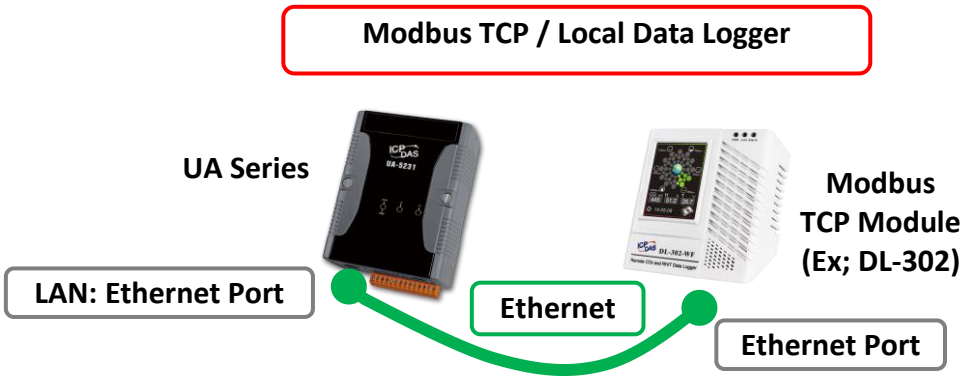
FAQ-DBL-02: UA Web UI Function Wizard – Data Log - How to set up Data Log function: Modbus TCP / Local Data Logger ? (Use DL-302)

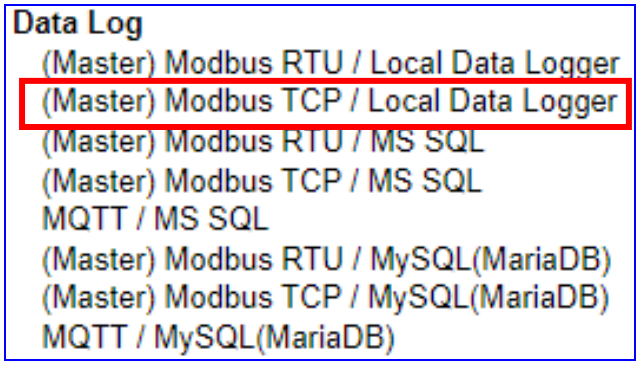
Local Data Logger supports to save I/O data log to Local CSV file in the SD card of the UA, and can record I/O status at the scheduled time. Furthermore, users can set the time interval of which CSV file to generate and divide on the local side.
The Modbus / Local Data Logger settings include Modbus RTU and TCP. Here will introduce Modbus TCP as the setting sample.

- **Modbus TCP / Local Data Logger**

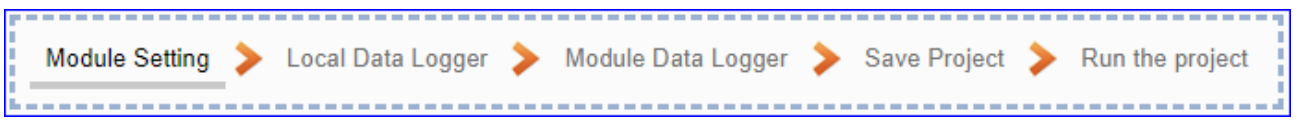


Note: The hardware/network connection methods please see the UA Manual Chapter 2.

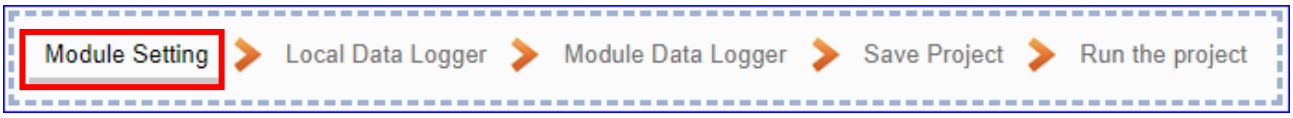
When UA series controller connects the Modbus TCP module (via Ethernet, as the picture) and save the data logger record to the microSD card in the UA, user can choose the item [**Modbus TCP / Local Data Logger**] of the "Data Log" in the Function Wizard.



[Step Box]:
The Step Box of the [**Modbus TCP / Local Data Logger**] has 5 steps. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step-by-step and then can complete the project quickly and rightly.

