

# LK PROGRAMMABLE CONTROLLER



## *Selection Guide*



Performance | Modular | Expandable | Backplane | Redundancy | Low Power | Compact | Easy



Elegant & Reliable



Modular



Easy Terminal



Expandable

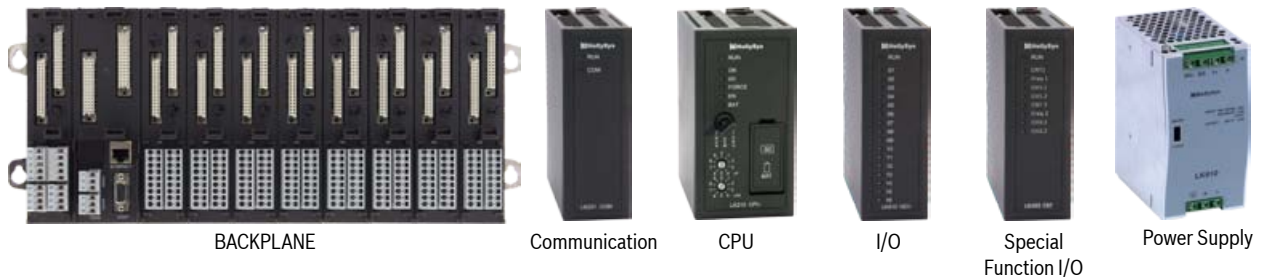
## TABLE OF CONTENT

<b>FEATURES .....</b>	<b>4~5</b>
HARDWARE ARCHITECTURE.....	4
FEATURES HIGHLIGHTS .....	5
CERTIFICATIONS .....	5
<b>SYSTEM ARCHITECTURE.....</b>	<b>6~7</b>
<b>PRODUCT FAMILY.....</b>	<b>8~9</b>
<b>MAXIMIZE RELIABILITY USING REDUNDANCY.....</b>	<b>10</b>
<b>SOFTWARE .....</b>	<b>11</b>
POWERPRO PROGRAMMING SOFTWARE.....	11
HOLLYVIEW HMI SCADA FOR LK SERIES PLC .....	11
<b>LK101</b>	
SINGLE CPU LOCAL BACKPLANE - 10 slots .....	12
TECHNICAL SPECIFICATION.....	13
<b>LK121</b>	
CPU REDUNDANCY LOCAL BACKPLANE - 11 slots.....	14
TECHNICAL SPECIFICATION.....	15
<b>LK111 &amp; LK112</b>	
EXPANSION BACKPLANE - 11 and 5 slots .....	16
TECHNICAL SPECIFICATION.....	17
<b>LK202, LK205, LK207, &amp; LK210</b>	
CPU MODULES - SINGLE & DUAL CPU CONTROLLER.....	18
Operating Mode Switch .....	19
LED Status Indicators.....	19
TECHNICAL SPECIFICATION.....	20~21
<b>LK231</b>	
PROFIBUS-DP COMMUNICATION MODULE .....	22
TECHNICAL SPECIFICATION.....	23
<b>LK232</b>	
PROFIBUS-DP BUS REPEATER MODULE .....	24
TECHNICAL SPECIFICATION.....	25
<b>LK233</b>	
PROFIBUS-DP OPTICAL FIBER INTERFACE MODULE .....	26
TECHNICAL SPECIFICATION.....	27
<b>LK239</b>	
MODBUS MODULE (MASTER/SLAVE) .....	28
TECHNICAL SPECIFICATION.....	29
<b>LK250</b>	
PROFIBUS-DP EXPANSION MODULE.....	30
TECHNICAL SPECIFICATION.....	31
<b>LK255</b>	
PROFIBUS-DP SLAVE INTERFACE MODULE .....	32
TECHNICAL SPECIFICATION.....	33
<b>LK410</b>	
ANALOG INPUT MODULE - VOLTAGE INPUT .....	34
TECHNICAL SPECIFICATION.....	35
<b>LK411 &amp; LK414</b>	
ANALOG INPUT MODULES - CURRENT INPUT.....	36
TECHNICAL SPECIFICATION.....	37

