



- Micro PLC with 10, 12 and 20 built-in Inputs/Outputs
- Versions with integrated Ethernet port for programming and monitoring
- Versions with or without display
- Relay or transistor outputs
- Expansion modules with 4 digital Inputs and 4 digital Outputs
- Expansion modules with analog Inputs or Outputs
- RS485 Modbus-RTU slave communication module
- HMI with graphic touchscreen display, format 4.3", 7" and 10.1".

Micro PLCs

| | |
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| Micro PLCs LRK series | 25 - 6 |
| Micro PLCs LRD series | 25 - 7 |
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| Technical characteristics | 25 - 14 |
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MICRO-PLC CONTROL PANEL



SEC. - PAGE



Pag. 25-6

MICRO PLCs LRK SERIES

- Compact with great performance
- Base modules with 10, 12 or 20 Inputs/Outputs
- Integrated Ethernet port for programming, monitoring and web server
- Wide program memory
- Versions with or without display
- 12/24VDC or 100...240VAC power supply
- Relay outputs
- Expandable with expansion modules LRE type.



Pag. 25-7

MICRO PLCs LRD SERIES

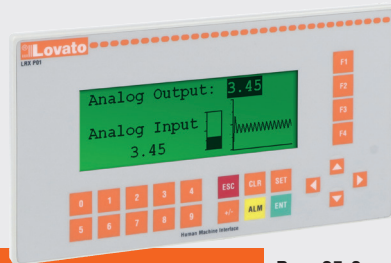
- Simple and functional.
- Base modules with 10, 12 or 20 Inputs/Outputs
- 12VDC, 24VDC, 24VAC or 100...240VAC power supply
- Relay or transistor outputs
- Expandable with expansion modules LRE type.



Pag. 25-8

EXPANSION AND COMMUNICATION MODULES

- Digital Inputs/Outputs
- Analog inputs (0...10V, 0/4...20mA)
- Analog outputs (0...10V, 0/4...20mA)
- Relay or transistor outputs
- PT100 temperature sensor inputs
- Modbus-RTU communication module
- 24VDC, 24VAC or 100...240VAC power supply.



Pag. 25-9

ACCESSORIES

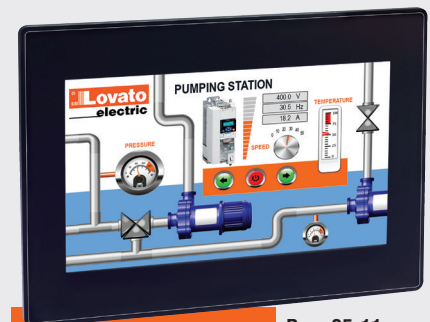
- Program backup memory
- Power supply unit
- HMI operator panel with graphic LCD.



Pag. 25-9

KIT

- Micro PLCs LRD series complete with software and USB programming cable
- Training kits complete with micro PLC and Inputs/Outputs simulation board.



Pag. 25-11

HMI

- Graphic display with touchscreen
- Available in formats 4.3", 7" and 10.1"
- Programming software
- IP66, Type 2 and 4X.

| | LRK series | LRD series | |
|--|--|---|-------------------|
| Built-in Ethernet port | ● | — | |
| LCD display | ● (not present on LRK12RD024B) | ● | |
| Auxiliary power supply | versions: 12/24VDC, 100-240VAC | versions: 24VDC, 12VDC, 24VAC, 100-240VAC | |
| Integrated Inputs/Outputs in the base module | 10, 12 or 20 | 10, 12 or 20 | |
| Maximum number of Inputs/Outputs (I/O) ① | 56 I/Os with expansion modules (44 digital I/Os + 12 analog I/Os) + 172 I/Os with network connection (126 digital Network I/Os + 46 analog Network I/Os) | 56 I/Os with expansion modules (44 digital I/Os + 12 analog I/Os) | |
| Program memory | 600 rows (ladder), 500 blocks (FBD) | 300 rows (ladder), 260 blocks (FBD) | |
| RS485 port | optional, integrated on type LRK20RD024RS | optional, integrated on type LRD20RD024P1 | |
| Programming | standard Ethernet cable | dedicated USB cable type LRXC03 | |
| Web server | ● | — | |
| Program backup memory | micro-SD card (32GB max) | dedicated module type LRXM00 | |
| Slot for battery for the retention of the clock time | ● (optional CR1220 battery) | — | |
| Basic functions | Arithmetic operations (addition, subtraction, multiplication, division) | ● | |
| | Timers | ● (31) | |
| | Counters | ● (31) | |
| | Analog comparators | ● (31) | |
| | Real Time Clock | ● (31) | |
| | HMI display pages | ● (31) | |
| | Auxiliary memories (markers M+N) | ● (127 + 127) | ● (63 + 63) |
| | Data registers | ● (240) | ● (240) |
| | Multiplexers | ● (15) | ● (15) |
| | Advanced functions | Data-logging | — |
| Astronomical clock | | — | |
| Analog filter | | — | |
| Max, min and average value | | — | |
| PID | | ● | |
| Network I/O (control or remote I/Os between micro PLC connected in Ethernet) | | — | |
| RS485 functions: remote I/O (master-slave), I/O link, Modbus RTU commands | | LRK20RD024RS only | LRD20RD024P1 only |

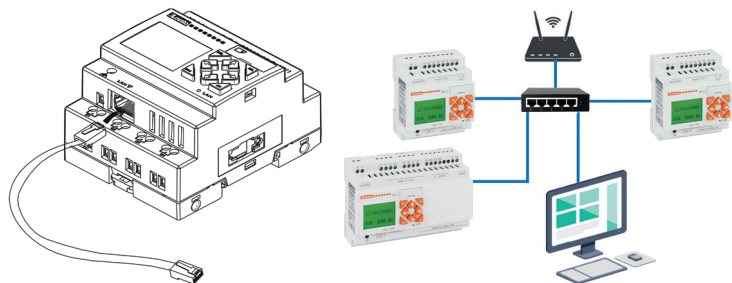
① Considering the base module with the highest number of built-in I/Os (type LR...20...).

MICRO PLCs LRK SERIES COMPACT WITH GREAT PERFORMANCE



BUILT-IN ETHERNET PORT

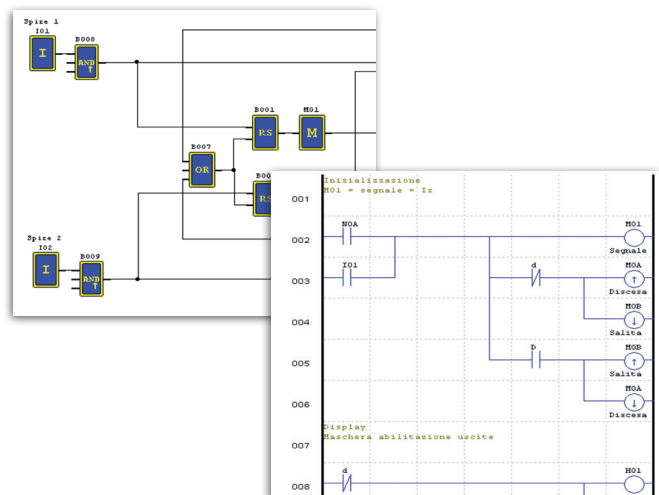
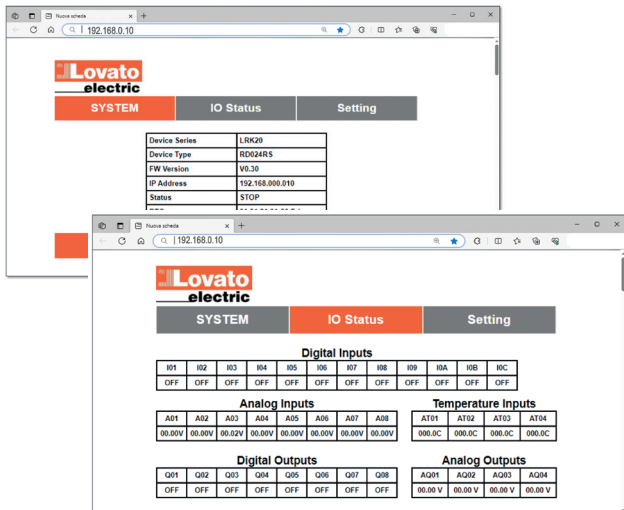
- local or remote programming with connection through IP address
- connection with standard Ethernet cable, without the need for special cables for programming
- support of Modbus-TCP communication port for the integration in supervision systems or interfacing with master intelligent devices such as HMI, PC or PLC
- built-in web server for the monitoring of the status and the main variables of the micro PLC from remote through a web browser.



