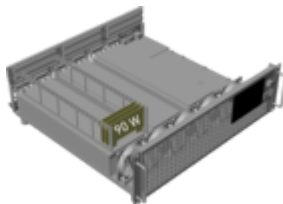


# Datasheet MALP09-01C12

|                                                      |                       |                                                                                     |
|------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Module <sup>1)</sup>                                 | MALP09-01C12          |  |
| Order no.                                            | 23-072-000-04         |                                                                                     |
| Maximum input voltage U <sub>max</sub>               | 10 V                  |                                                                                     |
| Maximum load current I <sub>max</sub>                | 12 A                  |                                                                                     |
| Continuous power                                     | 90 W                  |                                                                                     |
| Resistance setting                                   | 0.167 Ω ... 333.333 Ω |                                                                                     |
| Minimum input voltage U <sub>min</sub> <sup>2)</sup> | 1 V                   |                                                                                     |
| Rise and fall time fast                              | 200 μs                |                                                                                     |
| Input capacity                                       | 3 μF                  |                                                                                     |

1. A [PMLA LP-M](#) housing and a [Cooling Unit LP](#) are required to operate a module.
2. Minimum input voltage for maximum static load current.

## Series-Specific Data PMLA LP Variant

Series D, Rev. 1. Subject to technical changes.

The specified accuracies apply at an ambient temperature of  $23 \pm 5$  °C with connected sense lines and when the devices are used with clean voltages (ripple and noise < 0.1 %). Accuracy may worsen at voltages with higher interference values. Technical data may vary for special devices/modules.  
 \*Permissible voltages\* are positive or negative DC voltages.

| Channels and functions                    |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of channels per device             | max. 72                                                                                                                                                                                                                                                                                                                                                                                                            |
| Number of channels per system             | max. 96                                                                                                                                                                                                                                                                                                                                                                                                            |
| Total power per device                    | max. 2160 W                                                                                                                                                                                                                                                                                                                                                                                                        |
| Functions                                 | group addressing and name assignment<br>overcurrent protection<br>undervoltage protection<br>dynamic loads with list function<br>internal measurement data memory<br>discharge function for energy storage tests<br>SCPI programming with measurement function<br>MPP tracking<br>trigger model<br>SyncroLink for trigger synchronization<br>saving and loading device settings<br>watchdog in remote control mode |
| Operating modes                           |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Basic operating modes                     | CC, CV, CR, CP                                                                                                                                                                                                                                                                                                                                                                                                     |
| Combined operating modes                  | CC+CV, CP+CV, CR+CV, CP+CC, CR+CC, CV+CC                                                                                                                                                                                                                                                                                                                                                                           |
| Setting ranges                            | module-dependent                                                                                                                                                                                                                                                                                                                                                                                                   |
| User interface                            | 4.3" TFT touch display                                                                                                                                                                                                                                                                                                                                                                                             |
| Current rise and fall times               |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| With fast regulation                      | module-dependent                                                                                                                                                                                                                                                                                                                                                                                                   |
| With slow regulation                      | ca. 1 ms                                                                                                                                                                                                                                                                                                                                                                                                           |
| Accuracy of setting values                |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Voltage                                   | $\pm 0.1$ % of setting, $\pm 0.1$ % of range                                                                                                                                                                                                                                                                                                                                                                       |
| Current                                   | $\pm 0.1$ % of setting<br>$\pm 0.1$ % of range                                                                                                                                                                                                                                                                                                                                                                     |
| Resistance                                | $\pm 1.4$ % of setting<br>$\pm 0.3$ % of current range                                                                                                                                                                                                                                                                                                                                                             |
| Power (at U and I > 10 % of range)        | $\pm 0.7$ % of setting                                                                                                                                                                                                                                                                                                                                                                                             |
| Power (at U or I 5 ... 10 % of range)     | $\pm 2$ % of setting                                                                                                                                                                                                                                                                                                                                                                                               |
| Resolution                                | 12 bits                                                                                                                                                                                                                                                                                                                                                                                                            |
| Accuracy of adjustable protective devices |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Overcurrent protection                    | $\pm 0.2$ % of setting                                                                                                                                                                                                                                                                                                                                                                                             |
| Undervoltage protection                   | $\pm 0.2$ % of setting<br>$\pm 0.2$ % of range                                                                                                                                                                                                                                                                                                                                                                     |
| Resolution                                | 12 bits                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                                               |                                                                                                        |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Accuracy of measurement</b>                                |                                                                                                        |
| Voltage                                                       | $\pm 0.1$ % of measured value<br>$\pm 0.05$ % of range                                                 |
| Current                                                       | $\pm 0.2$ % of measured value<br>$\pm 0.05$ % of range                                                 |
| Resistance                                                    | is calculated from voltage and current values                                                          |
| Power                                                         | is calculated from voltage and current values                                                          |
| Resolution                                                    | 16 bits                                                                                                |
| Sampling time                                                 | 100 $\mu$ s, not triggerable                                                                           |
| <b>Dynamic function (LIST)</b>                                |                                                                                                        |
| Operating modes                                               | CC, CV, CR, CP                                                                                         |
| Number of load levels                                         | max. 100, with associated ramp and dwell time                                                          |
| Accuracy of load levels                                       | see accuracy of setting                                                                                |
| Pulse duration                                                | 0.2 ms ... 1000 s                                                                                      |
| Ramp duration                                                 | 0 ... 1000 s                                                                                           |
| Resolution                                                    | 0.2 ms                                                                                                 |
| Accuracy of the setting times                                 | $\pm 0.02$ %                                                                                           |
| <b>SyncroLink</b>                                             |                                                                                                        |
| Synchronism between load channels (jitter) of the same system | max. 100 $\mu$ s                                                                                       |
| Synchronism between load channels (jitter) to further systems | max. 250 $\mu$ s                                                                                       |
| <b>Measurement data acquisition (DAQ) in internal memory</b>  |                                                                                                        |
| Accuracy                                                      | see accuracy of measurement                                                                            |
| Resolution                                                    | 16 bits                                                                                                |
| Sampling time                                                 | 0.2 ms ... 1000 s, resolution 0.2 ms                                                                   |
| Measurement data                                              | time stamp, voltage, current                                                                           |
| Number of measuring points                                    | max. 500                                                                                               |
| <b>Settings memory</b>                                        |                                                                                                        |
| Number of memory positions (incl. programmed list)            | 10, selectable                                                                                         |
| <b>Input</b>                                                  |                                                                                                        |
| Input resistance                                              | > 50 k $\Omega$ with load input switched off, diode function with reverse polarity up to rated current |
| Input capacity                                                | module-dependent                                                                                       |
| Parallel operation                                            | up to 5 channels in analog master-slave mode (hardware-controlled)                                     |
| Maximum input voltage $U_{\max}$                              | module-dependent                                                                                       |
| Minimum input voltage $U_{\min}$                              | module-dependent                                                                                       |