<b>LK412</b>	
ANALOG INPUT MODULE - ISOLATED VOLTAGE/CURRENT INPUT .....	38
TECHNICAL SPECIFICATION.....	39
<b>LK430</b>	
ANALOG INPUT MODULE - RTD INPUT .....	40
TECHNICAL SPECIFICATION.....	41
<b>LK440, LK441 &amp; LK442</b>	
ANALOG INPUT MODULES - THERMOCOUPLE INPUT .....	42
TECHNICAL SPECIFICATION.....	43
<b>LK510 &amp; LK511</b>	
ANALOG OUTPUT MODULES - VOLTAGE / CURRENT OUTPUT.....	44
TECHNICAL SPECIFICATION.....	45
<b>LK810</b>	
ANALOG INPUT & ANALOG OUTPUT MODULE .....	46
TECHNICAL SPECIFICATION.....	48-49
<b>LK610</b>	
DIGITAL INPUT MODULES - DC INPUT .....	50
TECHNICAL SPECIFICATION.....	51
<b>LK710</b>	
DIGITAL OUTPUT MODULES - TRANSISTOR OUTPUT, DC.....	52
TECHNICAL SPECIFICATION.....	53
<b>LK720</b>	
DIGITAL OUTPUT MODULES - RELAY OUTPUT, AC / DC.....	54
TECHNICAL SPECIFICATION.....	55
<b>LK630</b>	
SOE MODULES - 16 CHANNEL SOE INPUT, Sink Type, DC .....	56
TECHNICAL SPECIFICATION.....	57
<b>LK620</b>	
COUNTER MODULES.....	58
TECHNICAL SPECIFICATION.....	59
<b>LK910</b>	
24VDC (5A, 120W) INPUT POWER SUPPLY, 115/230VAC .....	60
TECHNICAL SPECIFICATION.....	61
<b>PRODUCT SELECTION LIST.....</b>	<b>62</b>

## HARDWARE ARCHITECTURE

The LK PLC consists of a set of hardware modules which includes the CPU, communication, and I/O modules that can be combined and configured on the backplane to satisfy a broad range of automation control applications.



### CPU MODULES

- This is the main LK controller of the whole control system. It is responsible for execution of the programmable logic, all data communications with the modules, the HMI, and the operator stations in operation level.
- Communications with the local modules are done via internal PROFIBUS-DP data bus.
- Communications with the expansion I/O modules are done via external PROFIBUS-DP fieldbus.
- Communications with the operator level are done via Industrial Ethernet (10/100Mbps)
- At the front panel of the CPU module, you will find the LED status indicator, operating mode switches, rotary switches for addressing, SD memory card and backup battery compartment.

### I/O MODULES

- Various I/O modules are available to meet different applications such as 16x DI, 8x DO (Transistor or Relay), 8x AI (Voltage/Current), 6x RTD, 8x Thermocouple, AI/AO mix, 16x SOE, and 2x Counters.

### SPECIAL FUNCTION I/O MODULES

- Special purpose modules available such as sequence of events (SOE) and Counters.

### COMMUNICATION MODULES

- Provide system expansion and other third-party product communication.
- Various popular communications are available such as PROFIBUS-DP, MODBUS, OPTICS-FIBER LINK, etc.

### BACKPLANES & TERMINALS

- Two main types are available, the local backplane and expansion backplane.
- Build-in Interfaces for 24VDC parallel input power, Ethernet ports, PROFIBUS-DP, RS-485/RS-232, modems, etc.
- Build-in Input and Output terminal points.

### POWER SUPPLY MODULE

- LK910 redundant capable power supply (1+1) to provide reliable parallel (24VDC) input power to backplane. Every backplane has its own power supply to power-up the modules.

## FEATURES HIGHLIGHTS

### High Performance Processor

- Industrial level 533MHz / 266MHz / 100MHz processor with ultra-fast processing speed.
- Large memory capacity:
  - Program: 16MB / 8MB / 4MB, Data: 64MB / 16MB / 8MB
- 1MB / 1MB / 512KB power-loss protection.
- Fast analog and digital signal processing.

