

Custom Device Type Generator

In this document

Overview	2
Getting Started	3
Enabling the Application	3
Creating a New Custom Device Type	4
Testing a Modbus Read Block Assignment.....	7
Editing an Existing Custom Device Type.....	8
Removing an Existing Custom Device Type	9
Importing Custom Device Types.....	10
Exporting Custom Device Types	11

Additional Information

- EGX300 User Guide, part number 63230-319-216

Overview

The Custom Device Type Generator (CDTG) is a server-based application used for adding basic support for third party devices into EGX300.

The CDTG provides an interface for collecting device information needed to support a custom or third party device. This information is then stored on the EGX in a custom device configuration file (*.dct). From this file, the application will create and install the files needed by the EGX300 to support the new custom device.

Support for custom devices includes:

- real-time data via a simplified basic readings page
- device logging and exporting
- support for a select set of standard topics
- custom user defined topics

EGX300 features not supported include:

- summary device pages
- real-time trending
- control resets
- device discovery

Both the Read Holding Register (0x03) and the Read Input Register (0x04) Modbus commands are supported for the collection of custom device data. A maximum of ten block reads per device is allowed.

Up to 16 data topics of various data sizes may be defined from a single block read. The user can select from a list of the most commonly used topics (Standard Topics); or the user can create new topics (Custom Topics). Standard Topics are managed by the EGX300 and are compatible with Remote Energy Management (REM). Custom Topics are unmanaged and are not suitable for exporting to REM.

Individual topic scaling is supported to convert register values into units of measure.

A test feature allows the user to test the block read requests while developing the custom device type. This test feature returns the data of the request as well as any errors that are encountered.

An Import/Export feature permits the user to transfer and generate custom device types on other EGX300s, by sharing the configuration file.

The application is a protected administrative feature. It is not accessible via the main setup menu by default. To make the application accessible, an administrative user must implicitly navigate to the application access page. On this page, the application may be enabled or disabled.

People who use this application must be familiar with both the Modbus protocol and the Modbus register map of the device type being created.

Getting Started

To begin developing a custom device type, we recommend that you obtain the register map for the device. Use the register map to identify the quantities you wish to display and log, recording the register numbers and data types. Next, connect the custom device to the EGX300 as a serial or remote device. This allows you to communicate with the device, to use the test feature, while developing the device support.

Enabling the Application

The application is disabled by default. In order to make the application accessible, follow the instructions below.

Step	Action	Result
1	Type the following URL in your browser and press enter: <a href="http://<ip address>/device_type_gen_enable.shtml">http://<ip address>/device_type_gen_enable.shtml You must be logged in as an Administrator to access the URL.	The Enable Device Type Generator page displays, as illustrated in figure 1.
2	Click Enable .	The Enable button changes to Disable (see the left side of figure 1). The Custom Device Types feature is now enabled and will display on the Setup menu. To disable the feature, click Disable (right side of figure 1). After it is enabled, the application is accessible by any user logged on as an administrator (until it is manually disabled or the device is reset).
3	Click Main Interface .	You return to the main EGX300 screen.
4	From the Setup menu, select Custom Device Types .	The Custom Device Types page displays, as shown in figure 2.

Figure 1: Enable Button, Enabled and Disabled

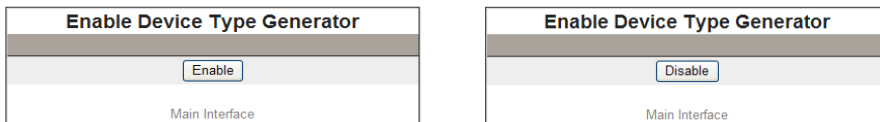
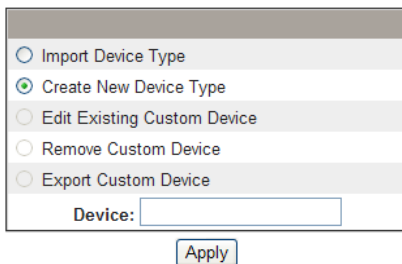


Figure 2: Custom Device Types Page

Custom Device Types



Creating a New Custom Device Type

Follow the instructions below to create a new custom device type.

