MICRO PLCs
• 10 Inputs/Outputs (LRD10...)
• 12 Inputs/Outputs (LRD12...)
• 20 Inputs/Outputs (LRD20...)
• 12VDC, 24VDC, 24VAC or 100...240VAC power supply
• Relay or transistor outputs.

EXPANSION AND COMMUNICATION MODULES
• 4 digital inputs / 4 digital outputs
• Analog inputs, 0...10V or 0...20mA
• Analog outputs, 0...10V or 0...20mA
• Relay or transistor outputs
• PT100 temperature sensor inputs
• Modbus-RTU protocol slave communication unit
• 24VDC, 24VAC or 100...240VAC power supply.

ACCESSORIES
• Program backup memory
• Programming and supervision software
• Power supply unit
• HMI operator panel with graphic LCD.

STARTER AND TRAINING KITS
• Complete kit to begin using micro PLCs, each equipped with LRD relay, programming-supervision software and USB connecting cable
• Training kits complete with micro PLC and inputs/outputs simulation board.
Micro PLCs

- 10, 12 and 20 Input-Output base modules
- Expansion modules with 4 digital Inputs and 4 digital Outputs
- Expansion modules for analog Inputs-Outputs
- Modbus-RTU slave communication module
- RS232/USB serial interface port for PC, HMI operator panel or program backup memory connection
- On-board programming languages: Italian, English, Spanish, French, German, Portuguese and Chinese
- PC programming languages: Italian, English and Spanish.

Micro PLCs

- Base modules ........................................................................................................ 20 - 4
- Expansion and communication modules ................................................................. 20 - 4
- Accessories ........................................................................................................... 20 - 5
- Starter and training kits .......................................................................................... 20 - 5

- Dimensions ........................................................................................................... 20 - 6
- Wiring diagrams .................................................................................................... 20 - 7
- Technical characteristics ....................................................................................... 20 - 8
SYSTEM CONTROL AND SUPERVISION
- Contact status viewing in simple and small screen display
- Possibility to add the micro PLC to systems integrated on data networks. By using supervision and energy management software, a multiclent structure can also be managed through Web interface.

QUICK CONTROL BOARD INSTALLATION
- Fewer number of components
- Less wiring with minor number of connections.

REPEATINESS
- Less errors during panel building
- Considerable time saving.

FLEXIBILITY
- Quick correction of abnormal conditions at final testing
- Fast changes on control boards.

FUNCTION BLOCKS AND MEMORY
- Timer (T) (delay on/off, recycle, pulsing, ...)
- Real Time Clock (RTC) (daily, weekly, monthly and yearly mode)
- Counter (C)
- Analog comparator (G)
- User’s pages (H) - 16 characters - 4 lines
- Auxiliary relay - Scratchpad (M + N memory types)
- Arithmetic operation: addition/subtraction and multiplication/division
- Data register (DR)

Saving can be in memory storage of:
- Auxiliary relay
- Counter value
- Data register.

FUNCTIONS

PWM OUTPUT
Pulse train generation with programmable pulse time and frequency
\[ V_{\text{out}} = 24VDC \times T_{\text{on}} \times \frac{T}{T} \]

HIGH SPEED INPUT
Position and speed detection

PID
IN: Heating switch on and required temperature setting
OUT: Current room temperature
OUTc: Measured room temperature in an exact spot
OUT: Temperature adjusting and controlling.

MULTIPLEXER
Selection of 1 of 4 values based on the combination of two digital signals

SHIFT FUNCTION - activation of pulsed outputs in sequence

BOOLEAN LOGIC BLOCKS
Output activation based on a series of digital signals

PROGRAM SIZE
Language
LADDER (contact scheme) 300 lines
FBD (function blocks) 260 blocks

MICRO PLC - EXCEPTIONAL PERFORMANCE!
HMI INTERFACE

LRX P01 is an HMI operator panel, used with many types of PLCs or other intelligent controllers equipped with communication port.