WIDE PROGRAM MEMORY

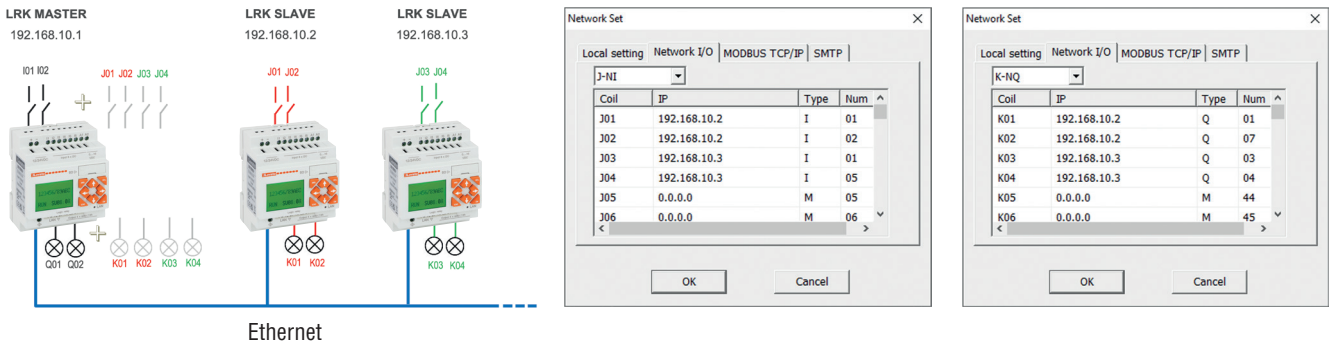
Double memory compared to micro PLC LRD series, for programs with medium-high complexity:

- 600 rows for LADDER programming (contact scheme)
- 500 blocks for FBD (function blocks).



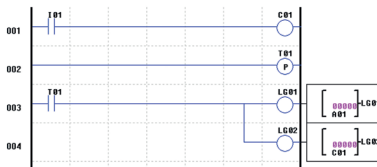
LARGE NUMBER OF MANAGEABLE INPUTS AND OUTPUTS

- up to 56 I/Os with the connection of expansion modules type LRE (44 digital I/O + 12 analog I/O)
- plus additional 172 I/Os controlled through network connection between more LRK base modules (126 digital Network I/Os + 46 analog Network I/Os): one LRK base module configured as master can control the I/Os of other LRK base modules configured as slaves connected on the same network.

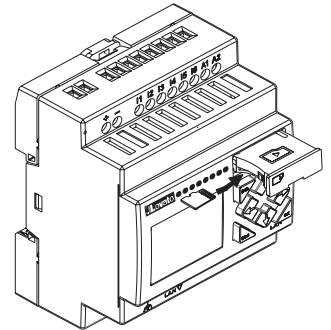


SUPPORT OF MICRO-SD CARD

- for program backup or data-logging
 - support of standard micro-SD card (32GB max).
- The micro-SD card allows the saving of the project to be transferred on other micro PLC LRK series, without the need of dedicated memory modules.
- It can also be used for the data-logging function, to store up to 15 variables of the micro PLC, sampled at configurable time intervals, which are saved to a daily xls file on the micro-SD card.



| | A | B | C |
|---|-------------------|-----------|---------------|
| | Time | Coil_Name | Current_Value |
| 1 | 24/01/10 10:30:00 | A01 | 252 |
| 2 | 24/01/10 10:30:00 | C01 | 8 |
| 3 | 24/01/10 10:30:00 | DR07 | 12 |
| 4 | 24/01/10 10:35:00 | A01 | 345 |
| 5 | 24/01/10 10:35:00 | C01 | 20 |
| 6 | 24/01/10 10:35:00 | DR07 | 39 |
| 7 | 24/01/10 10:35:00 | | |



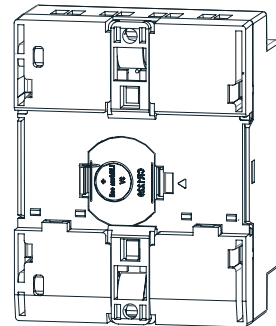
POWER SUPPLY 12/24VDC

The base modules with DC auxiliary power supply (type LRK...D024...) can be powered either at 12VDC or 24VDC, ensuring maximum flexibility for any application. It is also available a version with auxiliary power supply 100...240VAC (type LRK10RA240).



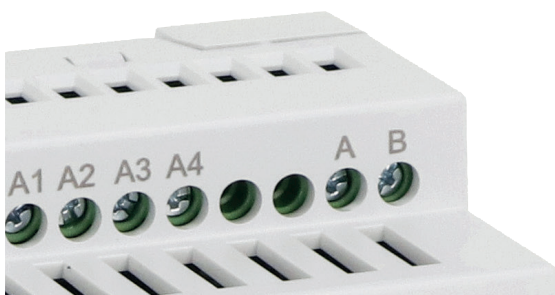
SLOT FOR BATTERY FOR THE RETENTION OF THE RTC

On the back of the micro PLC, there is a slot for an optional CR1220-type battery to maintain the integrated date and time even in the absence of power supply.



RS485 PORT

The micro PLC type LRK20RD024RS, in addition to the Ethernet port, also integrates a second communication port RS485 type, which operates independently of the Ethernet port.



ASTRONOMICAL CLOCK

Functionality that automatically calculates the sunrise and sunset times of a specific location based on set geographical coordinates (latitude and longitude). It is used to control the activation of the outputs of the micro PLC between sunrise and sunset, for applications such as public lighting control or the management of lights in parking lots, fountains, shop windows, neon signs, and many others.



MICRO PLCs LRD SERIES SIMPLE AND FUNCTIONAL



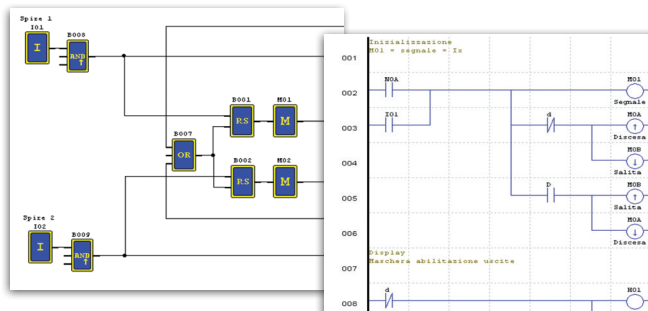
- **SYSTEM CONTROL AND SUPERVISION**
 - Contacts status viewing in simple pages on display
 - Possibility to add the micro PLC to data networks. With **Synergy** supervision and energy management software, a server-multiclient structure can also be managed through web interface.
- **QUICK INSTALLATION OF CONTROL PANELS**
 - Fewer number of components
 - Less wiring and number of connections.
- **REPEATABILITY**
 - Less errors during panel assembly
 - Considerable time saving.
- **FLEXIBILITY**
 - Quick correction of abnormal conditions during the panel test
 - Fast changes on control boards.

● **FUNCTION BLOCKS AND MEMORY**

| | |
|--|---------|
| Timers (T) (delay on/off, recycle, pulsing...) | 31 |
| Real Time Clock (RTC) (daily, weekly, monthly and yearly mode) | 31 |
| Counters (C) | 31 |
| Analog comparators (G) | 31 |
| User's pages (H) - 16 characters - 4 lines | 31 |
| Auxiliary relays - Markers (M + N memory types) | 63 + 63 |
| Arithmetic operation: addition/subtraction and multiplication/division | 31 + 31 |
| Data registers (DR) | 240 |
| Possibility to save in the internal memory: | |
| - Auxiliary memories | |
| - Counter values | |
| - Numerical variables. | |

● **PROGRAM MEMORY SIZE**

| | |
|-------------------------|------------|
| Language | |
| LADDER (contact scheme) | 300 rows |
| FBD (function blocks) | 260 blocks |

