SCADA MANUAL
Siemens WinCC Advanced Runtime

Principal: <Principal>
Customer: <Customer>
Place of installation: <Place of installation>
Product: <Product>

Principal order no.: <Principal order no.>
AMPP order no.: <AMPP order no.>
Date: <Date>

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1 General Information
This manual is intended for the control cabinet for above mentioned project provided by AMPP. The manual describes the controls and operations for the control panel and the SCADA system with Siemens WinCC application for above mentioned project.

2 Controls
The control environment consists of the following elements:
- Emergency stop button
- Fault indicator lamp
- PC with SCADA application

2.1 Emergency stop buttons and safety lines (pull cords)
The control panel is equipped with an emergency stop button on the cabinet and connections for a number of emergency stop buttons and several safety lines (pull cords) on the infeed or outfeed system in the field (see electrical diagram). In order to achieve a safe environment it is strongly recommended that several emergency stop (E-stop) buttons and safety lines are mounted. This must be near the installation at logic locations which are easily accessible. If an emergency stop button is pressed or safety line is pulled, the installation will stop immediately and the fault indicator lamp is switched on. The installation in a safe condition. Also, a failure message “Emergency stop active” appears on the HMI. Resetting the emergency stop situation: first pull out the pushed emergency stop buttons and reset all pulled safety line (pull cords) then reset the system by pressing the “Reset” button on the HMI.

2.2 Fault indication lamp
If one or more failures are active, the amber fault indicator lamp is switched on. At the time that all faults are resolved the light will turn off (no fault and “Reset” button pressed).

2.3 PC with SCADA application
SCADA stands for Supervisory Control And Data Acquisition. With the provided SCADA system, all necessary process values, alarms and graphs can be monitored as well control the complete installation provided by AMPP. The next chapter describes the functions of the SCADA system in detail.
3 Graphical user interface (SCADA)

3.1 General

As previously mentioned, the SCADA system is used to operate the TEMA Process dryer/cooler, reading data (process values), monitoring the process and enter data (setpoints). By default, the SCADA system starts on the main screen, where the whole process is visualized. The most important process values and setpoints of the process are shown in the main screen. In order to enter or modify setpoints, the setpoints screens can be opened by pressing the SP or PV labels or by pressing the “Settings” button.

Main screen

3.2 Status colours and text displays

Colours used in dynamic objects and text displays:

- Grey = No operation.
- Green blinking = Starting-up in MANUAL- and AUTO mode.
- Green = Running and no failure.
- Yellow = In MANUAL mode.
- Red blinking = Failure, alarm or warning.

Possible texts and colour combinations in the 3 text displays are:

<table>
<thead>
<tr>
<th>Display 1</th>
<th>Display 2</th>
<th>Display 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF mode</td>
<td>Standing still</td>
<td>Press start button</td>
</tr>
<tr>
<td>AUTO mode</td>
<td>Start sequence</td>
<td>Production off</td>
</tr>
<tr>
<td>MANUAL mode</td>
<td>Stop sequence</td>
<td>Production on</td>
</tr>
<tr>
<td></td>
<td>Not completely running</td>
<td>Production stops</td>
</tr>
<tr>
<td></td>
<td>Dryer to stand-by mode</td>
<td>Normal running</td>
</tr>
</tbody>
</table>
3.3 Main screen

After starting the SCADA PC and application, the SCADA system always starts with the main screen. On the main page, the whole process is visualized. By using the push buttons on the top of the screen, it is possible to navigate to other screens and operate the installation. From the other screens, it is always possible to return to the main screen with the “Main” or “Home” button.

In the main screen all important process data are visualized:

- **Process Values (PV);** green I/O field with a “Read Only” value. These are the actual process values.
- **Setpoint Values (SP);** red, yellow or orange input fields. These are the setpoints of the process. Used for the control loops and failure/warnings limit settings. In the Main screen the setpoints cannot be changed. Adjustment of setpoints is only possible in the “Settings” screens (press SP label or “settings” button). Red, orange and yellow setpoint fields can be changed in the settings screens. Blue setpoint fields are “read-only” (actual setpoints which are determined and controlled by the PLC system).
- **Push buttons;** to navigate through the SCADA application and operate the installation.
- **Static objects;** such as dryers, filters, heaters and similar components that are used in the installation.
- **Dynamic objects;** such as product lines, fans, motors, pipes, burner, valves and similar components that are used in the installation. These objects display the current status with colours.
- **Alarms;** this shows the latest alarms. To get an overview of all the active alarms or the alarm history, press the “alarm status” area.
- **Alarm Status;** Indicates if there is an alarm (red) or no alarm (green).
- **Text displays;** Displays the current status of the installation.
- **Home button;** By pressing the “Home” (AMPP logo) button, the SCADA will return to the main screen.
3.4 Alarms / Alarm History

If an alarm, failure or warning is issued, an “Alarms” pop-up will appear. See the picture below.

