INSTALLATION MANUAL
TL4211 HW1

GSM/GPRS Compact with built-in I/O's
RTU & Datalogger

TALENT SYSTEMS

Manuals and configuration software are available at website: www.talentsyst.com

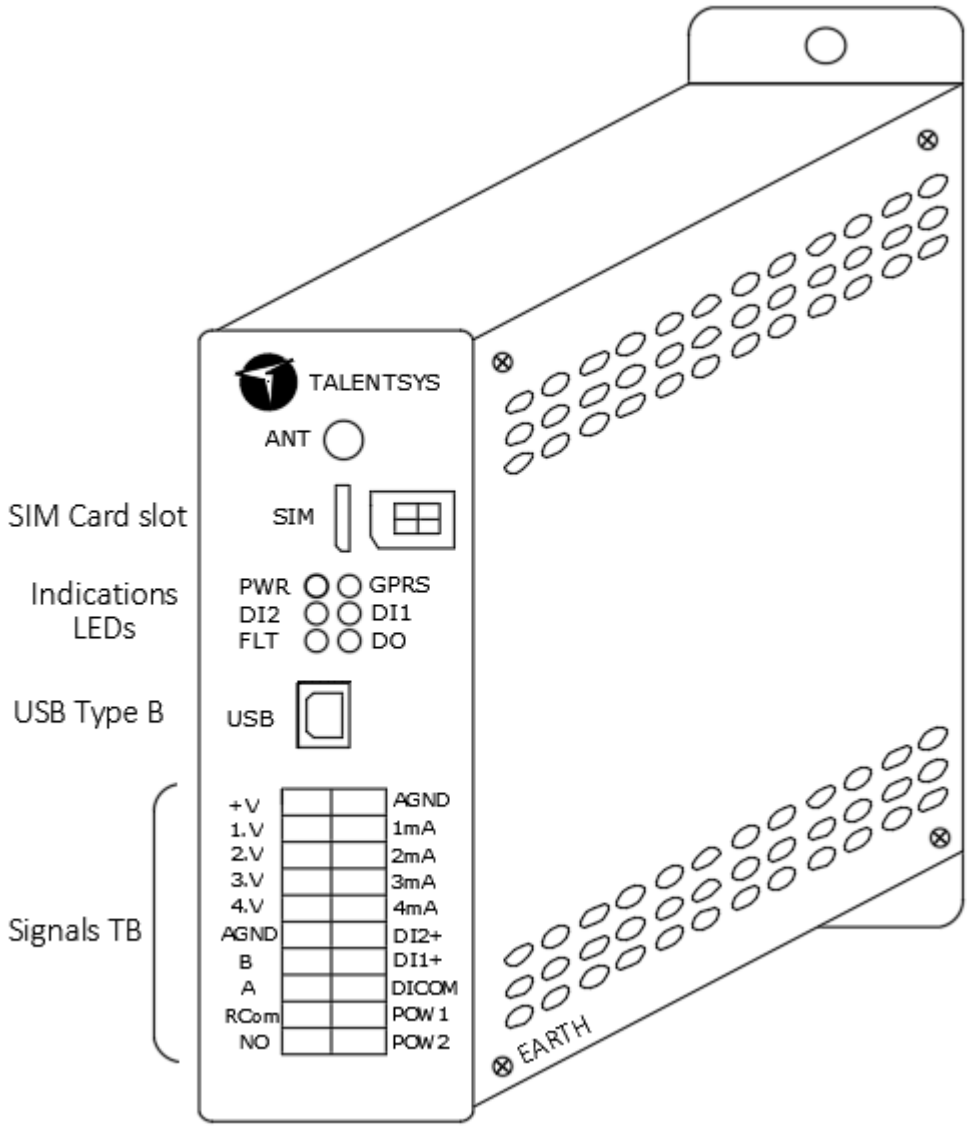
TALENTSYS

TECHNICAL SPECIFICATIONS	
ENVIRONMENTAL CONDITIONS Temperature Humidity Storage Protection rating	 0: 65°C 0:95% not condensing. -20 – + 80°C. IP20.
CONNECTIONS	300V 8A 10 Bend -40°C~+105°C Copper Alloy 2 3.81mm 2x10P Green Board Edge/Receptacle-Close Tin Push-Pull, P=3.81mm Pluggable System Terminal Block ROHS, SIM card holder Antenna SMA.
POWERSUPPLY	8-32VDC / Solar Systems
DIGITAL INPUTS	Number of channels 2 optically isolated, 5KV Isolation Voltage(Vrms) Input voltage OFF < 5V ON>8V (Max. 24V). Input current 10mA. Max. Frequency 1000Hz.
DIGITAL OUTPUTS	Number of channels 1. SPST Relays with free contacts. Max. Voltage 250VA. Max. Current 1A.
ANALOG INPUTS	Number of channels 4. mA or V configurable. Voltage input 0 – 10V. Accuracy 0.04% of the Full Scale. Current input 0 – 20mA accuracy 0.04% of the Full Scale. Resolution 16 bit. 3.7KV Isolation Voltage
COMMUNICATION PORTS	RS485 port at Screw terminals. USB type B Front port for configuration.
MODEM	**4G/LTE (Cat4), 3G, 2G** Multi-Band LTE-TDD/LTE-FDD/HSPA+ and GSM/GPRS/EDGE module which supports LTE CAT4 up to 100Mbps for downlink data transfer. Certifications - ROHS - REACH - CE
SUPPORTED SYSTEM PROTOCOLS	FTP(s) client, SMTP client, HTTP(S), MQTT(S), ModBUS TCP server, ModBUS TCP client, ModBUS RTU master, ModBUS RTU slave
SIM SLOT	Standard SIM 15x25 mm

PRELIMINARY WARNINGS
The symbol with the word **WARNING** identifies conditions and actions that pose hazard(s) to the user. The symbol with the word **CAUTION** identifies conditions and actions that may damage the device or the connected equipment. 

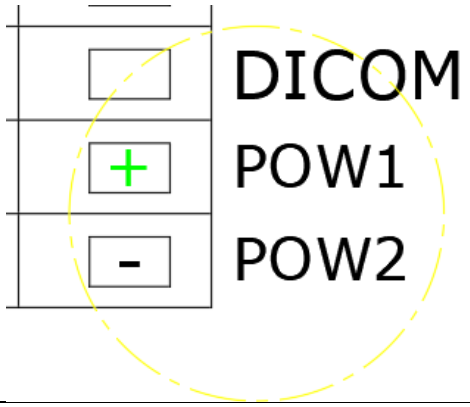
No warranty is guaranteed in connection with faults resulting from improper use, from modifications or repairs carried out by Manufacturer-unauthorized personnel on the device, or if the content of this user Manual is not followed.	
⚠	**WARNING: Before performing any operation is mandatory to read the full contents of this manual.** The module may only be used by qualified and skilled technicians in the field of electric installation.
	Only the Manufacturer is authorized to repair the module or to replace damaged parts. The product is susceptible to electrostatic discharge, take appropriate countermeasures during any operation.
⚠	**CAUTION: It is forbidden to place anything that could obstruct the ventilation slits.** **It is forbidden to install the module near heat sources.**
	Disposal of electrical & electronic equipment (applicable throughout the EU and other countries with separate collection programs). The symbol found on this product or on its packaging**,** indicates that this product it must be handed over to an applicable collection point for **the recycling of electrical and electronic equipment.**
⚠	**Warning: The power supply upper limits must not be exceeded in order to avoid serious damage to the module. Power off the module, with the PS1 button, before connecting the inputs and outputs.** In order to satisfy the electromagnetic compliance requirements: - Use shielded cables for the signals transmission; - Connect the shield to a preferential ground for devices; - Space the shielded cables from other cables used for power installations (transformers, inverters, motors, induction ovens, etc...);