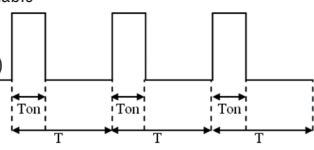


FUNCTIONS

● **PWM OUTPUT**

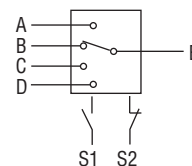
Pulse train generation with programmable pulse time and frequency (only for base module with transistor outputs type LRD12TD024)

$$V_{out} = 24VDC \times \frac{T_{on}}{T}$$



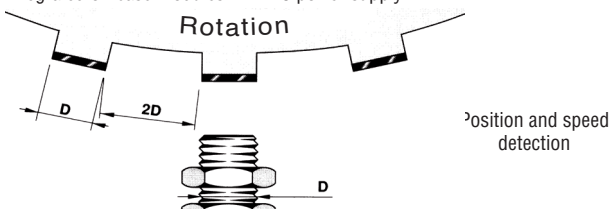
● **MULTIPLEXER**

Selection of 1 of 4 values according to the combination of two digital signals

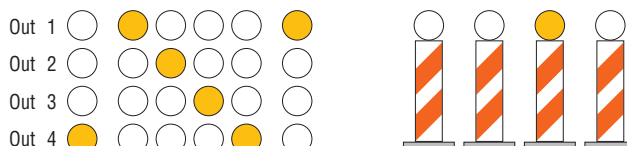


● **HIGH SPEED INPUT**

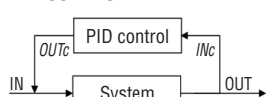
Integrated on base modules with DC power supply



● **SHIFT FUNCTION - activation of pulsed outputs in sequence**



● **PID CONTROL**

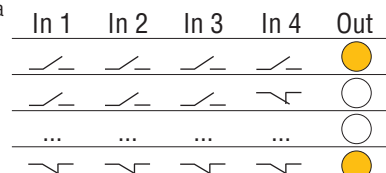


Example:

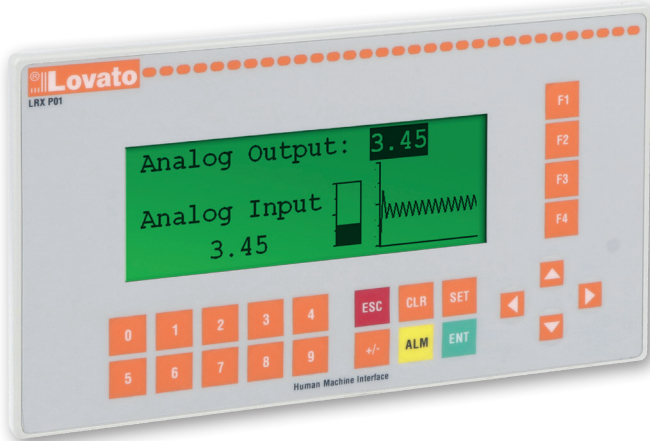
- IN: heating switch on and required temperature setting
- OUT: current room temperature
- INC: measured room temperature in an exact spot
- OUTc: temperature adjusting and controlling.

● **BOOLEAN LOGIC BLOCKS**

Output activation based on a series of digital signals



HMI OPERATOR PANEL LRXP01



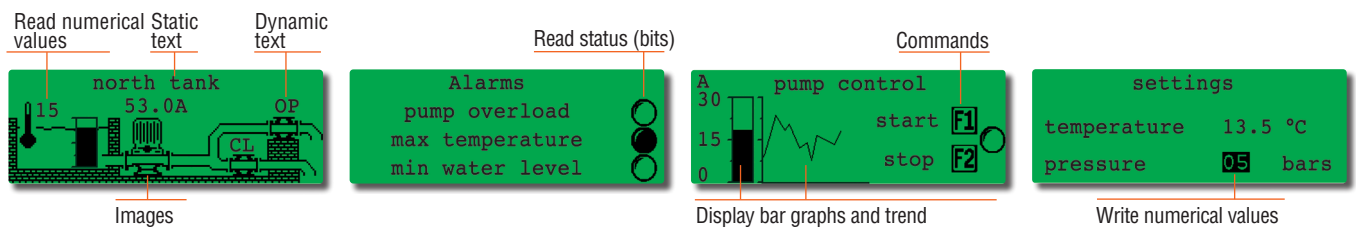
HMI INTERFACE

LRXP01 is an HMI operator panel, used with many types of PLCs or other intelligent controllers equipped with communication port with Modbus-RTU protocol.

With the HMI, the values of the PLC registers and the status of the relays can be controlled with the keys of the frontal keyboard, offering a simple and intuitive functioning of the machinery.

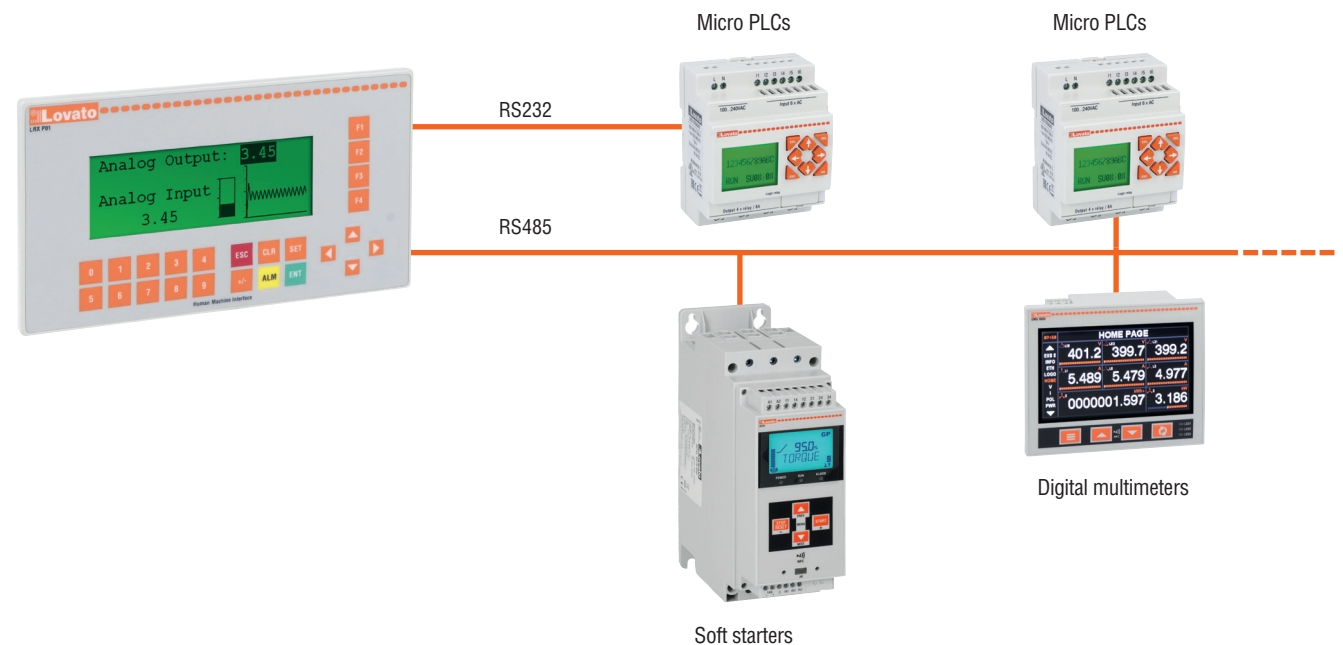
The LRXSWP01 editor software permits to create dedicated screens by taking advantage of the graphic display to show bitmaps, bar graphs and trends.

GRAPHIC BACKLIT LCD DISPLAY 192x64 PIXEL



COMMUNICATION MODES

LRXP01 supports Modbus-RTU protocol and can be connected to devices via the integrated RS232 and RS485 communication ports.



Micro PLCs LRK series



LRK12RD024



LRK12RD024B



LRK20RD024RS

new

| Order code | Auxiliary power supply | Inputs/Outputs | Display | Built-in communic. port | Qty per pkg | Wt |
|---------------|------------------------|----------------|---------|-------------------------|-------------|-------|
| | | | | | n° | [kg] |
| Base modules. | | | | | | |
| LRK10RA240 | 100...240VAC | 6/4 relay | Yes | Ethernet | 1 | 0.240 |
| LRK12RD024 | 12/24 VDC | 8/4 relay | Yes | Ethernet | 1 | 0.240 |
| LRK12RD024B | 12/24 VDC | 8/4 relay | No | Ethernet | 1 | 0.240 |
| LRK20RD024RS | 12/24 VDC | 12/8 relay | Yes | Ethernet + RS485 | 1 | 0.340 |

Expansion modules.

See page 25-8.

