EcoStruxure Augmented Operator Advisor
Manager User Manual

09/2019

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When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

⚠️ The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

⚠️ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠️ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.
PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.
About the Book

At a Glance

Document Scope
This document describes how to use the EcoStruxure Augmented Operator Advisor Manager software.

Read the EcoStruxure Augmented Operator Advisor Quick Start Guide for an overview of EcoStruxure Augmented Operator Advisor before using this document.

It is recommended that you undertake an EcoStruxure Augmented Operator Advisor training course before using the product.

Validity Note
This document is valid for Version 2.4 of EcoStruxure Augmented Operator Advisor.

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You can download these technical publications and other technical information from our website at https://www.schneider-electric.com/en/download
Product Related Information
The application of this product requires expertise in the design and operation of control systems.

⚠️ WARNING

**LOSS OF CONTROL**
- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control and monitoring paths must be provided for critical control functions.
- System control and monitoring paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- EcoStruxure Augmented Operator Advisor must not be used as a primary means of monitoring critical control functions.
- Each EcoStruxure Augmented Operator Advisor implementation must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠️ WARNING

**UNINTENDED EQUIPMENT OPERATION**
- Allow only authorized personnel with expertise in the design and operation of control systems to program, install, alter, and apply this product.
- Follow local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠️ CAUTION

**FALSE SCENE DETECTION**
- Use tags in situations where similar equipment and/or environments could result in false scene detection.
- Attach tags firmly to the equipment with sufficient protection against damage or deterioration of the tag.

Failure to follow these instructions can result in injury or equipment damage.
**NOTICE**

**UNAUTHORIZED OPERATOR ACCESS**

- Keep user names and passwords secret.
- Protect tablet and runtime device access with a password or other security mechanism.
- Do not share access with others.
- Change default passwords upon first connection.
- Regularly update passwords.
- Apply relevant local IT rules.
- Do not save confidential information in post-its or notebooks.
- Do not attach confidential or sensitive user documents in projects.

*Failure to follow these instructions can result in equipment damage.*
Chapter 1
Introduction

Introduction to EcoStruxure Augmented Operator Advisor Manager

The EcoStruxure Augmented Operator Advisor Manager is included in the EcoStruxure Augmented Operator Advisor Runtime. The EcoStruxure Augmented Operator Advisor Manager gets installed automatically when the EcoStruxure Augmented Operator Advisor Runtime is installed (see EcoStruxure Augmented Operator Advisor, Quick Start Guide).

Using the EcoStruxure Augmented Operator Advisor Manager software you can:

- Manage users credentials (runtime/manager and operators) and view a list of all users (added, deleted or modified) in USERS tab.
- View a list of all procedures that are completed by operators in the EcoStruxure Augmented Operator Advisor App in PROCEDURES tab.
- View a list of all notes in scenes that are created by operators in the EcoStruxure Augmented Operator Advisor App in NOTES tab.
- Activate and edit Node-RED in NODE-RED tab.
# Chapter 2
Using Augmented Operator Advisor Manager

## What Is in This Chapter?
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</tbody>
</table>
Launching the EcoStruxure Augmented Operator Advisor Manager

Before launching the EcoStruxure Augmented Operator Advisor Manager, make sure the EcoStruxure Augmented Operator Advisor Runtime is installed on your runtime device, your firewall is configured and the port check is successfully completed (see EcoStruxure Augmented Operator Advisor, Quick Start Guide).

To launch the EcoStruxure Augmented Operator Advisor Manager:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Open the EcoStruxure Augmented Operator Advisor Runtime and click **AOA Manager**.  
**Result:** The EcoStruxure Augmented Operator Advisor Manager opens.  
**NOTE:**  
- The license is activated on launching the software for the first time and the number of days left on the license is displayed if trial version is used.  
- You must leave the EcoStruxure Augmented Operator Advisor Runtime running in the background. If EcoStruxure Augmented Operator Advisor Runtime is not running, then you will not be able to login to EcoStruxure Augmented Operator Advisor Manager. |
| 2    | Log in using the default user name and password (admin/admin). |
| 3    | In the window that opens, enter a new admin password following the instructions.  
**NOTE:** Record the password in a safe location and provide appropriate protection. |
User Management

Overview

There are three types of users of EcoStruxure Augmented Operator Advisor:

- Builder users
- Runtime/Manager administrators
- Operator users

**Builder users** are those who will access EcoStruxure Augmented Operator Advisor Builder. Users without credentials can sign-up in the builder login screen.

**Runtime/Manager administrators** are those who are responsible for configuring users and security settings using the EcoStruxure Augmented Operator Advisor Manager. Runtime/Manager administrators must have administrator rights (maximum security level).