By using the HMI, the values of both PLC inner registers and relay status can be monitored and changed with the keys or LEDs. In this way, for machinery and equipment functioning results to be simple and direct.

The LRX SW P01 editor software permits to make dedicated screens by taking advantage of the graphic display to view bitmaps, bar graphs and trend lines.

BACKLIGHT 192x64 PIXEL GRAPHIC LCD

Read numerical values

Dynamic text

Images

Read status (bits)

Display bar graphs and trend lines

Commands

Write numerical values

COMMUNICATION MODES

LRX P01 supports Modbus-RTU protocol and RS232 or RS485 communication modes can be chosen.

Micro PLCs

Micro PLCs

Power analyzers

Generating set controllers

Soft starters

Variable speed drives

Power factor controllers

Automatic transfer switch controllers
**Expansion and communication modules**

<table>
<thead>
<tr>
<th>Order code</th>
<th>Auxiliary supply voltage</th>
<th>In/Out</th>
<th>Qty per pkg</th>
<th>Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRE02A D024</td>
<td>24VDC</td>
<td>2 analog outputs 0...10V/0...20mA</td>
<td>1</td>
<td>0.160</td>
</tr>
<tr>
<td>LRE04A D024</td>
<td>24VDC</td>
<td>4 analog outputs 0...10V/0...20mA</td>
<td>1</td>
<td>0.160</td>
</tr>
<tr>
<td>LRE04P D024</td>
<td>24VDC</td>
<td>4 PT100 temp. sensor inputs</td>
<td>1</td>
<td>0.160</td>
</tr>
<tr>
<td>LRE08R D024</td>
<td>24VDC</td>
<td>4/4 relay</td>
<td>1</td>
<td>0.171</td>
</tr>
<tr>
<td>LRE08T D024</td>
<td>24VDC</td>
<td>4/4 transistor</td>
<td>1</td>
<td>0.151</td>
</tr>
<tr>
<td>LRE08R A024</td>
<td>24VAC</td>
<td>4/4 relay</td>
<td>1</td>
<td>0.180</td>
</tr>
<tr>
<td>LRE08R A240</td>
<td>24VDC</td>
<td>4/4 relay</td>
<td>1</td>
<td>0.180</td>
</tr>
<tr>
<td>LRE08T D024</td>
<td>24VDC</td>
<td>4/4 transistor</td>
<td>1</td>
<td>0.151</td>
</tr>
<tr>
<td>LRE08R A024</td>
<td>24VAC</td>
<td>4/4 relay</td>
<td>1</td>
<td>0.180</td>
</tr>
<tr>
<td>LRE08R A240</td>
<td>24VDC</td>
<td>4/4 relay</td>
<td>1</td>
<td>0.180</td>
</tr>
</tbody>
</table>

**BASE MODULES**

<table>
<thead>
<tr>
<th>Type</th>
<th>Power supply</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Max I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRD12RD024</td>
<td>24VDC</td>
<td>6 digital + 2 digital/analog</td>
<td>4 relay</td>
<td>12 + 24</td>
</tr>
<tr>
<td>LRD12RD024</td>
<td>24VDC</td>
<td>6 digital + 2 digital/analog</td>
<td>4 transistor</td>
<td>12 + 24</td>
</tr>
<tr>
<td>LRD20RD012</td>
<td>12VDC</td>
<td>8 digital + 4 digital/analog</td>
<td>8 relay</td>
<td>29 + 24</td>
</tr>
<tr>
<td>LRD20RD024</td>
<td>24VDC</td>
<td>8 digital + 4 digital/analog</td>
<td>8 relay</td>
<td>20 + 24</td>
</tr>
<tr>
<td>LRD20RD04P</td>
<td>24VDC</td>
<td>8 digital + 4 digital/analog</td>
<td>8 relay</td>
<td>20 + 24</td>
</tr>
<tr>
<td>LRD10RD040</td>
<td>100...240VAC</td>
<td>6 digital</td>
<td>4 relay</td>
<td>10 + 24</td>
</tr>
<tr>
<td>LRD20RA240</td>
<td>24VAC</td>
<td>12 digital</td>
<td>8 relay</td>
<td>20 + 24</td>
</tr>
<tr>
<td>LRD20RA240</td>
<td>24VAC</td>
<td>12 digital</td>
<td>8 relay</td>
<td>20 + 24</td>
</tr>
</tbody>
</table>