General characteristics

- Base modules with 10, 12 or 20 built-in Inputs/Outputs
- Auxiliary power supply 12/24VDC or 100...240VAC
- Backlit LCD display, 4 rows x 16 characters, 10 languages (not present on type LRK12RD024B)
- Relay outputs
- Built-in Ethernet port for programming and monitoring
- Integrated web server
- Support of protocols Modbus-TCP and Modbus-RTU over TCP
- Programming from PC with Ethernet connection and software LRXSW, freely downloadable from the website www.LovatoElectric.com, or from the front keyboard (except for type LRK12RD024B)
- Ladder (contact scheme) or FBD (function blocks) programming language
- Program memory: 600 rows (ladder), 500 blocks (FBD)
- Expandability:
 - up to 56 I/Os with expansion modules type LRE (44 digital I/Os + 12 analog I/Os)
 - plus additional 172 remote I/Os via Ethernet connection with other base modules type LRK (126 digital Network I/Os + 46 analog Network I/Os)
- Slot for micro-SD card (32GB max) for program backup and data-logging
- Integrated Real Time Clock with optional battery type CR1220
- Base module type LRK20RD024RS with two built-in communication ports, Ethernet and RS485 types.

FUNCTIONS

- Arithmetic operations: addition, subtraction, multiplication and division between variables
- Analog comparators between variables
- Timers
- Counters
- Auxiliary relays (markers)
- Data registers
- Real Time Clock (RTC) blocks
- HMI display pages with texts
- High speed input (1kHz), only on base modules with DC power supply
- PID control
- Multiplexers
- Analog ramps
- Shift function
- Boolean logic blocks
- Password protection, 4 digits
- Astronomical clock
- Filter instructions (analog filter, calculation of maximum, minimum and average value)
- I/O networking (possibility to read and write variables of other base modules type LRK connected on the same Ethernet network in master-slave configuration)
- Data-logging with micro-SD card.

Operational characteristics

- Auxiliary power supply: 12/24VDC (LRK...RD024...) or 100...240VAC 50/60Hz (LRK10RA240)
- Relay outputs lth 8A 240VAC
- Analog inputs 0...10VDC (on versions with DC power supply only)
- Operating temperature: -20...+50°C
- Storage temperature: -40...+70°C
- Relative humidity <90% non-condensing
- Modular housing
- 35mm DIN rail mounting (IEC/EN/BS 60715) or screw fixing (M4x20mm)
- Screw terminals
- Protection degree: IP20.

Certifications and compliance

Certifications obtained: cULus (except LRK10RA240).
Compliant with standards: IEC/EN/BS 61131-2, UL 61010-1, UL 61010-2-201, CSA C22.2 No. 61010-1, CSA C22.2 No. 61010-2-201:18.

Micro PLCs LRD series



LRD10...
LRD12...



LRD20RD024P1

| Order code | Auxiliary power supply | Inputs/Outputs | Qty per pkg | Wt |
|--|------------------------|----------------|-------------|-------|
| | | | n° | [kg] |
| Base modules. | | | | |
| LRD12RD024 | 24VDC | 8/4 relay | 1 | 0.241 |
| LRD12TD024 | 24VDC | 8/4 transistor | 1 | 0.220 |
| LRD20RD024 | 24VDC | 12/8 relay | 1 | 0.360 |
| LRD12RA024 | 24VAC | 8/4 relay | 1 | 0.250 |
| LRD20RA024 | 24VAC | 12/8 relay | 1 | 0.368 |
| LRD10RA240 | 100...240VAC | 6/4 relay | 1 | 0.242 |
| LRD20RA240 | 100...240VAC | 12/8 relay | 1 | 0.367 |
| LRD20RD012 | 12VDC | 12/8 relay | 1 | 0.360 |
| Base module with built-in RS485 communication port | | | | |
| LRD20RD024P1 | 24VDC | 12/8 relay | 1 | 0.360 |
| Expansion modules. | | | | |

See page 25-8.

General Characteristics

- Base modules with 10, 12 or 20 built-in Inputs/Outputs
- Auxiliary power supply 12VDC, 24VDC, 24VAC or 100...240VAC
- Backlit LCD display, 4 rows x 16 characters, 10 languages
- Relay or transistor outputs
- Programming from PC with USB cable type LRXC03 and software LRXSW, freely downloadable from the website www.LovatoElectric.com, or from the front keyboard
- Ladder (contact scheme) or FBD (function blocks) programming language
- Program memory: 300 rows (ladder), 260 blocks (FBD)
- Expandability up to 56 I/Os with expansion modules type LRE (44 digital I/Os + 12 analog I/Os)
- Optional memory module for program backup
- Base module type LRD20RD024P1 with built-in RS485 communication port.

FUNCTIONS

- Arithmetic operations: addition, subtraction, multiplication and division between variables
- Analog comparators between variables
- Timers
- Counters
- Auxiliary relays (markers)
- Data registers
- Real Time Clock (RTC) blocks
- HMI display pages with texts
- High speed input (1kHz), only on base modules with DC power supply
- PID control
- PWM outputs, only on base module type LRD12TD024
- Multiplexers
- Analog ramps
- Shift function
- Boolean logic blocks
- Password protection, 4 digits.

Operational characteristics

- Auxiliary power supply: 12VDC (LRD...D012), 24VDC (LRD...D024) or 100...240VAC 50/60Hz (LRD...A240)
- Relay outputs Ith 8A 240VAC
- Analog inputs 0...10VDC (on versions with DC power supply only)
- Operating temperature: -20...+55°C
- Storage temperature: -40...+70°C
- Relative humidity <90% non-condensing
- Modular housing
- 35mm DIN rail mounting (IEC/EN/BS 60715) or screw fixing (M4x20mm)
- Screw terminals
- Protection degree: IP20.

Certifications and compliance

Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

Expansion and communication modules



LRE...

| Order code | Auxiliary supply voltage | Inputs/Outputs | Qty per pkg | Wt |
|--|--------------------------|---|-------------|-------|
| | | | n° | [kg] |
| Expansion and communication modules for micro PLCs LRK and LRD series Ⓢ . | | | | |
| LRE02AD024 | 24VDC | 2 analog outputs 0...10V/0...20mA | 1 | 0.160 |
| LRE04AD024 | 24VDC | 4 analog inputs 0...10V/0...20mA | 1 | 0.160 |
| LRE04PD024 | 24VDC | 4 PT100 temp. sensor inputs | 1 | 0.160 |
| LRE08RD024 | 24VDC | 4/4 relay | 1 | 0.171 |
| LRE08TD024 | 24VDC | 4/4 transistor | 1 | 0.151 |
| LRE08RA024 | 24VAC | 4/4 relay | 1 | 0.180 |
| LRE08RA240 | 100...240VAC | 4/4 relay | 1 | 0.180 |
| LREP00 | 24VDC | Communication module RS485, protocol Modbus-RTU | 1 | 0.134 |

Ⓢ The expansion modules are supplied with connector for the connection to the base module.

General characteristics

The expansion modules type LRE allow to expand the number of inputs and outputs of the LRK and LRD series micro PLCs. Several models are available, including:

- Digital inputs and digital outputs type relay or transistor
- Analog inputs configurable as type 0...10VDC or 0/4...20mA
- Analog outputs configurable as type 0...10VDC or 0/4...20mA
- Inputs for PT100 temperature sensors

Additionally, it is available an RS485 module to equip the micro PLCs without built-in communication with a serial port for interfacing with Modbus-RTU masters such as HMI, PLC, gateways or other intelligent devices for control and monitoring.

The LRE expansion modules are connected to the base module via a connector, provided as standard, and have independent auxiliary power supply terminals.

On each base module type LRK or LRD it is possible to install up to 8 expansion modules, according to the configuration shown in the section "Maximum configuration".

Certifications and compliance

Certifications obtained: cULus, EAC.

