PROFINET

(using SST Module)

PROFINET Compatibility Addendum

Arlyn UpScale

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v3.2.102023

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1 OVERVIEW

1.1 What is PROFINET?

PROFINET stands as an open Industrial Ethernet solution grounded in global standards, enabling seamless data exchange between controllers and devices in automation settings. Introduced in the early 2000s, it has gained widespread adoption in the realm of Industrial Ethernet.

Being an open standard, PROFINET has sparked the development of a plethora of products by numerous manufacturers, spanning PLCs, PACs, Drives, Robots, Proxies, IOs, and diagnostic tools.

PROFINET facilitates both cyclic and acyclic communication among components, encompassing functionalities like diagnostics, functional safety, alarms, and additional data exchange. This protocol leverages standard Ethernet as its communication medium, with Ethernet cables interconnecting PROFINET components in a network, accommodating the coexistence of various Ethernet protocols within the same infrastructure.

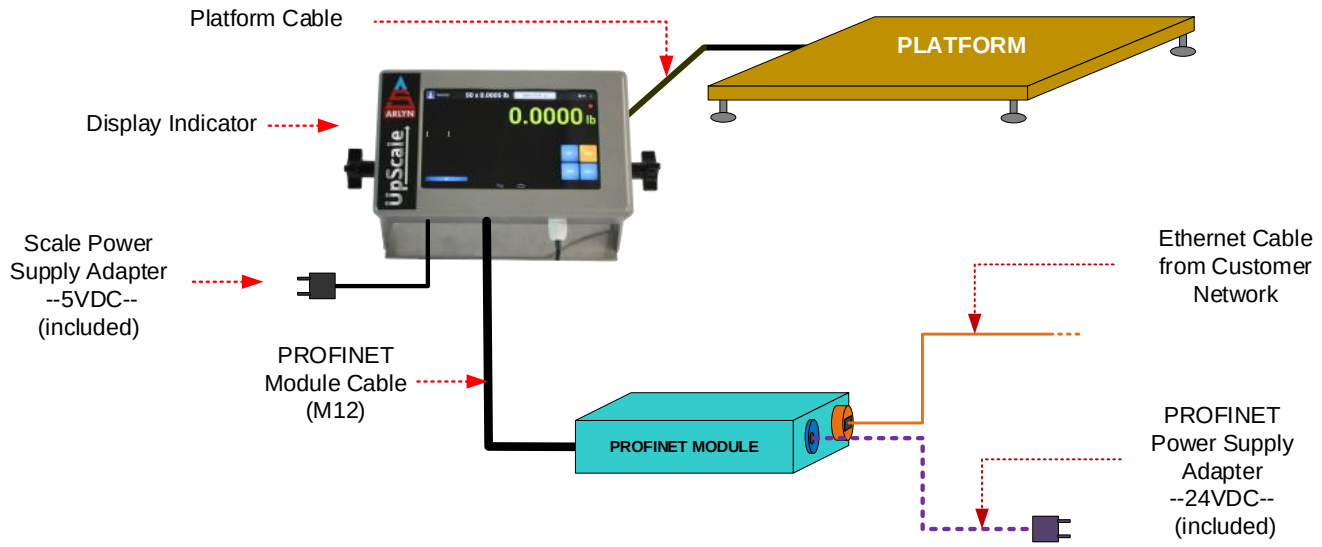
1.2 Purpose of this Document

This addendum will go through the process of setting up your PROFINET add-on to the scale and help you configure the module to fit your network environment.

2 COMPONENT SETUP

2.1 Wiring

PROFINET SETUP w/ ARLYN UPSCALE



Platform Cable – Connects the PLATFORM to the INDICATOR through an M12 Cable.

Indicator & Platform – Components that make up your scale.