Device 3D view



ELECTRICAL CONNECTIONS

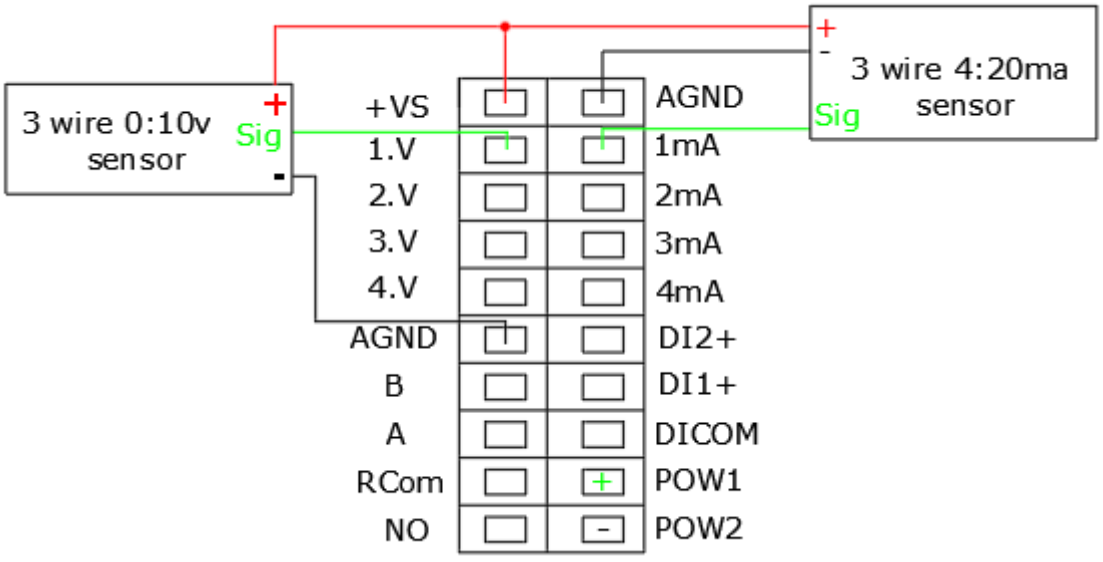
POWER SUPPLY

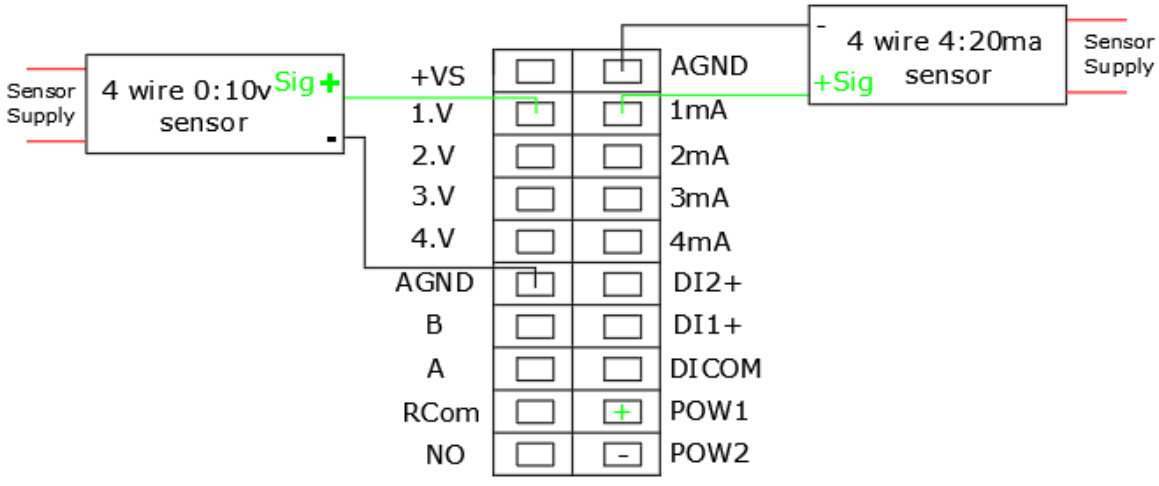


The power supply must be connected to terminals POW1 and POW2 without polarity cautions, its already protected inside the device
The supply voltage must be between:
8-32VDC.
The power supply source must be protected from any malfunctions of the module through appropriately sized safety fuse.

ANALOG INPUTS

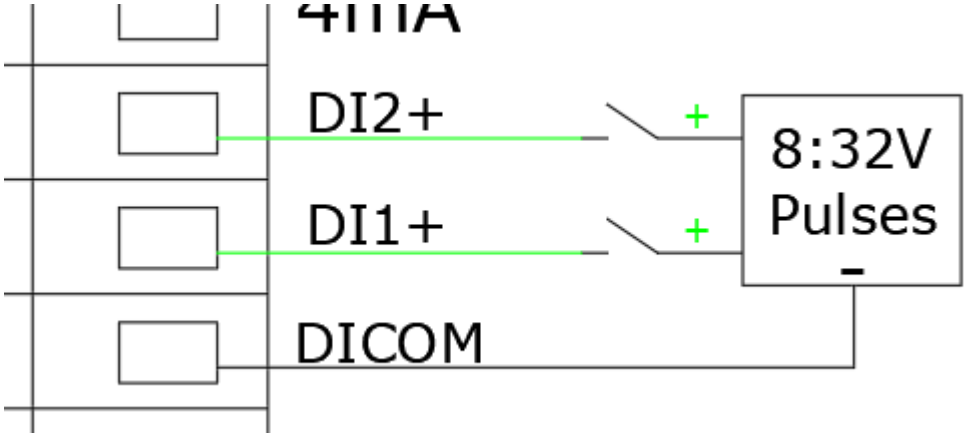
The module has four software voltage or current configurable analog inputs. All the analog inputs are single ended hardware design; the module don't have differential inputs.





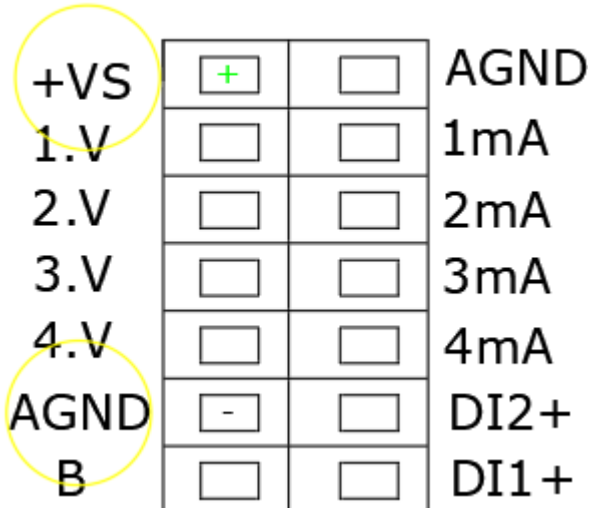
For the configuration software you can read the user manual.

DIGITAL INPUTS
The module has two digital inputs.

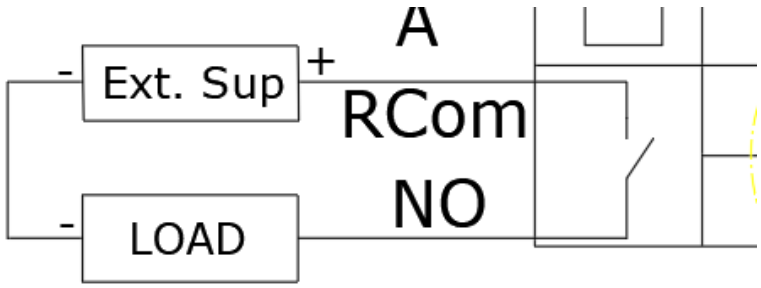


If user want to use internal +V (voltage supply), the AGND must be shorted with DICOM.
For the configuration software you can read the user manual.

Internal power supply: +VS is protected power source with 0.5A max load
+VS value will be main supply voltage – 1.5 with reference with AGND.



DIGITAL OUTPUTS
The module has one digital output relay SPST.



For the configuration software you can read the user manual.

SERIAL PORT

The module has one RS485 serial port.

For the configuration software you can read the user manual.

MODULE LAYOUT	
Dimensions (W×H×D)	40 x 130 x 120 mm
Weight	230g
Case	Stainless Steel, Gary color with green front

LED SIGNALING ON FRONT PANEL		
LED	**Status**	**LED's Meaning**
PWR	ON	Internal power is OK
	OFF	Internal power issue
Digital Output Relay (DO) (Green)	ON	Relay energized
	OFF	Relay de-energized
Digital Input 1 (DI1) (Green)	ON	Digital Input 1: Energized
	OFF	Digital Input 1: DE-energized
Digital Input 2(DI2) (Green)	ON	Digital Input 2: Energized
	OFF	Digital Input 2: DE-energized
FAULT (Red)	Blinking 1s ON 1s OFF	GPRS Modem Not ready, Or software fault, Use TalentLogix configurator software, check status and errors from Info window
	Blinking 0.5s ON 0.5s OFF	Module Boot loader running
	ON	Hardware issue, Use TalentLogix configurator software, check status and errors from Info window
	OFF	Module OK
GSM / GPRS (Green)	ON	Modem power is OK
	OFF	Modem is not running
	Blinking 64ms ON 3s OFF	Connected to the provider network

	Blinking 64ms ON 0.8s ☐ OFF	Searching the GSM or GPRS network
	Fast Blinking 64ms ON 0.3s ☐ OFF	Connected to the GPRS network
	OFF ☐	GPRS Module not ready

SIM CARD INSERTING	
	Inserting the SIM card into the front slot of IDC10 connector.

TalentLogix Software: Comprehensive User Manual

Version: 3.0.0

Welcome to the full guide for the TalentLogix Configuration Tool. This document explains every part of the software in simple terms, designed for users who want to manage their industrial devices without needing to write code.