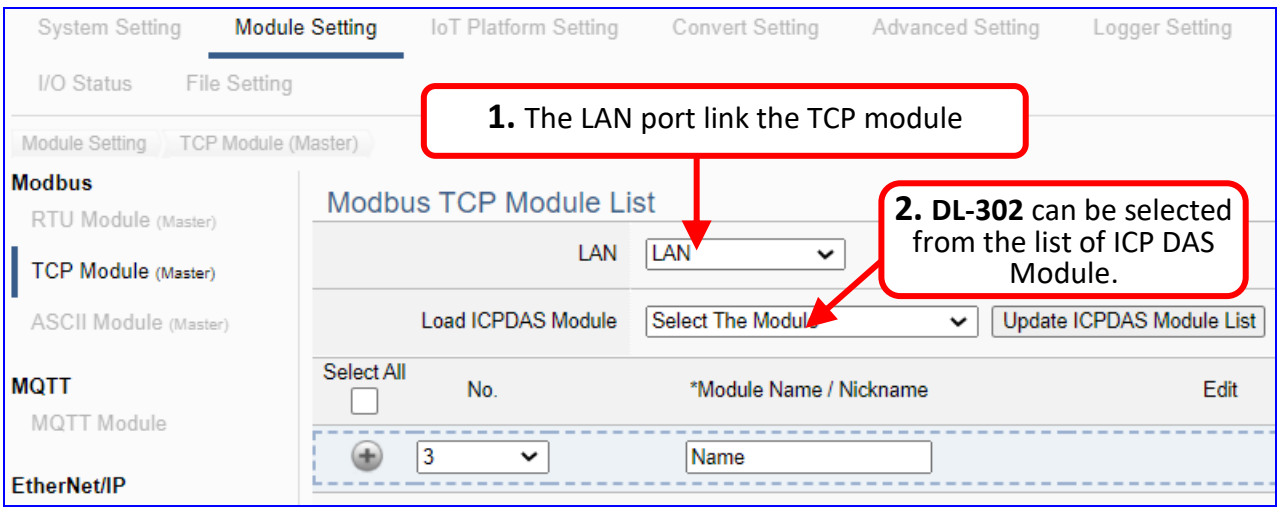


Step 1. Module Setting

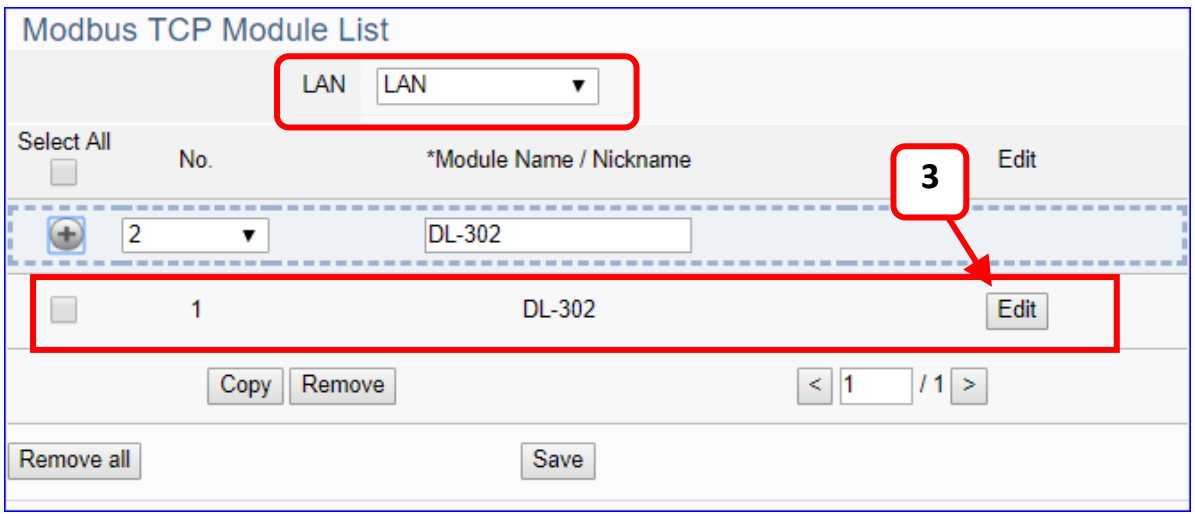


It auto-enter the first step, **Step 1 [Module Setting]** of the UI setting.

This page is for setting the communication values with the connected modules. First check the LAN port that connected with the module. If you use the module in the ICP DAS module list, you can select it and system will auto add and set up the module. Or you can give a name (Default name: Name). Click [ ] button to add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

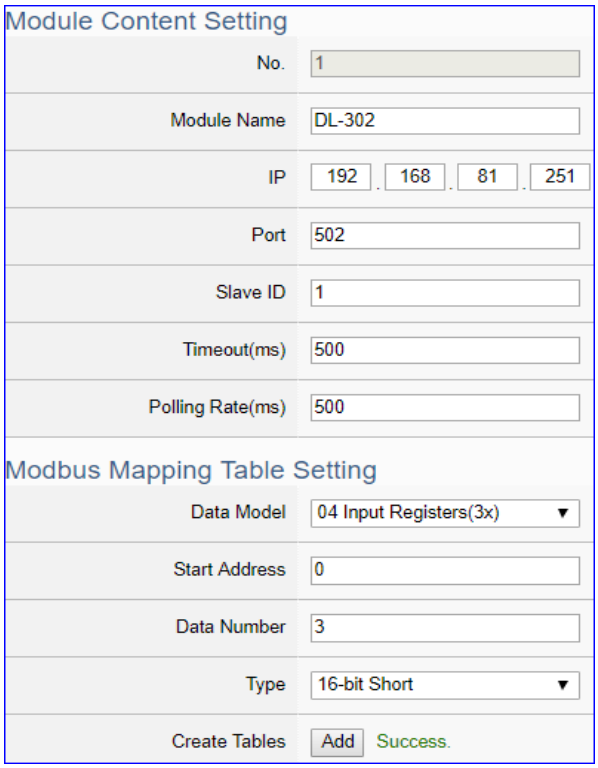


Add a module (No.: 1, Name: **DL-302**) as below, and then click [Edit] button to enter the "Module Content Setting" page.



If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

[**Module Content Setting**] can set up the module and the Modbus mapping table:



This Example: DL-302

[IP] 192.168.81.251 (by user case)