Scale Power Supply – Connects the INDICATOR to your power outlet at 5VDC. Supplies power to the Scale (Display & Platform),

PROFINET Module – PROFINET box that converts weight data from the scale to PROFINET Protocol,

PROFINET Power Supply – Powers up the PROFINET Module at 24VDC separately.

2.2 Setup

The system is designed in such a way so that it is “plug and play” in terms of wiring. Before connecting the scale to your PLC or HMI to communicate in PROFINET, it must be setup to be recognized by your network. The module only accepts Static IP and it needs to be configured accordingly.

1) Follow the instructions in the Arlyn UpScale Quickstart and the User Manual to set your scale up accordingly.
2) Connect the PROFINET module to the display as shown in the wiring diagram above.
3) Connect the included 24VDC power supply to the PROFINET module.
4) Connect the module to your LAN Network first to configure Static IP as instructed in the following sections.

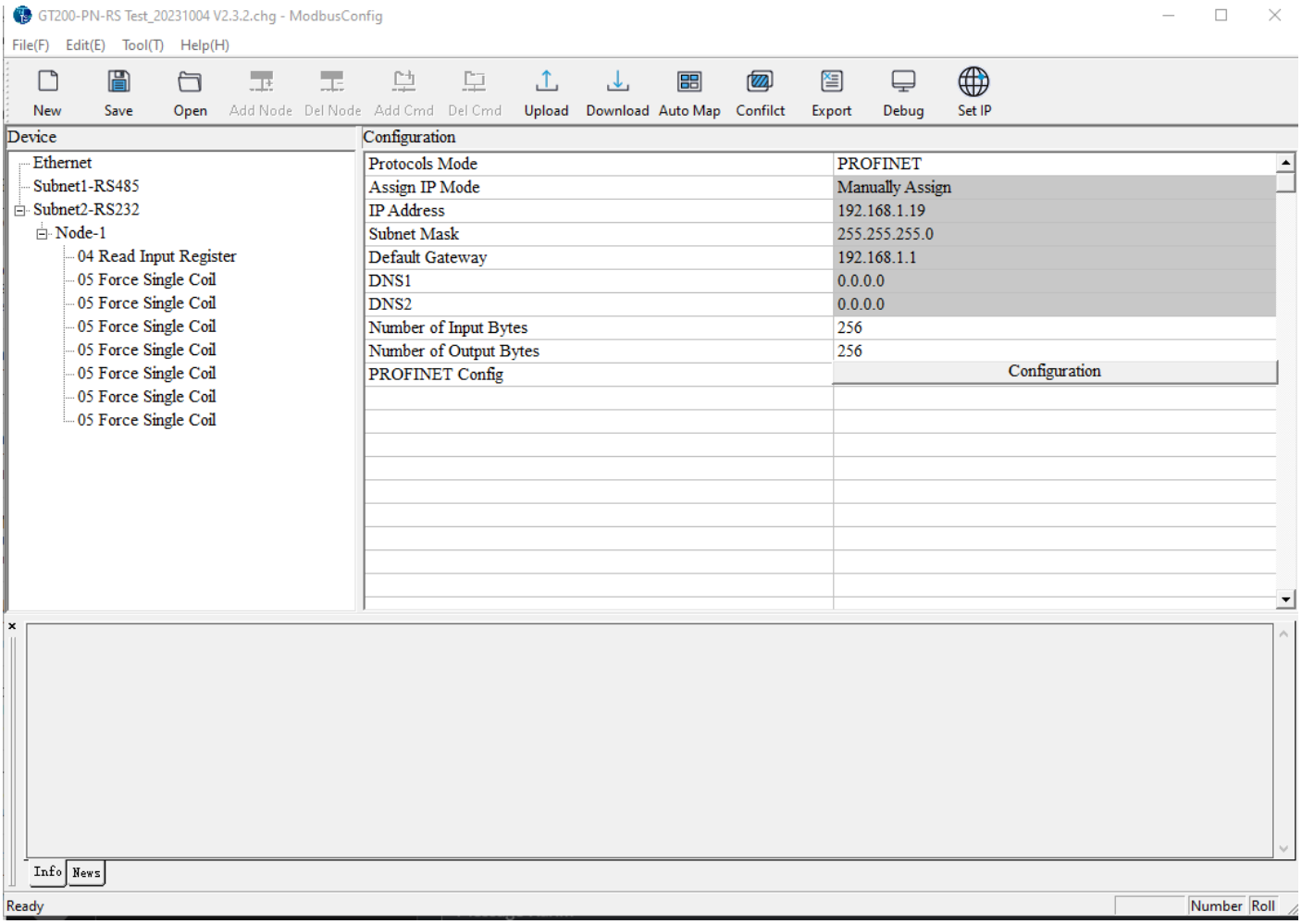
3 STATIC IP CONFIGURATION

Follow the instructions below to setup the software to interact with your PROFINET module for Static IP. NOTE: Follow only the instructions below. Do not touch any configuration variables that has been previously setup. These are critical parameters for PROFINET operation.

3.1 SST Software Installation

SST Software is a PC application that is used to interact with and configure the PROFINET module that came with the scale. The software can be downloaded at the following link: https://www.sstautomation.com/DownloadData/Software/SST-TS-CFG_V2.3.2.zip

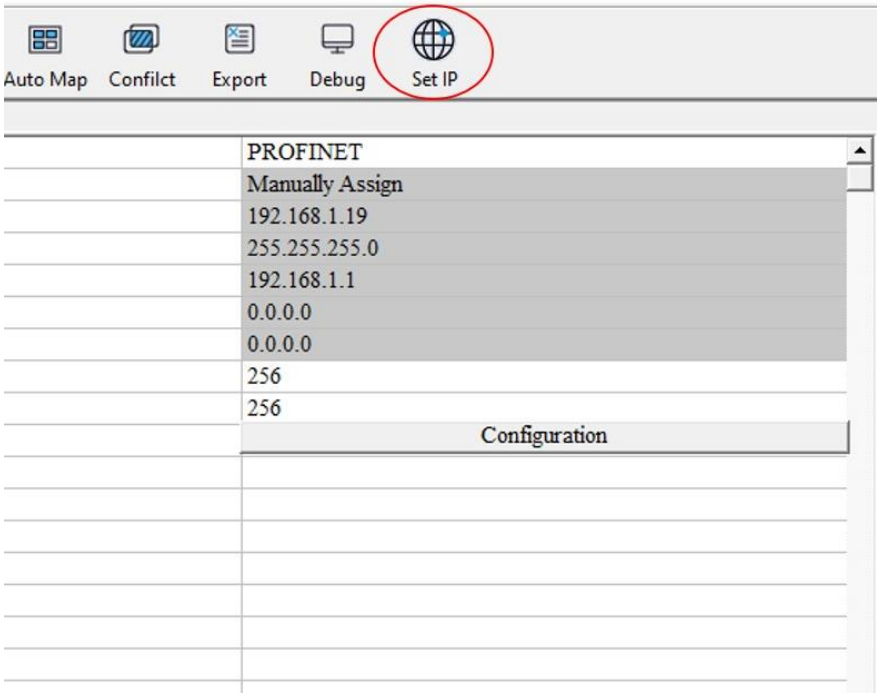
Once the software is installed, running the software will have the following desktop view:



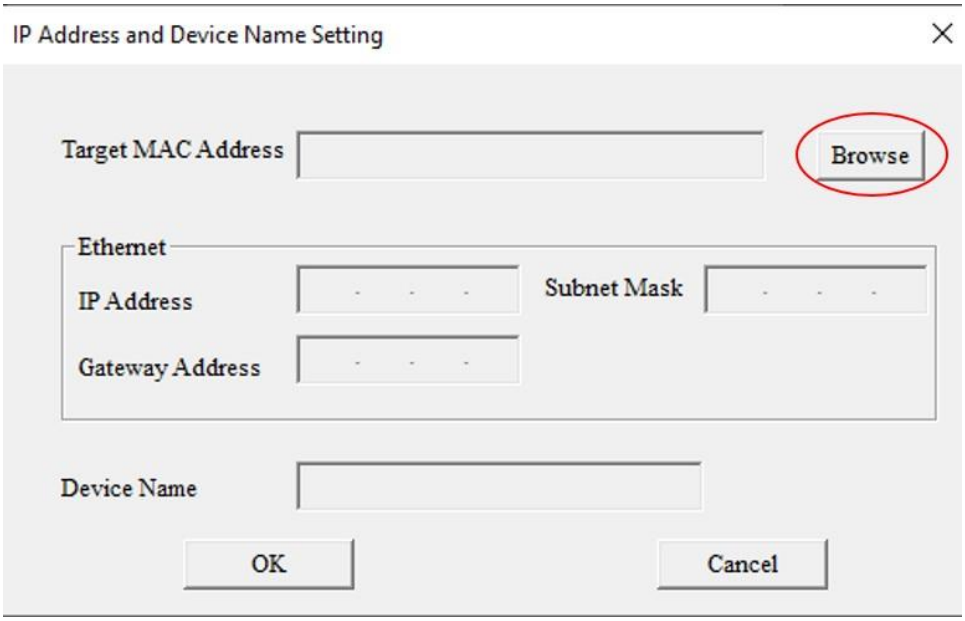
3.2 Assign Static IP & Device Name to PROFINET Module

3.2.1 Procedure

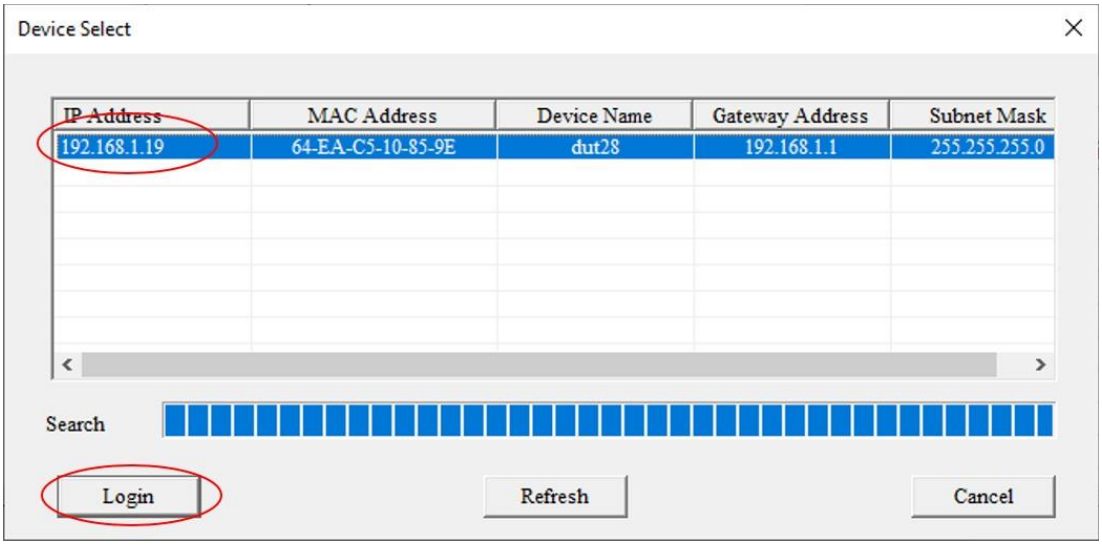
1) On the SST Software, click on the **Set IP** button on the top right corner of the window. This should open a pop-up dialog called “IP Address and Device Name Setting”.