**Operator users** are those who will use the EcoStruxure Augmented Operator Advisor App. Based on their user rights (security level) they will have access to different objects in the app. In the builder project, objects are attributed with a security level numerical value. Operator users with a security level numerical value equal to or greater than the objects security level may view and interact with the object. Otherwise, the object is hidden or not accessible.

**NOTE:**
- The EcoStruxure Augmented Operator Advisor Manager can manage (create / modify / delete) the users (Runtime and Operator) only. You cannot create Builder users.
- You cannot delete Admin group.
Creating Operator Users

The EcoStruxure Augmented Operator Advisor Manager on the runtime device is used to create / modify / delete operator users and configure security settings for them.

**NOTE:** Only users with admin rights can login to the EcoStruxure Augmented Operator Advisor Manager software.

This procedure explains how to create users in the EcoStruxure Augmented Operator Advisor Manager:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If not already running, launch <em>EcoStruxure Augmented Operator Advisor</em> → <em>Augmented Operator Advisor</em> from the list of installed Windows programs. <strong>Result:</strong> The EcoStruxure Augmented Operator Advisor window opens.</td>
</tr>
<tr>
<td>2</td>
<td>Launch <em>AOA Manager</em>.</td>
</tr>
<tr>
<td>3</td>
<td>Log in using the user name and password.</td>
</tr>
<tr>
<td>4</td>
<td>Click the <strong>USERS</strong> tab.</td>
</tr>
<tr>
<td>5</td>
<td>Click <strong>Add group</strong> to create a new user group. All users must belong to a group.</td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| 6    | Give the group a name and enter a security level. The security level is a number from 0 to 65535. Higher numbers have more security rights. Admin rights correspond with maximum security level 65535. All users within a group have the security level of the group. Click **Validate** to confirm the creation of the group.  
Group  
Name  
Security level  
Validate  
Cancel |
| 7    | Click **Add user** to create a new user. |
Changing the Runtime/Manager User Password

Click the details of the Runtime/Manager user, available on the top right corner of the page, and select the Profile from the drop-down list to change the password.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>8</td>
<td>Enter a user name and password. Also choose the group to which the user belongs. Click Validate to confirm the creation of the user.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>New password</td>
</tr>
<tr>
<td>Re-type password</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert mode</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Validate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cancel</th>
</tr>
</thead>
</table>

**NOTE:** You can give expert rights to a user by selecting the Expert Mode check box. An Expert user can go to any step in a procedure whereas a non-expert user must follow the steps in the correct order.
**Node-RED Management**

**Introduction**
Node-RED is an open source, visual programming tool that requires few or no programming skills. It uses pre-programmed, reusable blocks of code called nodes. Nodes are wired together to create flows of data.

Node-RED is a third-party software available for use with EcoStruxure Augmented Operator Advisor Manager on the runtime device. With it, you can easily connect Node-RED flows to points of interest to display SQL database values in your augmented reality applications.

Node-RED includes the following components:
- Node-RED engine
- Node-RED editor

You can manage the Node-RED engine activation (launch or stop) and set it up to start automatically or manually. You can also launch the Node-RED editor to modify Node-RED parameters.

Configuration and setup of user authentication is done directly in Node-RED. Refer to Node-RED documentation for more information.

**Starting the Node-RED Engine**
This procedure explains how to start the Node-RED engine:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Go to Start menu and launch the **EcoStruxure Augmented Operator Advisor** → Augmented Operator Advisor from the list of installed Windows programs.  
**Result:** The EcoStruxure Augmented Operator Advisor window opens. |
| 2    | Launch AOA Manager. |
| 3    | Log in using an Admin group user name and password. |
| 4    | Click the **Node-RED** tab. |
| 5    | Click **Start** button to start the Node-RED engine.  
**Result:** The status of the Node-RED engine (ON / OFF) is displayed in the **Status** column. |
Launching the Node-RED Editor

This procedure explains how to launch the Node-RED editor:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start the Node-RED engine <em>(see page 19).</em></td>
</tr>
<tr>
<td>2</td>
<td>Once the Node-RED engine is started, launch the Node-RED editor by clicking the Launch button.</td>
</tr>
</tbody>
</table>

Starting the Node-RED Automatically

This procedure explains how to start the Node-RED engine automatically:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start the Node-RED engine <em>(see page 19).</em></td>
</tr>
<tr>
<td>2</td>
<td>Click Autostart button to start the Node-RED automatically each time the server starts.</td>
</tr>
</tbody>
</table>

Result: The status of the Node-RED starting mode (AUTO / MANUAL) is displayed in the Status column.
Notes Management

Notes Tab

In this tab, you can see the list of all Notes created by the operators in the App. Operators can create their own Notes in scenes or sub-scenes when running the App on their tablet device. The information entered by the operators into the Notes may be of use in order to make improvements to your project.