**EXPANSION AND COMMUNICATION MODULES**

<table>
<thead>
<tr>
<th>Type</th>
<th>Power supply</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Max I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRE02AD024</td>
<td>24VDC</td>
<td>—</td>
<td>2 analog</td>
<td>—</td>
</tr>
<tr>
<td>LRE04AD024</td>
<td>24VDC</td>
<td>4 analog</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LRE04PD024</td>
<td>24VDC</td>
<td>4 PT100</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LRE08RD024</td>
<td>24VDC</td>
<td>4 digital</td>
<td>4 relay</td>
<td>—</td>
</tr>
<tr>
<td>LRE08TD024</td>
<td>24VDC</td>
<td>4 digital</td>
<td>4 transistor</td>
<td>—</td>
</tr>
<tr>
<td>LRE08RA240</td>
<td>100...240VAC</td>
<td>4 digital</td>
<td>4 relay</td>
<td>—</td>
</tr>
<tr>
<td>LRE08RA240</td>
<td>24VAC</td>
<td>4 digital</td>
<td>4 relay</td>
<td>—</td>
</tr>
<tr>
<td>LREP00</td>
<td>24VDC</td>
<td>RS485 Modbus-RTU protocol communication unit</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Dimensions**

- 24VDC
- 24VAC
- 100...240VAC

**General characteristics**

- Additions-Subtraction on variables
- Multiplication-Division on variables
- Comparator on variables
- HMI display for parameter viewing and programming
- PWM output
- High speed input (1kHz)
- PID function
- Multiplexer
- Analog ramp
- Register transfer (numerical variables and status)
- Shift function
- Boolean logic blocks
- LRD20RD040 P1 with RS485 port onboard.

**Operational characteristics**

- 8A lth current relay outputs for AC and DC versions
- 0.3A 24VDC transistor outputs for DC version
- 0...10V analog inputs for DC version
- Version: modular for mounting on 35mm DIN rail (IEC/EN 60715) or M4x15mm screw fixing
- Type of terminal: Screw

**Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E300049), as Programmable Controllers. Compliant with standards: IEC/EN 61131-2, UL508, CSA C22.2 n°142.
### Accessories

- **LRX M00**: Program backup memory
- **LRX C00**: Power supply unit, 100...240VAC/24VDC, 1.3A
- **LRX P01**: User's manual Italian edition (paper)
- **LRX SW**: Programming and supervision software (CD-ROM)
- **LRX SW P01**: Learning edition (paper)
- **LRX SW P02**: Learning edition (paper)
- **LRX SW P03**: Learning edition (paper)

### Starter and training kits

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Qty per pkg</th>
<th>Wt [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRDKIT 12R D024</td>
<td>LRD starter kit complete with LRD12R D024 base module, LRD SW software and LRD C03 cable</td>
<td>1</td>
<td>0.424</td>
</tr>
<tr>
<td>LRDKIT 12R A024</td>
<td>LRD starter kit complete with LRD12R A024 base module, LRD SW software and LRD C03 cable</td>
<td>1</td>
<td>0.424</td>
</tr>
<tr>
<td>LRDKIT 10R A240</td>
<td>LRD starter kit complete with LRD10R A240 base module, LRD SW software and LRD C03 cable</td>
<td>1</td>
<td>0.424</td>
</tr>
<tr>
<td>LRD DEM 12R D024</td>
<td>Training kit with LRD12R D024 mounted on inputs/outputs simulation board</td>
<td>1</td>
<td>0.920</td>
</tr>
<tr>
<td>LRD DEM 20R D024</td>
<td>Training kit with LRD20R D024 mounted on inputs/outputs simulation board</td>
<td>1</td>
<td>1.060</td>
</tr>
</tbody>
</table>

### Technical characteristics

- **HMI panel LRX P01 general characteristics**
  - 24VDC power supply
  - RS232 communication port:
    - Direct connection to LRD using LRX C00
    - Connection to other devices using a standard D-SUB 9 serial cable
  - Power supply port
  - LRX SW P01 editor software for specific pages and easy use
  - IEC degree of protection: IP65.