Step	Action	Result
1	<p>From the Custom Device Types page, click Create New Device Type. Type a device name in the text box, and click Apply.</p> <p>The device name length must be 32 characters or less and cannot contain these special characters: = ? < > ~ + ' [] ! ^ { } * \$. & " , \ ; : " @ # /</p>	<p>The Assign Blocks page displays, as shown in figure 3. The new device name shows in the header row.</p>
2	<p>Click the Modbus Function drop down list, and select the Modbus function that is to be used when reading data for this block.</p>	<p>The two options are:</p> <p>Read Holding Registers (0x03)</p> <p>Read Input Registers (0x04)</p>
3	<p>In the Start Register and Register Count text boxes, enter the Modbus starting register and the number of registers to read.</p>	<p>This defines the starting point and size of the Modbus read block.</p>
4	<p>Optional: Click the Test button at the end of the row.</p>	<p>This opens the Test Block page, which allows the currently defined read block to be checked. For more information, see Testing a Modbus Read Block Assignment.</p>
5	<p>Click Define Topics.</p>	<p>Opens a new table for defining the data topics of the Modbus read block currently being defined. See figure 4.</p>
6	<p>Click the Topic Name drop down. Select one of the standard topics listed, or select "Add Custom Topic" to define a new topic.</p>	<p>If "Add Custom Topic" was selected, a topic name box opens above the topic definition box. This selects the data topic string to be shown in the data logging output files and the real-time view custom basic readings web page.</p> <p>Standard topics are topics managed by the EGX300 and are shared among the standard device types. These topics are suitable for exporting to REM, but may not have REM support. Custom Topics are not managed and cannot be exported to REM.</p> <p>If you selected a standard topic name, skip step 7.</p>
7	<p>Type the custom topic name, and click Add New Topic. Click Yes to the prompt.</p> <p>Only alphanumeric characters are allowed in the custom topic string names.</p>	<p>Adds the custom topic to the device; also adds the custom topic name to the list of available topics in the Topic Name drop-down. An asterisk (*) preceding the topic name indicates a custom topic name in the drop-down.</p>
8	<p>Click the Data Type drop-down, and pick a data type.</p>	<p>Defines the number of registers needed to hold the value of the data topic, based on data type and how the data is to be presented.</p>
9	<p>Enter the Modbus register starting point for reading the data topic in the Register Number(s) text box.</p> <p>Use the Modbus register number. If the register map for the device lists the register address, add '1' to the address to calculate the register number.</p> <p>If you need to scale the measured value, go to step 10. If not, skip to step 13.</p> <p>Scaled values are calculated with the equation $y=(Mx+B)*S$, where</p> <p>M = multiplier (step 10)</p> <p>x = formatted data determined by selected data type</p> <p>B = offset value (step 12)</p> <p>S = scaling factor (step 11)</p>	<p>Defines the register number within the currently defined read block where the data topic value resides.</p> <p>The topic register number(s) must fall within the register range defined by the read block.</p> <p>If the data type requires more than one register, the register numbers must be in sequential order. The topic register number containing the most significant word (MSW) of a multi-register topic must be in the first, or left-most, register box.</p> <p>Note: Register numbers can be ascending or descending. Your device's register map will determine how to enter register values for each topic.</p>

