



# Gree Mini Split (GMS) BACnet Converter

## User Manual

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Version 1.1

12/11/2023

Document Number: 1.1

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# 1. Introduction

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This User Manual provides the information necessary, for installers and integrators, to effectively use the GMS GW for connecting Gree split unit/s with 3<sup>rd</sup> party equipment.

The GMS GW provides data exchange between the Gree split indoor units and BMS systems, over standard BACnet IP/MSTP interface.

Each GMS GW device can support up to 1/12 indoor units over 2 lines, allowing combination of R series and P, X, M, W Series, each running on a separate RS485 line.

2 (Two) GMS GW models are available, addressing different deployment size:

GMS GW 1 : 1 Split indoor unit

GMS GW 12 : up to 12 Split indoor units

## 1.1 Compatibility

GMS GW Model	Split Unit Model	
GMS GW 1, GMS GW 12	<ul style="list-style-type: none"><li>• VIREO Gen 3</li><li>• VIREO+ Ultra</li><li>• LIVO Gen 3</li><li>• LIVO Gen 4</li><li>• SAPPHIRE</li><li>• LIVO R32</li><li>• VIREO R32</li><li>• SAPPPIRE R32</li></ul> MULTI MULTI ULTRA MULTI R32	

## 1.2 Conventions

This document provides screen prints and corresponding narrative to describe how to use the GMS GW 1 /12.

When an action is required on the part of the reader, it is indicated by a line beginning with the word "Action:" For example:

**Action:** Click on OK.

Fields or buttons to be acted upon are indicated in bold italics in the Action statement; links to be acted upon are indicated as links in underlined blue text in the Action statement.

**Note:** The term ‘user’ is used throughout this document to refer to a person who requires and/or has acquired access to the GMS GW.

### 1.3 Revisions History

Version Number	Date	Author/Owner	Description of Change
0.1	8/20/2023	CA	GMS GW manual
1.1	12/11/2023	CA	

Table 1 - Record of Changes to document

### 1.4 Acronyms and Abbreviations

Acronym	Literal Translation
DTE	Data Terminal Equipment
GPIO	General Purpose Input / Output
HVAC	Heating Ventilation and Air Conditioning
N.C.	Not Connected

Table 2 – Acronyms and Abbreviations

## 2. Overview

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The GMS GW enables integration of Gree split units with BMS (Building Management System) controllers and Home Automation controllers.

Each GMS GW device can support up to 1/12 indoor units over 2 lines.

GMS GW allows you to:

- Daisy chain maximum of total 12 Gree split units (GMS GW -12) or 1 split unit (GMS GW 1) to L1 & L2.
- Connect all to the single line, or separate to 2 lines (L1 & L2).
- Mix Gree Mini Split and Gree Multi Split Series units on the same line.

GMS GW capabilities and interfaces includes:

- RS485 BACnet MSTP or Modbus RTU (according to the EIA/TIA-485 standard),
- Ethernet (ASCII, Modbus IP, REST, BACnet IP) for control and monitoring of the HVAC system's operation
- Remote access via smart phone, tablet or PC using the CoolAutomation cloud-based Control application
- Available Control functionalities for each connected indoor unit:
  - Run/stop
  - Set temperature setpoint
  - Change operating mode
  - Change fan speed
  - Louver: Auto swing, Off
  - Alarm status
  - Setpoint range (if available on the Gree split unit model)
  - Lock Functionality
  - Display remote controller measured temperature
  - All functions can be monitored and controlled over BACnet MSTP or BACnet IP (points are available in [Appendix A](#))

What's in the box:

1. GMS GW 1 or GMS GW 12 device
2. AC Power adaptor
3. USB cable
4. RJ45 Ethernet cable
5. Quick installation 1 pager

### 3. System Layout and Connectivity

The following sub-sections provide details on the different connectivity options of the system and how to use the various functions of the GMS GW.

#### 3.1 Device Layout and Connectivity



- (1) Mini USB Device Connector
- (2) RS-485 Line 1 Connector
- (3) RS-485 Line 2, Power Connector
- (4) PWR
- (5) ETH Connector
- (6) LCD Screen

Figure 1 – Device Layout

##### 3.1.1 Mini USB Device Connector

Used to connect the GMS GW to the PC USB Host for firmware updates and maintenance operations.