- **FUNCTIONS**
  - Send commands
  - Read status
  - Provide static and dynamic texts
  - Write variables
  - Read variables:
    - Numerical value
    - Bar graph
    - Trend line.

### Programming

At any time and with extreme simplicity, LRD can be set up and reprogrammed to satisfy new requirements and improve the operation of a system. Programming is simple and intuitive and can be done directly on the base module keypad or by personal computer, connected by LRX C00 (RS232) or LRX C03 (USB) interface and using the relative LRX SW software. With a personal computer, two programming language tools can be used: FBD (Function Block Diagrams) and LAD00ER (contact scheme).

Both of the following can be accomplished:
- Simulate the program directly **“off-line”** on a personal computer to test if it runs correctly.
- Use the supervision mode to check the project **“on-line”**.

There are 8 function keys on front, dedicated to on-board adjustment, control and supervision of digital input and output status, analog input values, time and date entry and the operation status of the micro PLC itself.

### Certifications and compliance

Certifications obtained: UL Listed, for USA and Canada (cULus - File E300049), as Programmable Controllers for power supply and HMI units and base module of kits. Compliant with standards: IEC/EN 61131-2, UL508, CSA C22.2 n°142.
Micro PLCs
Dimensions [mm (in)]

BASE MODULES
LRD10… - LRD12…

LRD20…

EXPANSION AND COMMUNICATION MODULES
LRE… expansion/communication modules

ACCESSORIES
LRX1V3 D024 power supply unit

LRX P01 HMI operator panel

Cutout

20
Micro PLCs

Wiring diagrams

BASE MODULES
LRD12R D024

LRD20R D012 - LRD20R D024

LRD20R A024

LRD20R A240

EXPANSION AND COMMUNICATION MODULES
LRE02A D024

LRE04A D024

LRE04P D024

LRE08R D024

LRE08T D024

LRE08R A024

LRE08R A240

ACCESSORIES
LRX 1V3 D024

LRE P00

LRX P01

12VDC for LRD20R D012.
**Micro PLCs**

**Technical characteristics**

### BASE MODULES

<table>
<thead>
<tr>
<th>LRD... D012</th>
<th>LRD... D024</th>
<th>LRD... A024</th>
<th>LRD... A240</th>
</tr>
</thead>
</table>

#### POWER SUPPLY

- **IEC rated voltage** Ue (frequency range)
  - 12VDC
  - 24VDC
  - 24VAC (50/60Hz)
  - 100...240VAC (50/60Hz)
- **Operating limits**
  - 10.4...14.4VDC
  - 20.4...28.8VDC
  - 20.4...28.8VAC (47/63Hz)
  - 85...265VAC (47/63Hz)
- **Average current consumption**
  - 265mA (LRD12...)
  - 125mA (LRD20...)
  - 290mA
  - 100mA

#### DIGITAL INPUTS

- **Rated voltage**
  - 12VDC
  - 24VDC
  - 24VAC (50/60Hz)
  - 100-240VAC (50/60Hz)
- **Input voltage**
  - State 0: <2.5VDC
  - State 1: >7.5VDC
- **Delay time**
  - 0 to 1: 4ms (0.5ms for high speed)
  - 1 to 0: 4ms (0.3ms for high speed)
- **Admissible overload**
  - 14VDC: 28VDC

