

# Application Note 215



## GMW3172 / 9.2.5 Pulse Superimposed Voltage

### Test Application

Applicable for autowave.control version  $\geq$  5.4.9



## 1. General

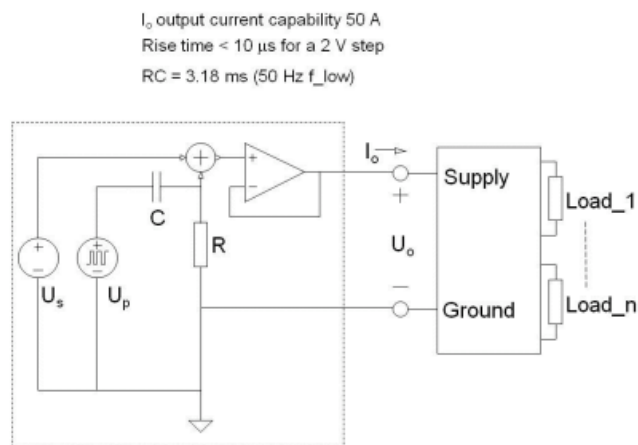
The Standard GMW3172 includes a test item 9.2.5. named “Pulse Superimposed Voltage”. This test asks for an additional electronic circuit to get the wave shapes at the DUT output as requested in the standard. This external EM-Test solution is called OPT AW-GMW3172.

The following application note is a guide line how to correctly perform this test with EM Test equipment.

### 1.1. Test Specification According to the Standard

The test procedure is actually a continuous square signal of +/- 1V which is superimposed to variable dc signal ( $U_{max}-2$  to  $U_{min}+2V$ ). The rough test setup (see Figure 1.1 below) and also a proposal for the electronic circuit is given by the standard document.

The electronic circuit inside the adapter box OPT AW-GMW3172 is built according to the definition in the standard. The test can only be performed with autowave.control. For convenient testing all parameters are already set except the variable parameter for us which has to be selected separately by the user.



Test Setup Definitions/Parameters:

- $U_o = U_s + U_p$
- $U_s = (U_{min} + 2 V)$  to  $(U_{max} - 2 V)$  DC voltage
- $U_p =$  Square wave -1 V to +1 V 50 % duty cycle ( $2 V_{p-p}$ )
- $U_p$  frequency sweep range: 1 Hz to 4 kHz
- Frequency sweep type: Logarithmic
- Frequency sweep duration for one cycle: 120 s for 1 Hz to 4 kHz to 1 Hz

Figure 1.1

### 1.2. Remarks to hardware, software - and firmware

The test item 9.2.5 Pulse Superimposed Voltage needs the following equipment to be performed:

AutoWave generator:	Including FW Version 5.04.09 or higher (will be updated by autowave.control)
Software autowave.control:	Version 5.4.9 or higher
VDS200Nx	Signal output for DUT
OPT AW-GMW3172	Adapter box including electronic circuit acc. to standard GMW3172 including 24V dc power supply

### ! IMPORTANT !

Please notice software autowave.control version 5.4.9 or higher is mandatory requested to perform the wave shape correctly.

### 1.3. OPT AW-GMW3172 adapter box

The requested adapter box OPT AW-GMW3172 consists of 2 different parts:

1. Adapter box including electronic circuit for pulse shaping (see figure 1.2 below)



Figure 1.2

2. DC power supply for adapter box OPT AW-GMW3172 (see figure 1.3 below)

The DC power supply is delivered with a power mains input cable with corresponding socket depending to the request of the country. The power supply offers a wide range voltage input for 100-240VAC / 47-63Hz. Please notice, it is mandatory to run the adapter box OPT AW-GMW3172 only with the original dc power supply. Using other power supplies may cause noises and other disturbances to the electronic circuit which makes it impossible to perform the test correctly.



Figure 1.3

## 2. Test Setup

Please connect the adapter box to the system by considering the following instruction.

### 2.1. Hardware Test Setup

The adapter box can be connected directly to the corresponding channels of the Autowave generator illustrated in Setup 14 (see figure 2.1 and figure 2.2).