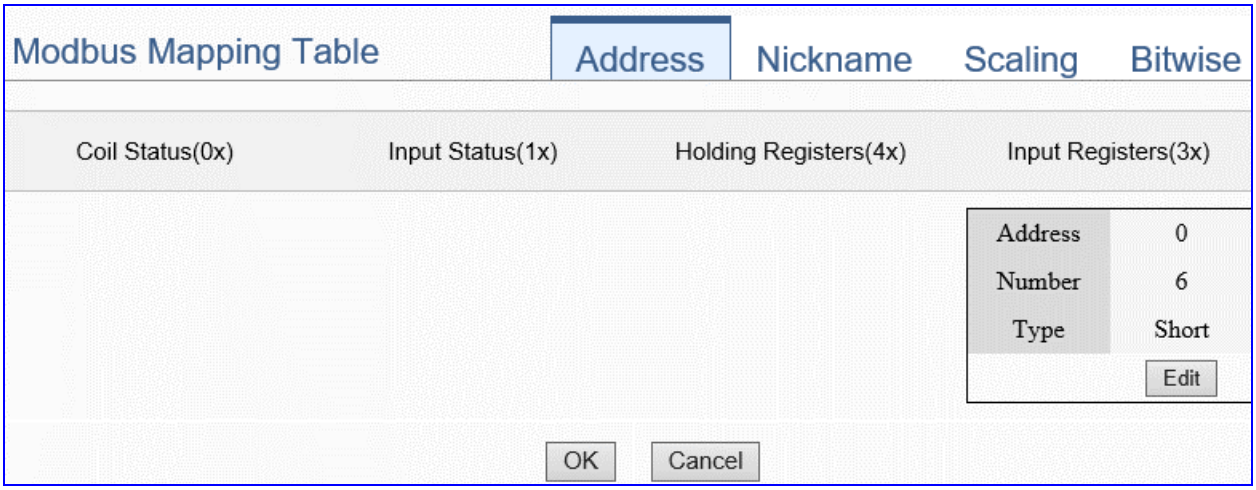
DL-302 is in the ICP DAS Module list, when select it from the list the system will auto-add module and set up its Modbus Mapping Table. If not in the list, user has to set up the [Modbus Mapping Table] as below:

Data Model: 04 Input Registers(3x)
Start Address: 0
Data Number: 6
Type: 16-bit Short
→ Click [Add]

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
IP	The IP address of the connected module. Default: 0.0.0.0
Port	The port number for Modbus TCP. Default: 502
Slave ID	Set the Slave ID of the UA. (Range: 1 ~ 247)
Timeout(ms)	Set the timeout value for the module. Default: 500 ms
Polling Rate	Set a time interval for the command. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI) 01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

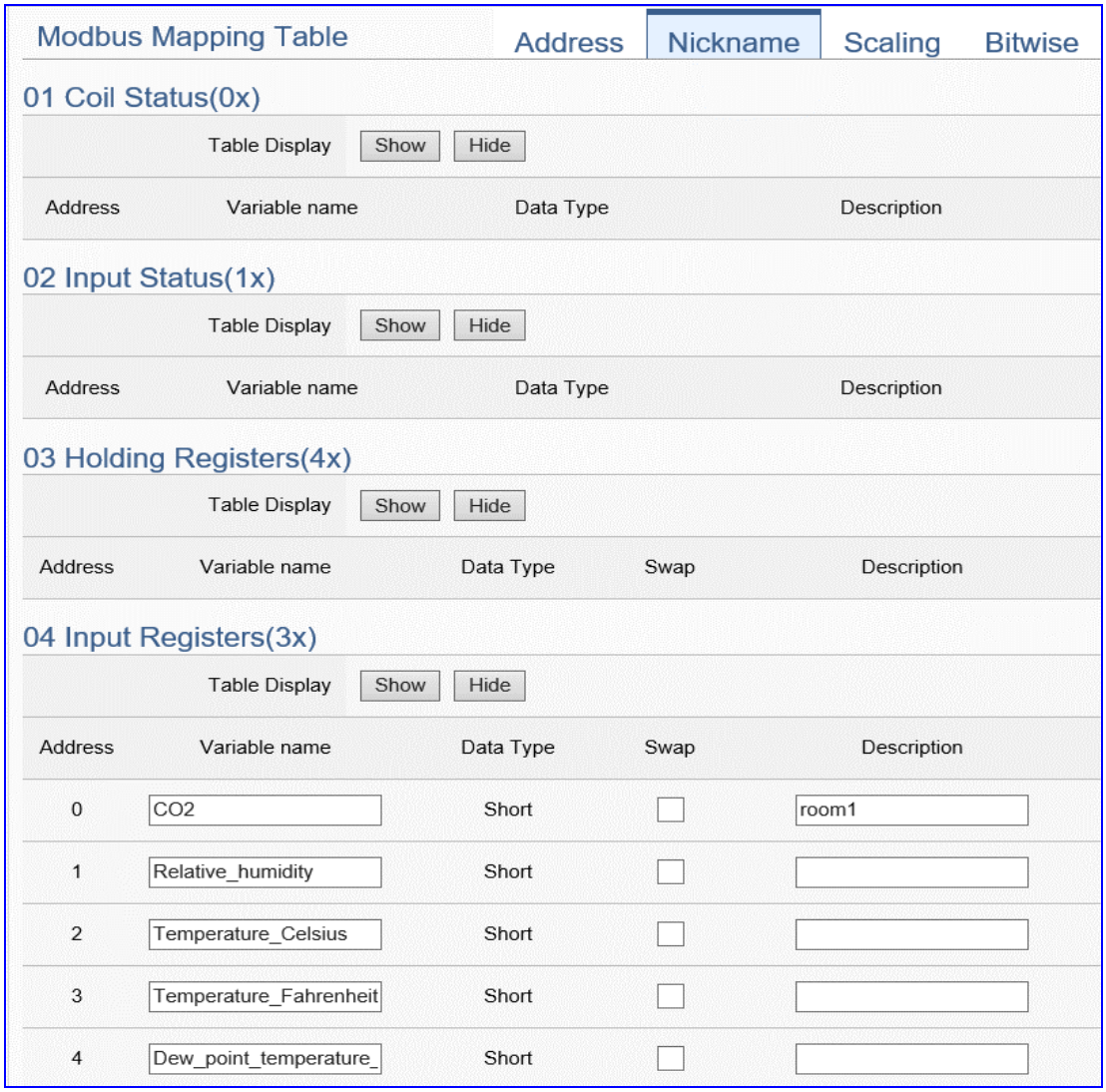
The finished Modbus Mapping Table as below.

Address:
Display and edit the Modbus Mapping Table (in the order of mapping DO, DI, AO & AI).



Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.

Nickname:
Setting the variable nickname and description.