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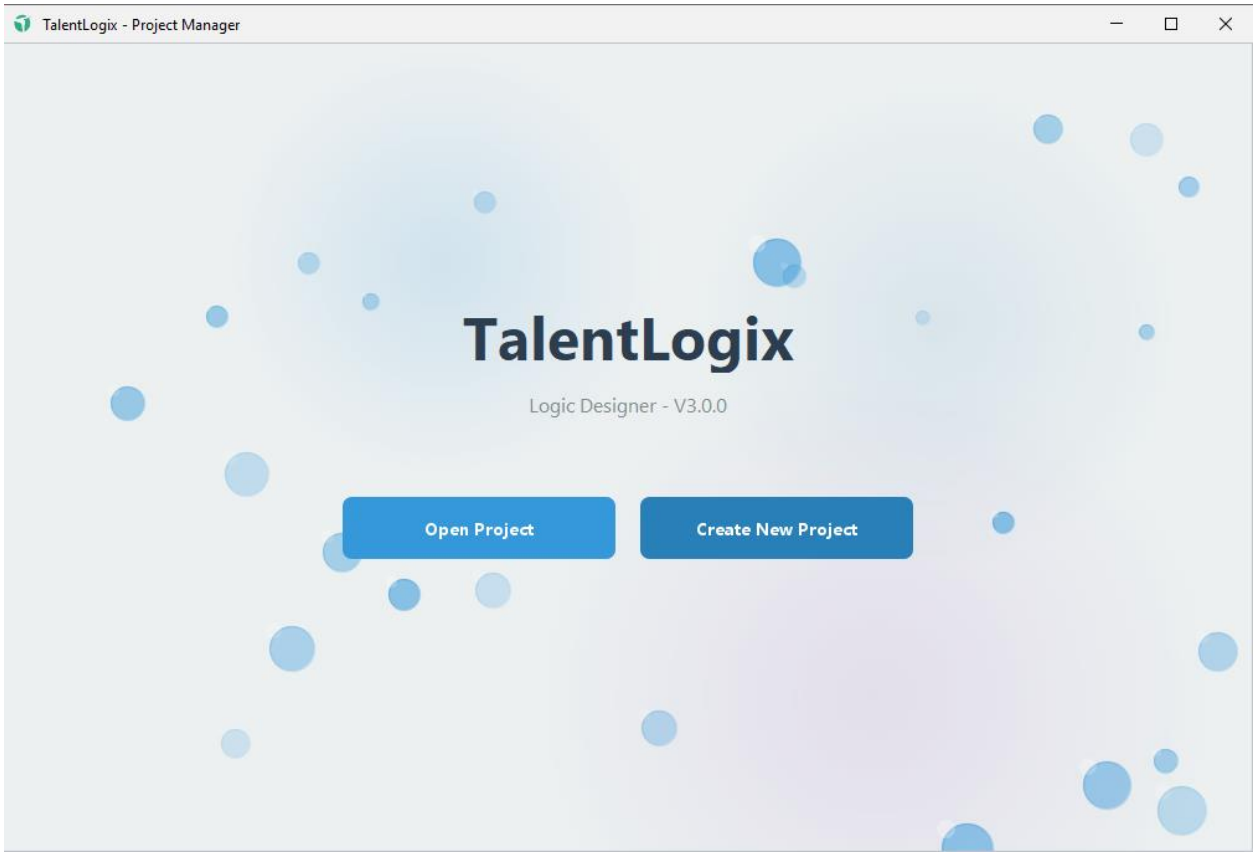
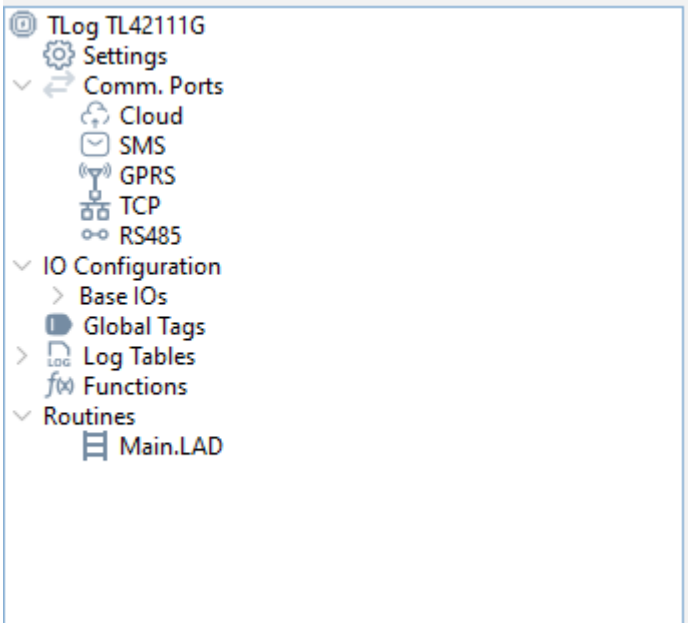
1. Getting Started: The Main Interface

When you launch the application, you enter the central workspace.

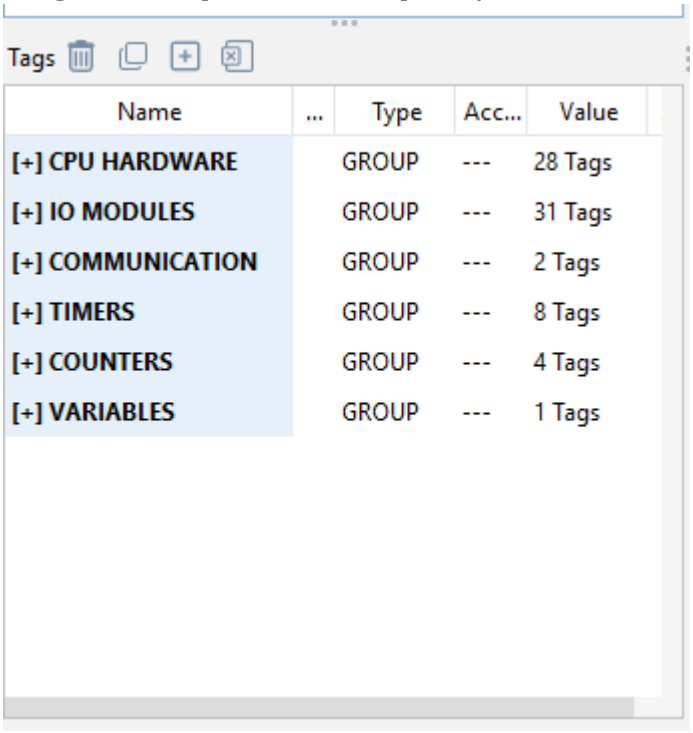


- **Menu Bar**:

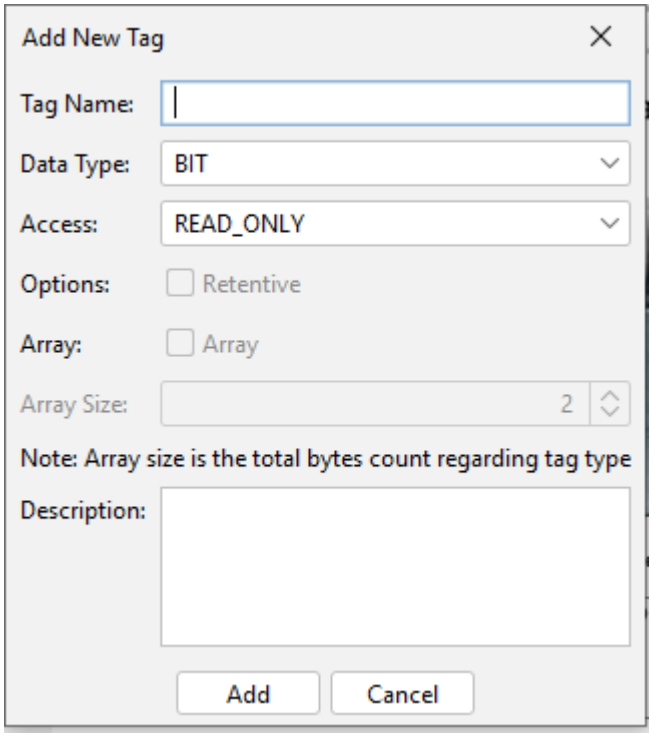
  - **File**: Create new projects, save your work, or open existing configurations.
  - **Edit**: Undo/Redo actions.
  - **Comm (Communication)**: Configure how the software talks to your device.
- **Project Explorer (Left)**: This is your navigation tree. It lists your "CPU" (the device) and all its modules (Settings, Inputs, Cloud, etc.). Double-click any item to open its configuration panel as a new **Tab** in the central workspace.



- **Tabs (Center top)**: Every module you open (Settings, Logic, Inputs) appears as a tab. You can click between them to switch tasks quickly.
- **Tags Table (Bottom Left)**: A quick list of active data points.



- **Adding new Tags**



- **Workspace (Center)**: The main area where configuration panels and logic editor appear.

