMATION AND ELECTRICAL ENGINEERING LTD

Reports – Batch list

- Batch List shows list of batches executed in certain period. The list could be sorted using following filters::
  1. Time period (“Date From”, “Date To”)
  2. Process Cell
  3. Recipe Category
  4. Master Recipe
  5. Unit
  6. Order ID
- Click on the button „Generate” creates an excel file including all executed Batches::
  - Batch Start Time
  - Batch End Time
  - Batch Duration in this Unit (hh:mm)
  - Order Id
  - Batch ID
  - Unit name
  - Process Cell Name
  - Recipe Category
  - Recipe Name

Batch List

Process Cell	All
Unit	All
Recipe category	All
Recipe	All
Order ID	All

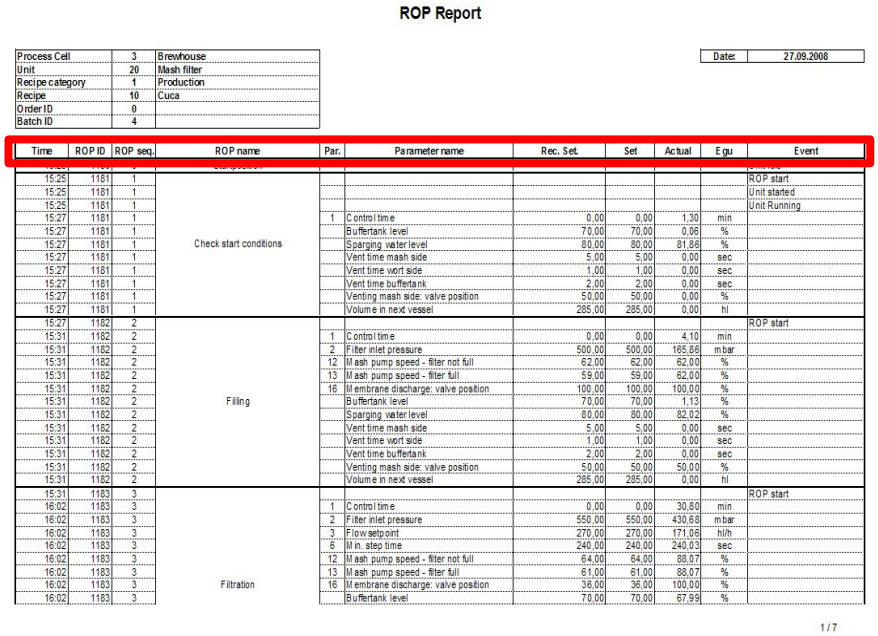
Date from:	01.03.2016.
Date to :	29.03.2016.
Batch Type:	All

Start Time	End Time	Duration	Order ID	Batch ID	Unit	Process Cell	Recipe category	Recipe
18.03.2016. 16:17	21.03.2016. 11:16	66:59	2016	7	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 09:11	21.03.2016. 11:47	2:35	2016	7	Malt Silos 3	Raw materials area	Production	RMH
21.03.2016. 11:42	21.03.2016. 11:45	0:02	2016	7	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 11:54	21.03.2016. 11:55	0:01	2016	8	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 11:55	22.03.2016. 16:22	28:26	2016	8	Malt Silos 1	Raw materials area	Production	RMH
21.03.2016. 13:09	21.03.2016. 13:14	0:04	2016	9	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:09			2016	9	Malt Silos 5	Raw materials area	Production	RMH
21.03.2016. 13:15	21.03.2016. 13:16	0:00	2016	10	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:16			2016	10	Malt Silos 2	Raw materials area	Production	RMH
21.03.2016. 13:17	21.03.2016. 13:18	0:00	2016	11	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:17	24.03.2016. 14:07	72:49	2016	11	Malt Silos 3	Raw materials area	Production	RMH
21.03.2016. 13:18	21.03.2016. 13:19	0:01	2016	12	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:19			2016	12	Malt Silos 4	Raw materials area	Production	RMH
21.03.2016. 13:21	21.03.2016. 13:22	0:01	0	0	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:22	21.03.2016. 13:23	0:00	2016	13	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:23	21.03.2016. 13:25	0:01	2016	14	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:24			2016	14	Malt Silos 6	Raw materials area	Production	RMH
21.03.2016. 13:26	21.03.2016. 13:27	0:01	2016	15	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:26	21.03.2016. 13:29	0:03	2016	15	Malt Silos 7	Raw materials area	Production	RMH
21.03.2016. 13:29	21.03.2016. 13:30	0:00	2016	16	Malt Intake	Raw materials area	Production	RMH
21.03.2016. 13:30	24.03.2016. 11:47	70:16	2016	16	Malt Silos 7	Raw materials area	Production	RMH
21.03.2016. 13:33	21.03.2016. 13:34	0:00	2016	17	Malt Intake	Raw materials area	Production	RMH
22.03.2016. 15:04	22.03.2016. 15:06	0:02	2016	18	Milling	Raw materials area	Production	RMH
22.03.2016. 15:42	22.03.2016. 15:44	0:02	2016	19	Milling	Raw materials area	Production	RMH
22.03.2016. 15:46	22.03.2016. 16:16	0:29	2016	20	Milling	Raw materials area	Production	RMH
22.03.2016. 16:21	22.03.2016. 16:21	0:00	2016	21	Malt Intake	Raw materials area	Production	RMH