**Setup 14:**  
example with:

**Rack**  
AutoWave  
VDS 200N

**External:**  
OPT AW-GMW3172  
DC Charger

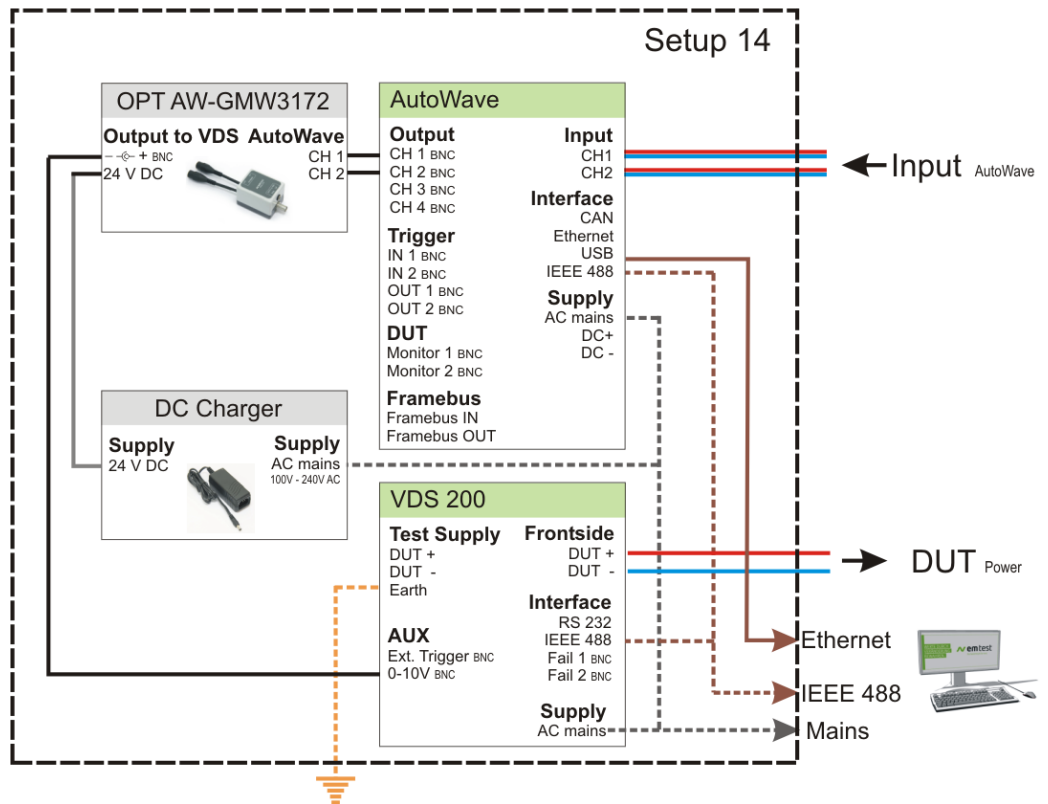


Figure 2.1

- |                                   |   |  |
|-----------------------------------|---|--|
| A: CH1 Adapter Box                | → | CH1 Autowave generator                   |
| B: CH2 Adapter Box                | → | CH2 Autowave generator                   |
| C: BNC connector "Output (to VDS) | → | BNC connector VDS200x 0-10V IN           |
| D: 24Vdc                          | → | Separate Power supply for OPT AW-GMW3172 |