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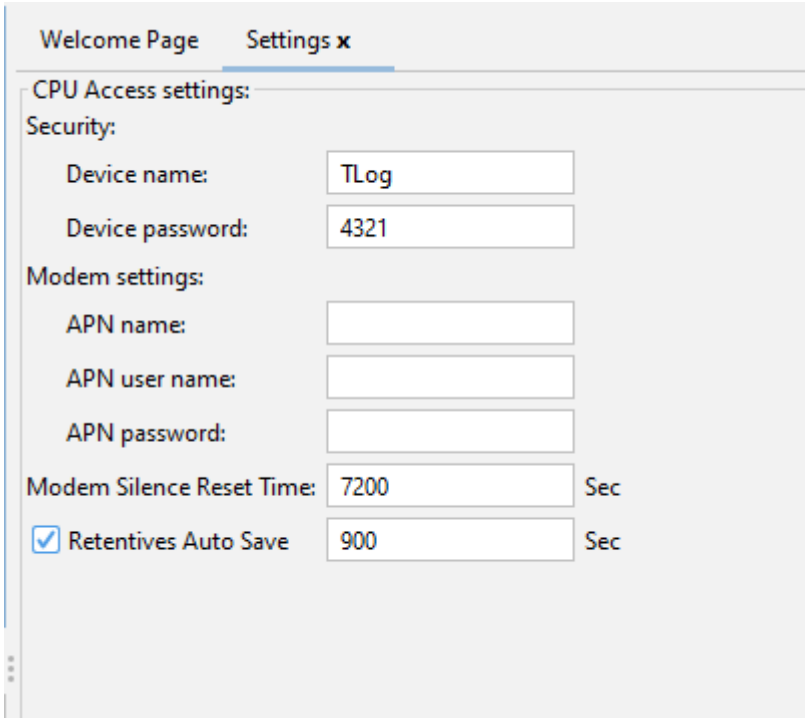
2. Device Settings & Core Information

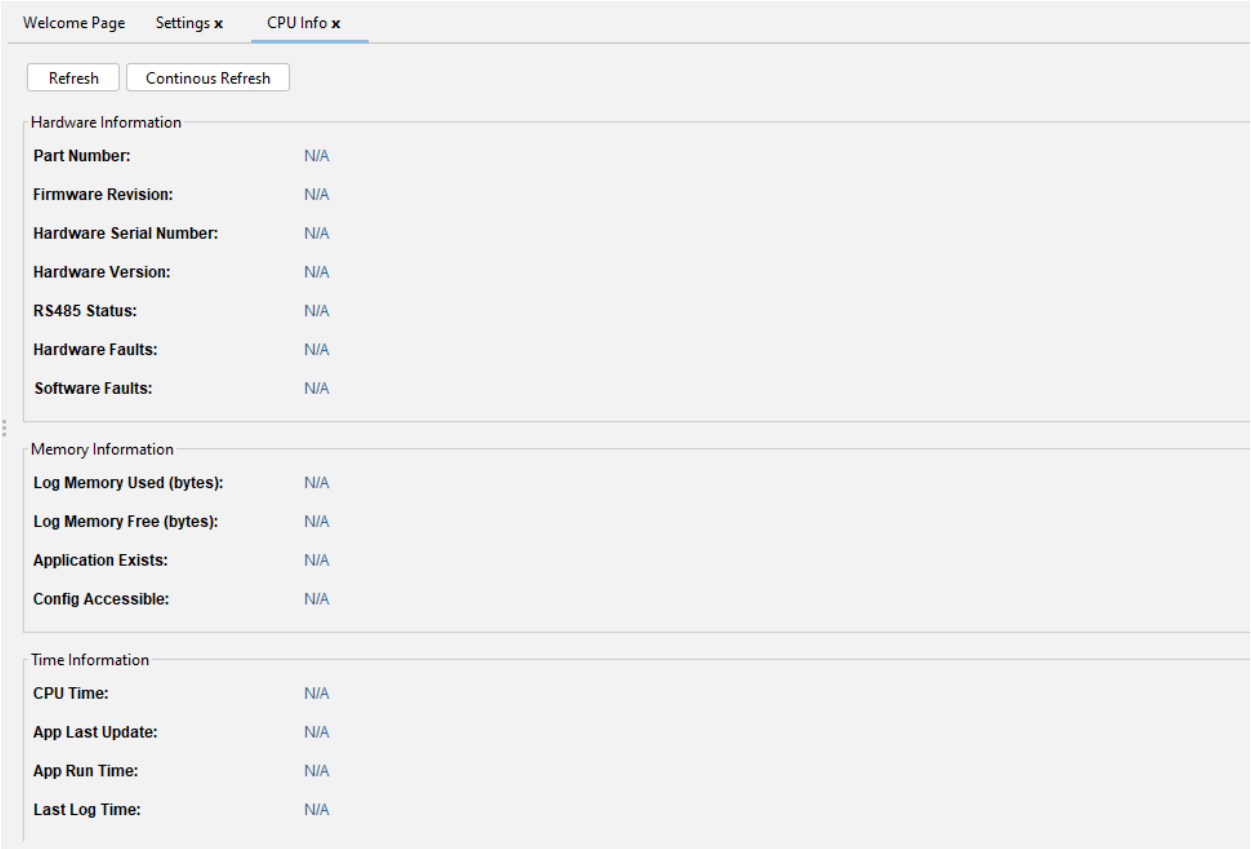
CPU Settings



This is the "ID Card" of your device. - **Device Name**: A friendly name for your unit. - **Device Password**: A 4-digit security code. - **Retentives Auto Save**: If enabled, the device will remember its "memory" (like counters or states) if it loses power.

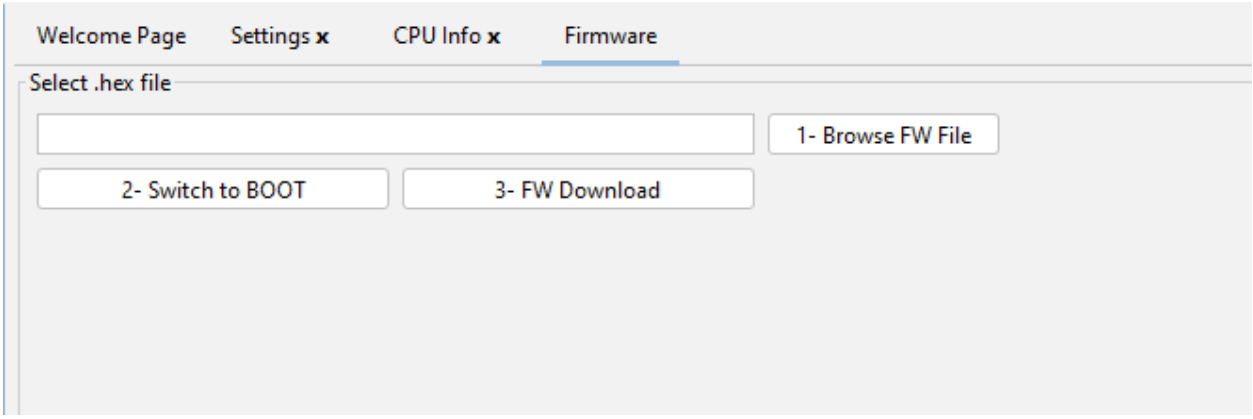
Device Info (The "i" Icon)

Provides a real-time health check: - **Hardware/Firmware Info**: Shows serial numbers and version versions. - **Faults & Errors**: Lists any hardware problems (like RTC battery failure) or software configuration errors. - **Memory Stats**: See how much space is left for data logs. - **Refresh**: Use "Refresh" to get latest stats, or "Continuous Refresh" to watch them change live.



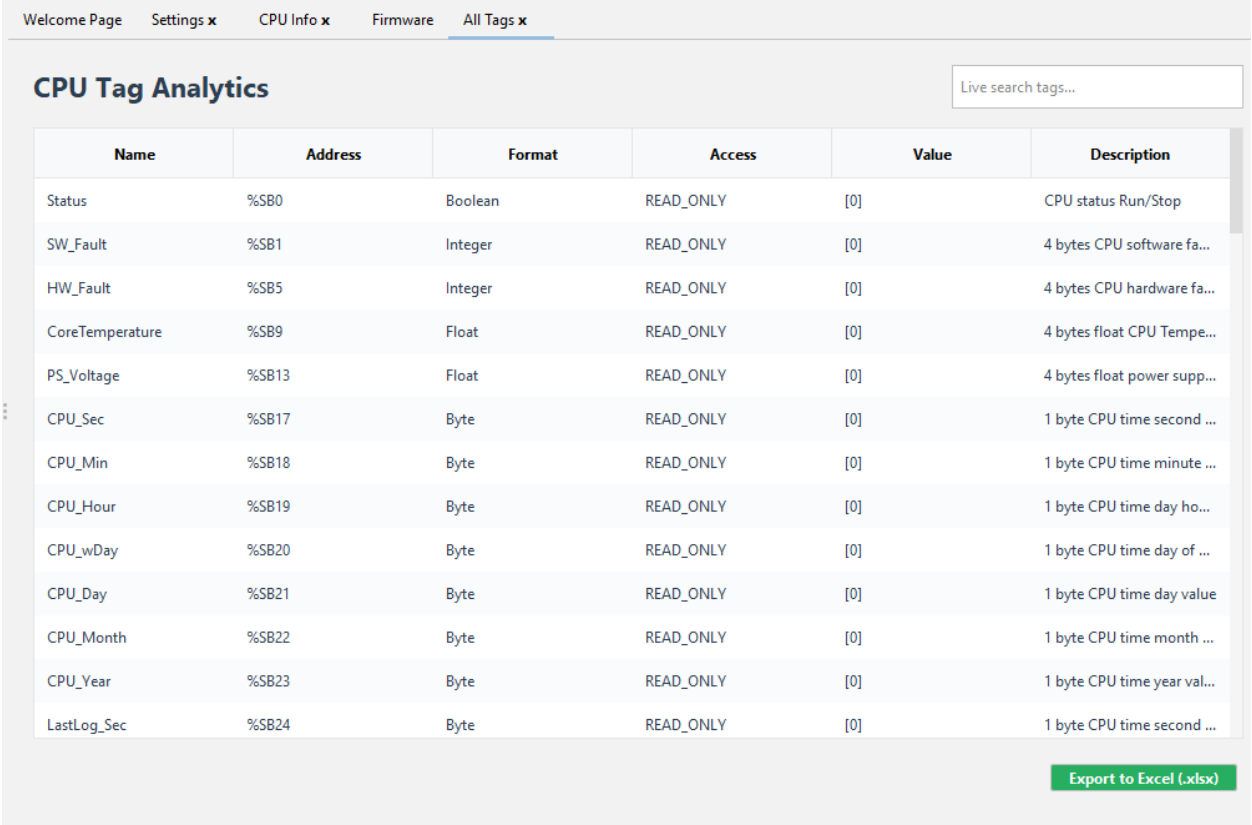
Firmware Update

Use this panel only when you have a new software file (.hex) from the manufacturer. 1. **Browse**: Select the file. 2. **Switch to BOOT**: Puts the device in "Update Mode". 3. **Download**: Sends the new software to the device.