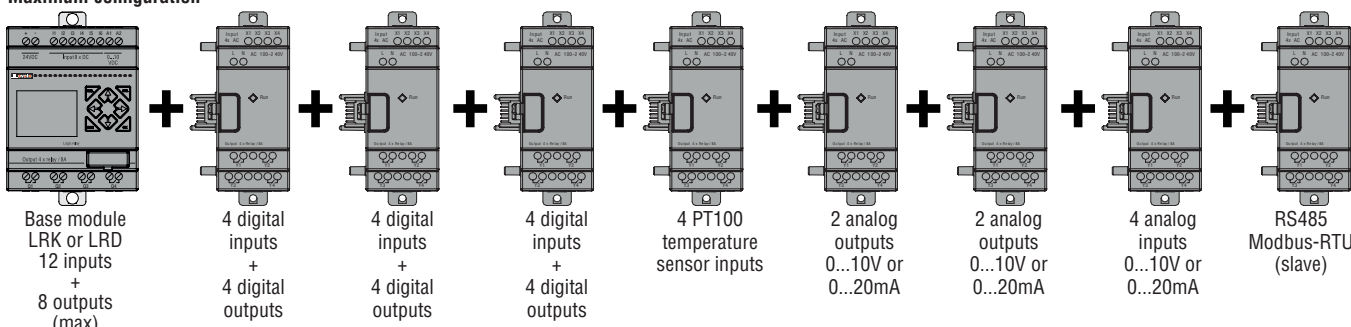
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

INPUTS/OUTPUTS REFERENCE TABLE

| BASE MODULES | | | | TOT DIGITAL I/Os BASE MODULE + EXPANSIONS |
|-------------------------------------|--------------|--|--------------|--|
| Type | Power supply | Inputs | Outputs | Max I/Os |
| LRK12RD024 LRK12RD024B | 12/24VDC | 6 digital + 2 digital/analog | 4 relay | 12 + 24 |
| LRK10RA240 | 100...240VAC | 6 digital | 4 relay | 10 + 24 |
| LRK20RD024RS | 12/24VDC | 8 digital + 4 digital/analog | 8 relay | 20 + 24 |
| LRD12RD024 | 24VDC | 6 digital + 2 digital/analog | 4 relay | 12 + 24 |
| LRD12TD024 | 24VDC | 6 digital + 2 digital/analog | 4 transistor | 12 + 24 |
| LRD20RD012 | 12VDC | 8 digital + 4 digital/analog | 8 relay | 20 + 24 [Ⓢ] |
| LRD20RD024 | 24VDC | 8 digital + 4 digital/analog | 8 relay | 20 + 24 |
| LRD20RD024P1 | 24VDC | 8 digital + 4 digital/analog | 8 relay | 20 + 24 |
| LRD10RA240 | 100...240VAC | 6 digital | 4 relay | 10 + 24 |
| LRD20RA240 | 100...240VAC | 12 digital | 8 relay | 20 + 24 |
| LRD12RA024 | 24VAC | 8 digital | 4 relay | 12 + 24 |
| LRD20RA024 | 24VAC | 12 digital | 8 relay | 20 + 24 |
| EXPANSION AND COMMUNICATION MODULES | | | | |
| LRE02AD024 | 24VDC | — | 2 analog | — |
| LRE04AD024 | 24VDC | 4 analog | — | — |
| LRE04PD024 | 24VDC | 4 PT100 | — | — |
| LRE08RD024 | 24VDC | 4 digital | 4 relay | — |
| LRE08TD024 | 24VDC | 4 digital | 4 transistor | — |
| LRE08RA240 | 100...240VAC | 4 digital | 4 relay | — |
| LRE08RA024 | 24VAC | 4 digital | 4 relay | — |
| LREP00 | 24VDC | RS485 communication module, Modbus-RTU slave | | |

[Ⓢ] Expansion modules supplied at 24VDC.

Maximum configuration



- 24 digital inputs (4 configurable as analog 0...10V input)
- 20 digital outputs (relay, transistor or mixed)
- 4 inputs for PT100 temperature sensor

- 4 analog inputs 0...10V, 0/4...20mA
- 4 analog outputs 0...10V, 0/4...20mA
- 1 RS485 communication module.

Note. The sequence and the maximum number of the product given above must be respected for correct operation.

Accessories



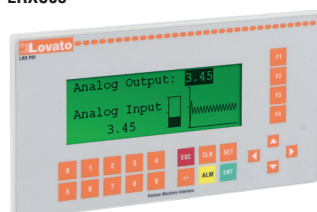
LRX1V3D024



LRXM00



LRXC03



LRXP01

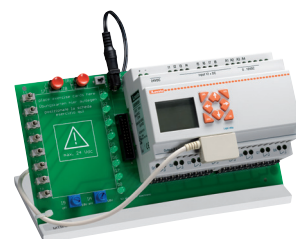


LRXC02

Kits



LRDKIT...



LRDDEM...

| Order code | Description | Qty per pkg | Wt |
|------------|-------------|-------------|------|
| | | n° | [kg] |

For base modules LRD series.

| | | | |
|--------|---|---|-------|
| LRXM00 | Program backup memory | 1 | 0.011 |
| LRXC00 | PC (RS232)-LRD (1.5m) programming cable or LRXP01 (RS232)-LRD direct connection | 1 | 0.083 |
| LRXC03 | PC (USB)-LRD (1.5m) programming cable | 1 | 0.080 |

For base modules LRK and LRD series.

| | | | |
|------------|---|---|-------|
| LRX1V3D024 | Power supply unit 100...240VAC/24VDC 1.3A | 1 | 0.220 |
| LRXP01 | HMI operator panel, 24VDC, RS232, RS485 (Modbus-RTU Master) | 1 | 0.200 |
| LRXC02 | PC (RS232)-LRXP01 programming cable | 1 | 0.180 |

| Order code | Description | Qty per pkg | Wt |
|------------|-------------|-------------|------|
| | | n° | [kg] |

Kits.

| | | | |
|---------------|--|---|-------|
| LRDKIT12RD024 | Starter kit with LRD12RD024 base module, LRXSW software and LRXC03 cable | 1 | 0.424 |
| LRDKIT12RA024 | Starter kit with LRD12RA024 base module, LRXSW software and LRXC03 cable | 1 | 0.424 |
| LRDKIT10RA240 | Starter kit with LRD10RA240 base module, LRXSW software and LRXC03 cable | 1 | 0.424 |

Training kits.

| | | | |
|---------------|---|---|-------|
| LRDDEM12RD024 | Training kit with LRD12RD024 mounted on inputs/outputs simulation board | 1 | 0.920 |
| LRDDEM20RD024 | Training kit with LRD20RD024 mounted on inputs/outputs simulation board | 1 | 1.060 |

Backup memory and power supply unit general characteristics

- The LRXM00 backup memory allows the saving of the user's program as backup copy or to be quickly transferred to other base module LRD series.
- The LRX1V3D024 power supply produces a DC voltage to supply the base and expansion modules when 24VDC is not available in the panel. The power supply can also be used to supply any 24VDC auxiliary circuits.

HMI operator panel LRXP01 general characteristics

- Auxiliary supply voltage 24VDC
- RS232 communication port for direct connection to micro PLC LRD series using cable type LRXC00
- RS485 port for communication with slave devices via Modbus-RTU protocol
- Programming via software LRXSWP01, freely downloadable from the website www.LovatoElectric.com
- Degree of protection: IP65.

FUNCTIONS

- Send commands
- Read status
- Static and dynamic texts
- Write variables
- Read variables with representation in numerical format, bar graphs or trends.

Programming software LRXSW

At any time and with extreme simplicity, micro PLCs LRK and LRD series can be set and reprogrammed to satisfy new requirements and improve the operation of a system. Programming is simple and intuitive and can be done directly from the keyboard on front (except for type LRK12RD024B) or from PC with LRXSW software, freely downloadable from the website www.LovatoElectric.com.

The connection between the base module and the PC is done via Ethernet connection for the base modules LRK series and with USB cable type LRXC03 for base modules LRD series.

Two programming languages can be used: LADDER (contact scheme) or FBD (Function Block Diagram).

In addition to the project configuration, with LRXSW software it is possible to:

- Simulate the program "off-line" from PC, to test if it runs correctly even without a micro PLC connected
- Use the supervision mode to check the project "on-line" while running in real time on a micro PLC.

As an alternative to the LRXSW software, with the front keyboard it is possible to program the micro PLC "on-board", monitor the status of the Inputs/Outputs and all the variables of the micro PLC, and configure settings such as the date and time, operating mode, password and communication parameters (e.g. setting network parameters on base modules LRK series).

Certifications and compliance

Certifications obtained: cULus for power supply and HMI units and base module of kits, EAC.

Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

HMI LRH SERIES



- HMI WITH COLOUR TOUCHSCREEN DISPLAY**
 The HMI LRH series have a graphic TFT display with 64k colours, touchscreen, easy to program and extremely flexible. They can be interfaced with different type of devices, from PLC to any kind of intelligent controller provided with communication port, like multimeters, drives, process controllers. The LRHSW programming software allows the configuration of the HMI in a simple and intuitive way, thanks to the graphical interface with which you can create customized screens to show images, trends, bar graphs, analog indicators, dynamic objects and other functionalities. The HMI LRH series are the ideal solution for the supervision and control of small and large automation scenarios that are more and more required in the world of Industry 4.0.

- WIDESCREEN DISPLAY WITH HIGH VISIBILITY**

- TFT display with resistive touchscreen
- High brightness thanks to the LED backlighting
- 64k colours
- Available in formats 4.3", 7" and 10.1".

- SIMPLICITY AND EFFICIENCY**

- Simple and elegant design with low energy consumption
- High robustness, thanks to the use of highly reliable industrial components
- Plastic enclosure, degree of the protection IP66, Type 2 and 4X.

