1. INSTALLATION - MECHANICAL

1.1 GENERAL DESCRIPTION

The MLC 9000+ System - comprising one or more Bus Modules each with up to eight Loop Modules - is designed for installation in an enclosure which is sealed against the ingress of dust and moisture. The enclosure must contain sufficient length of 35mm Top-Hat DIN mounting rail to accommodate the system modules (see below) plus an extra 50mm of rail to permit modules to be separated for removal/replacement.

1.2 VENTILATION

Under normal circumstances, no forced ventilation is required and the enclosure need not contain ventilation slots, but temperatures within the enclosure must be within specification.

1.3 INSTALLING A LOOP MODULE

The MLC 9000+ system is installed in the following order:

1. Bus Communications Module (refer to Bus Module installation instructions)
2. Interconnect Module(s)
3. First Loop Controller Module
4. Second Loop Controller Module
5. Third Loop Controller Module etc....

To install the Loop Module follow the instructions below:

CAUTION: HOT SWAPPING OF LOOP CONTROLLER MODULES.

Although hot swapping of Loop Modules is possible, caution must be exercised in order to eliminate the risk of receiving an electric shock due to the possibility of up to 240VAC being present at the relay terminals of an Loop Module. Before removing any connectors from a Loop Module, please ensure that all hazardous voltages have been isolated from the appropriate connectors.

1.4 REMOVING A LOOP MODULE

1.4.1 Removing a Loop Module

Unplug all connectors from top & bottom of the Loop Module.

Press Plunger

Figure 3 Removing a Loop Module

1.4.1 Removing an Interconnect Module

Remove Associated Loop Module

Figure 4 Removing an Interconnect Module

2. INSTALLATION - ELECTRICAL

1.3.1 Installing an Interconnect Module

Slide Interconnect Modules to the left until the module is connected to its neighbour

Figure 1 Installing an Interconnect Module

1.3.2 Installing a Loop Module

Quick-Release Plunger

Figure 2 Installing a Loop Module

CAUTION: HOT SWAPPING OF LOOP CONTROLLER MODULES.

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WARNING: The maximum of eight Loop Module’s per Bus Module must not be exceeded.

It is recommended that (a) some means of preventing unauthorized access to the enclosure interior (e.g. lockable doors) is provided, and (b) that a suitable DIN rail clamp be used, once the MLC 900+ system is fully installed, to prevent the system from moving on the DIN rail.

NOTE: An additional 60mm of space is required above and below the system modules to permit ventilation and to accommodate wiring bend radii to enclosure trunking or conduits. Allow sufficient slack in all cables inside the trunking to permit interconnect modules to be separated for removal/replacement.
2.1 Installation Considerations

Ignition transmitters, arc welders, mechanical contact relays and solenoids are all common sources of electrical noise in an industrial environment and therefore the following guidelines MUST be followed.

1. If the instrument is being installed in existing equipment, the wiring in the area should be checked to ensure that good wiring practices have been followed.
2. Noise-generating devices such as those listed should be mounted in a separate enclosure. If this is not possible, separate them from the instrument, by the largest distance possible.
3. If possible, eliminate mechanical contact relays and replace with solid state relays. If a mechanical relay being powered by an output of this instrument cannot be replaced, a solid state relay can be used to isolate the instrument.
4. Do not run signaling cables adjacent to power-carrying conductors. If the wiring is run in a conduit, use a separate conduit for the signal wiring. Use of shielded cables is recommended and this must be grounded at one point only.

2.2 Noise Suppression at Source

Usually when good wiring practices are followed, no further noise protection is necessary. Sometimes in severe electrical environments, the amount of noise is so great that it has to be suppressed at source. Many manufacturers of relays, contactors etc. supply surge suppressors which mount on the noise source. For those devices that do not have surge suppressors supplied, Resistance-Capacitance (RC) networks and/or Metal Oxide Varistors (MOV) may be added.