Global Tags (Tag Explorer)

For a complete overview of every data point in your system, double-click **Global Tags** in the Project Explorer. - **Analytics Table**: Shows the name, address, format, and current value of every tag. - **Live Search**: Use the search box at the top right to filter tags by name in real-time. - **Excel Export**: Click "Export to Excel" to save your entire tag database as an .xlsx file for offline auditing.

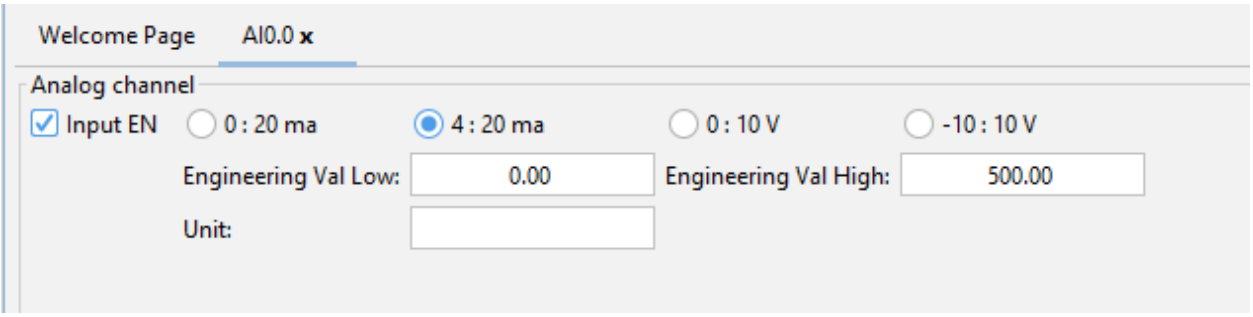


Name	Address	Format	Access	Value	Description
Status	%SB0	Boolean	READ_ONLY	[0]	CPU status Run/Stop
SW_Fault	%SB1	Integer	READ_ONLY	[0]	4 bytes CPU software fa...
HW_Fault	%SB5	Integer	READ_ONLY	[0]	4 bytes CPU hardware fa...
CoreTemperature	%SB9	Float	READ_ONLY	[0]	4 bytes float CPU Tempe...
PS_Voltage	%SB13	Float	READ_ONLY	[0]	4 bytes float power supp...
CPU_Sec	%SB17	Byte	READ_ONLY	[0]	1 byte CPU time second ...
CPU_Min	%SB18	Byte	READ_ONLY	[0]	1 byte CPU time minute ...
CPU_Hour	%SB19	Byte	READ_ONLY	[0]	1 byte CPU time day ho...
CPU_wDay	%SB20	Byte	READ_ONLY	[0]	1 byte CPU time day of ...
CPU_Day	%SB21	Byte	READ_ONLY	[0]	1 byte CPU time day value
CPU_Month	%SB22	Byte	READ_ONLY	[0]	1 byte CPU time month ...
CPU_Year	%SB23	Byte	READ_ONLY	[0]	1 byte CPU time year val...
LastLog_Sec	%SB24	Byte	READ_ONLY	[0]	1 byte CPU time second ...

Physical Connections (Inputs)

Analog Inputs (AI)

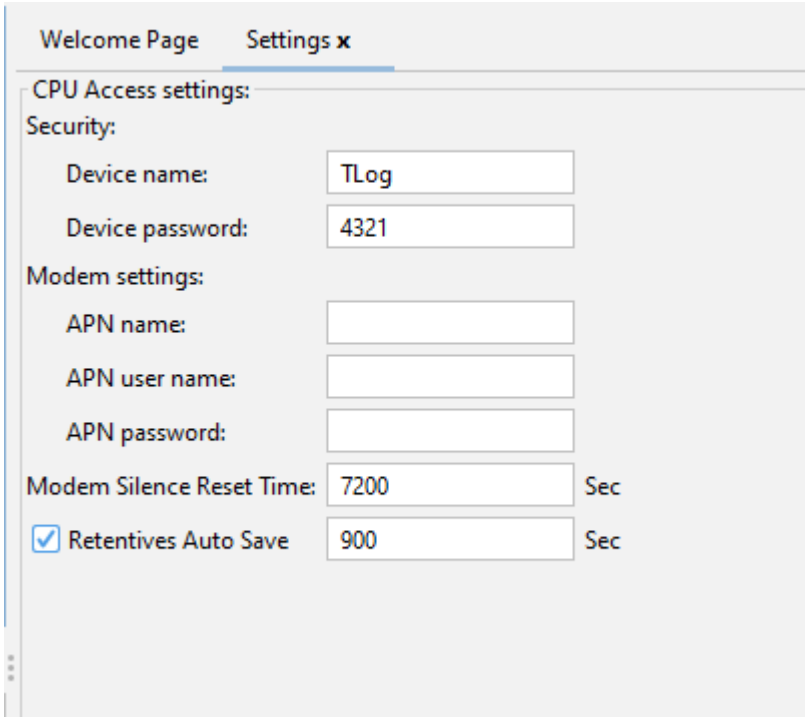
Configures sensors that provide a range of values (e.g., 0-100%). - **Signal Type**: Standard industrial signals like 4-20mA or 0-10V. - **Scaling**: Tell the software that "4mA means 0" and "20mA means 100". - **Units**: Label your data (e.g., C°, PSI, %, Bar).