- CONNECTIVITY FOR EASY INTEGRATION**

- 3 built-in communication ports: Ethernet, USB and serial (type RS232-RS485-RS422, configurable via software LRHSW)
- Support of communication protocols Modbus-RTU Master/Slave, Modbus TCP Client/Server, OPC UA Client/Server, Simatic S7 Ethernet and MQTT.

- POWERFUL AND INTUITIVE PROGRAMMATION**

- High performance CPU
- Extensive gallery of widgets, objects and pre-configured scenarios for typical applications
- Data acquisition and display on numeric indicators, trends or graphical gauges
- Support of vector graphics, images, analog indicators, bar graphs
- Advanced functionalities: dynamic objects, alarms and events management, support of multilingual applications, recipes, tags editor, user and password management, script language
- Advanced properties of the objects: e-mail, events scheduler, etc
- Support HTML5 and JavaScript
- Possibility to simulate the program by working off-line.



- Power supply : 12-24VDC
- USB port
- Ethernet port : 10/100 MBIT
- Serial port : RS485, RS232, RS422



- PRE-CONFIGURED SCENARIOS**

Preconfigured and ready to use scenarios for typical applications managed with LOVATO Electric products (remote control of a micro PLC, supervision of a pumping station with variable speed drive, monitoring of a photovoltaic system with energy meter, soft starter monitoring, control and supervision of a power factor correction plant, monitoring of an automatic transfer switch ATS panel, command and monitoring of a mains-generator application, etc.) freely downloadable from the website www.LovatoElectric.com.

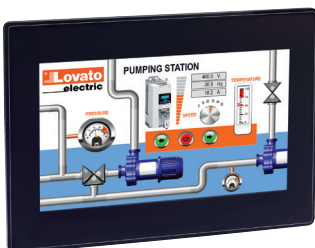
HMI



LRHA04



LRHA07



LRHA10



EXCCAB02

| Order code | Description | Q.ty per pkg | Wt |
|-------------------------------|--|--------------|-------|
| | | n° | [kg] |
| HMI. | | | |
| LRHA04 | 4.3" TFT LCD display | 1 | 0.400 |
| LRHA07 | 7" TFT LCD display | 1 | 0.600 |
| LRHA10 | 10.1" TFT LCD display | 1 | 1.000 |
| Programming software for HMI. | | | |
| LRHSW01 | User license for LRHSW software (downloadable from www.LovatoElectric.com), valid for 1 station | 1 | — |
| RS485 connection cable. | | | |
| EXCCAB02 | RS485 connection cable for LRH, length 3m | 1 | 0.150 |
| Kits HMI and micro PLC. | | | |
| LRDKITHMIA04 | Kit with micro PLC type LRD20RD024P1, HMI type LRHA04 and EXCCAB02 cable | 1 | 1.000 |
| LRDKITHMIA07 | Kit with micro PLC type LRD20RD024P1, HMI type LRHA07 and EXCCAB02 cable | 1 | 1.200 |

| Model | LRHA04 | LRHA07 | LRHA10 |
|-------------------------------------|--|--------------------|--------------------|
| SYSTEM RESOURCES | | | |
| Display | 4.3" TFT 16:9 | 7" TFT 16:9 | 10.1" TFT 16:9 |
| Colours | 64K | | |
| Resolution | 480x272 pixel | 800x480 pixel | 1024x600 pixel |
| Brightness | 200Cd/m ² | | |
| Dimming | Yes | | |
| Touchscreen | Resistive | | |
| CPU | ARM Cortex A8 300MHz | ARM Cortex A8 1GHz | ARM Cortex A8 1GHz |
| Operative system | Linux 3.12 | | |
| Flash | 2GB | 4GB | 4GB |
| RAM | 256MB | 512MB | 512MB |
| Application memory | 60MB | | |
| Real Time Clock, RTC backup, Buzzer | Yes | | |
| INTERFACES | | | |
| Ethernet | 1 (10/100 Mbit) | | |
| USB | 1 (Host v2.0, max 500mA) | | |
| Serial | 1 (RS232, RS485, RS422, software configurable) | | |
| FUNCTIONALITIES | | | |
| Vector graphics | ● | | |
| Dynamic objects | ● | | |
| Font True Type | ● | | |
| Alarms | ● | | |
| Event list | ● | | |
| Recipes | ● | | |
| User management | ● | | |
| Trends | ● | | |
| Multi-language management | ● | | |

General characteristics

- Widescreen display with resistive touchscreen
- Available in formats 4.3", 7" and 10.1"
- LED backlight
- Ethernet, USB and serial port (type RS232-RS485-RS422, configurable via software LRHSW)
- Lightweight and low-power design
- Highly reliable industrial components
- Powerful and intuitive programming with software LRHSW (downloadable from www.LovatoElectric.com), with 30-days trial license included
- Support of protocols Modbus-RTU Master/Slave, Modbus-TCP Client/Server, OPC UA Client/Server, Simatic S7 Ethernet and MQTT
- Support of vector graphics
- Rich library of preconfigured and ready to use graphical objects (widgets): static or dynamic images, buttons, sliders, lights, bar graphs, gauges, meters, media widgets, etc.
- Possibility to create custom widgets
- Tags editor to create, import or export tags
- Alarm handling with management of events and actions (e.g. alerts with pop-up messages, send email, write tags, etc.)
- Data-logging with presentation of the collected data in graphical trends and tables, with possibility to save the data in .CSV file
- Recipes data handling
- Scheduler to execute specific actions at set intervals, or on a time basis
- Automatic generation of customizable reports
- Multilingual projects management with texts in True Type font
- Data transfer function to exchange data between the devices connected to the HMI
- Powerful script language with JavaScript editor
- Web access: support of HTML5 technology to allow users to access HMI projects from a remote web browser running on a PC or on a mobile device (smartphone or tablet)
- Advanced user management with possibility to configure different levels of authorizations and permissions on the projects, with dedicated credentials
- Monitoring and remote control of the project running on the HMI from a PC with the software LRHSW Client, installed together with the programming software LRHSW
- On-line and off-line simulation of the applications.

Operational characteristics

- Rated auxiliary power supply: 12/24VDC
- Operating range: 10...32VDC
- Operating temperature: 0...+50°C
- Storage temperature: -20...+70°C
- Humidity: 5-85% RH, non condensing
- Protection degree: IP66, Type 2 and 4X (front); IP20 (rear).

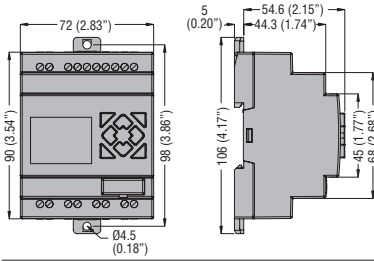
Preconfigured scenarios

Preconfigured and ready to use scenarios for typical applications managed with LOVATO Electric products (remote control of a micro PLC, supervision of a pumping station with variable speed drive, monitoring of a photovoltaic system with energy meter, soft starter monitoring, control and supervision of a power factor correction plant, monitoring of a mains-generator application, etc.) freely downloadable from the website www.LovatoElectric.com.

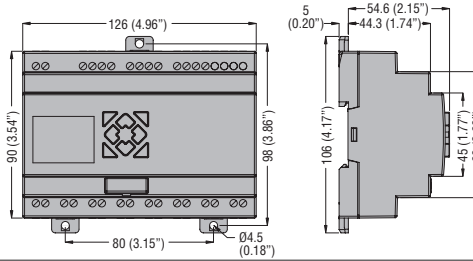
Certifications and compliance

Certifications obtained: cULus, EAC, RCM.
Compliant with standards: emissions EN/BS 61000-6-4, immunity EN/BS 61000-6-2 for installation in industrial environments; emissions EN/BS 61000-6-3, immunity EN/BS 61000-6-1 for installation in residential environments; UL508.

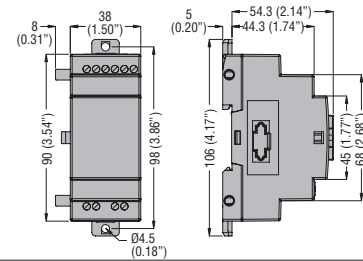
BASE MODULES
LRK10... - LRK12...
LRD10... - LRD12...



LRK20...
LRD20...

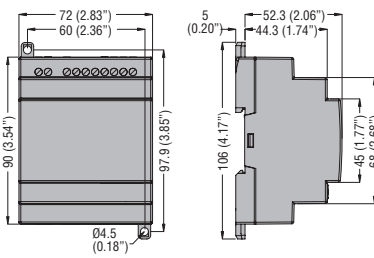


EXPANSION AND COMMUNICATION MODULES
LRE...