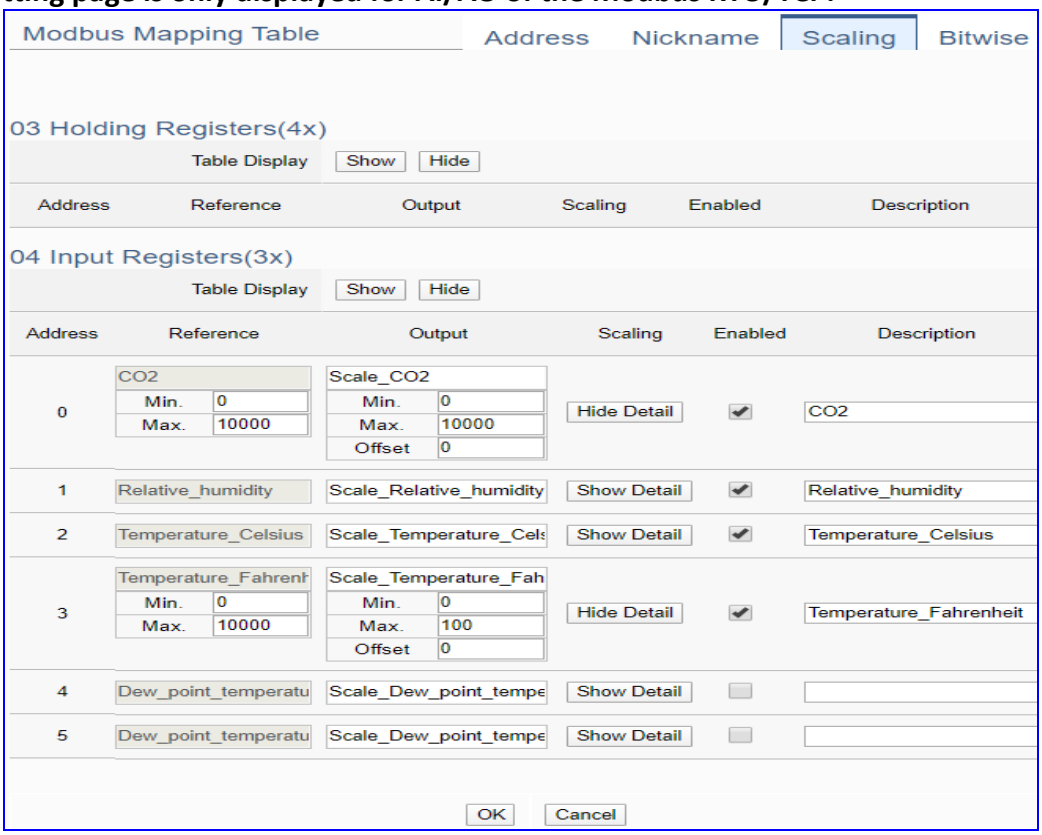


Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Scaling:

Scaling is only available in the AI/AO settings of Modbus RTU/TCP. When the variable value needs to be scaled or converted before output, click the "**Advanced Setting**" button of the variable on the **Scaling** page, input the **Min**./**Max**./**Offset** of the Reference/Output items, add a description, and check "**Enable**" box, The Scaling conversion function will be activated.

Note: this setting page is only displayed for AI/AO of the Modbus RTU/TCP.