MONTELEKTRO AUTOMATION AND ELECTRICAL ENGINEERING LTD

Reports – ROP report (step protocol)

- ROP report shows list of ROPs executed in certain period. The list can be sorted using following filters:.
  1. Time period (“Date From”, “Date To”)
  2. Process Cell
  3. Recipe Category
  4. Master Recipe
  5. Order ID
  6. Batch ID
  7. Unit
- Click on the button „Generate” creates an excel file including all ROPs for selected Batch:.
  - Start Time
  - ROP ID
  - ROP sequential number in master recipe
  - ROP name
  - Master recipe setpoint, Actual recipe setpoint and Parameter actual value at the end of Operation
  - Unit state changing events (unit start, stop, hold, restart…)



ROP Report

Process Cell	3	Brewhouse
Unit	20	Mash filter
Recipe category	1	Production
Recipe	10	Cuca
Order ID	0	
Batch ID	4	

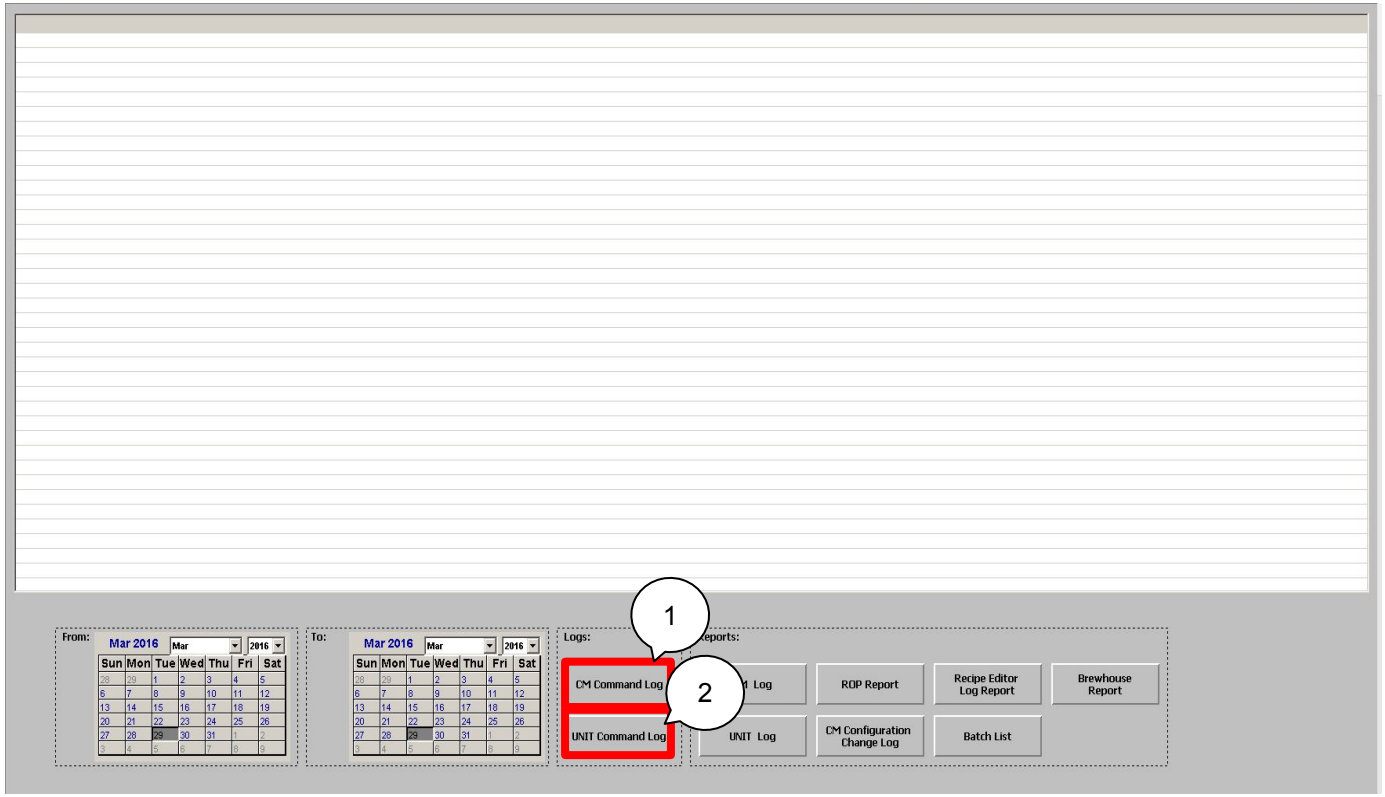
Date: 27.09.2008

Time	ROP ID	ROP seq.	ROP name	Par.	Parameter name	Rec. Set.	Set	Actual	Egu	Event
15:25	1181	1								ROP start
15:25	1181	1								Unit started
15:25	1181	1								Unit Running
15:27	1181	1		1	Control time	0,00	0,00	1,30	min	
15:27	1181	1			Buffertank level	70,00	70,00	0,06	%	
15:27	1181	1	Check start conditions		Sparging water level	80,00	80,00	81,86	%	
15:27	1181	1			Vent time mash side	5,00	5,00	0,00	sec	
15:27	1181	1			Vent time wort side	1,00	1,00	0,00	sec	
15:27	1181	1			Vent time buffertank	2,00	2,00	0,00	sec	