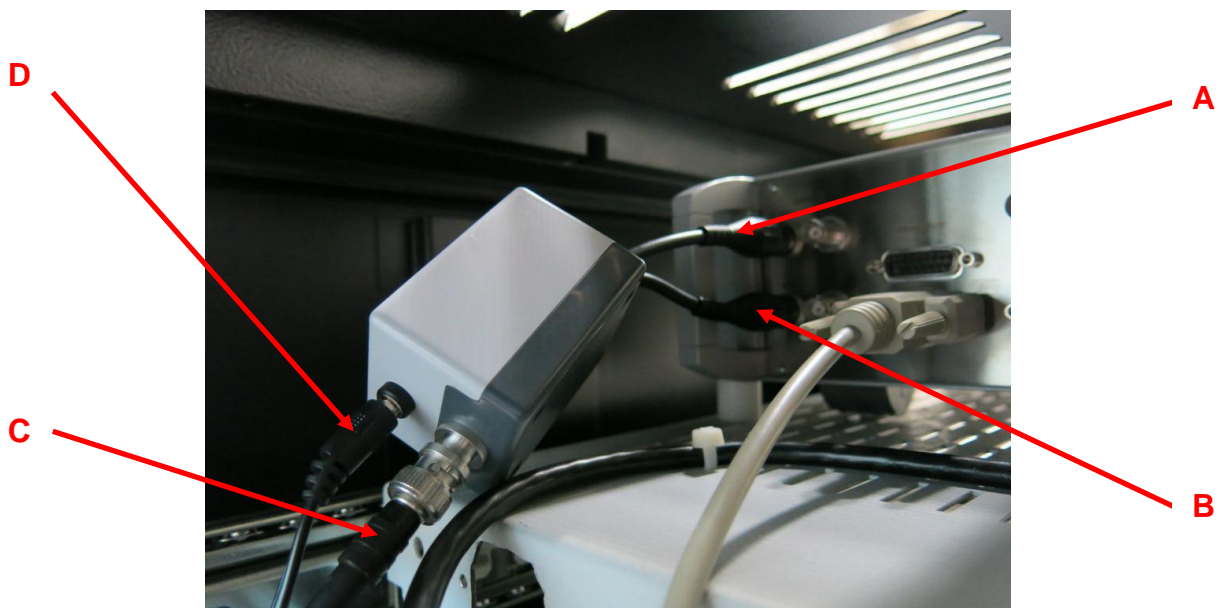


Figure 2.2

## 2.2. Software Test Setup

To get the correct signal to the input of the adapter box it is very important to correctly configure the device setup in autowave.control. Please follow strictly the instructions and check whether the setup is correct.

Step1: Configuration Autowave (see figure 2.3 below)

→ A) Output CH1: VDS200 (1) – Analog In

→ B) Output CH2: ExternalSource (1) - In

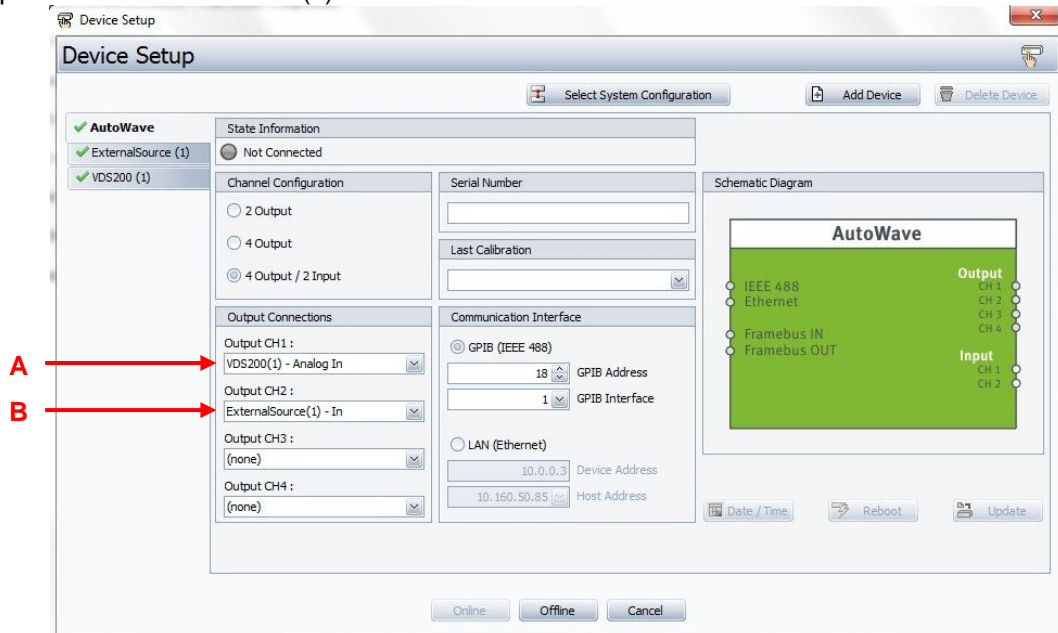


Figure 2.3

Step2: Configuration VDS200x (see figure 2.4 below)

→ A) Choose the VDS-type which is connected to the system

→ B) Select the Analog IN Connection to "AutoWave – Output CH1"

→ C) Check if the correct IEEE address or corresponding communication interface is selected