10	<p>If the data topic requires a constant multiplier value, enter the value in the Multiplier text box.</p>	<p>Defines the multiplier constant value (between 1 and 65535) that will be applied to the value held in the topic data register.</p> <p>The multiplier is not supported for 64-bit data types.</p> <p>The multiplier for the ML4 data type is limited to a maximum of 900.</p>
11	<p>If the data topic requires a power of ten scaling factor, then select it from the Scale drop-down box.</p>	<p>Defines the power of ten scaling factor (10⁻⁶ to 10⁶) that will be applied to the value held in the topic data register and will set the decimal point in the appropriate place.</p>
12	<p>If the data topic requires an offset, enter the value in the Offset text box.</p> <p>Note: The Offset field is available in firmware version 4.300 or higher.</p>	<p>Defines the offset value (between -10,000 and 10,000) that will be applied to the value held in the topic data register.</p> <p>Offset is only supported for signed and unsigned 16- and 32-bit data types.</p>
13	<p>If you want logging support for this topic, check Logging Support.</p>	<p>Defines the data topic to be available for logging.</p> <p>The topic will be selected for logging by default.</p>
14	<p>If the Logging Support box is checked, choose either Absolute or Incremental from the Logging Method box.</p>	<p>Defines the way in which a data topic will be presented:</p> <p>Absolute: The absolute value of the topic is to be used when plotting the graph on the Interval Data Log page.</p> <p>Incremental: The difference between the last logged value and the current logged value is used when plotting the graph on the Interval Data Log page. Use this method for accumulated quantity topics such as energy.</p>
15	<p>If you want this data topic to appear on the Monitoring page, check Real Time Data Support.</p>	<p>Defines the data topic to appear on the real time view basic readings page when the user selects the device under <Monitoring><Real Time Data><Single Device Pages>.</p>
16	<p>If you want to define another data topic, click Add Topic and repeat steps 6 through 14 above.</p>	<p>Adds another line to the Block x: Topics table, to allow the user to specify the topic. You can define up to 16 data topics per read block assignment.</p>
17	<p>After you have finished defining data topics, click Save Topics.</p>	<p>This hides the Block x: Topics table and returns control back to the Assign Blocks table. At this point, another read block may be defined.</p>
18	<p>If you want to define another read block, click Add Block.</p>	<p>This adds another line to the Assign Blocks table, allowing you to specify the read block. You can add up to ten read blocks.</p>
19	<p>After you are satisfied with all read block definitions, data topic definitions, and read block testing, click Save.</p>	<p>This will save the device information to a device type configuration file named <devicename>.dct (within the EGX300). The application will then generate all files needed (within the EGX300), to create the new custom device type.</p> <p>The Custom Device Types page will again display.</p> <p>The new device type can be assigned to a device in the device list page.</p> <p>Note: If the browser closes inadvertently, unsaved information will be lost. If you are working on a large device type, you should save often to protect your information. After you save information, you can open the device type for edit and continue creating the device type.</p> <p><i>After editing a custom device type, you must force the browser to retrieve the newly edited page from the EGX and replace its cached copy.</i></p> <p>To do this, press <CTRL><F5> in most browsers. Depending on the browser being used and its configuration, it may be necessary to close and reopen the browser before the edited device type changes will display. See Editing an Existing Custom Device Type for more information.</p>

Figure 3: Assign Blocks Page for a Custom Device

Assign Blocks My Custom Device					
Delete	Block	Modbus Function	Start Register	Register Count	
<input type="checkbox"/>	1	Read Holding Registers 0x03	1	1	Define Topics Test
Add Block Save					

Figure 4: Assign Blocks Page, Adding Topics

Assign Blocks My Custom Device					
Delete	Block	Modbus Function	Starting Register	Number of Registers	
<input type="checkbox"/>	1	Read Input Registers 0x04	1	1	Define Topics Test
Add Block Apply					

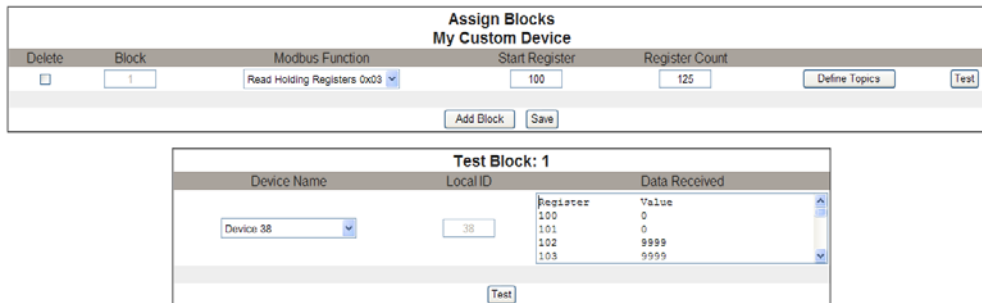
Block 1: Topics									
Delete	Topic Name	Data Type	Register Number(s)	Multiplier	Scale	Offset	Logging Support	Logging Method	Real Time Data Support
<input type="checkbox"/>	Apparent Energy (kVAh)	U16	1	1	10e0	0	<input checked="" type="checkbox"/>	Absolute	<input checked="" type="checkbox"/>
Add Topic Save Topics									

Testing a Modbus Read Block Assignment

The block read test will send the Modbus read request, defined in the current block, from the EGX300 to a local, serial, or remote connected device. For instructions on configuring a custom device under development, see [Getting Started](#).