15:27	1181	1			Venting mash side: valve position	50,00	50,00	0,00	%	
15:27	1181	1			Volume in next vessel	285,00	285,00	0,00	hl	
15:27	1182	2								ROP start
15:31	1182	2		1	Control time	0,00	0,00	4,10	min	
15:31	1182	2		2	Filter inlet pressure	500,00	500,00	165,66	mbar	
15:31	1182	2		12	Mash pump speed - filter not full	62,00	62,00	62,00	%	
15:31	1182	2		13	Mash pump speed - filter full	59,00	59,00	62,00	%	
15:31	1182	2		16	Membrane discharge: valve position	100,00	100,00	100,00	%	
15:31	1182	2	Filling		Buffertank level	70,00	70,00	1,13	%	
15:31	1182	2			Sparging water level	80,00	80,00	82,02	%	
15:31	1182	2			Vent time mash side	5,00	5,00	0,00	sec	
15:31	1182	2			Vent time wort side	1,00	1,00	0,00	sec	
15:31	1182	2			Vent time buffertank	2,00	2,00	0,00	sec	
15:31	1182	2			Venting mash side: valve position	50,00	50,00	50,00	%	
15:31	1182	2			Volume in next vessel	285,00	285,00	0,00	hl	
15:31	1183	3								ROP start
16:02	1183	3		1	Control time	0,00	0,00	30,80	min	
16:02	1183	3		2	Filter inlet pressure	550,00	550,00	430,68	mbar	
16:02	1183	3		3	Flow setpoint	270,00	270,00	171,06	hl/h	
16:02	1183	3		6	Min. step time	240,00	240,00	240,03	sec	
16:02	1183	3		12	Mash pump speed - filter not full	64,00	64,00	88,07	%	
16:02	1183	3		13	Mash pump speed - filter full	61,00	61,00	88,07	%	
16:02	1183	3	Filtration	16	Membrane discharge: valve position	36,00	36,00	100,00	%	
16:02	1183	3			Buffertank level	70,00	70,00	67,99	%	