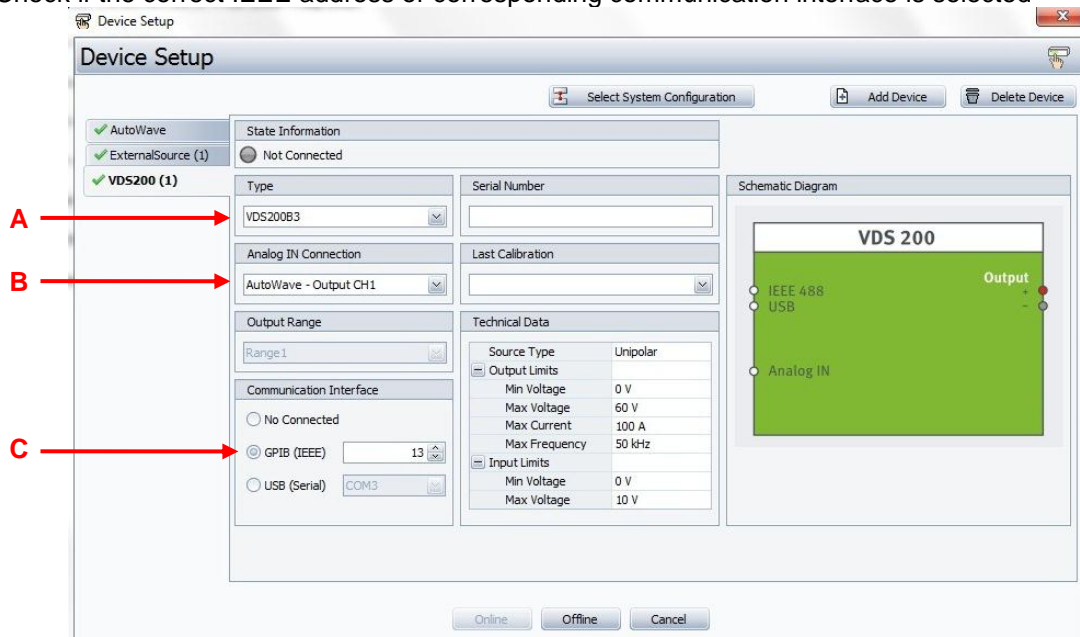


Figure 2.4

Step3: Configuration External Source (see figure 2.5 below)

→ A) Select Analog IN Connection to AutoWave – Output CH2

**Output Limits:**

→ B) Source Type: bipolar

→ C) Min Voltage: Enter the same negative voltage level as your VDS200(1) supplies for positive polarity

→ D) Max Voltage: Enter the same positive voltage level as your VDS200(1) supplies

→ E) Max Frequency: Enter 5kHz

**Input Limits:**

→ F) Max Voltage: 10V

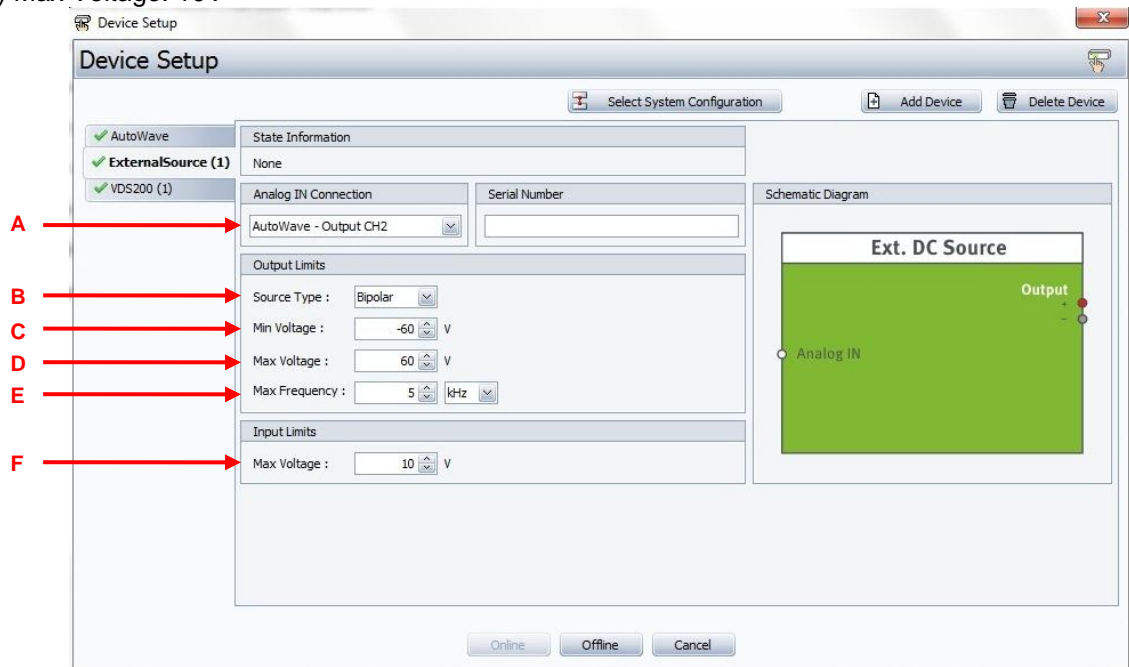


Figure 2.5

### 3. Test Performance

#### 3.1. Start a Test

Connect your DUT to the +/- output connectors of the VDS200x.