##### 3.1.2 RS-485 Line 1 Connector

RS232/IO Pin	Pin Name	Signal Level	Function Description
1	RS232_TX		Not in Use (Future)
2	RS232_RX		Not in Use (Future)
3	VDC-	GND	Ground
4	L1 A		RS-485 Gree split line 1, A terminal
5	L1 B		RS-485 Gree split line 1, B terminal

Table 3 – RS-485 L1 Connector

### 3.1.3 RS-485 Line 2, Power\*, BACnet MSTP, Modbus RTU Connector

Pin Number	Pin Name	Function
1	VDC+	+ VDC – Power, positive Input/Output
2	VDC-	- VDC – Power, negative Input/Output
3	L2 A	RS-485 Gree split line 2, A terminal
4	L2 B	RS-485 Gree split line 2, B terminal
5	BAC A	RS485 A – BACnet MSTP / Modbus RTU
6	BAC B	RS485 B – BACnet MSTP / Modbus RTU

Table 4 – RS-485 Line 2, Power, BACnet , Modbus Connector

By default, terminals BAC A and BAC B are used as an RS485 Interface line for DTE connection. GMS GW supports the following RS485-based protocol:

- BACnet MSTP
- Modbus RTU (Slave mode)

### 3.1.4 Power Connector

The GMS GW can be powered by one of the following methods:

- AC/DC adapter (in the box) via VDC+ and VDC- terminals
- 9-24V DC from HVAC or other equipment via VDC+ and VDC- terminals
- USB device port

### 3.1.5 ETH Connector

The GMS GW incorporates an IEEE 802.3 compatible 10/100 Mb/s Ethernet port via an RJ45 connector. Below are the main port specifications:

Parameter	Value	Notes
Max Ethernet cable length	137m	CAT5 twisted pair cable
Bit Rate	10/100 Mb/s	
Supported Ethernet Protocols	10BASE-T/100BASE-TX	
Protocol Auto-Negotiation	Enabled	Against Link Partner

Table 5 - Ethernet port specifications

The RJ45 connector includes Link and Activity indication LEDs used as specified below:

LED	Color	Function
Link LED (left)	Green	ON - good link OFF - no link
Activity LED (right)	Orange	Blinks when Tx/Rx activity detected

Table 6 - Ethernet link & activity indication LEDs

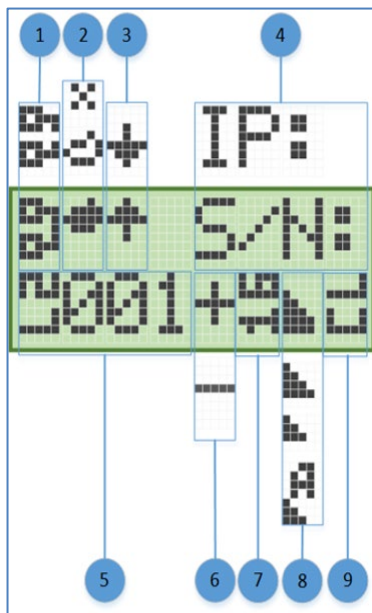
The Ethernet interface is used by several protocols available in the GMS GW

- BACnet IP
- Connection to Cloud based applications.
- Modbus IP
- REST API, SSDP
- ASCII I/F (via the ASCII I/F IP server)

**Network settings** of the GMS GW are controlled using the [ifconfig command](#).

### 3.1.6 LCD Screen

The GMS GW is equipped with an alphanumeric 8x2 characters LCD that presents important device parametric and status information.



- (1) ETH network connection status: Disconnected, Connected
- (2) Cloud infrastructure connection status: Not connected, Connected, communication in progress
- (3) HVAC lines (L1 and L2) communication status: RX, TX
- (4) IP address (if acquired) and device S/N are displayed (1 min toggle)
- (5) Gree split unit UID (L2.001 on this picture) – this address is set on the Gree split indoor Panel (not on the GMS GW device).
- (6) Operation status of selected Gree split unit: ON, OFF
- (7) Set Point temperature for selected Gree split unit
- (8) Fan speed for selected Gree split unit: High, Medium, Low, Auto
- (9) Operation mode for selected Gree split unit CL - Cool, HT - Heat, FA - Fan, DR - Dry, AU – Auto