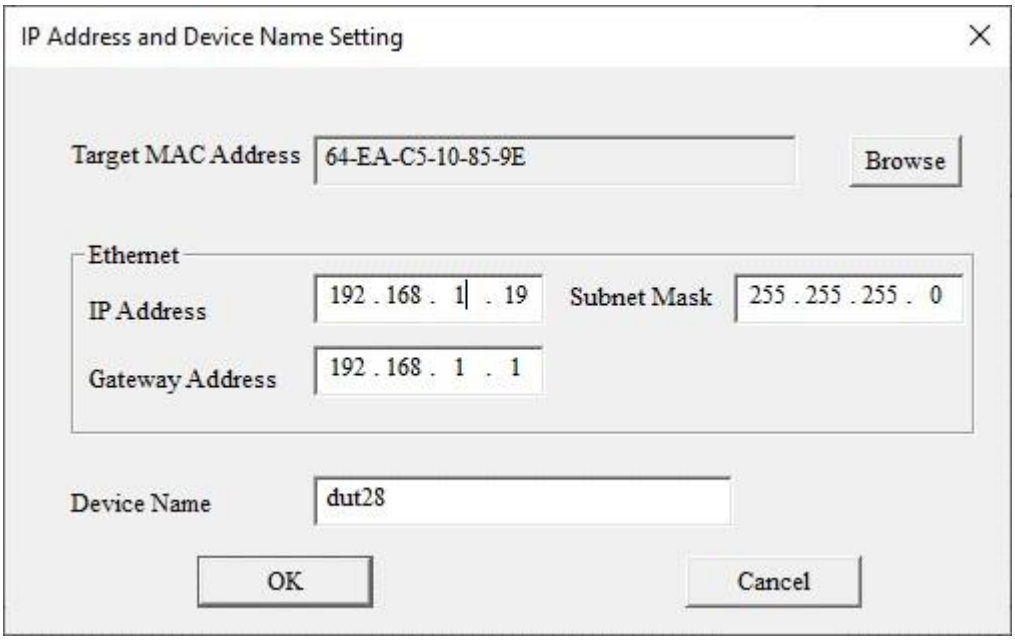
2) On the “IP Address and Device Name Setting” dialog, click on the **Browse** button.



3) If your device is connected to your network and powered, you should see it appear on the screen listed. Press the **Login** button to see the Ethernet information of the device.



4) Set your Static IP information as desired.



IMPORTANT NOTES:

- The initial IP address set for the PROFINET module is set on the 192.168.1.X Subnet. It is possible you may not be able to detect the device if it is not on the same subnet as has been set by our Factory.
- Please make sure your IP address, Gateway Address and Subnet Mask are compatible with each other. For more information on this, ask your IT Personnel.
- All fields must be completed.
- Regarding the "Device Name", if you are using this module as your only PROFINET device, then leave it as "dut28". If you have **more than one device**, then each PROFINET module must have its own unique name and IP address.
- The following rules apply for Device Name:
  - The following are legal names: dut28, dut28nn32, etc.
  - The following are illegal names: 28dut, dut28$, dut28+uu

5) Once you have completed setting up the Static IP, press the **OK** button to confirm.
6) Click **Browse** again which will lead to the Device Scanning screen as illustrated in step 3.