|                                                              |                                                                                                                                                  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input: permissible voltages</b>                           |                                                                                                                                                  |
| U <sub>in</sub> -PE (neg. load input - PE)                   | max. ±40 V DC                                                                                                                                    |
| U <sub>in</sub> +PE (pos. load input - PE)                   | U <sub>max</sub> + 40 V DC                                                                                                                       |
| U <sub>in</sub> -in- (neg. load inputs between the channels) | max. ±40 V DC                                                                                                                                    |
| <b>Power</b>                                                 |                                                                                                                                                  |
| Continuous power                                             | module-dependent                                                                                                                                 |
| Derating                                                     | -1.2 %/°C for T <sub>a</sub> > 21 °C                                                                                                             |
| <b>Protection and monitoring</b>                             |                                                                                                                                                  |
| Protective devices                                           | overcurrent, overpower, overtemperature                                                                                                          |
| Monitoring messages                                          | overvoltage indicator, polarity reversal indicator, undervoltage indicator (if input voltage is too low for set load)                            |
| <b>Connections</b>                                           |                                                                                                                                                  |
| Load input                                                   | Phoenix Contact MSTB2,5/24-STF-5,08                                                                                                              |
| Sense                                                        | 25-pin D-sub female connector                                                                                                                    |
| <b>Operating conditions</b>                                  |                                                                                                                                                  |
| Operating temperature                                        | 5 ... 40 °C                                                                                                                                      |
| Storage temperature                                          | -25 ... 65 °C                                                                                                                                    |
| Max. operating height                                        | 2000 m above sea level                                                                                                                           |
| Pollution degree                                             | 2                                                                                                                                                |
| Overvoltage category of mains                                | II                                                                                                                                               |
| Max. Humidity                                                | 80 % at 31 °C, decreasing linearly to 50 % at 40 °C                                                                                              |
| Min. distance rear panel to wall or other objects            | 70 cm                                                                                                                                            |
| Cooling                                                      | multi-stage air cooling, temperature-controlled, air inlet via the front panel, air outlet via the rear panel, suitable for gapless 19" mounting |
| Noise                                                        | max. 65 dB(A) at a distance of 1 m                                                                                                               |
| Mains voltage                                                | 1/N/PE AC 100 ... 240 V 50/60 Hz                                                                                                                 |
| Mains cable                                                  | length max. 3 m, cross-section of mains connection wires min. 1 mm <sup>2</sup>                                                                  |
| Power consumption                                            | max. 260 VA                                                                                                                                      |
| <b>Mechanics</b>                                             |                                                                                                                                                  |
| Housing                                                      | 19", 3 U                                                                                                                                         |
| Dimensions W x H x D                                         | 485 x 152 x 485 mm                                                                                                                               |
| Installation depth                                           | 470 mm                                                                                                                                           |
| Installation height                                          | 134 mm                                                                                                                                           |
| Weight                                                       | max. 22 kg                                                                                                                                       |
| Color front panel                                            | RAL7035 (light grey)                                                                                                                             |
| Color rear panel                                             | stainless steel                                                                                                                                  |
| Color cover                                                  | RAL7037 (stone grey)                                                                                                                             |

|                       |                                                                        |
|-----------------------|------------------------------------------------------------------------|
| <b>Safety and EMC</b> |                                                                        |
| Protection class      | 1                                                                      |
| Measurement category  | 0                                                                      |
| Electrical safety     | DIN EN 61010-1<br>DIN EN 61010-2-30                                    |
| EMC, CE marking       | DIN EN 61326-1<br>DIN EN 55011<br>DIN EN 61000-3-2<br>DIN EN 61000-3-3 |
| <b>Calibration</b>    |                                                                        |
| FCC-PMLAxx            | factory calibration certificate                                        |