1 / 7

Operation Manager – Event logs

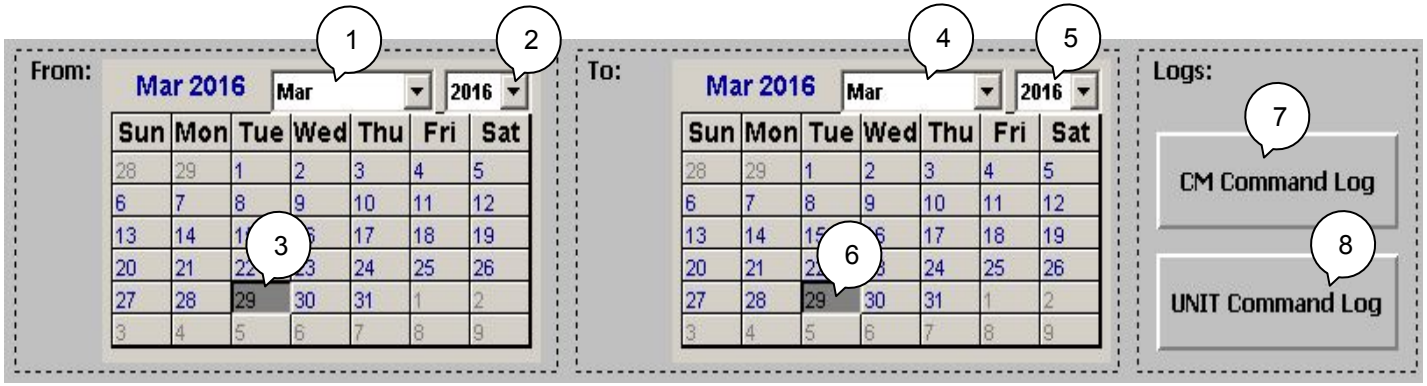
Log screen



- Log selection screen buttons::
  1. CM Command Log: Opens the sreen where control modules commands log is displayed.
  2. Unit Command Log: Opens the screen where unit commands log is displayed.