## 4. Installation Guidelines

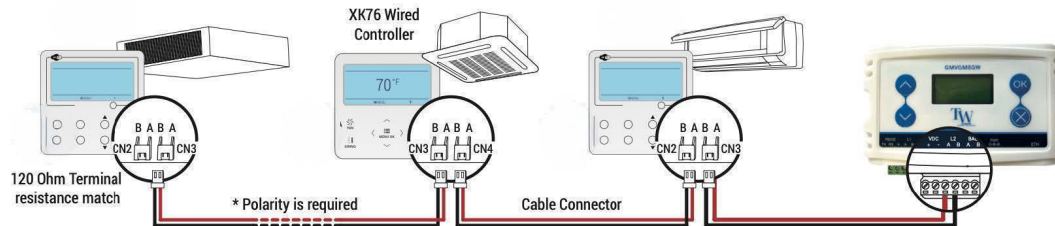
### 4.1 Connection GMS GW to Gree split Unit/s

- Each GMS GW device can support up to 1/12 indoor units with 2 lines.

#### Connecting Gree Mini split units to the gateway

- Connect Indoor unit (GMVGMSGW1) or Daisy chain maximum of total 12 Indoor units (GMVGMSGW12) to L1 & L2.
- Connect all to a single line, or separate to 2 lines (L1 & L2).
- Mix Mini split units and Multi split units on the same line.

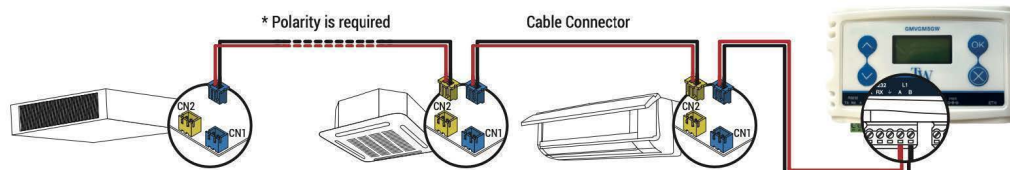
##### Connect GMVGMSGW to the Unit wired controller



##### Important Notes:

1. in case of mixed series connection, the terminal resistor must be turned on on the thermostat closest to the end of the daisy chain.

##### Connect GMVGMSGW to the indoor unit terminal (specific models only)

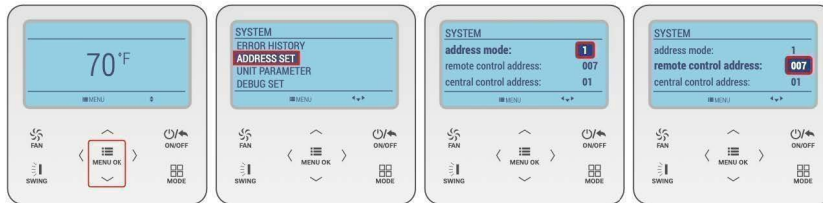


- For connecting Line 2 (L2) follow the same guidelines as in L1.
- Connect the GMS GW to power through one of the options as indicated in [power section above](#).
- Once connected you can integrate with your preferred automation system or BMS over the related interface/protocol and start controlling the split units
- You can also control the split units using the Cloud based mobile applications.

## 4.2 Setting split unit Address (ID) using the Wired Wall Controller

For proper operation, each split units connected to the RS485 bus should each be set with a unique address. Setting is done on the Wired Controller as follows (depends on the exact controller model):

### XK76 type Wired Controller



#### How to set address:

- Wired controller OFF
- Press **Menu/OK** and **Down Arrow** together for 5 seconds until you see the system menu list on the screen
- Select **Address Set** and press **Menu/OK**
- Set **address mode** to 1
- Set **remote control address** to the correct address (range 1-63)
- Press **Menu/OK** to save

- Indoor UID shows "LY.XXX" on the LCD screen and on the remote applications.
  - XXX = split unit "remote control address".
  - Y = Line Number on the GMS GW (can be 1 or 2)

## 4.3 GMS GW Settings

### 4.3.1 LCD Menu Interface

Most of the critical configuration parameters of the GMS GW can be revised and changed with LCD menu interface controlled with buttons.