### Expandable I/O Control

- Flexible system expansion capability.
- Depending on application, the I/O control points are scalable according to user's needs.
- 533MHz CPU Controller can support up to 2000 digital I/O or 1000 analog I/O.
- 266MHz and 100MHz CPU Controller can support up to 1000 digital I/O or 500 analog I/O.

### Various Communication Protocol

- Supports a wide variety of communication protocol (TCP/IP, PROFIBUS-DP, MODBUS, etc.)

### Backplane Architecture

- The local backplane provides all the communication link with all the local modules. (CPU, I/O, communication, special function)
- PROFIBUS-DP local data bus up to 12Mbps baud rate.

### Redundancy System

- Parallel power supply redundancy.
- CPU controller redundancy.
- Ethernet redundancy\*.
- PROFIBUS-DP redundancy.

### Hot-Swappable Modules

- All modules are hot swappable for easy maintenance.

### Low Power Consumption

- Low power consumption, CPU module draws around 5 watts, I/O module draws around 2~5 watts depending on the models.

### In-built Diagnostic

- Self-diagnostic and fault diagnostic.

### Compact Structural Design

- Integrated design saving installation space.

### Easy and Time-saving Installation

- Backplane provides safety insertion-keys preventing incorrect module insertion.
- Spring-cage wiring terminal.
- Backplane mounting with screws.

### Standard Programming Languages

- The programming software supports IEC-61131-3 standard, 6 types of programming language. (LD, IL, FBD, ST, SFC, CFC)

### Graphical HMI Designer

- Large Graphical Libraries.
- Alarms, reports, logs, and historical trend.
- User friendly interface.

\* Ethernet redundancy available on the redundancy backplane

## CERTIFICATIONS

The LK PLC and modules are awarded both the CE Mark for the European Community and the UL and cUL Mark for US and Canada.

### EUROPE

EC (European Community) Directives  
CE MARK



### UNITED STATE AND CANADA

UL (Underwriter's Laboratories, Inc.)  
UL LISTING MARK



SYSTEM ARCHITECTURE & COMMUNICATIONS

ARCHITECTURE

OPERATOR LEVEL



10/100 Redundant Industrial Ethernet Networking

LK REDUNDANT CPU CONTROLLER

LK SINGLE CPU CONTROLLER

Modbus<sup>®</sup>  
(RTU/ASCII) Network

SERIAL BUS  
RS-2485 / RS-232 Network

Redundant PROFIBUS<sup>®</sup>-DP Network

Expansion I/O Backplane

Expansion I/O Backplane

CONTROL LEVEL

- - 
  - 
  -
- Expand up to a maximum of 125 I/O Modules (DP address 2 ~ 126)