Step	Action	Result
1	From the Assign Blocks table, click Test (see figure 5).	Test Block: X will display, where X is a number from 1 to 10.
2	From the Device Name drop down, select the device name of the device you wish to test. Or select "Select by Device ID" and enter the device ID of the device.	The Local ID of the device, as shown on the Device List page, displays in the Local ID box.
3	3. Click Test .	If the device is physically connected to the EGX300 and configured properly for communication, the requested data should appear in the Data Received box. The data returned will be listed sequentially beginning with the start register number in the currently active read block definition. If there are errors or exceptions, they will display in the "Data Received" window.
4	Click the Define Topics button to exit the Test feature.	The Test Block table disappears and you are returned to the Topics page, to add more topics.

Figure 5: Assign Blocks Page, Testing the Block Assignment

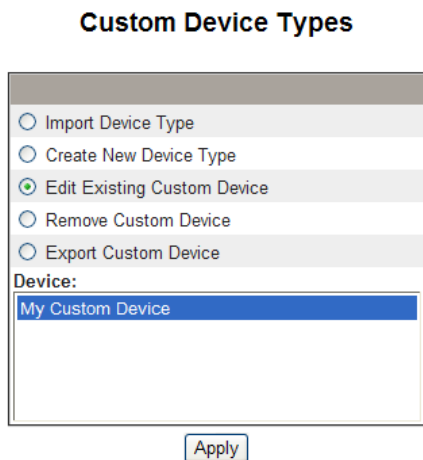


Editing an Existing Custom Device Type

You can edit an existing device type. Before editing is allowed, logging must be disabled on all devices assigned to the custom device type.

Step	Action	Result
1	From the Custom Device Types page, click Edit Existing Custom Device . Select a device name from the drop-down list, and then click Apply (see figure 6, below).	The Assign Blocks page displays, with the selected device name shown in the header row. If there are devices of this custom device type currently enabled for logging, the message "Device Type Currently in Use" will display, and editing will be denied.
2	Repeat the steps as shown in Creating a New Custom Device Type to make changes as necessary, and to test and save the device type.	See Creating a New Custom Device Type for details. Single Device pages reporting real time data are cached by the web browser being used. After editing a custom device type, the customer must force the browser to retrieve the newly edited page from the EGX and replace its cached copy. To do this, press <CTRL><F5> in most browsers. Depending on the browser being used and its configuration, it may be necessary to close and reopen the browser before the edited device type changes will display.

Figure 6: Editing a Custom Device Type



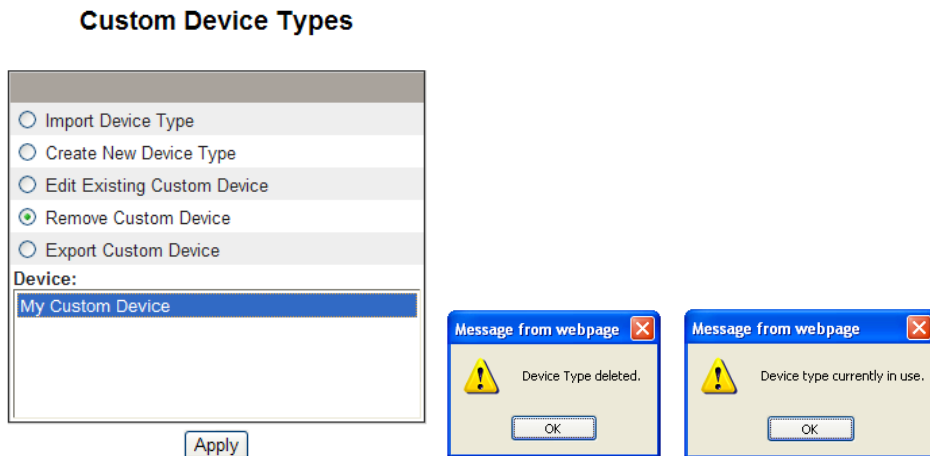
Removing an Existing Custom Device Type

Removing a custom device type from an EGX300 will remove the configuration file, plus all other files that were generated for supporting the device type.