Operation Manager – Event logs

Log reports

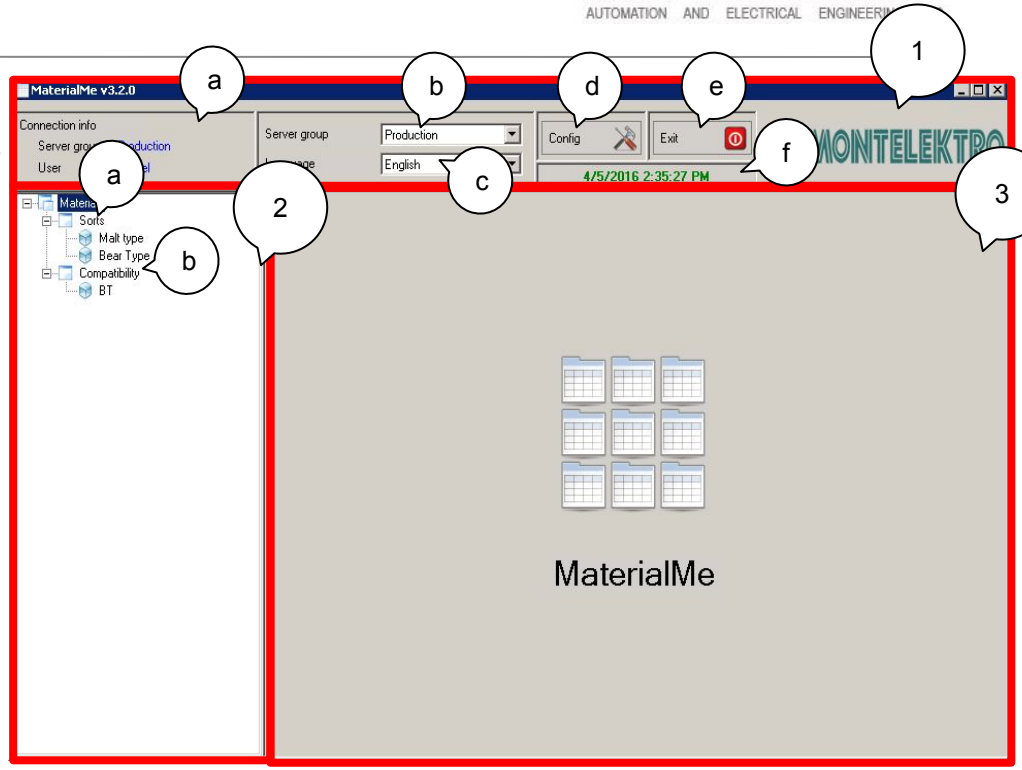


- Displaying list of commands executed on control module (Command log) or unit (Unit command log) in manual mode in certain period
- Time range settings:.
  1. set Start month
  2. set Start year
  3. set Start day
  4. set End month
  5. set End year
  6. set End day
  7. CM Command Log
  8. Unit Command Log .

Operation Manager – Material editor

Material editor screen

- Defines specific material lists in form of selection tables.
- Compatibility tables can be generated to define whether a specific material type is appropriate for a specific brew

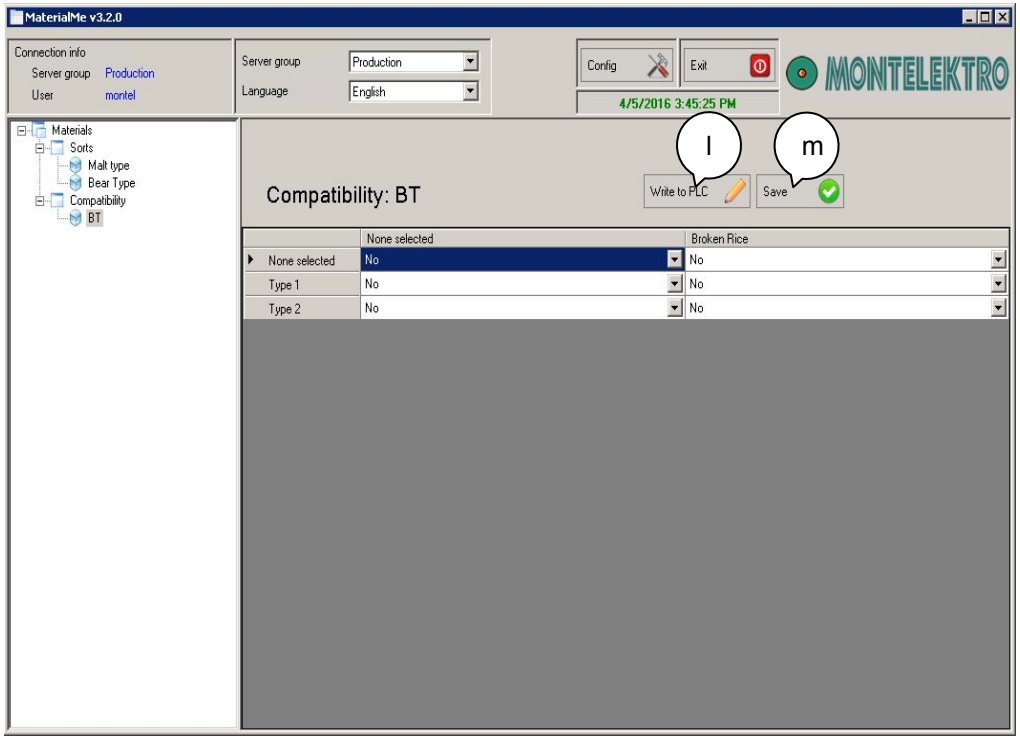


1. Main command and info area:
   a) Connection info area
   b) Server group area
   c) Language area
   d) Config
   e) Exit button
   f) Time & Date
2. Object hierarchy area:
   a) Sorts
   b) Compatibility
3. Data view area:
   - Browsing object hierarchy changes data view area accordingly
   - There are five data views as follows:
     - Blank view
     - Sorts view
     - Material type view
     - Compatibility tables view
     - Compatibility table definition view

Operation Manager – Material editor

Material editor

- Blank view
  - Shown on startup or on selecting node *Materials* (1)
- Sorts view
  - Consists of control buttons for adding, deleting or editing particular material types.
  - By click on the *„Edit"* or *„Add"* button, an extended dialog (2) appears giving the possibility to edit an existing or creating a new sort.
  - In order to create a new sort, a unique name has to be given in English (a) and local language (b)
  - An existing selection table can be chosen or a new one can be added (c).
  - To save the new sort, the *„Save"* button (d) should be pressed.
  - To delete a sort , a specific material type has to be selected and the *„delete"* button (e) has to be pressed
- Material type view
  - Lists the selection possibilities defined under one material type (3)
  - Add a row (f)
  - Delet a row (g)
  - Save the new sort (h)
- Compatibility tables view
  - Displays existing compatibility tables
  - Tables can be added (i), deleted (j) or saved (k)