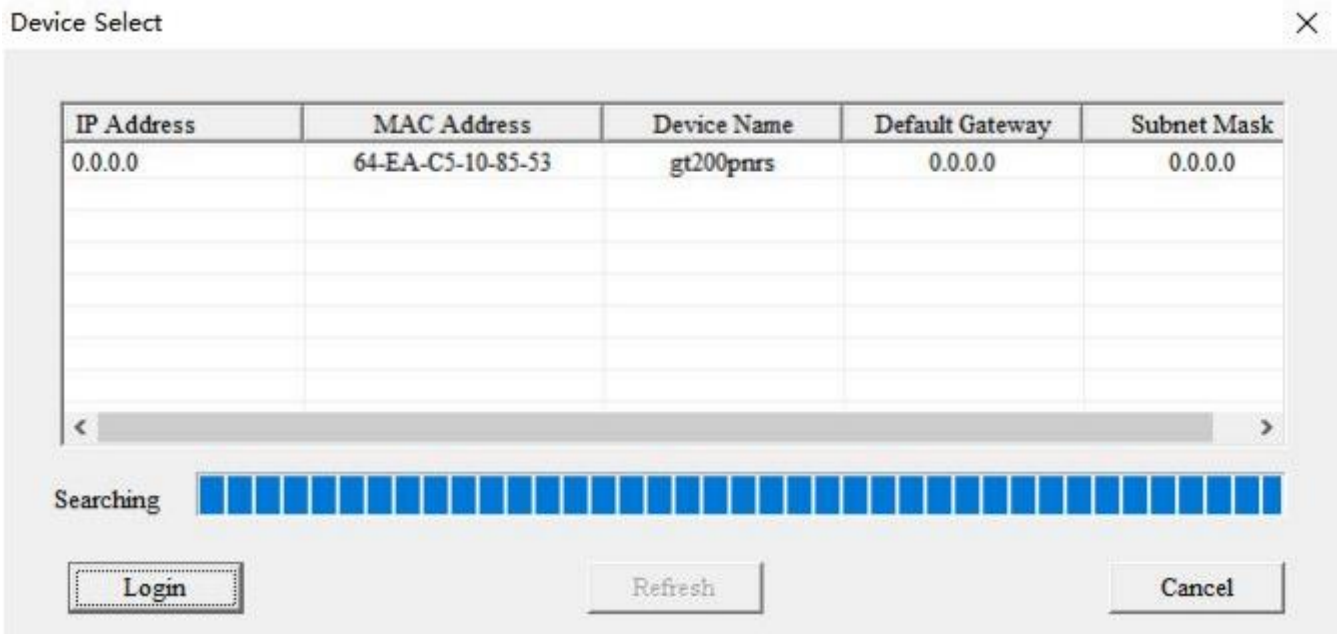
7) You should be able to see the new IP address that you have assigned for the PROFINET module.

3.2.2 IP Address Conflict Resolution

According to the specification of PROFINET protocol, acting as a PROFINET slave, the device must obey the rule that there can't be more than 1 PROFINET device which has the same IP address and name on the same LAN when connecting many PROFINET devices.

If there are conflictions of IP address and device name, users can change IP address and name of PROFINET module according to the steps outlined above and ensure that others IP address and name are different

For example: When it happens to IP address confliction, IP address, subnet mask and gateway address of PROFINET module will be reset to "0.0.0.0". To determine this has happened, use the same procedure outlined above to get to the dialog on Step 3 above and hit **Browse**. You will see the following dialog (if there was IP Address Confliction):



Follow the steps once again outlined in the "Assign Static IP and Device Name to PROFINET Module" sectioned above to re-assign new non-conflicting IP address and Device Name.

4 DATA AREAS - PROFINET ADDRESS MAP

PROFINET Addresses for the Input and Output Buffers as related to the scale data are listed live on this link: https://t.ly/4lnLG

The scale has two data areas:

Input Buffer (Address Region 0x0000) [Read Only]

Output Buffer (Address Region 0x4000) [Write Only]

A third section (Weight Status Bitwise Map) below shows the bit mapping for address for Input Buffer addresses 0x0010 (Status 1), 0x0016 (Status 2) and 0x0018 (Status 3).

The next sections are a capture of the link at the time of the printing of this addendum. It may not reflect new updates to the address map.

4.1 Input Buffer (Address 0x0000)

The Input Buffer addresses are read by the PROFINET Master (such as a PLC). They are continuously used for "reading" information from the scale through the PROFINET protocol.