NOTE:

- You can change the order of the listing using the arrows in each column.
- You can delete a listing entry in the report using the icon.
- You can export a listing by clicking the icon to the right of the required project name, in the left sidebar, and select Export .... The export is stored in .csv format, using the comma as separator.
Procedures Management

Procedures Tab

In this tab, you can see a report of all procedures followed by the operators in the EcoStruxure Augmented Operator Advisor App. You can see the name and version of the project, as well as the date and time that the procedures were followed, the individual steps taken, and the name of the user who followed the procedure.

NOTE:

- You can change the order of the listing using the arrows in each column.
- You can delete a listing entry in the report using the icon.
- You can export a listing by clicking the icon to the right of the required project name, in the left sidebar, and select Export .... The export is stored in .csv format, using the comma as separator.
Appendices
Appendix A
Node-RED Samples for EcoStruxure Augmented Operator Advisor

Overview
This chapter presents samples of flows between a MySQL database and EcoStruxure Augmented Operator Advisor.

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<td>Writing Data from EcoStruxure Augmented Operator Advisor in a MySQL Database</td>
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</tbody>
</table>
Integrating Data from a MySQL Database in EcoStruxure Augmented Operator Advisor

Overview
MySQL data can be integrated in EcoStruxure Augmented Operator Advisor. Two examples of how to do this are provided here.

Beginner Sample
The sample below illustrates the integration of SQL variables in EcoStruxure Augmented Operator Advisor. After the SQL invocation, the MySQL database returns a two row array containing a variable name and the associated value. Each variable name that comes from the MySQL database is associated to an EcoStruxure Augmented Operator Advisor variable.
Deploying the Beginner Sample Flow in Node-RED

To deploy this flow in Node-RED:

First, copy the following code.

```json
// Appendices

// Optional header node for debugging the Augmented Operator

// Appendices

// Optional help node for debugging the Augmented Operator

// Appendices

// Augmented-Operator-server

// Appendices

// Augmented-Operator-variable

// Appendices

// change

// Appendices

// function

// Appendices

// switch

// Appendices

// status

```
In Node-RED, in the top right of the screen, click the icon, then choose Import → Clipboard to paste the code.

If you copied the example code from a PDF file, you will need to remove any line breaks before advancing to the next step.

Click Import to create the flow.
Intermediate Sample

The sample below illustrates the integration of SQL variables in EcoStruxure Augmented Operator Advisor. This sample differs from the previous one because it enables the integration of a multitude of SQL variables without adding new nodes.
Deploying the Intermediate Sample Flow in Node-RED

To deploy this flow in Node-RED:

First, copy the following code.

```javascript
//Set of Augmented Operator Advisor types:
//========================Do not change Begin.========================
const AR_TYPES= {
    "String":"String",
    "WString":"WString",
    "Boolean":"Boolean",
    "Int8":"Int8",
    "Int16":"Int16",
    "Int32":"Int32",
    "UInt8":"UInt8",
    "UInt16":"UInt16",
    "UInt32":"UInt32",
    "Float":"Float",
    "Double":"Double",
    "SByte":"SByte",
    "Byte":"Byte",
    "Time":"Time",
    "Date":"Date",
    "DateTime":"DateTime",
    "TimeOfDay":"TimeOfDay"
};
//========================Do not change End.========================

/*Association table that associates SQL variables with AR ones:
One entry per variables. Each entry must follow this model:
"SQL_variable_name": {
    name:"AR_variable_name",
        type: AR_TYPES["<types>"] // <= choose <types> under AR_TYPES
 },

i.e: The following association table contains two entry:
In this exemple:
-Entry 1: The SQL variable "sqlVar1" is associated to an AR variable "ARvar1" of type "String"
-Entry 2: The SQL variable "sqlVar2" is associated to an AR variable "ARvar2" of type "Int32"
*/
msg.SQLARassociationTable = {
    //----------Entry 1 begin----------
    "sqlVar1": {
        name:"ARvar1",
        type: AR_TYPES["String"]
    },
    //----------Entry 1 end----------
    //----------Entry 2 begin----------
    "sqlVar2": {
        name:"ARvar2",
        type: AR_TYPES["Int32"]
    }
    //----------Entry 2 end----------
};

//========================Do not change from here=============================
return msg;
```

node.error("Could not send the msg properly. Please check your flow!");
return msg;
```
In Node-RED, in the top right of the screen, click the icon, then choose **Import → Clipboard** to paste the code.

If you copied the example code from a PDF file, you will need to remove any line breaks before advancing to the next step.

Click **Import** to create the flow.
Writing Data from EcoStruxure Augmented Operator Advisor in a MySQL Database

Overview
Data, represented as variables, can be retrieved from EcoStruxure Augmented Operator Advisor to update specific rows in a specific table into a MySQL database.

EcoStruxure Augmented Operator Advisor to MySQL Sample
Deploying the EcoStruxure Augmented Operator Advisor to MySQL Flow in Node-RED

To deploy this flow in Node-RED:

First, copy the following code.