DIGITAL INPUT

DIGITAL OUTPUT

ANALOG INPUT

ANALOG OUTPUT

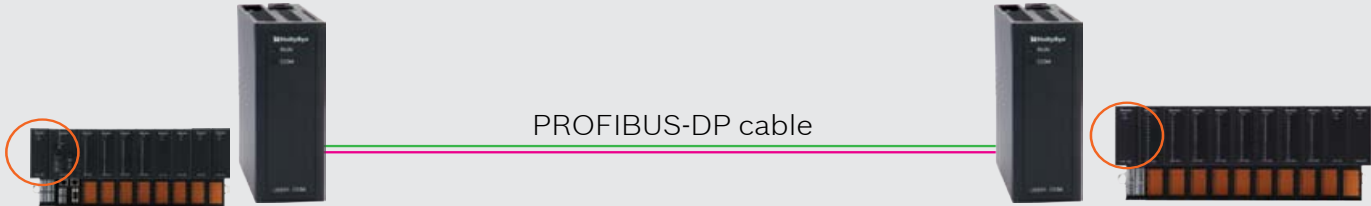
INSTRUMENTS & DEVICES





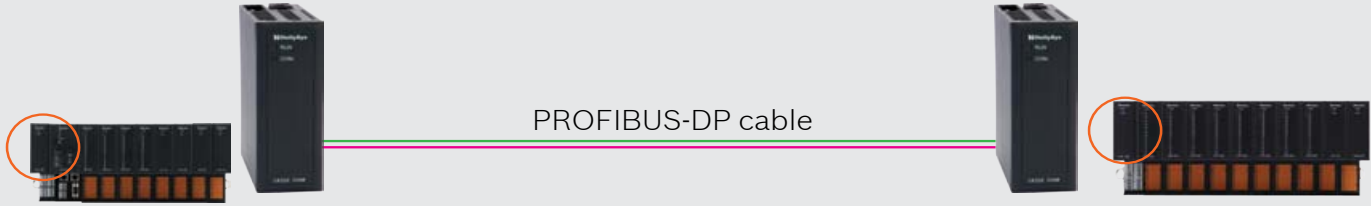
### LK231 -- PROFIBUS-DP communication adapter module

Complies with PROFIBUS-DP specification. ideally, within 200 meters.  
Short distance DP communication. Example, within same cabinet of local and expansion backplane(s).



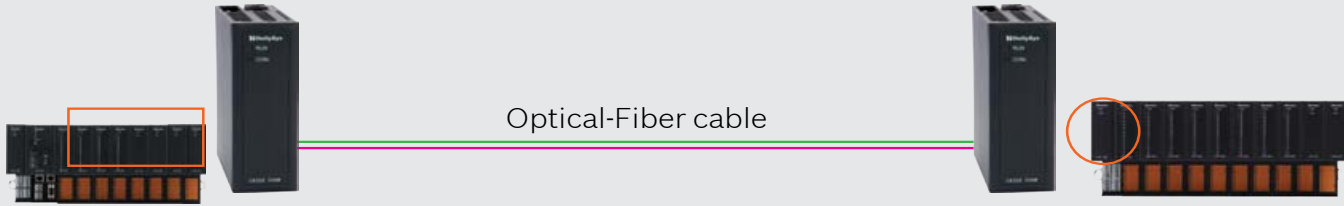
### LK232 -- PROFIBUS-DP communication adapter module with DP-Repeater

Complies with PROFIBUS-DP specification. able to boost the DP signals.  
Medium distance DP communication. Example, within one cabinet to another remote cabinet of backplane(s).



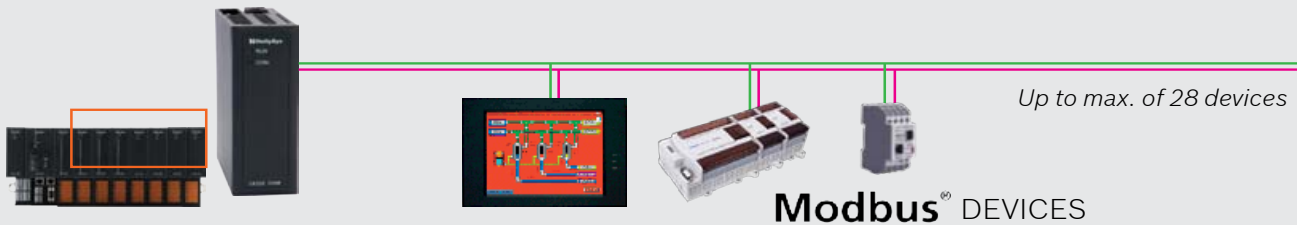
### LK233 -- DP-to-Optical-fiber interface communication module

Complies with PROFIBUS-DP specification. able to translated DP signals over optic-fiber and vice versa.  
Long distance DP communication. Example, within maximum distance of not more than 5km.



### LK239 -- MODBUS communication module (Master/Slave)

For communication using MODBUS RTU/ASCII protocol with MODBUS devices.









### LK255 -- PROFIBUS-DP Slave Interface Module

Provides communication interface to other third-party PROFIBUS-DP Master







PRODUCT FAMILY

### COMMUNICATION MODULES

	Model: <b>LK231</b> PROFIBUS-DP Communication Master / Slave Module		Model: <b>LK232</b> PROFIBUS-DP Repeater Module		Model: <b>LK233</b> Optic Fiber DP Interface module
	Model: <b>LK239</b> MODBUS Master/Slave Module		Model: <b>LK250</b> PROFIBUS-DP Backplane Expansion Module		Model: <b>LK255</b> PROFIBUS-DP Slave Interface module