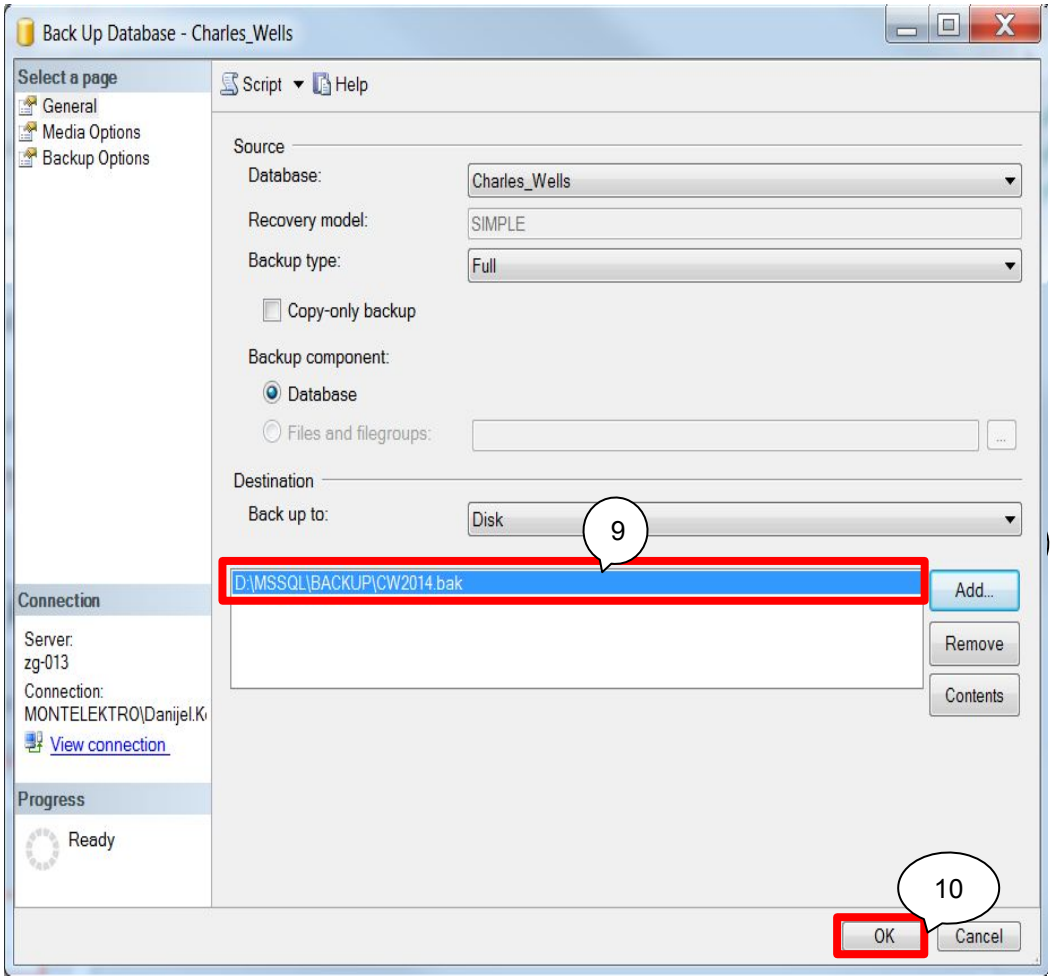


- Compatibility table definition view
  - Once a table is created, it can be edited by left click on the table name in the hierarchy area
  - In the table compatibility definition view window, links between different materials types can be defined
  - Once defined, relations can be saved (l) and written to PLC (m)