PROFINET: INPUT BUFFER [BIG ENDIAN NOTATION]				
KIND	**Address**	**ITEM**	**DESCRIPTION**	**NOTES**
		TOP PLATFORM		
Input Buffer 0x0000 to 0x0013 (IO-DEVICE -> IO-CONTROLLER) BIG ENDIAN	0x0000	Unit (Top Platform)	byte (1)	
	0x0001		byte (0)	0: lb, 1: kg, 2: g, 3: oz, etc.
	0x0002	Reserved		
	0x0003	Reserved		
	0x0004	Gross Weight value (Top Platform)	byte (3)	
	0x0005		byte (2)	
	0x0006	Gross Weight value (Top Platform)	byte (1)	
	0x0007		byte (0)	
	0x0008	Net Weight Value (Top Platform)	byte (3)	
	0x0009		byte (2)	
	0x000A	Net Weight Value (Top Platform)	byte (1)	
	0x000B		byte (0)	
	0x000C	Tare Weight Value (Top Platform)	byte (3)	
	0x000D		byte (2)	
	0x000E	Tare Weight Value (Top Platform)	byte (1)	
	0x000F		byte (0)	
	0x0010	Status 1 (Top Platform)	byte (1)	Data 8-bit "Weight Status", Ref 10009 to 10016
	0x0011		byte (0)	Data 8-bit "Weight Status", Ref 10001 to 10008
	0x0012	Displayed value (Top Platform)	byte (3)	
	0x0013		byte (2)	
	0x0014	Displayed value (Top Platform)	byte (1)	
	0x0015		byte (0)	
	0x0016	Status 2 (Top Platform)	byte (1)	Data 8-bit "Weight Status", Ref 10024 to 10032
	0x0017		byte (0)	Data 8-bit "Weight Status", Ref 10017 to 10024
	0x0018	Status 3 (Top Platform)	byte (1)	Data 8-bit "Weight Status", Ref 10041 to 10048
	0x0019		byte (0)	Data 8-bit "Weight Status", Ref 10033 to 10040

Format of GROSS WEIGHT, NET WEIGHT, TARE WEIGHT and DISPLAYED WEIGHT values

These values are presented in 4-byte Floating Point value. To read the whole weight, the 4 bytes presented must be interpreted as "floating point".

Format of WEIGHT STATUS Addresses

The "Weight Status" registers are further expanded in the Weight Status Bitwise Map section.

4.2 Output Buffer (Address 0x4000)

These addresses are used for sending commands to the scale through the PROFINET protocol. For example, if you want to ZERO the scale from the PROFINET Master (e.g. PLC), send ON (or 1) to address 0x4000 and the scale will zero out. Similarly, the same can be said about changing units, or taring, etc.

Please note that you must **clear** the address after sending the ON bit. This is done by sending OFF (or 0) to the address. If you don't perform this action, the scale will not respond to another ON command.

PROFINET: OUTPUT BUFFER					
KIND	Address	ITEM		DESCRIPTION	NOTES
		TOP PLATFORM			
Output Buffer 0x4000 to 0x400F (IO-COINTROLLER -> IO-DEVICE) BIG ENDIAN	0x4000	Zero	Bit 0	1: Execute	
	0x4001	Reserved	Bit 1	Future expansion for Zero operation	
	0x4002	Tare	Bit 2	1: Execute	
	0x4003	Clear Tare Value	Bit 3	1: Execute	
	0x4004	Change Unit	Bit 4	1: Toggle to next active unit	
	0x4005	Net / Gross Display	Bit 5	1: Net 0: Gross	1: Toggle Net/Gross
	0x4006	Cycle	Bit 6	1: Toggle Cycle (Abort Cycle)	1: Toggle
	0x4007	Average Weight & Hold	Bit 7	1: Start 0: Stop	1: Toggle
	0x4008	Flow Rate	Bit 8	1: Start 0: Stop	1: Toggle
	0x4009	Log Weight	Bit 9		
	0x400A		Bit 10		
	0x400B		Bit 11		
	0x400C		Bit 12		
	0x400D	User Output 1	Bit 13	1: ON 0: OFF	NA
	0x400E	User Output 2	Bit 14	1: ON 0: OFF	NA
	0x400F	User Output 3	Bit 15	1: ON 0: OFF	NA