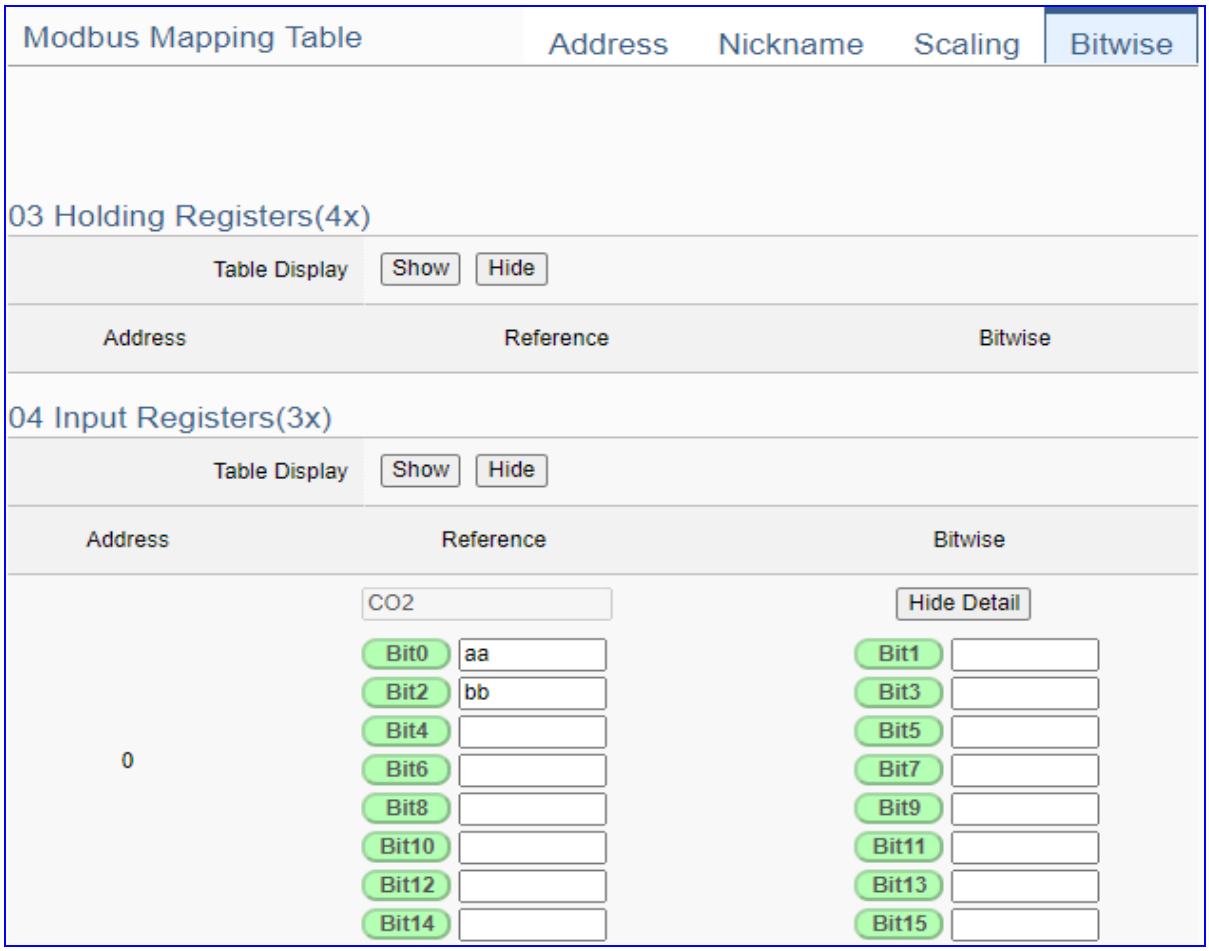


Modbus Mapping Table – Scaling	
Modbus Mapping Table	Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address **Scaling do not support 01 Coil Status(0x):DO & 02 Input Status(1x):DI**
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Reference	The I/O variable of the Modbus address.
Output	The scaling variable for scaling output. User can define the variable name.
Scaling	Click [Show Detail] to set up the Scaling parameters, and click [Hide Detail] to hide the parameters. Fill in the Min/Max range values of the source in the Reference column. Fill in the Min/Max range values after scaling in the Output column. If needs offset, fill the offset value in the Offset item. Remember check “Enable” box.
Enable	Check the box of the variable can enable just that variable for scaling.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Bitwise:

Bitwise is only available in the AI/AO settings of Modbus RTU/TCP. When the data needed to take out the value of the specified bit, fill in the variable name in the specified Bit# of the required address, and the value of the bit can be output to the filled variable.

Note: this setting page is only displayed for AI/AO of the Modbus RTU/TCP.

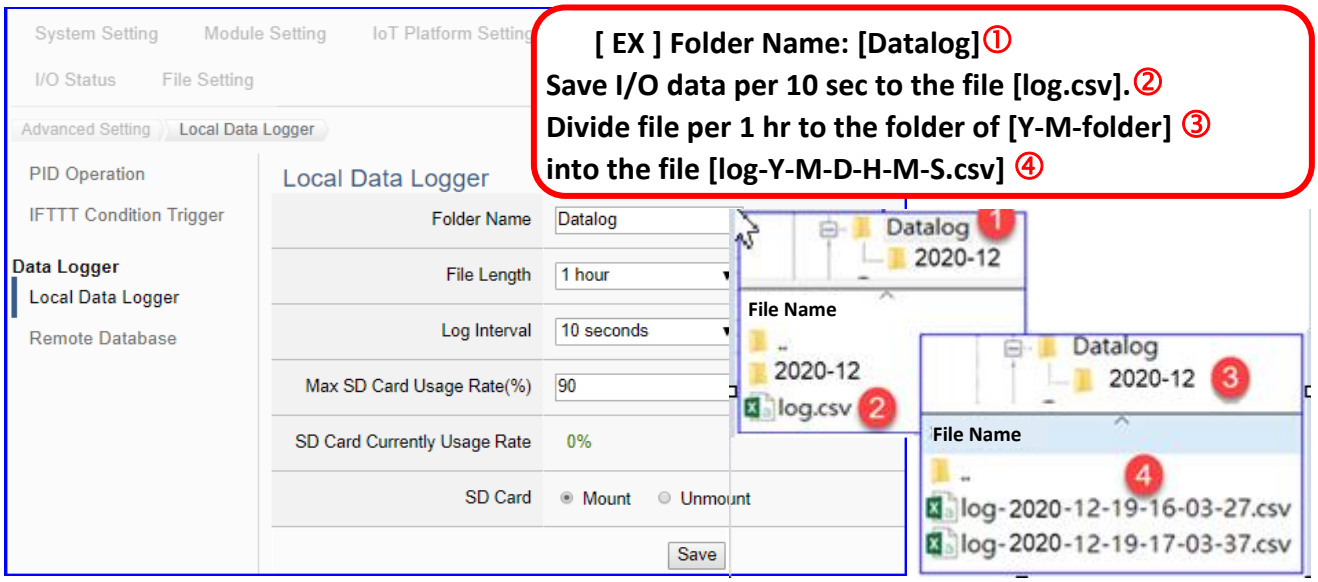


Modbus Mapping Table – Bitwise	
Modbus Mapping Table	Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address **Bitwise do not support 01 Coil Status(0x):DO & 02 Input Status(1x):DI** **Bitwise do not supports 32-bit Float & 64-bit Double data types.**
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Reference	The Bit# variables of the Modbus address.
Bitwise	Set up the variables for Bitwise. Click [Advanced Settings] to set up the Bitwise parameters, and click [Hide] to hide the parameters. Fill in the variable names to the Bit# that wanted to do the Bitwise. The value in the fixed bit number will be assigned into the variable.
OK	Click to save this page settings and back to the module list page.

Step 2. Local Data Logger

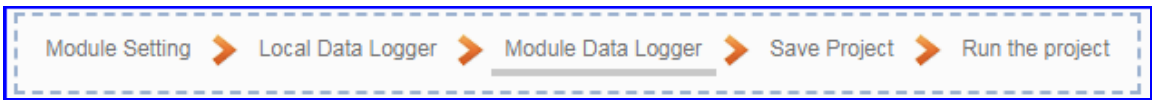
Click the next step, and enter the **Step 2 [Local Data Logger]** of the UI setting. This page is for setting the saving microSD card, e.g. the folder name, file length, log interval, card usage rate, and mount/unmount.
We select the “Modbus TCP / Local Data Logger” conversion at the beginning, so this step will auto enter the [**Data Logger > Local Data Logger**] page of Advanced Setting. The “Step Box” will prevent the user from selecting the wrong platform.