Select in autowave.control the corresponding test 9.2.5 in the GMW3172 standard. For software releases  $\geq 5.5.0$  a window (similar to figure 3.1) appears which is asking you to connect the adapter box acc to this application note.



Figure 3.1

The voltage level for Us can be selected for each level from  $U_{max}-2V$  (18V-2V) to  $U_{min}+2V$  (4.5V+2V) according to the standard. All other parameters are firmly set acc. to the standard. The square wave shape remains constantly at +/-1V (see figure 3.2 below)

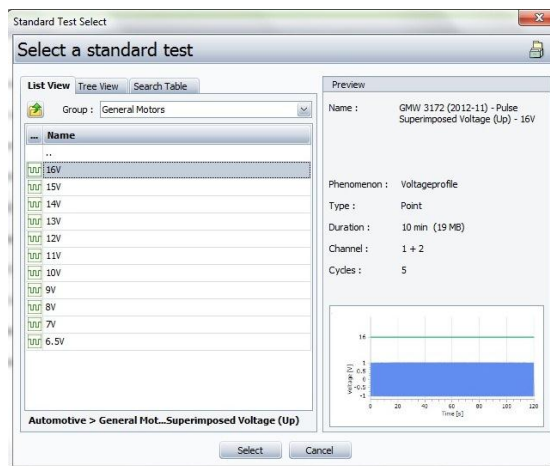


Figure 3.2

After the test window appears (see figure 3.3 below) only push the button start to perform the test.

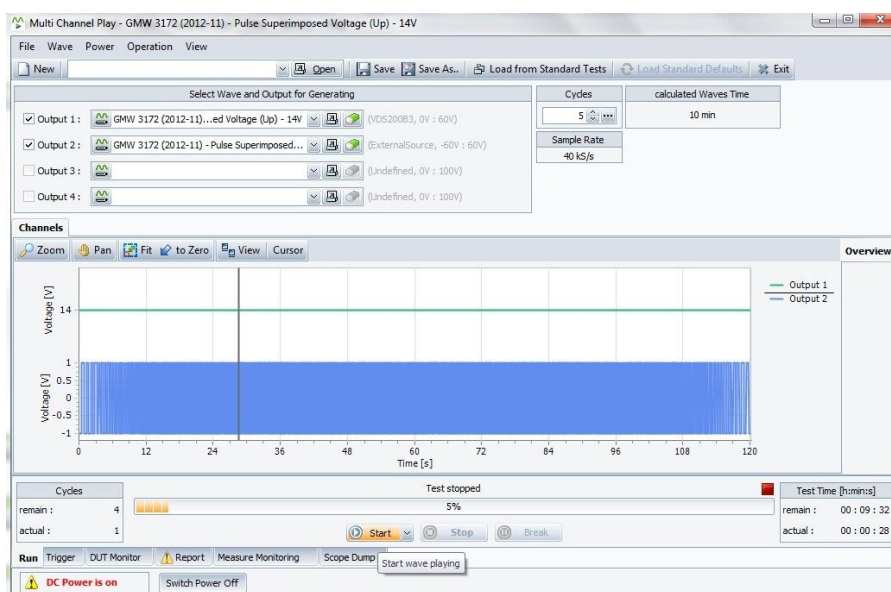


Figure 3.3

Please ensure after testing to remove the adapter box from the system and connect the system again as before.



### 3.2. Wave Shape Verification

The standard shows examples for the emerging wave shape when applying the dc and square wave signal to the electronic circuit. 3 different measuring points are mentioned: 1Hz, 100Hz, 4kHz (see figure 3.4 below)

The pulse shape measured at the output of the VDS200x shall look as the examples below (the example below is for a  $U_s$  of 14V).

Please notice: The electronic circuit inside the adapter box OPT AW-GMW3172 is built according to the proposal in the standard document.