Up Button



OK Button



Down Button

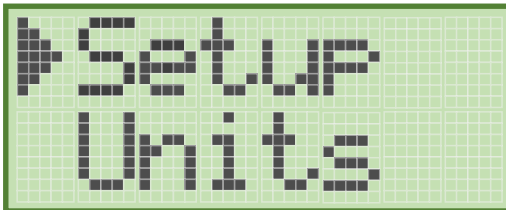


Exit or Cancel Button

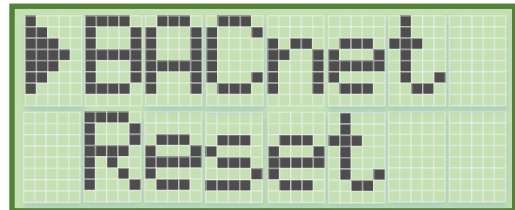
### 4.3.2 Configuring Device Object's Instance number

The Device Object's Instance number must be unique across the entire BACnet internetwork because it is used to uniquely identify the BACnet devices. It may be used to conveniently identify the BACnet device from other devices during installation.

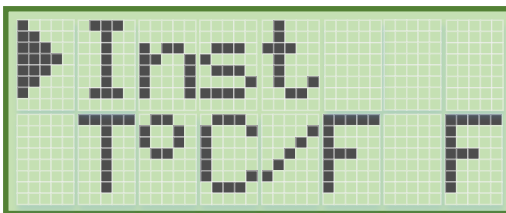
- 1 Press OK to enter Menu



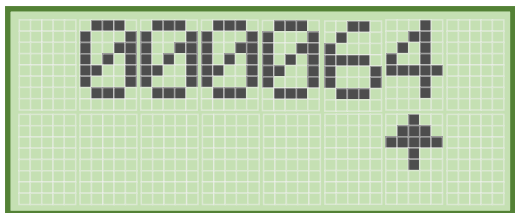
- 2 Press Down to select BACnet item



- 3 Press OK to enter BACnet item



- 4 Press OK to configure Instance number



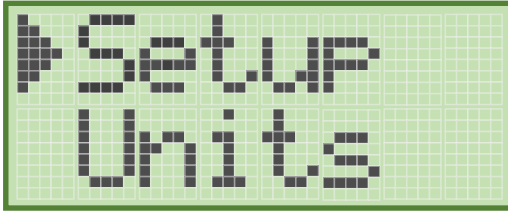
- 5
- **Up** to increase digit value
  - **Down** to decrease digit value
  - **OK** to change next digit
  - **Exit** to store Instance number

- 6 Press Exit to return to the upper layer of the Menu or exit Menu.  
Menu will be closed automatically after 10 seconds of inactivity

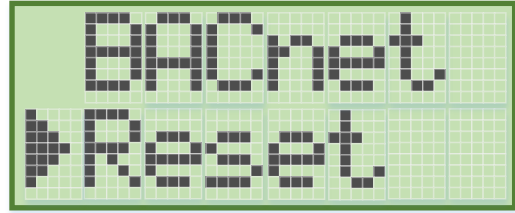
Device Object's Instance number change will be effective after restarting the GMS GW.

### 4.3.3 GMS GW Reset

① Press OK to enter Menu



② Press Down to select Reset item

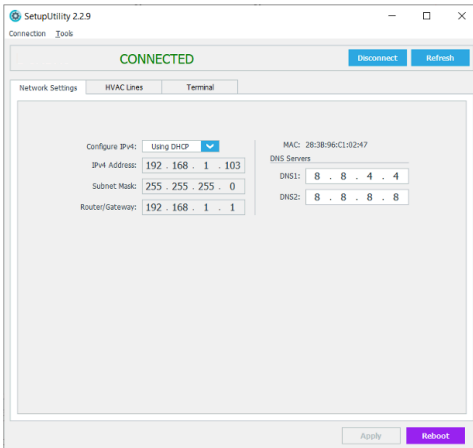


③ Press OK to restart GMS GW

## 5. Device Configuration

Device configuration is made through the mini USB port connect to a PC, using the SW configuration tool