Before setting the parameters, user can refer to the "Example of the Log file and fields for the local data log file" that after the step 5.



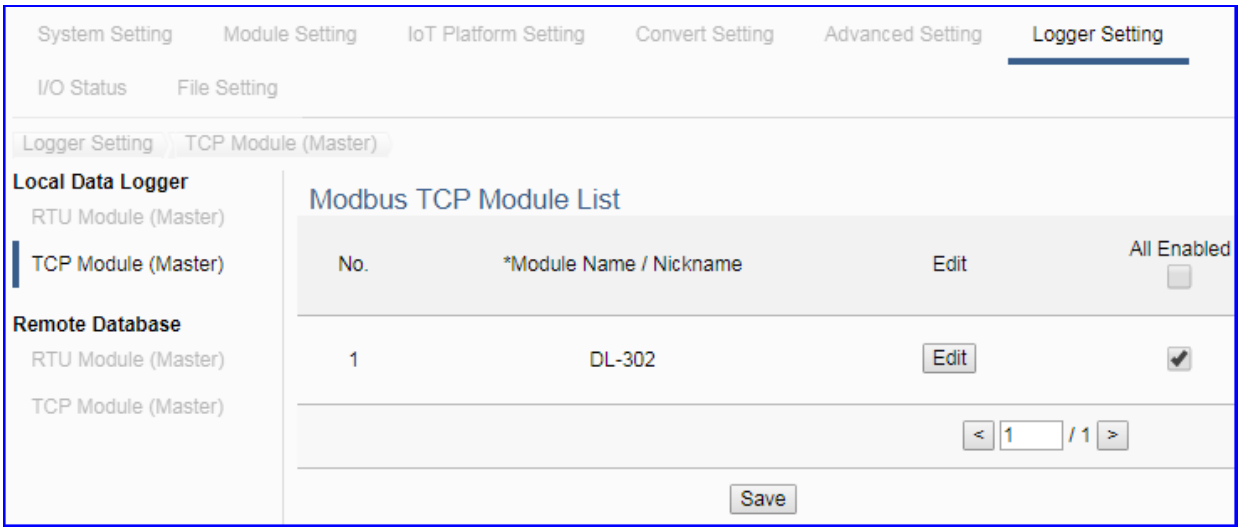
Advanced Setting > Data Logger > Local Data Logger	
Folder Name	The folder name in microSD card of UA, user definable. The I/O data will save into the file “log.csv” under this folder.
File Length	Unit: hour. User can select per 1, 2, 3, … 8, 12, or 24 hours to divide the log.csv into the file “log-Y-M-D-H-M-S.csv” under the folder “Y-M”.
Log Interval	The interval to save I/O data per seconds, minutes or hours.
Max SD Card Usage Rate (%)	Set up the maximum usage rate (Unit: %) of UA microSD card. If the data current rate meet the max rate, the oldest data will be removed first.
SD Card Currently Usage Rate	Display the current usage rate of UA microSD card (show %).
SD Card	Mount: Click to mount microSD card and begin to record data. Unmount: Click to unmount microSD card and stop record data.
Save	Click to save the settings of this item.

Step 3. Module Data logger



Click the next step, and enter the **Step 3 [Module Data logger]** UI setting. This step is for enabling the Modbus TCP module for Local Data Logger.
We select the “Modbus TCP / Local data logger” of Data Log at the beginning, so this step will auto enter the [**Local Data Logger > TCP Module (Master)**] page of Logger Setting. The “Step Box” will prevent the user from selecting the wrong platform.

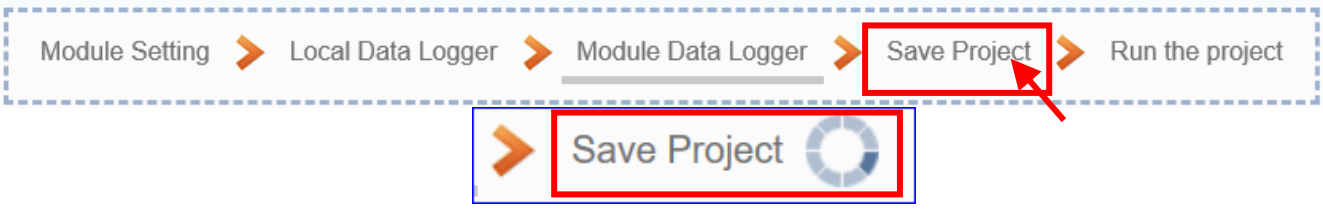
Please check the box of the module user wants to do the data logger, e.g. DL-302.



Logger Setting > Local Data Logger > TCP Module – Modbus TCP Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	If user wants to enable some I/O channels for data logger, click [Edit] of that module to enter the “Content Setting”. It is normal to set all channels as enabled, and the function will not affect the unconnected channels.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

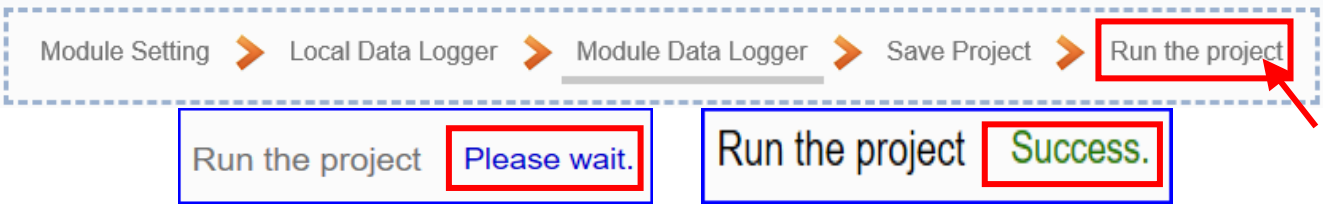
- **Step 4. Save Project**

The setting of this example is finished now. Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