Standard Software backup procedure - SQL

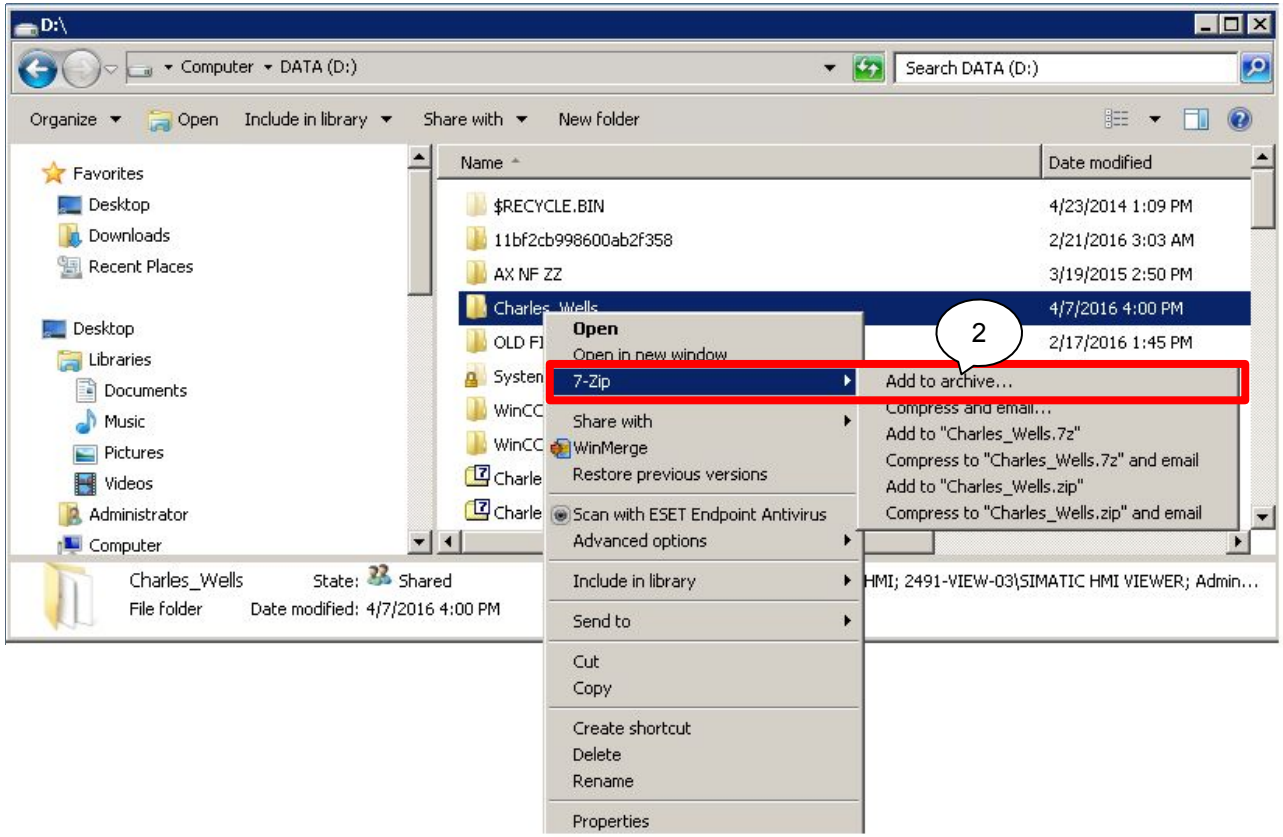
SQL Backup

- Start *Microsoft SQL Server Managenent Studio 2014 (1)*
- Type the correct server name (2) and click Connect (3)
- Right click on the *Charles_Wells* Database (4)
- Select *Tasks*(5)□*Back Up…*(6)
- Click on *Add (6)* if there is no actual backup to select
- Select the file name and root (7) and click *OK* (8)
- Type the backup name with extension *.bak (9) and click ok (10)
- The SQL backup is complete



Standard Software backup procedure

Standard Software Backup



- Go to the location on the Master hard drive containing the *Charles Wells* folder (1)
- Right click on the *Charles Wells* folder and make an archive of the entire folder (2)
- Repeat the same for *view node.*

Contact

MONTELEKTRO
AUTOMATION AND ELECTRICAL ENGINEERING LTD

Montelektro d.o.o.

Sanja Horvat Međimorac
Automation engineer
Tel. +385 01 347 76 09
sanja.horvat@montelektro.hr
www.montelektro.com

Thank you for your attention!