REACT 2
and UNO-DM-PLUS
AN-Load manager
Introduction

REACT 2 and UNO-DM-PLUS load manager feature is used to improve direct solar self-consumption. Referring to Figure 1, typical direct PV self-consumption (dashed area in grey) quota is around 30/40%, so a lot of energy is not consumed and injected into the grid. The load manager can be used to shift some loads/appliances when there is a high availability of solar energy leading to increase PV self-consumption quota up to +10%.

![Figure 1](image)

Scope and field of application

Load manager feature is available in the inverter models showed in Table 1

<table>
<thead>
<tr>
<th>Models</th>
<th>Firmware version</th>
<th>N° of digital outputs</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>REACT 2</td>
<td>&gt;0.4.7; 1926A</td>
<td>2</td>
<td>Available in every product variant</td>
</tr>
<tr>
<td>UNO-DM-PLUS</td>
<td>&gt;1.8.8; 1924A</td>
<td>1</td>
<td>Optional, by installing UNO-DM-COM-KIT or UNO-DM-PLUS Ethernet COM KIT</td>
</tr>
</tbody>
</table>

Table 1 – Compatible models

Description

Availability of load manager behavior options depends on system configuration (e.g. presence of meter and/or battery). Possible configurations are shown in Table 2.

<table>
<thead>
<tr>
<th>Load manager behavior</th>
<th>REACT 2</th>
<th>UNO-DM-PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Meter</td>
<td>Meter</td>
</tr>
<tr>
<td>Solar production</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Self-consumption boost</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Self-consumption boost preserving battery</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Low priority load disconnection</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 2 - Load manager behavior options based on system configuration
Available working mode

Self-consumption boost

Target
Increase self-consumption quota using both solar and battery (if present) power to supply load manager loads. Digital output switch to ON when power to the grid exceeds the activation threshold and it switches to OFF when power from the grid exceeds the deactivation threshold. Specific holding times of power above the activation and below the deactivation thresholds can be set to reduce probability of unwanted activations/deactivation due to power transients.

Figure 2

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation (A)</td>
<td>Power into the grid</td>
</tr>
<tr>
<td>Deactivation (D)</td>
<td>Power from the grid</td>
</tr>
</tbody>
</table>

Table 3 - Self-consumption boost - Activation and deactivation thresholds

Figure 3
Self-consumption boost preserving battery

**Target**
Increase the self-consumption quota without using battery power to supply load manager loads. Digital output switch to ON when power to the grid exceeds the activation threshold and it switches to OFF when discharged power from the battery exceeds the deactivation threshold.

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation (A)</td>
<td>Power into the grid</td>
</tr>
<tr>
<td>Deactivation (D)</td>
<td>Discharging power</td>
</tr>
</tbody>
</table>

A: Power into the grid

D: pbatt

Table 4 - Self-consumption boost preserving battery - Activation and deactivation thresholds
**Low-priority load disconnection**

**Target**
Avoid unwanted utility meter trips due to overload. In some countries (e.g. Italy) grid fails if the absorbed power exceeds the contract power limit.

Digital output switches to ON (normally-closed contact, NC) when power from the grid exceeds the activation threshold. It switches to OFF when power from the grid goes below the deactivation threshold.

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation (A)</td>
<td>Power from grid</td>
</tr>
<tr>
<td>Deactivation (D)</td>
<td>Power from grid</td>
</tr>
</tbody>
</table>

Table 5 - Low-priority load disconnection - Activation and deactivation thresholds
Solar production

**Target**
Increase self-consumption quota using solar power with no meter in the plant.
Load manager load is activated if inverter solar power is greater than the activation threshold and switched off when solar power is lower than the deactivation threshold.

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation (A)</td>
<td>Inverter output power</td>
</tr>
<tr>
<td>Deactivation (D)</td>
<td>Inverter output power</td>
</tr>
</tbody>
</table>

Table 6 - Solar production - Activation and deactivation thresholds

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**Figure 8**

**Figure 9**
Physical connection

**REACT 2**
REACT 2 is equipped with 2 multifunction relays (digital output) configurable as load manager. These two signal relays (ratings in table) can be used in normally open or normally closed modes.

![Figure 10](image1.png)

### Relay ratings:
- **Maximum AC voltage**: 230 Vac
- **Maximum current**: 1 A
- **Ambient temperature range**: -20...+ 60 °C

**UNO-DM-PLUS**
A multifunctional relay, configurable as load manager, is included in the optional UNO-DM-COM-KIT and UNO-DM-PLUS Ethernet COM KIT. This multifunctional relay (ratings below) can be used in normally open or normally closed modes.

![Figure 11](image2.png)  
![Figure 12](image3.png)

### Relay ratings:
- **Maximum AC voltage**: 300 Vac
- **Maximum current**: 1 A
- **Ambient temperature range**: -20...+ 60 °C
Enabling and modifying load manager parameters

1) Access the webserver user interface of REACT 2 and UNO-DM-PLUS. Details on product user manuals.
2) Access as administrator.
3) Click the icon 1, select Digital output and finally the gear icon (3) on the relay to be configured.
4) Set load manager in the configuration select and fill the other inputs as desired.

For testing purpose, the load manager can be forced to: ON or OFF manually by pressing the dedicated buttons. Clicking on AUTO button the load manager behavior follows the above settings.
Load name

Digital output behavior selection
(see available working modes paragraph for details)

Activation threshold

**Time activation threshold**
Minimum holding time of the power above the activation threshold for the load manager to activate the digital output. Longer time avoids undesired activation due to power transients.

Deactivation thresholds

**Time deactivation thresholds**
Minimum holding time for which the power shall remain above the deactivation threshold to deactivate the digital output. Longer time avoids undesired deactivation due to power transients.