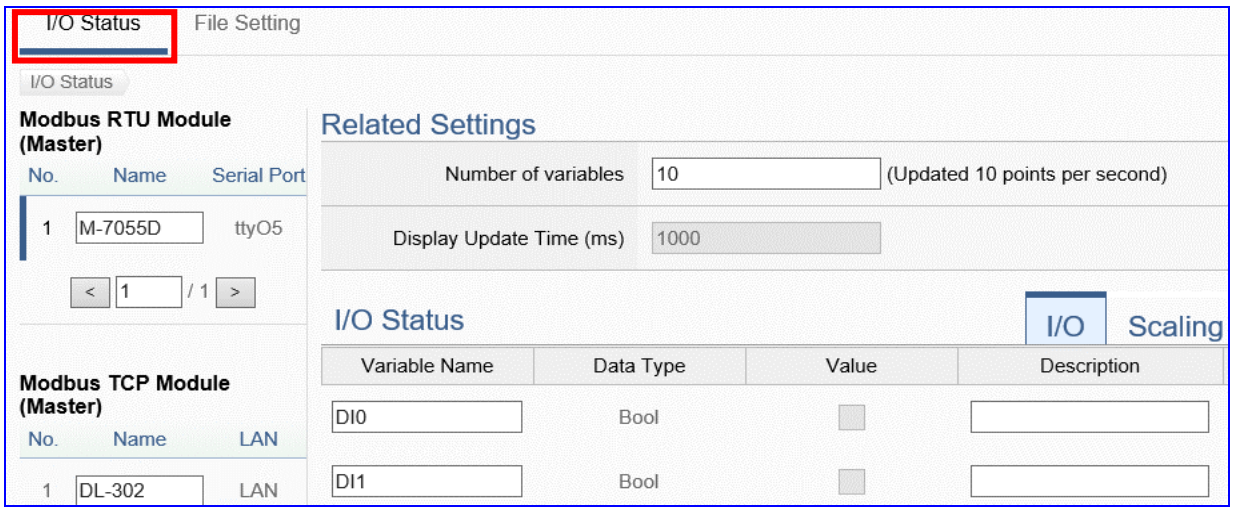
- **Step 5. Run the Project**

The project, after saving, needs to be executed. Click the next step **[Run the Project]**. This step can also via the [**System Setting** > **Controller Service Setting** > **Run Project**] to Stop and Run the project.



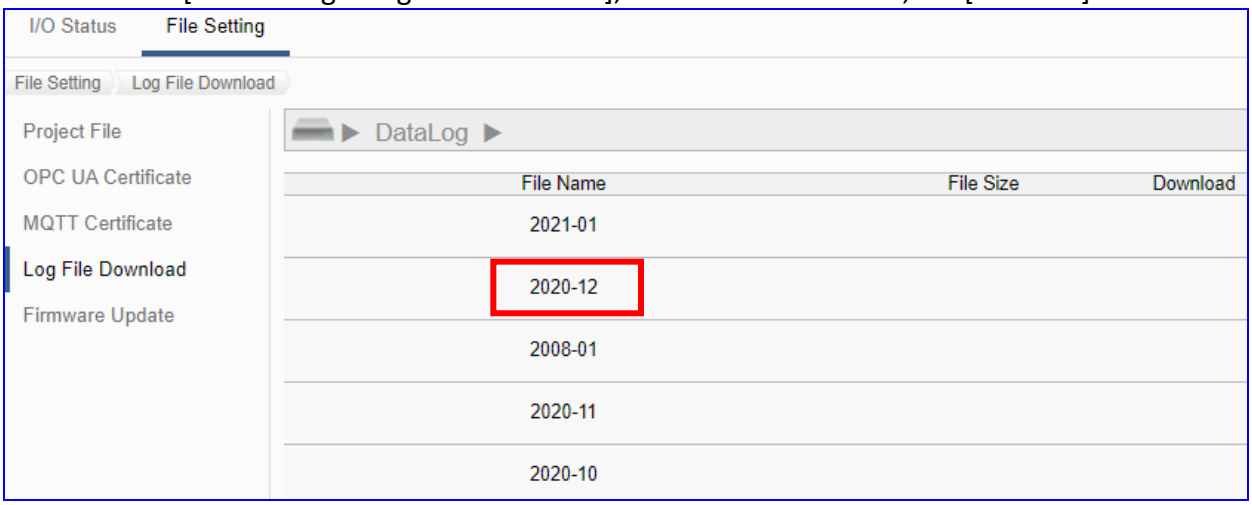
When the words "**Please wait**" disappears, the new words "**Success**" appears, that means the UA controller is running new project successfully. Then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the Data Logger function. Users can see the I/O status from the menu [**I/O Status**]. For more about the Web UI settings, please refer to the UA manual CH4 and CH5.