```javascript
// Appendices

Deploying the EcoStruxure Augmented Operator Advisor to MySQL Flow in Node-RED

To deploy this flow in Node-RED:

First, copy the following code.

```javascript
/*Association table that associates SQL variables with AR ones per entry per variables. Each entry must follow this model:
One entry per variables. Each entry must follow this model:
"AR_variable_name":{
        name:"SQL_variable_name"
    },
    
i.e: The following association table contains two entry:
In this exemple:
-Entry 1: The AR variable "ARvar1" is associated to an SQL variable "sqlVar1"
-Entry 2: The AR variable "ARvar2" is associated to an SQL variable "sqlVar2"
*/
ARSQLassociationTable = {
    //----------Entry 1 begin----------
    "ARvar1": {
        name:"sqlVar1",
        
    }, 
    //----------Entry 1 end----------
    //----------Entry 2 begin----------
    "ARvar2": {
        name:"sqlVar2",
    }
    //----------Entry 2 end----------
};

msg.topic = "UPDATE testtable SET value = '<VALUE>' WHERE name = '<NAME>';".replace("<VALUE>",msg.payload.value).replace("<NAME>",ARSQLassociationTable[msg.parts.key].name);

return msg;
```

In Node-RED, in the top right of the screen, click the icon, then choose Import → Clipboard to paste the code.

If you copied the example code from a PDF file, you will need to remove any line breaks before advancing to the next step.

Click Import to create the flow.
Glossary

A

area
An area is a zone within each site or building (such as production lines, plant rooms, storage areas, workshops, laboratories, and office areas) that you want to monitor using EcoStruxure Augmented Operator Advisor. If you have the appropriate license type, you can create an area for each part of the site to monitor within an EcoStruxure Augmented Operator Advisor project.

augmented reality
Technology that superimposes a computer-generated image on a user view of the real world, providing a composite view of the image with points of interest superimposed.

E

EcoStruxure Operator Terminal Expert
EcoStruxure Operator Terminal Expert is human machine interface (HMI) configuration software that enables you to create and edit application panels to control automation systems for Magelis GTU terminal (Premium and Open boxes) and Magelis industrial PCs (Panel and Box).

I

IIoT
Industrial Internet of Things. The application of IoT to the manufacturing industry. Also called the Industrial Internet or Industry 4.0.

IoT
Internet of Things. A network of intelligent devices that collect and share data.

N

Node-RED
Node-RED is an open source, visual programming tool that requires few or no programming skills. Instead, it uses pre-programmed, reusable blocks of code called nodes. Nodes can be wired together to create flows of data.
Glossary

P

point of interest
A point of interest is a position in an area, scene or subscene for which additional diagnostic or technical information is available. Various types of points of interest can be defined, including technical documentation, design drawings, information contained in a spreadsheet, and the real-time values of process variables generated.

procedure
A procedure is a set of task steps that the operator must carry out in a predefined order to complete the task.

process variable
A process variable is the measured value of a particular part of a process being monitored or controlled, for example, temperature, pressure level, or flow rate.

project
An EcoStruxure Augmented Operator Advisor project is made up of areas, scenes and procedures. Build the project and then copy it to the EcoStruxure Augmented Operator Advisor Runtime. The operator can then access the project on a tablet running the EcoStruxure Augmented Operator Advisor App.

S

scene
A scene corresponds to an image overlaid with points of interest.

SQL
Structured Query Language.

subscene
A part of a scene, typically a close up view of a particular area of the scene. A subscene can contain its own points of interest.

T

tag
A two-dimensional matrix. Tags can be printed and attached to items of equipment that are physically identical or very similar. The tags are scanned as part of a scene by the EcoStruxure Augmented Operator Advisor App and the correct points of interest for the item of equipment displayed.
U

URI
Uniform Resource Identifier. This is used to point to an object such as a file, and defines which application is used to open it. This may require the installation of third party applications.

V

variable
A variable is a type of a point of interest that is replaced by the real-time value of a software object from a process or database, for example, a system bit, when the scene containing the variable is displayed on the tablet.