#### ANALOG INPUTS FOR DC VERSIONS ONLY

- **Input signal range**
  - 0...10V
  - 0.01V
- **Current consumption at 10VDC**
  - <0.17mA
- **Input impedance**
  - >40kΩ

#### DIGITAL OUTPUTS

- **Type of output / IEC rated current Ith**
  - Relay / 8A (LDR...R... / LRE08R... only)
  - Transistor / 0.3A 24VDC (LDR...T... / LRE08T... only)
- **Applied voltage**
  - Max 265VAC/30VDC (LDR...R... / LRE08R... only)
  - 10...28.8VDC (LDR...T... / LRE08T... only)

#### AMBIENT CONDITIONS

- **Operating temperature**
  - -20...+55°C
- **Storage temperature**
  - -40...+70°C
- **Relative humidity**
  - 20...90% without condensation

#### HOUSING

- **Version**
  - Modular for mounting on 35mm DIN rail (IEC/EN 60715) or M4x15mm screw fixing

### EXPANSION MODULES

<table>
<thead>
<tr>
<th>LRE02A D024</th>
<th>LRE04A D024</th>
<th>LRE04P D024</th>
</tr>
</thead>
</table>

#### POWER SUPPLY

- **IEC rated voltage** Ue
  - 24VDC
- **Operating limits**
  - 20.4...28.8VDC

#### ANALOGIC INPUTS/OUTPUTS

- **Type of channels**
  - 2 outputs configurable for voltage or current
  - 4 outputs configurable for voltage or current
  - 4 inputs for PT100 temperature sensors
- **Operating limits**
  - 0...10V
  - 0...10mA
  - 0...10V
  - -100...+600°C
- **Display resolution**
  - 0.00...10.00V
  - 0.00...20.00mA
  - 0.00...10.00V
  - 0.00...10.00V
- **Resolution**
  - 10mV
  - 40μA
  - 10mV
  - 0.1°C
- **Accuracy**
  - ±2.5%
  - ±2.5%
  - ±1%
- **Power consumption**
  - 70mA
  - 70mA

#### COMMUNICATION MODULE

- **LRE P00**
  - 24VDC
- **RS485 connection**
  - Isolated
- **Baud rate**
  - 4800...38400bps
- **Terminator resistor**
  - Integrated 1200Ω
- **Cable length**
  - 0.14...1.5mm² (26...16AWG)
- **Tightening torque**
  - 0.6Nm (5.4lb-in)
## HMI OPERATOR PANEL  
**LRX P01**

<table>
<thead>
<tr>
<th><strong>SUPPLY</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC rated voltage Ue</td>
<td>24VDC</td>
</tr>
<tr>
<td>Operating limits</td>
<td>20.4...26.4 VDC (-15%...+10%)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.9 W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AMBIENT CONDITIONS</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>0...+55°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40...+70°C</td>
</tr>
<tr>
<td>Altitude</td>
<td>≤2000m</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10...95% (non-condensing)</td>
</tr>
<tr>
<td>Maximum pollution degree</td>
<td>2 (IEC/EN 61131-3)</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>15g</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>0.5g</td>
</tr>
<tr>
<td>Conductor section</td>
<td>0.4...3.3 mm² (22-12 AWG)</td>
</tr>
<tr>
<td>Tightening torque</td>
<td>1.8 Nm / 10.4 lbin</td>
</tr>
<tr>
<td>IEC degree of protection</td>
<td>IP65</td>
</tr>
</tbody>
</table>

## POWER SUPPLY UNIT  
**LRX 1V3D024**

<table>
<thead>
<tr>
<th><strong>IEC rated voltage Ue</strong></th>
<th>100...240VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption</td>
<td>0.85A</td>
</tr>
<tr>
<td>Output current</td>
<td>1.3A, 24VDC</td>
</tr>
<tr>
<td>Cable length</td>
<td>0.14...1.5mm² (26...16AWG)</td>
</tr>
<tr>
<td>Tightening torque</td>
<td>0.6Nm (5.4lb-in)</td>
</tr>
</tbody>
</table>