	Model: <b>LK210</b> CPU: 533MHz Flash : 16MB SDRAM: 64MB Power-loss Protection: 1MB Redundancy: Supported
---	---

### BACKPLANES




<h4>LOCAL BACKPLANE</h4>  <p><b>LK101 / LK102</b> - 10x slots Single CPU</p>  <p><b>LK121 / LK122</b> - 11x slots Redundancy CPU</p>	<h4>EXPANSION BACKPLANE</h4>  <p><b>LK111 / 114</b> - 11x slots expansion</p>  <p><b>LK112</b> - 5 slots expansion</p>
--	---



### POWER SUPPLY

	Power Supply Model: <b>LK910</b>
---	---

### DIGITAL INPUT MODULES / DIGITAL OUTPUT MODULES

	Model: <b>LK610</b>  16 channels Digital Input 12 / 24 VDC		Model: <b>LK710</b>  16 channels Transistor Digital Output		Model: <b>LK720</b>  8 channels Relay Digital Output
---	--	---	--	---	--

P  
R  
O  
D  
U  
C  
T



## CPU MODULES

Model: **LK207**  
 CPU: 533MHz  
 Flash : 16MB  
 SDRAM: 64MB  
 Power-loss  
 Protection: 1MB

Model: **LK205**  
 CPU: 266MHz  
 Flash : 8MB  
 SDRAM: 16MB  
 Power-loss  
 Protection: 1MB

Model: **LK202**  
 CPU: 100MHz  
 Flash : 4MB  
 SDRAM: 8MB  
 Power-loss  
 Protection: 512KB

## LK SERIES PLC



## SPECIAL FUNCTION



Model: **LK620**  
  
 2 channels  
 1MHz High-Speed  
**Counter Module**



Model: **LK630**  
  
 16 channels  
 Resolution: 1ms  
**SOE Module**

	Cable Type A	Cable Type B
<b>Transmission Rate</b>	<b>Range per Segment</b>	<b>Range per Segment</b>
9.6Kbps, 19.2Kbps, 93.75Kbps	1200 meters	1200 meters
187.5Kbps	1000 meters	600 meters
500Kbps	400 meters	200 meters
1.5Mbps	200 meters	70 meters