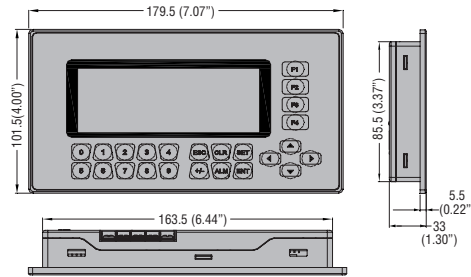


ACCESSORIES

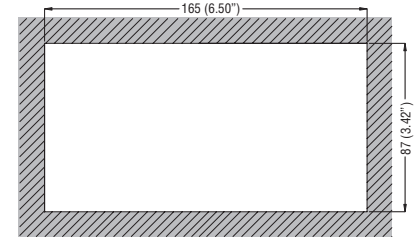
LRX1V3D024 power supply unit



LRXP01 HMI operator panel

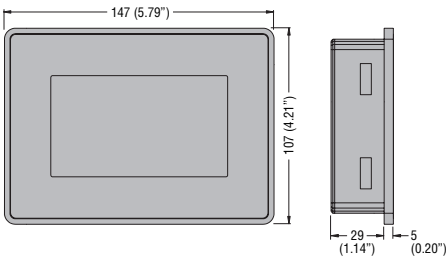


Cutout

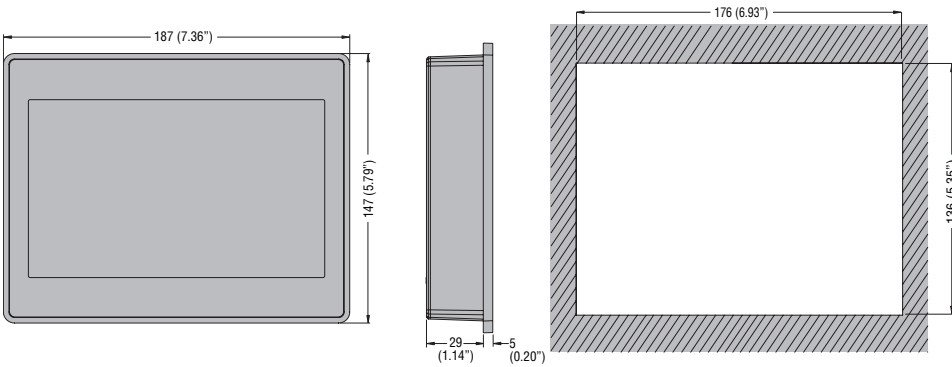


HMI

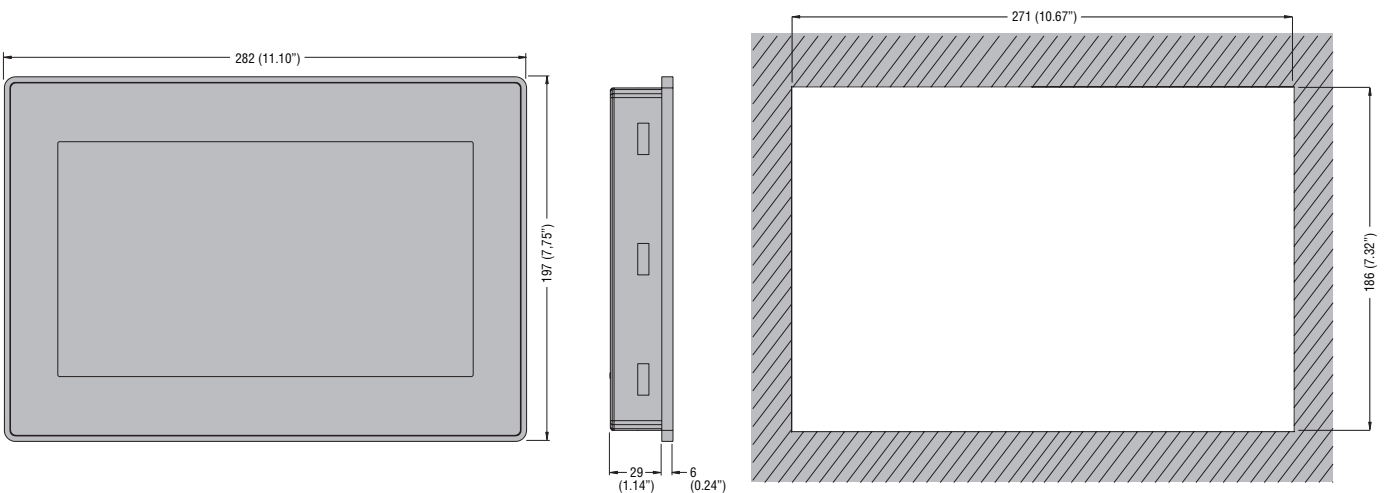
LRHA04



LRHA07

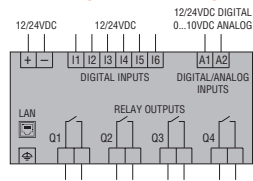


LRHA10

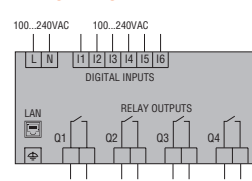


BASE MODULES

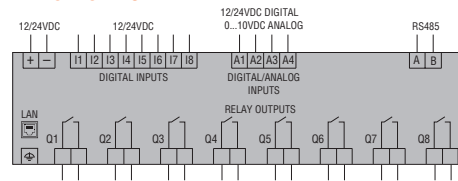
LRK12RD024 - LRK12RD024B



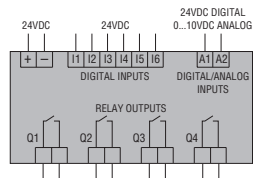
LRK10RA240



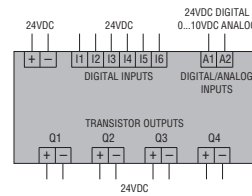
LRK20RD024RS



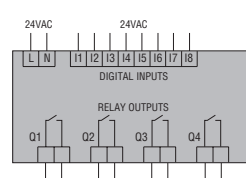
LRD12RD024



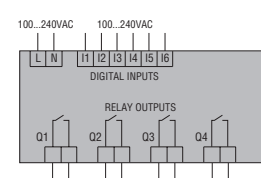
LRD12TD024



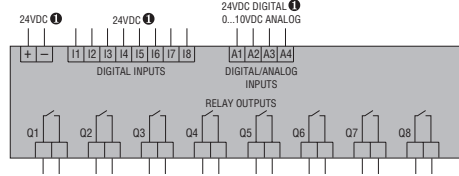
LRD12RA024



LRD10RA240

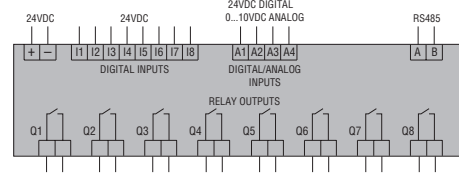


LRD20RD012 - LRD20RD024

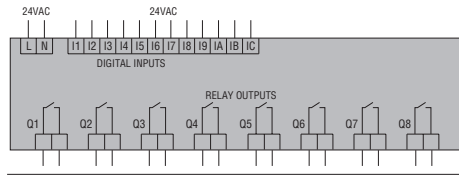


1 12VDC for LRD20RD012.