### 5.1 Network Configuration

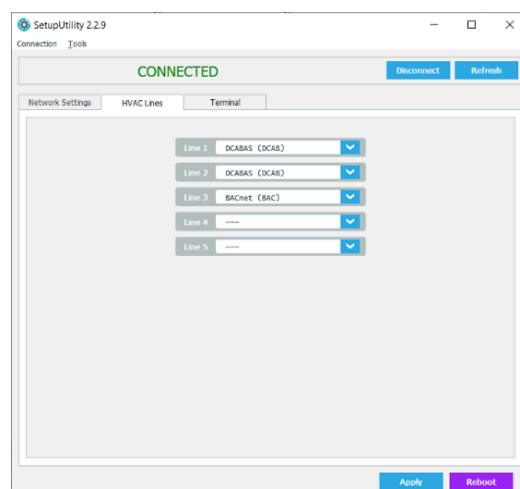
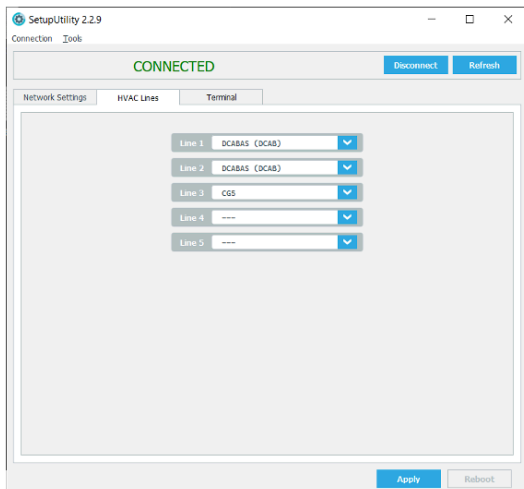


### 5.2 GMS GW Line Configuration

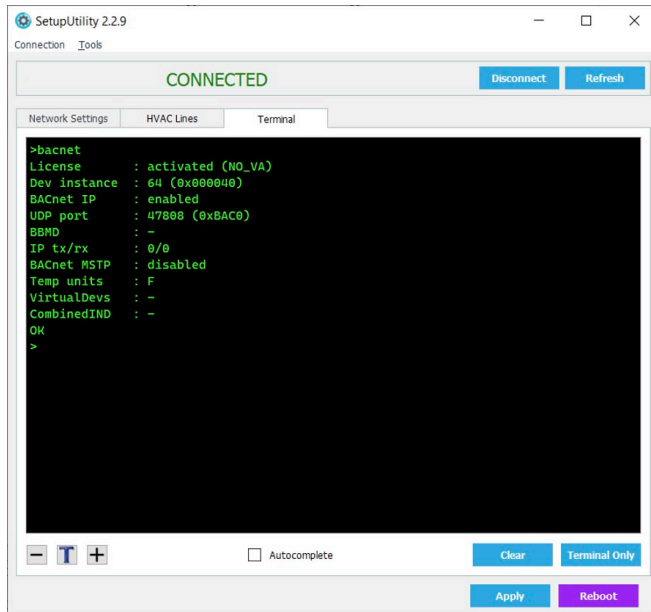
You can set the external interface protocol on the GMS GW to be Modbus RTU (slave) or BACnet MSTP. Use Line 3 configuration drop down to set the desired mode.

CG5 – Modbus RTU

BACnet (BAC) - BACnet



## 5.3 GMS GW Terminal



## 6. Specifications

Parameter		Data
Power supply	Min load*	5VDC/60mA (via mini USB); 12VDC/35mA; 24VDC/20mA
	Max load**	5VDC/100mA (via mini USB); 12VDC/70mA; 24VDC/40mA
Mounting		Magnet
Operating conditions	Ambient temperature	-10°C ~ 60°C / 14°F ~ 140°F
	Humidity	0% ~ 96% non-condensing
Storage conditions	Ambient temperature	-20°C ~ 70°C / -4°F ~ 158°F
	Humidity	0 % ~ 98 % non-condensing
Dimensions	H x W xD	65 x 115 x 31 [mm] / 2.56 x 4.50 x 1.22 ["]
LCD	Size / color / interface	2 x 8 / grey / HD44780
Communication functions	split indoor connection	Connection to split indoor unit/s over RS485 interface
	MODBUS RTU	RS-485 communication line
	Ethernet	100 Mbps
	BACnet MSTP	RS-485 communication line
	USB Device	12 Mbps
Maximum PBU wiring length (ft/m)		3280/1000 (2 Conductor 20-22 Awg Shielded Twisted Pair Cable)
Maximal allowable wiring length (to BMS) over RS485		1000 [m] / 3300 [ft]
Maximal allowable wiring length (to router) over Ethernet		137 [m] / 450 [ft]