4.3 Weight Status Bitwise Map

PROFINET: WEIGHT STATUS (0x0010 - 0x0019)					
KIND	Ref No	ITEM		DESCRIPTION	NOTES
		TOP PLATFORM			
Status 1 - Top Platform (Byte 1) (Input Buffer Address 0x0010)	010016		Bit 15		
	010015	Error	Bit 14	1: Error	
	010014	Weighing Failure	Bit 13	1: Weight cannot be shown for some reason.	
	010013	Overload	Bit 12	1: Overload 0: Normal	
	010012	Stability Control	Bit 11	1: Stable 0: Unstable	
	010011	Motion Detect	Bit 10	1: Motion 0: No Motion	
	010010	Zero Tracking	Bit 9	1: "Zero Tracking" in progress	
	010009	Hold	Bit 8	1: Weight Hold 0: Normal	
Status 1 - Top Platform (Byte 0) (Input Buffer Address 0x0011)	010008	Average & Hold in Progress	Bit 7	1: Average & Hold in Progress	
	010007	Tare in Progress	Bit 6	1: Tare in Progress	
	010006	Zero in Progress	Bit 5	1: Zero in Progress	
	010005	Gross Display	Bit 4	1: Display Showing Gross	
	010004	Net Display	Bit 3	1: Display Showing Net	
	010003	Gross Center of Zero	Bit 2	1: "zr" indicator in Gross mode	w/ Motion/Detect Enabled
	010002	Net Center of Zero	Bit 1	1: "zr" indicator in Net mode	w/ Motion/Detect Enabled
	010001	Stable	Bit 0	1: Green 0: Red	

Status 2 - Top Platform (Byte 1) (Input Buffer Address 0x0016)	010032		Bit 15		
	010031	User input 3	Bit 14		
	010030	User input 2	Bit 13		
	010029	User input 1	Bit 12		
	010028	LO Output	Bit 11	(Weight or Parts Comparator)	
	010027	OK Output	Bit 10	(Weight or Parts Comparator)	
	010026	HI Output	Bit 9	(Weight or Parts Comparator)	
	010025		Bit 8		
Status 2 - Top Platform (Byte 0) (Input Buffer Address 0x0017)	010024	Setpoint 8	Bit 7	1: On 0: Off	
	010023	Setpoint 7	Bit 6	1: On 0: Off	
	010022	Setpoint 6	Bit 5	1: On 0: Off	
	010021	Setpoint 5	Bit 4	1: On 0: Off	
	010020	Setpoint 4	Bit 3	1: On 0: Off	
	010019	Setpoint 3	Bit 2	1: On 0: Off	
	010018	Setpoint 2	Bit 1	1: On 0: Off	
	010017	Setpoint 1	Bit 0	1: On 0: Off	

Status 3 - Top Platform (Byte 1) (Input Buffer Address 0x0018)	010048	Mode error	Bit 15		
	010047	Calibration error	Bit 14		
	010046	FRAM error	Bit 13		
	010045	A/D error	Bit 12		
	010044	Checksum error	Bit 11		
	010043		Bit 10		
	010042		Bit 9		
	010041	Net display error	Bit 8		
Status 3 - Top Platform (Byte 0) (Input Buffer Address 0x0019)	010040	Tare error	Bit 7		
	010039	Zero correction error	Bit 6		
	010038	Input (A/D) under	Bit 5		
	010037	Input (A/D) over	Bit 4		
	010036	Gross Under	Bit 3		
	010035	Gross Over	Bit 2		
	010034	Net under	Bit 1		
	010033	Net over	Bit 0		