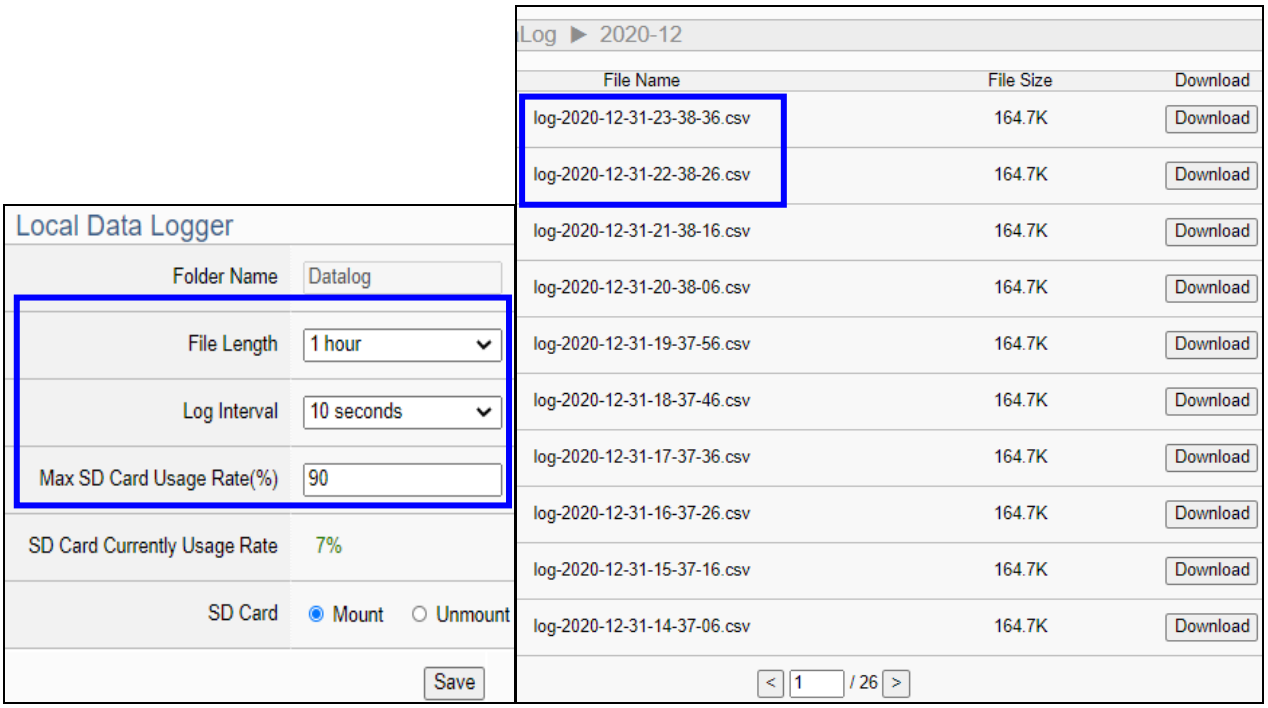
- **Get the Log File of the Local Data Logger:**

1. Enter the menu [File Setting > Log File Download], click the folder name, ex: [2020-12].



2. Download the Log file you need. The relationship of file name and the time is as below:
   The log file is divided according to the "**File Length**" set by the user and stored in the file under the **"year-month" folder**. The file name/example is as follows:
   "**log-20xx(year)-xx(month)-xx(day)-xx(hour)-xx(minute)- xx(seconds).csv**"

[Example]: Set **"File Length"** as **1 hr.**, "**Log interval**" as **10 Sec.,** and data recording will be performed every 10 seconds, and the file generation time is **every 1 hour + 10 seconds**. When the system time comes to these specific times, the file will automatically end and save the file to the storage. The system will generate a new file to continue recording the log data of the next 1 hour + 10 seconds, and so on. When all files are saved to over the setting of **"Max SD Card Usage Rate(%)", the oldest file will be overwritten**.



- **Example of the CVS file and fields for the local data log file:**

✧ The Log record will be stored to the microSD card in the UA PAC, and the default name is the **folder** "**Datalog**" which can be customized by the user.
✧ I/O data records will be stored in the **file** "**log.csv"** under this folder.
✧ The log data file is divided every 1, 2, 3… 8, 12 or 24 hours according to user settings, and saved to the **file** "**log-YYYY-MM-DD-HH-MM-SS.csv**" under the **folder** "**YYYY-MM**".
✧ Each tag data and status are recorded in each separate row, **the row is added down for each interval**, and the tag data is recorded in time sequence.

The example file is shown as the following.

	A	B	C	D
1	# Log file created/rotated Wednesday	9 Dec 20 04:46:29 GMT		
2	Timestamp	Name	Value	Status
3	2020-12-09-12-46-29-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
4	2020-12-09-12-46-29-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1133	Good
5	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.CO2	699	Good
6	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.RH	7089	Good
7	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.TC	2225	Good
8	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.TF	7205	Good
9	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.DC	1671	Good
10	2020-12-09-12-46-29-619	MRTU_No.2_DL-302_AO.DF	6207	Good
11	2020-12-09-12-46-39-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
12	2020-12-09-12-46-39-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1152	Good
13	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.CO2	699	Good
14	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.RH	7089	Good
15	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.TC	2225	Good
16	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.TF	7205	Good
17	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.DC	1671	Good
18	2020-12-09-12-46-39-619	MRTU_No.2_DL-302_AO.DF	6207	Good
19	2020-12-09-12-46-49-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
20	2020-12-09-12-46-49-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1172	Good
21	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.CO2	699	Good
22	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.RH	7085	Good
23	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.TC	2225	Good
24	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.TF	7205	Good
25	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.DC	1670	Good
26	2020-12-09-12-46-49-619	MRTU_No.2_DL-302_AO.DF	6206	Good
27	2020-12-09-12-46-59-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
28	2020-12-09-12-46-59-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1193	Good
29	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.CO2	698	Good
30	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.RH	7089	Good
31	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.TC	2223	Good
32	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.TF	7201	Good
33	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.DC	1668	Good
34	2020-12-09-12-46-59-619	MRTU_No.2_DL-302_AO.DF	6202	Good
35	2020-12-09-12-47-09-619	MRTU_No.1_tM-AD4P2C2_AO.Vin0	2278	Good
36	2020-12-09-12-47-09-619	MRTU_No.1_tM-AD4P2C2_AO.Vin1	1213	Good

log-2020-12-09-12-46-29