Table 7 – Specifications



BV	3	Lock (prohibit) Operation Mode change from Wired Controller	259	515	131331	131586
BV	5	Global Lock	261	517	131333	131588
Analog Inputs (AI)						
AI	0	Room Temperature	256	512	131328	131584
Analog Values (AV)						
AV	0	SetPoint Temperature	256	512	131328	131584
Multi State Value (MV)						
MV	0	Fan Speed: 0-Low            3-Auto            6-Super High 1-Medium       4-Top 2-High            5-Very Low	256	512	131328	131584
MV	1	Operation Mode: 0-Cool            3-Dry 1-Heat            5-Fan 2-Auto	257	513	131329	131585
MV	2	Louver Position (swing): 5-Auto (swing) 6-OFF (stop)	258	514	131330	131586

#### R Series Specific Objects (Class=1)

Object Type	Object Number	Object Description	Object Instance Number			
			X1.001	X1.002	X2.001	X2.002
Binary Inputs (BI)						
BI	13	Defrosting	1048845	1049101	1179917	1180173
BI	14	ODU Fan State	1048846	1049102	1179918	1180174

BI	15	4-Way Valve	1048847	1049103	1179919	1180175
BI	16	Compressor Status	1048848	1049104	1179920	1180176
Binary Values (BV)						
BV	7	Health Function	1048839	1049095	1179911	1180167
BV	8	I-Demand Function	1048840	1049096	1179912	1180168
BV	9	Dry Function	1048841	1049097	1179913	1180169
BV	10	Quiet Mode	1048842	1049098	1179914	1180170
BV	11	Memory Function	1048843	1049099	1179915	1180171
BV	12	Wired Controller Temperature Presentation 0-Celsius, 1-Fahrenheit	1048844	1049100	1179916	1180172
BV	17	Absence Function	1048849	1049105	1179921	1180177
BV	18	Low Temperature Dry Function	1048850	1049106	1179922	1180178
BV	19	Fresh Air Function	1048851	1049107	1179923	1180179
BV	20	Cooling Set Point Limit Enable	1048852	1049108	1179924	1180180
BV	21	Heating Set Point Limit Enable	1048853	1049109	1179925	1180181
Analog Values (AV)						
AV	5	Cooling Set Point Limit	1048837	1049093	1179909	1180165
AV	6	Heating Set Point Limit	1048838	1049094	1179910	1180166
Positive Integer Values (PIV)						
PIV	0	IDU Type Code	1048832	1049088	1179904	1180160
PIV	1	Sleep Function	1048833	1049089	1179905	1180161
PIV	2	Modbus Address	1048834	1049090	1179906	1180162
PIV	3	Outdoor Temperature °C	1048835	1049091	1179907	1180163
PIV	4	Evaporation Temperature °C	1048836	1049092	1179908	1180164

Specific Objects for M, W, P, X Series with DWUNI wired controller (Class=1)

Object Type	Object Number	Object Description	Object Instance Number			
			X1.001	X1.002	X2.001	X2.002
Binary Values (BV)						
BV	4	Health Function	1048836	1049092	1179908	1180164
BV	5	I-Demand Function	1048837	1049093	1179909	1180165
BV	6	Dry Function	1048838	1049094	1179910	1180166
BV	7	Quiet Mode	1048839	1049095	1179911	1180167
BV	8	Memory Function	1048840	1049096	1179912	1180168
BV	9	Wired Controller Temperature Presentation 0-Celsius, 1-Fahrenheit	1048841	1049097	1179913	1180169
BV	10	Absence Function	1048842	1049098	1179914	1180170
BV	11	Low Temperature Dry Function	1048843	1049099	1179915	1180171
BV	12	Set Point Limits Enable	1048844	1049100	1179916	1180172
Analog Values (AV)						
AV	2	Cooling Set Point Limit	1048834	1049090	1179906	1180162
AV	3	Heating Set Point Limit	1048835	1049091	1179907	1180163
Positive Integer Values (PIV)						
PIV	0	Modbus Address	1048832	1049088	1179904	1180160
PIV	1	Outdoor Temperature °C	1048833	1049089	1179905	1180161