If an alarm is acknowledged, and no other unacknowledged alarms are present, the “Alarms” pop-up disappears. If the problem isn’t solved, but you want to close the Alarms pop-up, press the “X” button.

Click on this area to go to the alarm screen with an overview of all active and historical alarms.

Alarm Status:
- = Alarm present
- = No alarm present
### Alarm screen (Alarms)

3.5 Setpoint screens

### Settings screen 1
Settings screen 2

In the Setpoint screens all process data (process values and setpoints) and information for all instruments and equipment is presented. Examples are setpoints for high & low limits, actual setpoints, Manual mode setpoints and start setpoints. On settings screen 2 the right side of the screen is used to display a web interface of the power meter. On this web interface it is possible to read out all data that is available on the SOCOMEC power meter.

For an explanation of the process values and setpoints, see the documents “Software list” and “Process sequence”.

3.6 Legend

00000 = Process value (read only - Output)
00000 = Setpoint (In-Output)
00000 = Setpoint (read only - Output)
00000 = Start Setpoint (In-Output)
00000 = Maximum Setpoint (In-Output)
TICA1113 on/off / TICA1113 on/off = Activate / deactivate button for controller TICA1113.
= Active / inactive status of an controller.
3.7 **Graph screens**

With the “Graph” button, the Graph Real-time screen is opened. The graph Real-time screen shows the real-time process data used for the main temperature control loops for the dryer/cooler. The graph visualizes standard one hour data.

<table>
<thead>
<tr>
<th>Trend pens in the Graph:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TiCA1101 Supply air temperatures dryer: PV+ SP</td>
</tr>
<tr>
<td>TiCA1126 Exhaust air temperatures dryer: PV+ SP</td>
</tr>
<tr>
<td>TiCA1113 Product temperatures dryer: PV+ SP</td>
</tr>
<tr>
<td>V35 Fuel valve position: PV</td>
</tr>
<tr>
<td>Product supply: PV</td>
</tr>
</tbody>
</table>

Navigation through the Graph is possible by using the navigation buttons directly underneath the time line (X-line).

If it is necessary to get a graph of data that is older than 1 hour, the “Graph historical” screen can be opened by pressing the “Historical” button. See next page for the historical graph.
The historical graph displays a graph with data of the last 60 days. The displayed graph data will be stored on the hard drive of the SCADA PC. The file format is set to .CSV files. In case this data needs to be collected, these CSV files can be found in the directory C:\Logs.

**Graph Historical**

**Trend pens in the Graph:**
- TICA1101 Supply air temperatures dryer: PV+ SP
- TICA1126 Exhaust air temperatures dryer: PV+ SP
- TICA1113 Product temperatures dryer: PV+ SP
- V35 Fuel valve position: PV
- Product supply: PV

Navigation through the Graph is possible by using the navigation buttons directly underneath the time line (X-line).
3.8 Maintenance screen

To prevent downtime of the installation due to broken motors or parts, there is a maintenance screen. This screen gives an overview of the setpoints and process values of the runtime maintenance timers. If the setpoint of the maintenance alarm is exceeded, a maintenance message is shown.

The message window can be closed by clicking the X of the pop-up window. The message can be cleared by pressing the corresponding “Reset” button.

Beside the runtime maintenance timers on this screen, it also displays the process value and setpoint of the motor currents. If the process value exceeds the setpoint value, a failure is set. For the response on these failures see the document “CEM” (Cause-Effect Matrix).
3.9 **Menu screens**

In order to be able to use several different sand types or to setup the system for use during winter/summer time, the menu screens can be used.

All setpoints in the grey area (left side of the menu screens) represent the actual used setpoints for the installation. The setpoints in the bright blue area (right side of the menu screens) represent the selected menu setpoints.