4. Communication & Networking

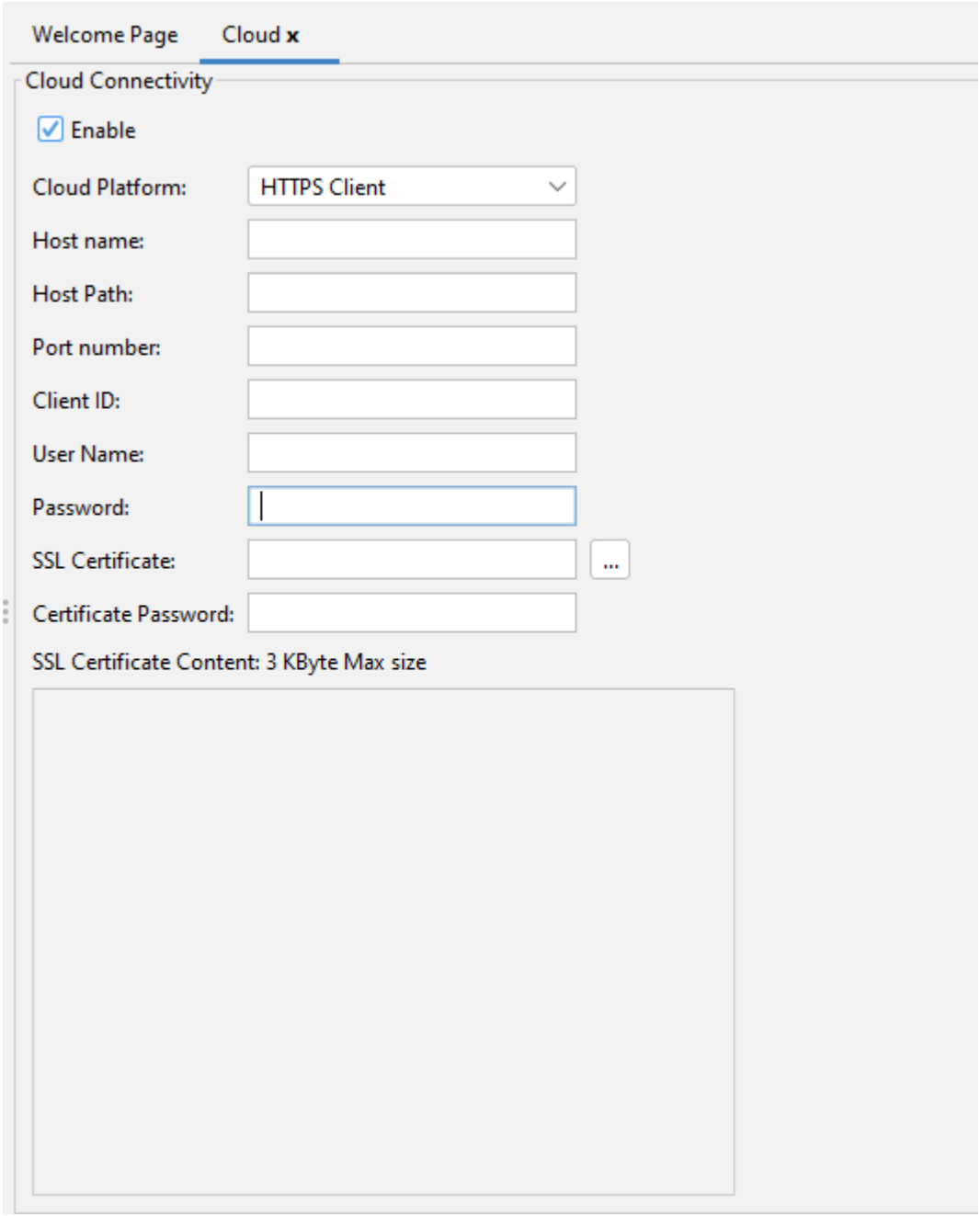
SIM Provider (APN) Settings

If your device uses a SIM card, you must set the **APN** (Access Point Name), which is like the "address" for the mobile network provided by your SIM company.

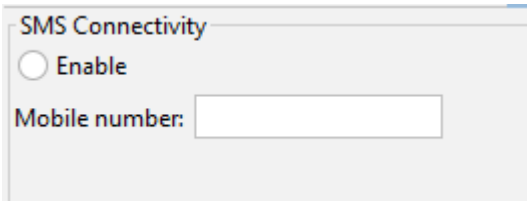


Networking Modules

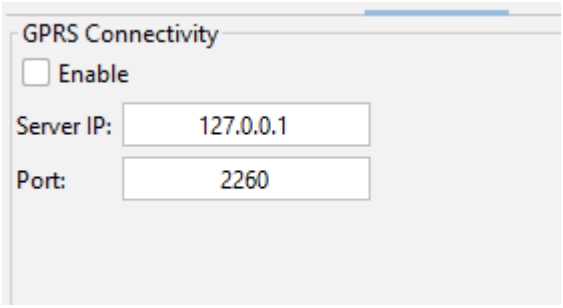
- **Cloud**: Connect to dashboard services like MQTT or HTTPS. This allows you to monitor your device from a web browser anywhere in the world.



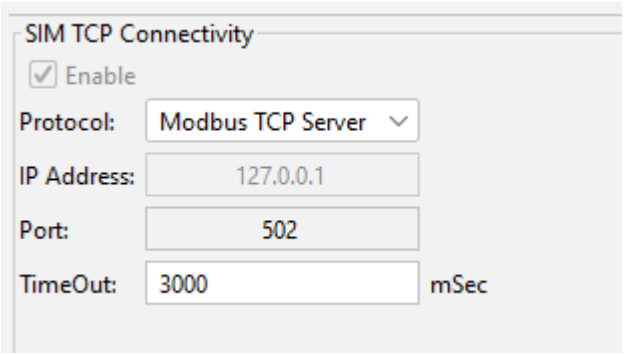
- **SMS & GPRS**:
  - **SMS**: Enable text message alerts sent to your mobile phone.



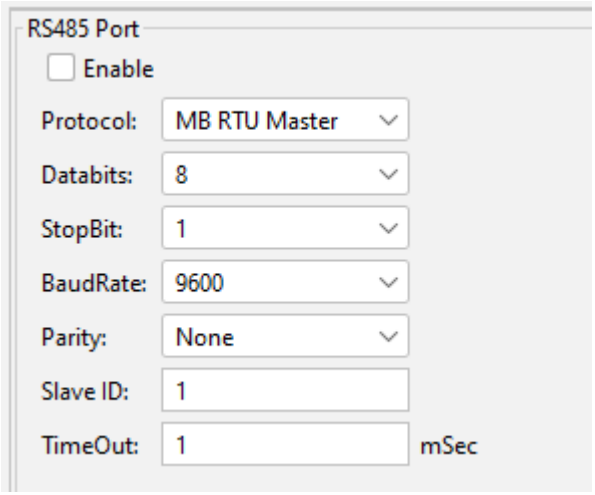
  - **GPRS**: Connect the device to the internet via mobile data.



- **TCP (Network)**: Set the IP address if connecting via a local Ethernet network.



- **RS485**: Industrial serial connection used to talk to other local sensors or "Slave" devices.



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5. Visual Control Logic (Ladder)

Think of this as a visual flowchart that tells the device what to do (e.g., "If the water level is high, turn on the pump").

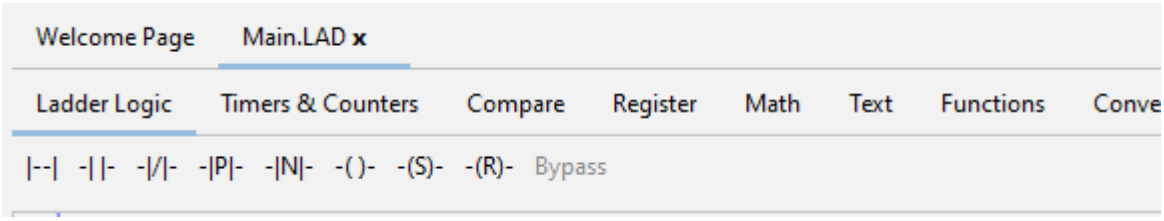
How Ladder Logic Works

The "Logic Designer" uses horizontal lines called **Rungs**. Power flows from the left side. If the conditions you place on the left are met, the power reaches the "Coil" (Action) on the right side and triggers it.

Your Toolkit: Ladder Commands

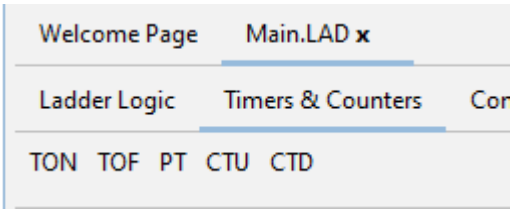
The software organizes these commands into tabs at the top of the designer. Here is what each one does:

Tab 1: Basic Ladder Logic



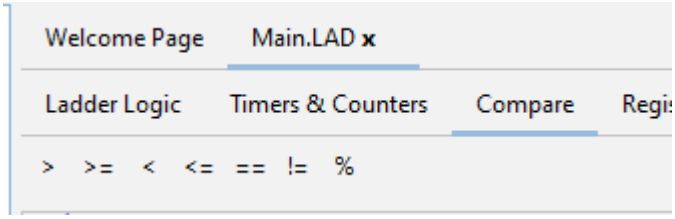
- **-| |- (Normal Open)**: *(Accepts: BOOL)* A digital "check". It lets power through ONLY when the switch/sensor is **ON**.
- **-|/|- (Normal Closed)**: *(Accepts: BOOL)* The opposite. It lets power through ONLY when the switch/sensor is **OFF**.
- **-|P|- (Positive Edge)**: *(Accepts: BOOL)* Triggers only for a split second the moment a switch is turned **ON**.
- **-|N|- (Negative Edge)**: *(Accepts: BOOL)* Triggers only for a split second the moment a switch is turned **OFF**.
- **-( )- (Output)**: *(Accepts: BOOL)* The primary "action". Turns a switch/light/motor ON or OFF based on the checks on its left.
- **-(S)- (Set)**: *(Accepts: BOOL)* Turns an action ON and "locks" it. It stays ON even if the condition on the left disappears.
- **-(R)- (Reset)**: *(Accepts: BOOL)* The key to the "Set" command. It "unlocks" or turns OFF a previously set action.
- **Bypass**: *(Accepts: Branching Logic)* Allows you to create a "dual path" or "OR" logic (e.g., "If Switch A OR Switch B is ON, do this").
- **-|ONS|- (One Shot)**: *(Accepts: BOOL)* Ensures that an action happens exactly once, no matter how long the switch is held down.

Tab 2: Timers & Counters



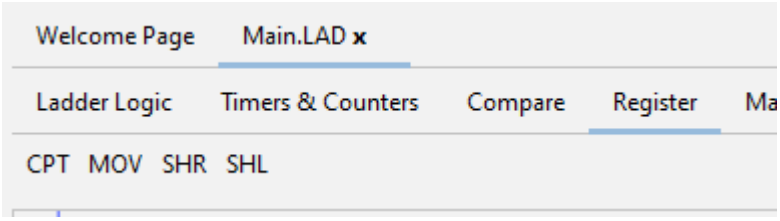
- **TON (Timer On Delay)**: *(Accepts: TIMER)* Waits for a specific time before turning the output ON.
- **TOF (Timer Off Delay)**: *(Accepts: TIMER)* Keeps something ON for a set time after the switch is turned OFF.
- **PT (Pulse Timer)**: *(Accepts: TIMER)* Turns an output ON for exactly a set duration and then turns it off.
- **CTU (Count Up)**: *(Accepts: COUNTER)* Adds 1 to a counter every time a switch is flipped.
- **CTD (Count Down)**: *(Accepts: COUNTER)* Subtracts 1 from a counter every time a switch is flipped.