## ANALOGUE INPUT MODULES / ANALOGUE OUTPUT MODULES

Model: **LK410**  
**LK411**  
**LK412**  
**LK414**  
  
 8 / 6 channels  
 Voltage or Current  
**Analog Input**

Model: **LK430**  
**LK431**  
**LK441**  
**LK442**  
  
 8 / 6 channels  
 TC or RTD  
**Analog Input**

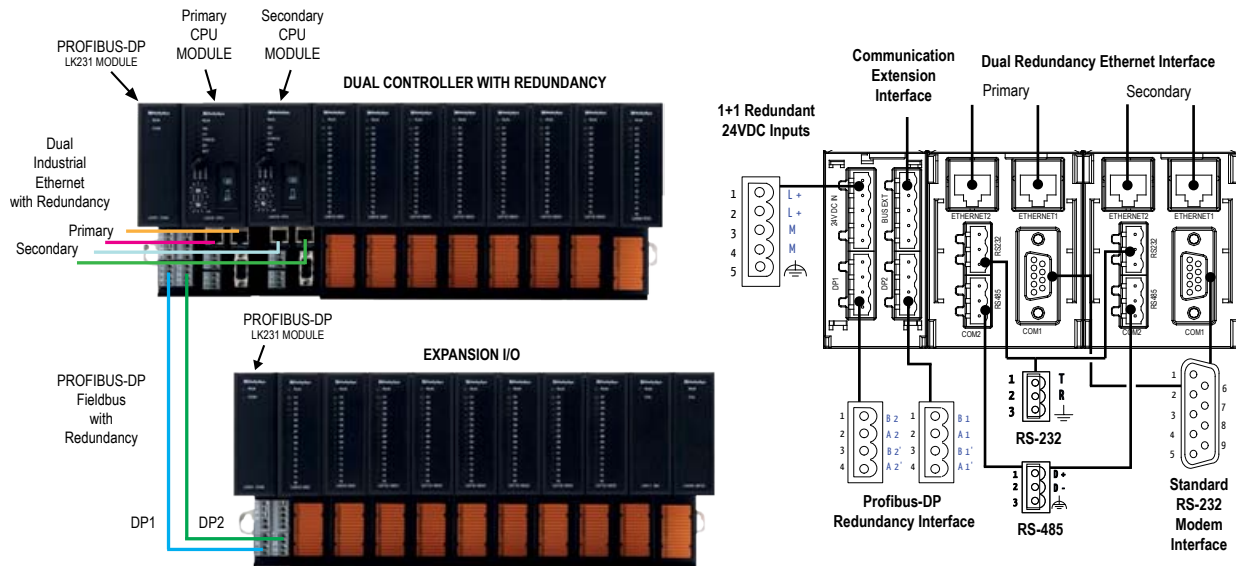
Model: **LK510**  
**LK511**  
  
 4 channels isolation  
 Voltage / Current  
**Analog Output**

Model: **LK810**  
  
 4 channels  
**Analog Input** ;  
 2 channels  
 Voltage or Current  
**Analog Output**

## MAXIMIZE RELIABILITY USING REDUNDANCY

Redundancy is much needed in certain automation application which requires high availability and reliability. A good example of such application is continuous process control. Major economic losses can happen if redundancy are not available during equipment downtime.

The LK PLC provides user with the following redundancy solution such as power supply, controller, Ethernet, and PROFIBUS-DP field-bus communication. Controller redundancy is achieved by using the backplane with dual controller slots. Sub-system comprises of using two controllers, the I/O modules, the communication module, and the expansion I/O backplanes with modules installed.



### CONTROLLER REDUNDANCY

- Two controller modules with redundancy support are required to be installed on the local redundancy backplane.
- Upon powering on, the two controllers will be automatically configured as primary and secondary controller based on its slot position. (left-most slot is the primary controller and the slots on the right is secondary controller.)
- The primary controller starts executing the program logic and control all the I/Os, and communications.
- The secondary controller act as a backup controller and will switch over if any failure occurs on the primary controller therefore ensuring continuous process.

### INDUSTRIAL ETHERNET REDUNDANCY

- Ethernet Redundancy is available on the Redundancy backplane. Four RJ-45 interfaces Ethernet ports are located on the backplane and each controller is supported by two of the Ethernet port. The Industrial Ethernet complies with the IEEE802.3/u international standard with a communication baud rate supporting either 10Mbps or 100Mbps.

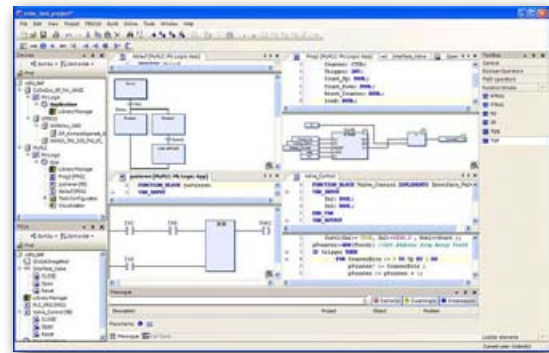
### PROFIBUS-DP REDUNDANCY

- The LK controller can supported two PROFIBUS-DP port and both the interfaces are located directly on the backplane.
- PROFIBUS-DP provides the fieldbus networking and is used for all communications with the expansion I/O modules.
- The PROFIBUS-DP complies with the IEC61158 international standard and the EN50170 European standard with a communication speed of 9.6Kbps up to 1.5Mbps depending on cable length and type.

REDUNDANCY

# POWERPRO PROGRAMMING SOFTWARE

PowerPro is the programming software designed for LK PLC. Based on Windows environment, PowerPro complies with IEC61131-3 standard delivering an off-line simulation and online debugging functions. It allows the user to test the logic prior any program test run, providing convenience in programming and debugging.



- Fully comply with programming standard of IEC61131-3 standard.
- Powerful operation capability (example, 32-bit floating point operation, optimized PID algorithm, etc.)
- Expansion library with support for user defined library.
- Software simulation, online debugging, and user code functions check.
- View, alarm, and logging functions.
- Password protection for user program.