### Menu screen 1

<table>
<thead>
<tr>
<th>Description</th>
<th>PV</th>
<th>SP</th>
<th>SP Limit Low</th>
<th>SP Limit High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product temperature dryer/cooler</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Exhaust air temperature</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Supply air temperature</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Sub pressure dryer</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Pressure dryer</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Moisture measurement</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
</tbody>
</table>

### Menu screen 2

<table>
<thead>
<tr>
<th>Description</th>
<th>PV</th>
<th>SP</th>
<th>SP Limit Low</th>
<th>SP Limit High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product supply</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Vacuum conveyor wet sand</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>P10 Primary conveyor wet sand</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>V13 Set conveyor wet sand bunker 1</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>V14 Set conveyor wet sand bunker 2</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>V15 Set conveyor wet sand bunker 3</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>V16 Set conveyor wet sand bunker 4</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Inlet</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Moons</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>Dust measurements</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
</tbody>
</table>
Use of the Menu’s

In the menu screens several actions can be performed by using the menu buttons on the bottom of the menu screens:

- **Select a menu**
  To select a menu, one of the ten menu buttons can be pressed. After selection, the selected menu number and name should appear in the green text fields behind “Actual menu running”. This is shown on the bottom of the menu screens as well as on top of every screen.

- **Change the name of the selected menu**
  This can be done by selecting the menu, set the name in the yellow text field on the bottom of the screen and press the return key on the keyboard. By pressing the “Store menu setpoints” button, the given name will be set in the green text field of the corresponding menu.

- **Change the menu setpoints**
  Select a menu and change the setpoints of the menu (bright blue area) on menu screens 1, 2 and 3. When the changes are made, press the “Store menu setpoints” button.

- **Replace the menu setpoints with the actual setpoints**
  Select a menu and press the “Copy actual to menu setpoints” button. Now on screen all menu setpoints of the selected menu are equal to the actual setpoints. Last step is to press the “Store menu setpoints” button. Now the copied setpoints are saved into the selected menu.

- **Replace the actual setpoints with the menu setpoints**
  Select the menu of which the setpoints should be used. Press the “Copy menu to actual setpoints” button. Now the menu setpoints are set into the actual setpoints.
3.10 **Info screen**

The "Info" screen shows the contact details of the suppliers and a navigation for system settings.

![Info screen]

3.11 **System settings**

- Close SCADA application - Logon required
- Go to Stop sequence timers and PID controllers - Logon required
- Go to the current user who is logged on - Logon required
- Logoff the current user - Logon required
- Clear the alarm log - Logon required
- Status indication of the PLC - Logon required
3.12 PID and Timers

PID and Timers screen

On this screen, the stop times of the timers during "stop sequence" for each part can be modified. On the right side of the screen, all PI settings of the PID controllers can be set.*

The Commissioning Graph is a more detailed graph and can be used during the commissioning of the installation.

* Logged on user is responsible for safe operation of the installation.
4 Operating modes

- AUTO mode, automatic control possible
- OFF mode, completely switched off
- MANUAL mode, manual control possible

4.1 AUTO mode

In normal conditions “AUTO” mode is used to run the installation. Activating “AUTO” mode is only possible when the “OFF” mode is active. In “AUTO” mode the installation can be started by a start command with the “Start” button on the top of the screen. The installation starts automatically according to the sequence described in the document “Process sequence”.

With the “Stop” button on the top of the screen, the installation will go in stop sequence. The installation stops automatically according to the sequence described in the document “Process sequence”.

When the “OFF” button is pressed, the process stops abruptly. This may affect the installation. It is recommended to stop the installation using the “Stop” button. Do not use “OFF” button to stop!!

Operating example:

A failure is activated during automatic operation. As a result of this failure, several equipment is stopped according to the document “CEM” (Cause-Effect Matrix).

To restart the installation and resume production:

- If the problem is solved, press the “Reset” button.
- Press the “Start” button to restart the “start sequence” of the installation.
- If the problem isn’t solved, but you want to clear the pop-up, press the “X” button or “Reset” button.

If a failure or problem is not solved within a certain time (see the “CEM” document) the installation will automatically start the “Stop sequence” to prevent unnecessarily waste of energy.
### 4.2 OFF mode

With the "OFF" button (hold down 3 sec.) the installation is switched off ("OFF" mode) and the horn is blocked after 30 minutes. So the horn will not be activated in the middle of the night because e.g. the compressor is switched off and the pressure on the air bellows or filter tanks drops below switching point.

**WARNING:** The process stops abruptly, regardless of process control or conditions!
4.3 MANUAL mode

**WARNING:** Check the equipment and installation before starting in MANUAL mode. Several safety’s and interlocks are disabled in MANUAL mode. Operator is responsible for safe operation of the installation!

With the "MANUAL" button the manual control (MANUAL mode) is activated. This feature allows the operator to start/stop (or open/close) the equipment in the installation. This function is intended for testing the equipment and can only be activated when the “OFF” mode is active.