Tab 3: Compare (Math Checks)



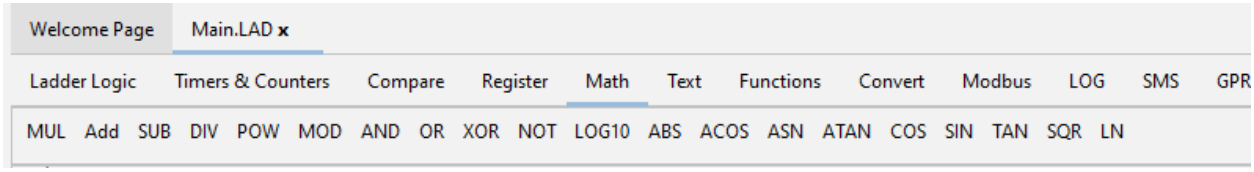
- **> / >=**: *(Accepts: INT, DINT, FLOAT)* Checks if one number is larger than (or equal to) another.
- **< / <=**: *(Accepts: INT, DINT, FLOAT)* Checks if one number is smaller than (or equal to) another.
- **== / !=**: *(Accepts: INT, DINT, FLOAT)* Checks if two numbers are exactly the same or different.
- **% (Remainder Check)**: *(Accepts: INT, DINT)* Check if the reminder of division == zero.

Tab 4: Register



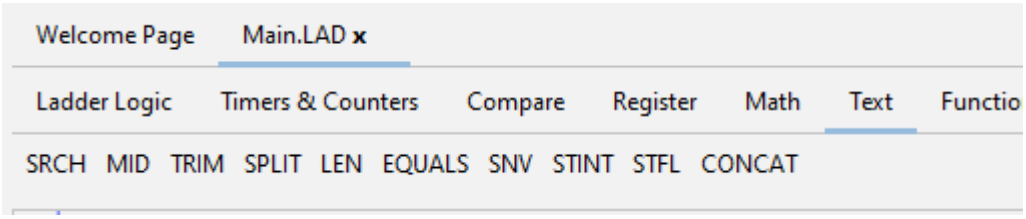
- **MOV (Move)**: *(Accepts: Any Data Type)* Copies a value from one place to another (e.g., "Copy CurrentTemp to SavedTemp").
- **CPT (Compute)**: *(Accepts: INT, DINT, FLOAT)* Lets you write a mathematical formula (e.g., (A + B) / C).
- **SHIFT Left/Right:** *(Accepts: INT, DINT, FLOAT)*

Tab 5: Math



- **ADD / SUB / MUL / DIV**: *(Accepts: INT, DINT, FLOAT)* Basic math: Plus, Minus, Times, and Divide.
- **AND / OR / XOR / NOT**: *(Accepts: INT, DINT, BOOL)* Advanced logical "bit" operations for combining numbers.
- **ABS / SQR / POW**: *(Accepts: INT, DINT, FLOAT)* Advanced math: Absolute value, Square Root, and "to the power of".

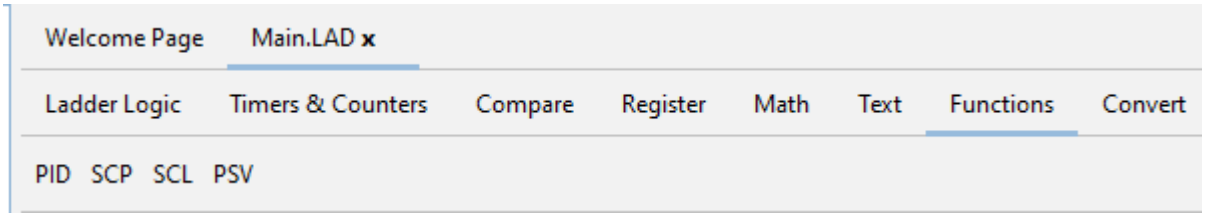
Tab 6: Text (Managing Words)



- **EQUALS**: *(Accepts: STRING)* Checks if two pieces of text (like a password) are the same.
- **LEN (Length)**: *(Accepts: STRING -> Output INT)* Counts the number of letters in a message.
- **CONCAT**: *(Accepts: STRING)* Glues two pieces of text together (e.g., "Pump" + " Error" = "Pump Error").
- **STINT / STFL**: *(Accepts: STRING -> Output INT/FLOAT)* Converts text (like "123") into a number so you can do math with it.

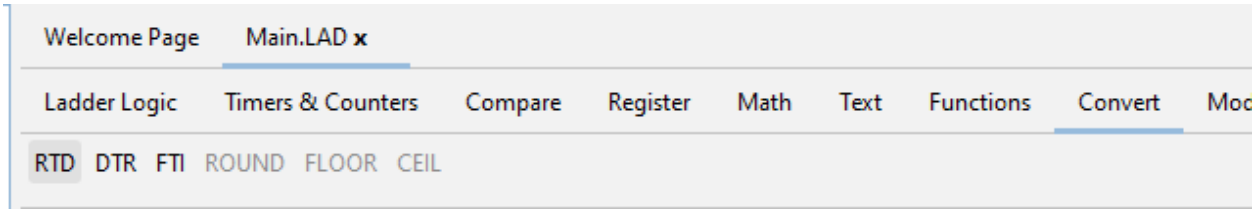
- **SEARCH / MID**: *(Accepts: STRING)* Used to find or extract specific parts of a long message.

Tab 7: Functions



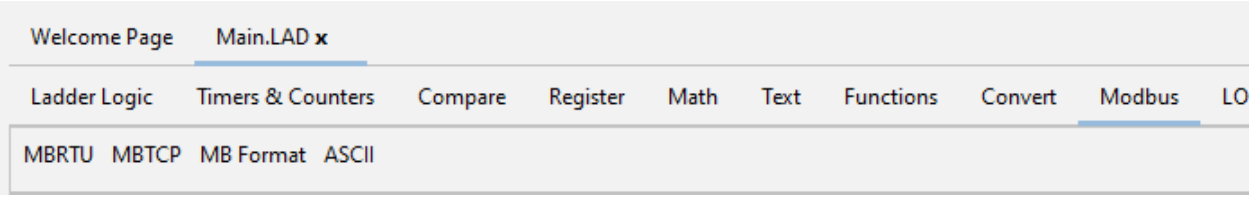
- **PID**: *(Accepts: INT, FLOAT)* A "smart" controller. Used to keep things stable (e.g., keeping a heater exactly at 50°C).
- **SCL (Scale)**: *(Accepts: INT, FLOAT)* Changes a raw sensor number into a meaningful unit (e.g., "Scale 0-1024 to 0-100%").

Tab 8: Conversion



- **ROUND / FLOOR / CEIL**: *(Accepts: FLOAT -> Output INT/FLOAT)* Various ways to turn decimal numbers (12.5) into whole numbers (12 or 13).

Tab 8: Modbus (External Devices)



- **MBRTU / MBTCP**: *(Accepts: BOOL, INT, DINT, FLOAT)* Used to talk to other industrial equipment to "ask" for data over Serial (RTU) or Ethernet (TCP).
- **MB Format**: *(Accepts: Format Config)* Configures how the data from those external devices is interpreted.

Here is a summary of how data is formatted and interpreted:

- **1. Primary Data Objects**
- Modbus defines four primary tables of data. All data is addressed from **0 to 65,535**.

Object Type	Access	Size	Description
Coils	Read/Write	1 bit	Digital outputs (e.g., triggering a relay or motor).
Discrete Inputs	Read Only	1 bit	Digital inputs (e.g., a limit switch or proximity sensor).
Input Registers	Read Only	16 bits	Analog measurements (e.g., current temperature or flow rate).
Holding Registers	Read/Write	16 bits	Configuration parameters or output set points.

2. Common Data Representations

Since a single register is only 16 bits (0 to 65,535 unsigned), complex data requires multi-register spans:

- **Integers (16-bit):**
  - **uint16:** Unsigned value from 0 to 65,535.
  - **int16:** Signed value using Two's Complement (-32,768 to +32,767).
- **Floating Point (IEEE 754):** * Uses **two** consecutive 16-bit registers (32 bits total).
  - Essential for precision instruments like electromagnetic flowmeters.
- **32-bit Integers (DINT):**
  - Uses two registers for larger counters (up to 4.2 billion).
- **Packed Bits:**
  - A single 16-bit register can represent 16 individual Boolean flags to save bandwidth.

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3. The "Endianness" and Byte Swapping Problem

One of the most common challenges in industrial automation is the **Byte Order**. Modbus itself is "Big-Endian" (most significant byte sent first), but different manufacturers handle 32-bit data differently.

When reading a 32-bit Float across Registers A and B, you may encounter four different orders:

1. **Big-Endian (ABCD):** Most common in PLCs.
2. **Little-Endian (DCBA):** Common in some PC-based systems.
3. **Big-Endian Byte Swap (BADC):** Bytes are swapped within the registers.
4. **Little-Endian Byte Swap (CDAB):** Also known as "Mid-Little Endian."