The output signal at the VDS200x is not only square wave but also depending on the applied frequency to the components (capacitor) in the electronic circuit. Therefore the signal changes from spike (1Hz) to square (4kHz) and back.

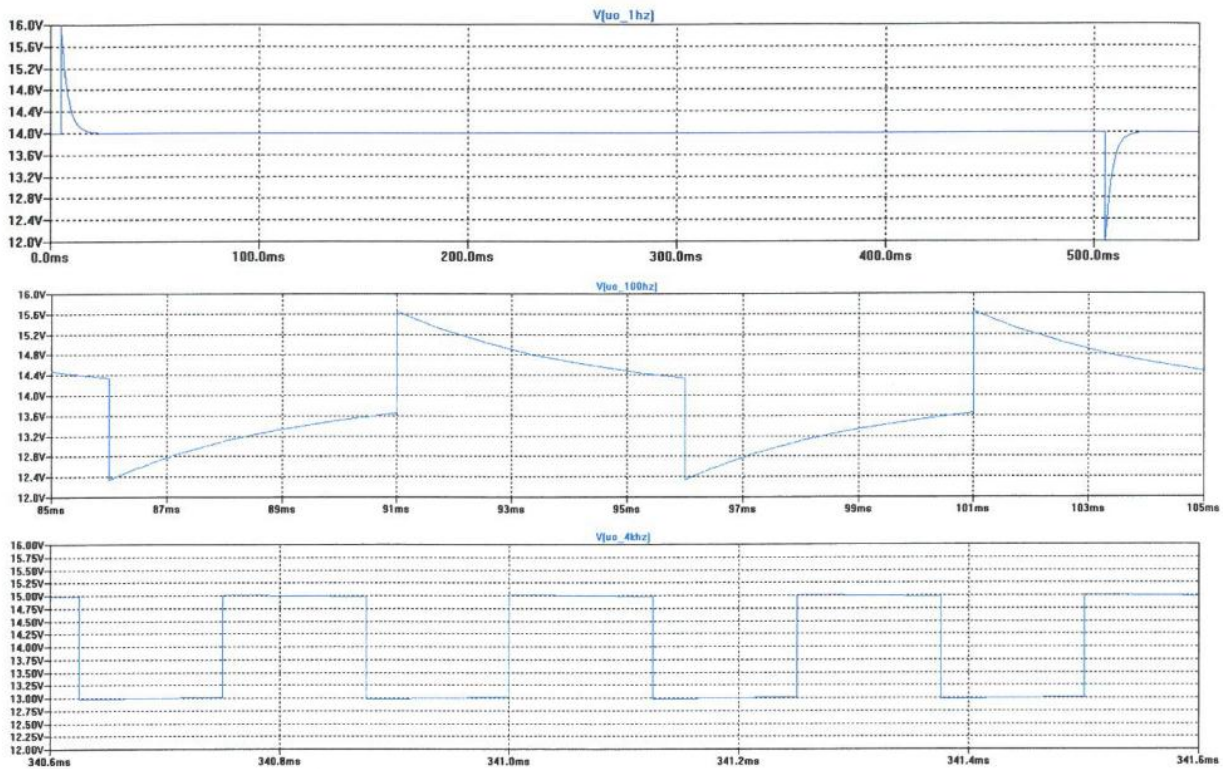


Figure 3.4



## 4. Technical Data

### 4.1. Specification

#### **Adapter box OPT AW-GMW3172**

Input voltage CH1 / CH2	Only applicable with Autowave generator acc to test GMW3172 test 9.2.5 Pulse Superimposed Voltage
Output voltage (OUTPUT (to VDS)	Only applicable with EM Test VDS200x generator
Power supply	Only with original Power Supply "XP Power" Model NO: AEL15US24 +24Vdc / 0.62 A
Dimension (housing only)	65mm x 50mm x 45mm ( L x W x H )
Weight	200 g
Operating temperature environment	23°C ± 5.0 °C
Humidity (at operating) environment	20 to 80% relative humidity ( RH) non condensing

#### **dc power supply for adapter box OPT AW-GMW3172**

Model	XP Power" Model NO: AEL15US24
Input voltage	100-240Vac / 47-63Hz / 0.4A
Output voltage	+24Vdc / 0.62 A max
Dimension (housing only)	90mm x 37mm x 35mm ( L x W x H )
Weight	300 g
Operating temperature environment	23°C ± 5.0 °C
Humidity (at operating) environment	20 to 80% relative humidity ( RH) non condensing