You can only remove a custom device type if there is no device currently assigned as the type being removed. All devices configured as the device type of the one being removed must be either deleted or assigned another device type.

Action	Result
(See figure 7.) From the Custom Device Types page, click Remove Custom Device . Select a device name from the drop down list, and then click Apply as shown in figure7.	A Windows message box will appear indicating either: Device Type Deleted or Device type currently in use. If Device type currently in use displays, the device type is assigned to a device in the Device List page and must be released before you can delete the custom device type.

Figure 7: Removing a Custom Device: Illustrating the Two Messages.



Importing Custom Device Types

You can import a custom device type from remote media—such as a computer hard drive or flash thumb drive—and transfer it to an EGX300. The EGX300 tests the device name of the device type file being imported against an internal list of device type names. If there is no conflict with the device type name, the imported device type is created.

Step	Action	Result
1	From the Custom Device Types page, click Import Device Type .	A text box and Browse button will appear as shown in figure 8.
2	Click Browse	A standard file search window displays.
3	Browse the file search window for the file. Select the file and click Open . An imported file MUST be a *.dte file that has been created and exported from the Custom Device Type Generator tool of another EGX300.	The filename and path display in the text box.
4	4. Click Apply .	If the device type is not already present on the EGX300, it will be added as shown in figure 9. If a device type of the same name already exists on the EGX300, an error message displays, as shown in figure 10. If the device was successfully Imported, it is listed in the device type selection list on the Device List page.

Figure 8: Importing a Device Type into an EGX300

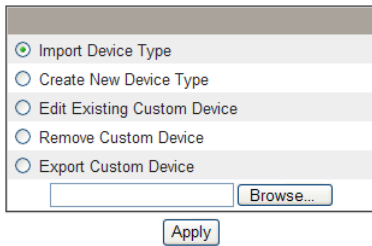


Figure 9: Importing a Device Type, Device Added

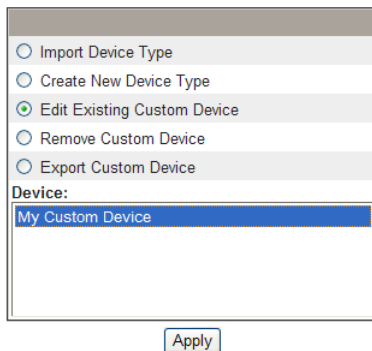
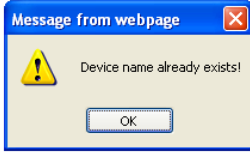


Figure 10: Importing a Device Type: Error Message



Exporting Custom Device Types

You can export a custom device type to external media such as a computer hard drive or flash thumb drive. Once exported, the custom device type will be available to be imported to another EGX300.

Step	Action	Result
1	From the Custom Device Types page, click Export Device Type . Select the device name from the list, and click Apply (see figure 11).	A standard file download window will open prompting you to open or save the file (see figure 12).
2	Click Save .	A Save As window will open allowing you to select the location where you will save the file.
3	Choose a save location and click Save .	The custom device type configuration file is saved.

Figure 11: Exporting a Custom Device Type

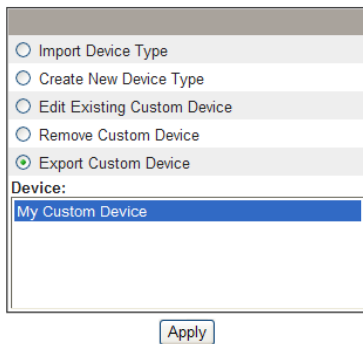


Figure 12: Exporting a Custom Device Type, Saving the Device