2.3 Thermocouple Inputs

The correct type of extension lead/compensation cable must be used for the entire distance between the Loop Module connector and the thermocouple. Correct polarity must be observed throughout and joints in the cable should be avoided. If the thermocouple extension lead is shielded, this must be done at one point only. If the thermocouple extension lead is not shielded, the shield must also be grounded at one point only.

2.4 RTD Inputs

The extension leads should be of copper and the resistance of the wires connecting the resistance element should not exceed 500 ohm per lead (the leads should be of equal resistance). For three wire RTDs, connect the common lead and the common leg of the RTD as illustrated. For a two wire RTD a wire link should be used in place of the third wire. Two wire RTDs should only be used when the leads are less than 3 metres long. Avoid cable ties!

2.5 Heater Current Input

For single loop modules with a heater current input the main heater conductor should be passed through a current transformer (CT) the secondary should then be connected to the input terminals of the Loop Module. A value of CT should be selected so that the secondary has a current maximum of 50mA.

For multiple loop modules with a heater current input as single CT is used. Each of the main heater conductors is passed through the single CT. The value of CT needs to be calculated to be able to withstand the maximum current in all three conductors at the same time. If a CT can not be found that is of sufficient size then one of the conductors can be passed through the CT in the opposite direction to the other two this has the effect of cancelling out one of the other conductors and as such reducing the secondary current.

Current Transformers available from your local supplier:

- 2.5:0.05 part number 85258
- 5.0:0.05 part number 85259
- 10.0:0.05 part number 85260

3. LOOP MODULE SPECIFICATIONS

![Figure 7](image)

### GENERAL

<table>
<thead>
<tr>
<th>Function</th>
<th>Each Loop Module performs the control functions and provides the input and output connections for its own control loops. Up to six independent inputs and up to 6 outputs, depending on model variant.</th>
</tr>
</thead>
</table>

### Types Available

- Z1300: One Universal input, two SSR/relay outputs (selectable)
- Z1301: One Universal input, one Heater Break input, two SSR/relay outputs and one Linear or three SSR outputs (selectable)
- Z661: Three Universal inputs, one Heater Break input, six SSR outputs
- Z662: Three Universal inputs, one Heater Break input, six SSR outputs and three Relay outputs
- Z663: Three Universal inputs, one Heater Break input, three SSR outputs and three Relay outputs
- Z664: Four Universal inputs, six SSR outputs
- Z665: Four Universal inputs, six SSR outputs and two Relay outputs

### Process Inputs

- Type and scale user selectable (see Process Inputs table)
- Sample rate 10 per second (100ms)

### Heater Current Input

- Measures a heater current value via an external CT for use by the Heater Break Alarm function.

### THERMOCOUPLE INPUTS

- Note: Reduced performance with Type "B" thermocouple between 100 – 600°C.

### THERMOCOUPLE INPUTS

#### Measure

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple</td>
<td>Better than ±0.5% for single Loop Modules</td>
</tr>
</tbody>
</table>

### DC Linear

<table>
<thead>
<tr>
<th>DC Linear</th>
<th>10 samples per second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>Eight bits in 250s (10 bits in 1 second typical)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.25% (mV into 2500 load, V into 2k3 load) Degraded linearly to ±0.5% for increasing burden to maximum drive capability.</td>
</tr>
<tr>
<td>Update Rate</td>
<td>10 samples per second</td>
</tr>
</tbody>
</table>

### RELAY OUTPUTS

- Drive Capability: 12V DC nominal (1000 volts) maximum at up to 20mA load
- Isolation: Isolated from process input and relay outputs. Not isolated from any other line or output. Not isolated from other similar outputs in the same system.

### APPROVALS

- EMI Standard: EN61326-1.0
- Safety: Complies with EN61010-1 and UL3121-1.

### PHYSICAL

- Dimensions: Height - 100mm; Width - 22mm; Depth - 120mm
- Mounting: 35mm x 7.5mm Top Hat DIN rail mounting via Interconnect (EN50022, DIN46277-3)
- Connector Types: All 5.08mm Combiner type
- Weight: 0.15kg