Tip: If your flowmeter reading looks like a massive, nonsensical number (e.g., 1.4 x 10^ 38), you likely have a byte-order mismatch in your driver configuration.

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4. Data Scaling

Because many older PLCs struggle with floating-point math, "Integer Scaling" is often used. Instead of sending **12.55**, the device sends the integer **1255** with a documented "Multiplier" of **0.01**. The receiving application then divides the value by 100 to restore the decimal.

5. ASCII vs. RTU Formats

While the data objects remain the same, the *encoding* changes based on the protocol variant:

- **Modbus RTU:** Binary representation. Most efficient for RS485/Industrial use.
- **Modbus ASCII:** Converts binary data into readable hexadecimal characters. Used for long-distance lines or radio links where timing is inconsistent.

- **Modbus TCP:** Encapsulates the RTU ADU (Application Data Unit) inside a TCP/IP packet, removing the Checksum (CRC) because Ethernet handles error checking at a lower layer.

Tab 9: Communication Alerts (SMS & Logs)

- **Log**: *(Accepts: Trigger BOOL)* Manually triggers the device to save a snapshot of data into the history file right now.
- **SMS**: *(Accepts: Trigger BOOL, STRING text)* Sends a pre-configured text message alert to your phone.

Tab 10: Advanced Networking (HTTP, FTP, MQTT)

- **HTTP POST/GET**: *(Accepts: STRING)* Send or receive data from web servers or APIs.
- **FTP/FTPS Send**: *(Accepts: Log File Name)* Upload log files automatically to a remote storage server.
- **Publish/Subscribe (MQTT)**: *(Accepts: Any Data Type converted to STRING/JSON)* The standard for "Internet of Things" (IoT). Connects your device to a live dashboard where data updates instantly.

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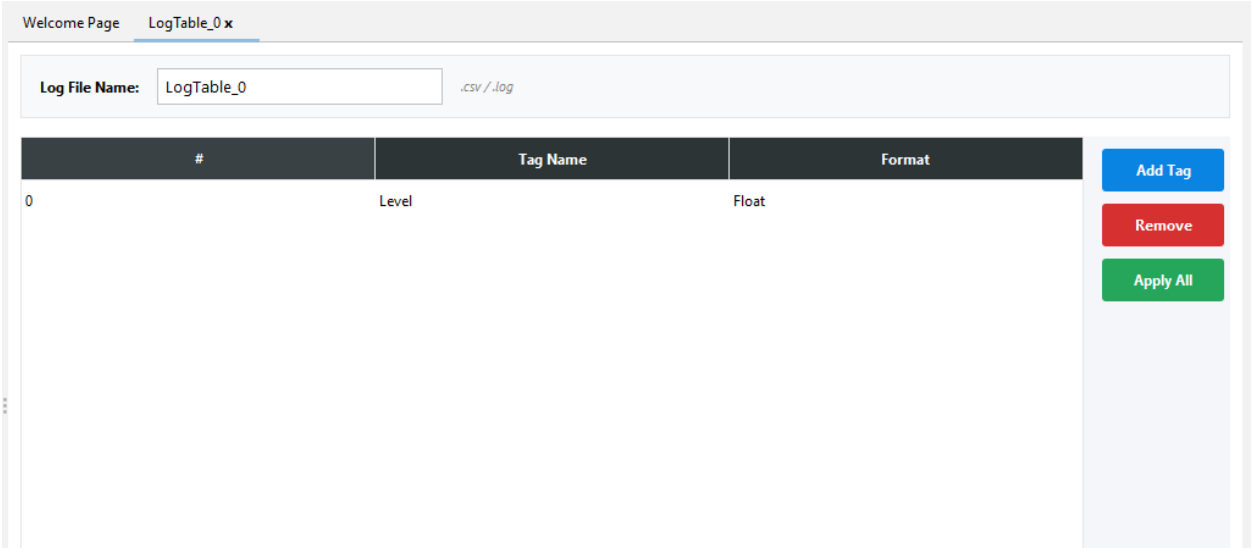
6. Data Management & History

Log Tables

Choose which Tags to record and how often. - **File Name**: What the storage file will be called (saved as .CSV). - **Update Mode**: the log happens according to the ladder logic conditions & user configurations.



Log Retrieval & Viewer

- **Log Retrieve**: Upload the recorded history files from the device to your computer.
- **Log Viewer**: Open these files directly in the software to see your data in a table. You can also **Export to CSV** to open the history in Microsoft Excel.

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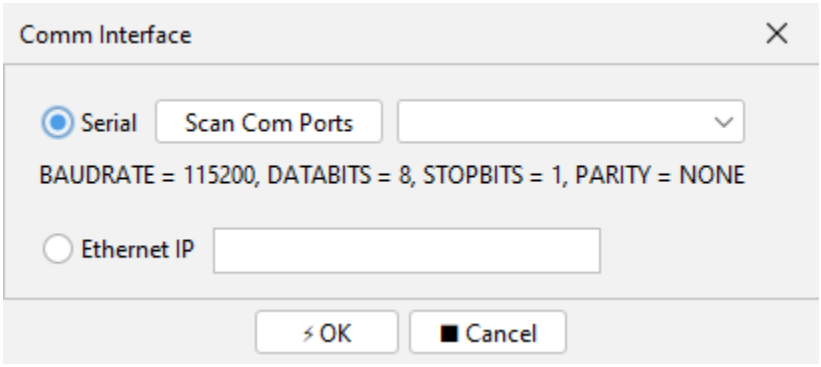
7. Diagnostics & Troubleshooting

Debug Monitor

A "Behind the Scenes" look at what the device is doing. - **Console Output**: A text stream of activity. - **Errors & Warnings Table**: A filtered list of just the problems found during operation. - **Start/Stop Debug**: Toggle this to begin watching the live diagnostic stream.

Comm Interface (The Connection Port)

Before the software can talk to the device, you must select the right "Port". 1. Click **Scan Com Ports**. 2. Select your USB/Serial connection from the list. 3. Click **OK**.



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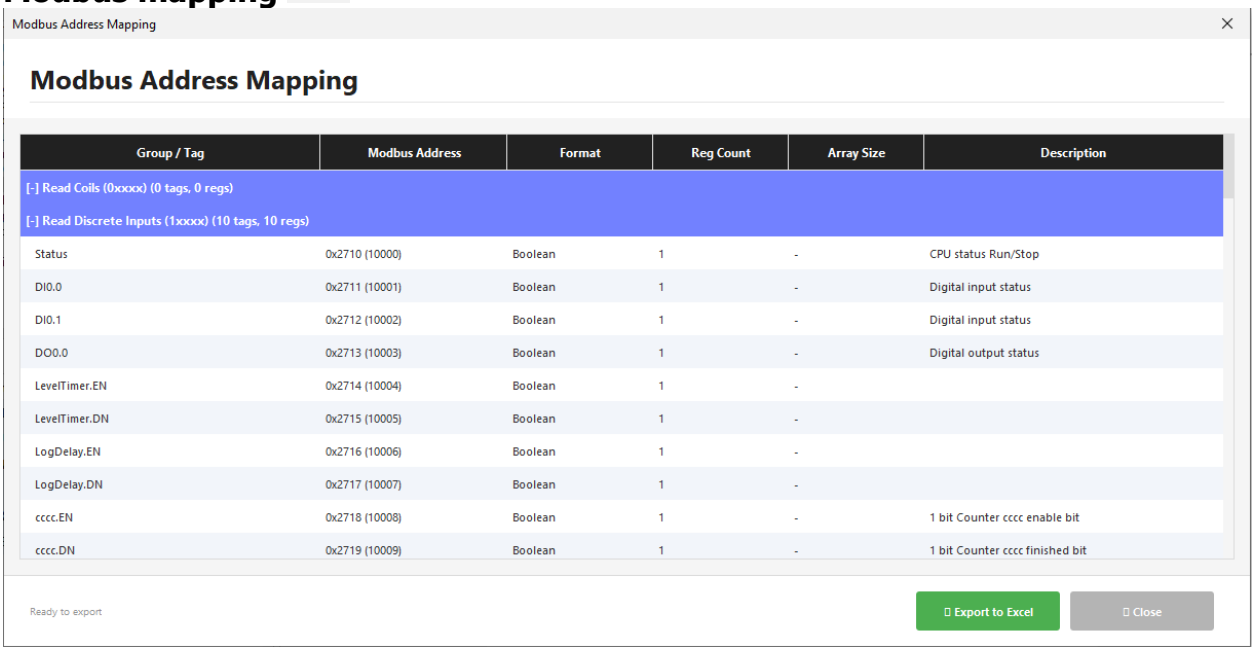
8. Summary of Action Icons

- **Tick Icon (Verify)**: Checks your logic and settings for mistakes.
- **Down Arrow (Download)**: Sends your project TO the device.
- **Up Arrow (Upload)**: Reads the project FROM the device.
- **Eye Icon (Online Mode)**: Watch the logic turn green and red live as it runs on the physical device.
- **Modbus mapping** MB



Technical Support: Please consult the Talent Systems technical team at mail info@talentsyst.com