In the main screen several buttons will appear when MANUAL mode is activated. Equipment can be activated/deactivated (toggle) by pressing the “start”, “open/close” button. All equipment (dynamic objects) that can be activated in MANUAL mode, are yellow and got a button for activation. If equipment has a setpoint for MANUAL mode (motor speed or valve positions), these setpoints can be changed from the Settings screens.

After starting (changing any state from default), the horn will sound 5 times prior actual starting.

- **start** = ready to start (yellow is not running)
- **stop** = ready to stop (green is running)
4.4 Stand-by mode

When a change of product is required, it is possible to activate the “Dryer / cooler standby” function. This function in combination with the stop button will stop the product supply and empty the dryer/cooler. The operation mode of all other components of the installation will remain the same.

This way it is possible to make a change in product without needing to stop the whole installation.

Installation into standby mode
- Activate the “Standby” button on SCADA.
- Activate the “Stop” button on SCADA.
- If stop time 5 "Stop Dryer drive M01, burner E12 and oil pump M54" is passed and Dryer drive M01 is running on normal speed again, the Stand-by mode is reached.

Installation from stand-by mode into start sequence (resume production)
- Activate the “Start” button on SCADA.
- When installation is completely running and in production again, deactivate the “Standby” button on SCADA. Or keep “Standby” button activated if the installations needs to go to standby mode again.

Installation from stand-by mode into stop sequence (stop complete installation)
- Deactivate the “Standby” button on SCADA (if activated).
- Activate the “Stop” button on SCADA (if not yet activated).
## Buttons and controls

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>Activate AUTO mode.</td>
<td>“OFF” mode active</td>
</tr>
<tr>
<td>OFF</td>
<td>Activate OFF mode. The process stops abruptly, regardless of process control or conditions.</td>
<td>“AUTO” mode active, “MANUAL” mode active</td>
</tr>
<tr>
<td>MANUAL</td>
<td>Activate MANUAL mode.</td>
<td>“OFF” mode active</td>
</tr>
<tr>
<td>Stand-by</td>
<td>Activate the Stand-by mode.</td>
<td>“AUTO” mode active</td>
</tr>
<tr>
<td>Start</td>
<td>Starts installation in sequence according “Start sequence” in Process sequence.</td>
<td>“AUTO” mode active</td>
</tr>
<tr>
<td>Stop</td>
<td>Stops installation in sequence according “Stop sequence” in Process sequence.</td>
<td>“AUTO” mode active</td>
</tr>
<tr>
<td>Reset</td>
<td>Reset failures.</td>
<td>-</td>
</tr>
<tr>
<td>Horn off</td>
<td>Switches the horn off at an alarm.</td>
<td>-</td>
</tr>
<tr>
<td>Graph</td>
<td>Open the Graph Real-time screen.</td>
<td>-</td>
</tr>
<tr>
<td>Settings</td>
<td>Open settings screens.</td>
<td>-</td>
</tr>
<tr>
<td>DIRECT STOP</td>
<td>Stop product infeed in AUTO mode (only for emergency, not normal stop!!)</td>
<td>Main screen</td>
</tr>
<tr>
<td>M25 Manual in AUTO mode</td>
<td>Manual control in AUTO mode of M25. If PICA1210 is broken, you can run the M25 in Manual control by activating this button.</td>
<td>Main screen</td>
</tr>
<tr>
<td>Alarm Status</td>
<td>Open the Alarm screen.</td>
<td>All Screens</td>
</tr>
<tr>
<td>Info</td>
<td>Open the Settings screens. Click on each TAG, PV or SP field in Main screen.</td>
<td>Main and settings screen</td>
</tr>
<tr>
<td>Main</td>
<td>Open the Info screen. Button present in the Settings screens.</td>
<td>Settings screens</td>
</tr>
<tr>
<td>Next</td>
<td>Go to Main screen.</td>
<td>-</td>
</tr>
<tr>
<td>Back</td>
<td>Go to the next page.</td>
<td>-</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Open the Maintenance screen. Button present in the Settings screens.</td>
<td>Settings screens</td>
</tr>
<tr>
<td>Menu</td>
<td>Open the Menu screens. Button present in the Settings screens.</td>
<td>Settings screens</td>
</tr>
</tbody>
</table>
6 Buttons release controllers

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>TICA1113 on/off</td>
<td>Release TICA1113 controller</td>
<td>-</td>
</tr>
</tbody>
</table>