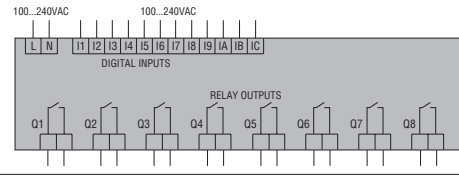
LRD20RD024P1



LRD20RA024

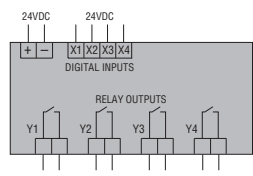


LRD20RA240

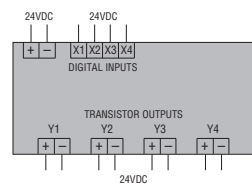


EXPANSION AND COMMUNICATION MODULES

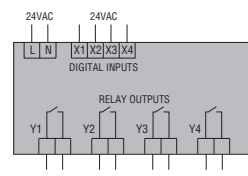
LRE08RD024



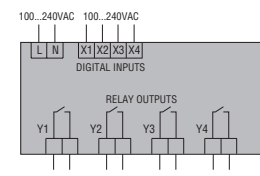
LRE08TD024



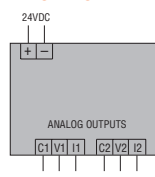
LRE08RA024



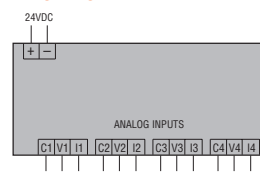
LRE08RA240



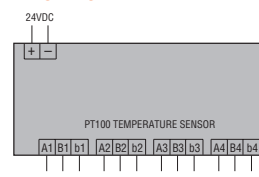
LRE02AD024



LRE04AD024



LRE04PD024



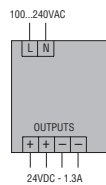
LREP00



ACCESSORIES

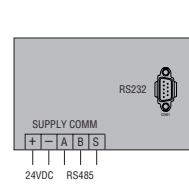
Power supply unit

LRX1V3D024



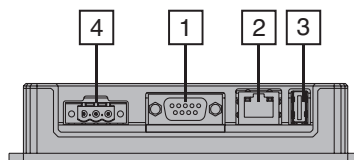
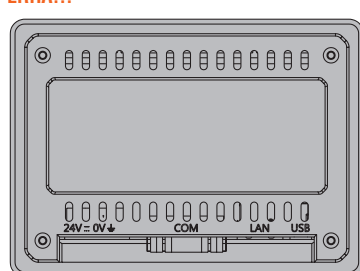
HMI operator panel

LRXP01



HMI

LRHA...



- 1 Serial port (RS232, RS485, RS422 configurable via software)
- 2 Ethernet port
- 3 USB port
- 4 Auxiliary power supply 12/24VDC

| BASE MODULES | | LRK...D024... | LRK...A240 | LRD...D012 | LRD...D024 | LRD...A024 | LRD...A240 |
|---|----------------------|---|--|---|--------------------------------------|----------------------------|--|
| AUXILIARY POWER SUPPLY | | | | | | | |
| Rated voltage | | 12/24VDC | 100...240VAC 50/60Hz | 12VDC | 24VDC | 24VAC 50/60Hz | 100...240VAC 50/60Hz |
| Operating limits | | 10.0...28.8VDC | 85...265VAC (47...63Hz) | 10.4...14.4VDC | 20.4...28.8VDC | 20.4...28.8VAC (47...63Hz) | 85...265VAC (47...63Hz) |
| Average current consumption | | 300mA (LRK12...) 400mA (LRK20...) | 90mA | 265mA | 125mA (LRD12...) 185mA (LRD20...) | 290mA | 100mA |
| DIGITAL INPUTS | | | | | | | |
| Rated voltage | | 12/24VDC | 100...240VAC 50/60Hz | 12VDC | 24VDC | 24VAC 50/60Hz | 100...240VAC 50/60Hz |
| Input voltage | State 0 | <5VDC | <40VAC | <2.5VDC | <5VDC | <6VAC | <40VAC |
| | State 1 | >10VDC (12V) >15VDC (24V) | >79VAC | >7.5VDC | >15VDC | >14VAC | >79VAC |
| Delay time | 0 to 1 | 5ms | 50/45ms (Ue=120VAC) 22/18ms (Ue=240VAC) | 4ms (0.5ms for high speed inputs) | 4ms (0.5ms for high speed inputs) | 90ms | 50/45ms (Ue=120VAC) - 22/18ms (Ue=240VAC) |
| | 1 to 0 | 3ms | 50/45ms (Ue=120VAC) 90/85ms (Ue=240VAC) | 4ms (0.3ms for high speed inputs) | 4ms (0.3ms for high speed inputs) | 90ms | 50/45ms (Ue=120VAC) - 90/85ms (Ue=240VAC) |
| ANALOG INPUTS (for base modules with DC power supply only) | | | | | | | |
| Input signal range | | 0...10VDC | — | 0...10VDC | — | — | — |
| Display resolution | | 0.01VDC | — | 0.01VDC | — | — | — |
| Current consumption at 10VDC | | <0.17mA | — | <0.17mA | — | — | — |
| Bit conversion | | 12 | — | 10 (LRD12...) 8 (LRD20...) | 8 | — | — |
| Maximum cable length | | ≤30m shielded | — | ≤30m shielded | — | — | — |
| DIGITAL OUTPUTS | | | | | | | |
| Type of output / IEC rated current Ith | | Relay / 8A | | Relay / 8A (LRD...R... / LRE08R... only) Transistor / 0.3A 24VDC (LRD...T... / LRE08T... only) | | | |
| Operative voltage | | Max 250VAC / 30VDC | | Max 265VAC / 30VDC (LRD...R... / LRE08R... only) 10...28.8VDC (LRD...T... / LRE08T... only) | | | |
| AMBIENT CONDITIONS | | | | | | | |
| Operating temperature | | -20...+50°C | | -20...+55°C | | | |
| Storage temperature | | -40...+70°C | | | | | |
| Relative humidity | | 20...90% non-condensing | | | | | |
| HOUSING | | | | | | | |
| Version | | Modular for mounting on 35mm DIN rail (IEC/EN/BS 60715) or M4x20mm screw fixing | | | | | |
| Connections | Type of terminals | Screw | | | | | |
| | Conductors section | 0.14...2.5mm ² (26...14AWG) | | | | | |
| | Tightening torque | 0.8Nm / 7.1lb.in | | | 0.6Nm / 5.3lb.in | | |
| | Maximum cable length | ≤100m | | | | | |
| IEC degree of protection | | IP20 | | | | | |

| EXPANSION MODULES | | LRE02AD024 | | LRE04AD024 | | LRE04PD024 | |
|--------------------------------|--|---|----------------|--|----------------|---------------------------------------|--|
| AUXILIARY POWER SUPPLY | | | | | | | |
| Rated voltage | | 12VDC | | 24VDC | | 24VAC 50/60Hz | |
| Operating limits | | 20.4...28.8VDC | | 20.4...28.8VDC | | 20.4...28.8VDC | |
| ANALOGIC INPUTS/OUTPUTS | | | | | | | |
| Type of channels | | 2 outputs configurable for voltage or current | | 4 inputs configurable for voltage or current | | 4 inputs for PT100 temperature sensor | |
| Operating limits | | 0...10V | 0...20mA | 0...10V | 0...20mA | -100...+600°C | |
| Display resolution | | 0.00...10.00V | 0.00...20.00mA | 0.00...10.00V | 0.00...20.00mA | -100.0...+600.0°C | |
| Resolution | | 10mV | 40μA | 10mV | 40μA | 0.1°C | |
| Accuracy | | ±2.5% | | ±2.5% | | ±1% | |
| Power consumption | | 70mA | | 70mA | | 70mA | |

| COMMUNICATION MODULE | | LREPO0 | |
|------------------------|--|--|--|
| Auxiliary power supply | | 24VDC | |
| Baud-rate | | 4800...57600bps | |
| Terminator resistor | | Integrated 120 Ohm | |
| Cable length | | 0.14...1.5mm ² (26...16AWG) | |
| Tightening torque | | 0.6Nm (5.4lb.in) | |

| | |
|--------------------------|---------------------------------------|
| HMI OPERATOR PANEL | LRXP01 |
| AUXILIARY POWER SUPPLY | |
| Rated voltage | 24VDC |
| Operating limits | 20.4...26.4VDC (-15%...+10%) |
| Power consumption | 1.9W |
| AMBIENT CONDITIONS | |
| Operating temperature | 0...+55°C |
| Storage temperature | -40...+70°C |
| Altitude | ≤2000m |
| Relative humidity | 10...95% non-condensing |
| Maximum pollution degree | 2 (IEC/EN/BS 61131-3) |
| Vibration resistance | 15g |
| Shock resistance | 0.5g |
| Conductor section | 0.4...3.3 mm ² (22-12 AWG) |
| Tightening torque | 1.8Nm / 10.4lb.in |
| IEC degree of protection | IP65 |

| HMI | LRHA04 | LRHA07 | LRHA10 |
|----------------------------------|---------------------------------------|---------------|---------------|
| AUXILIARY POWER SUPPLY | | | |
| Rated voltage | 12/24VDC | | |
| Operating range | 10...32VDC | | |
| Max current consumption at 24VDC | 0.25A | 0.3A | 0.38A |
| AMBIENT CONDITIONS | | | |
| Operating temperature | 0...+50°C | | |
| Storage temperature | -20...+70°C | | |
| Relative humidity | 5...85% non-condensing | | |
| IEC degree of protection | IP66, Type 2, 4X (front); IP20 (rear) | | |