## Flexible Programming Method

- Supporting 6 types of programming languages editor
  - Instruction List (IL)
  - Structural Text (ST)
  - Function Block Diagram (FBD)
  - Ladder Diagram (LD)
  - Sequence Function Chart (SFC)
  - Continuous Function Chart (CFC)
- Depending on variable requirements, programmers can choose the relevant programming languages to work with. While working with FBD, LD, or IL, programmers are allowed to switch in between these programming languages.
- Support different programming languages among subroutines and subroutine interactive call.

## Instructions Library

- Over 400 instructions and function blocks can be employed according to variable requirements of user.

- Common instructions include arithmetic, evaluation, boolean, shift, selection, compare, data type conversion, addressing, call, strings and etc.
- Common function blocks include enhanced PID controller, signal generator, function manipulator, analog processing, MODBUS, PROFIBUS-DP, Ethernet, real-time clock, and watchdog, etc.

## User-defined Library

- User can write their own function blocks, functions, and subroutines; and store them into an internal library.
- The user-defined library can be invoked in different projects.

## Software Simulation

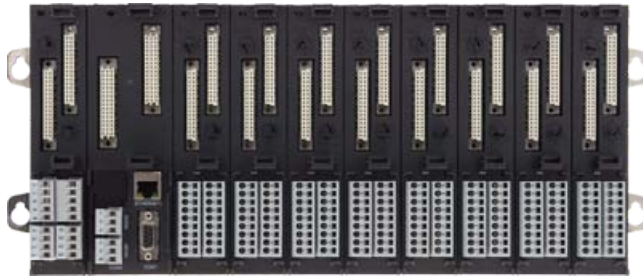
- Support offline simulation and online debugging
- Graphical display of the simulation result.
- Convenient programming and flexible break point debugging.

# HOLLYVIEW HMI SCADA FOR LK SERIES PLC

- Graphical Libraries**
- User Friendly Interface**
- Alarms**
- Reports**
- Logs**
- Historical Trend**



# LK101 - SINGLE CPU LOCAL BACKPLANE - 10 slots



**LK 101**

## Description

LK101 Single CPU local backplane are designed to accommodate 1x Communication, 1x CPU, and 8x I/O modules.

## Features

- 1x Comm + 1x CPU + 8x I/O slots
- First 4 out of the 8 slots can be use for interrupt.

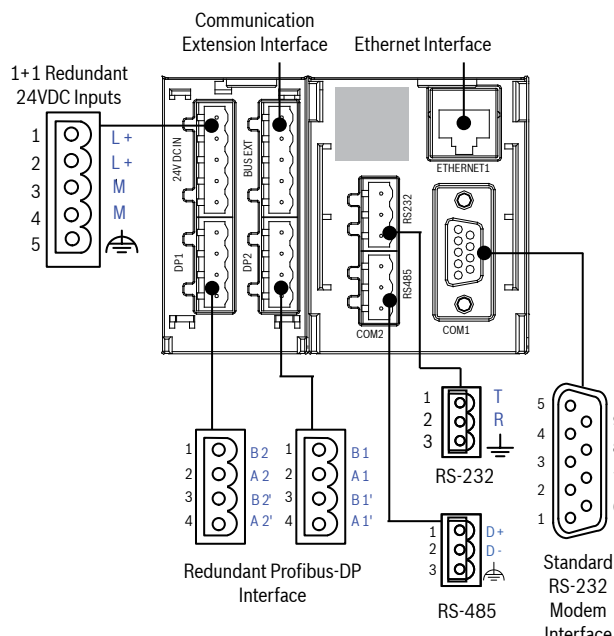
## Interfaces

- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- COM2: RS-485/RS-232 -- 3-terminal pins.
- COM1: RS-232 MODEM interface -- DB9.
- 10x spring-cage wiring terminal sets for I/O.
- 1x Ethernet ports -- RJ-45.
- Safety mechanical key preventing incorrect module insertion.

## Weight & Size

- 367.5mm x 166mm x 35.5 mm
- 1360g

## Interface and Connections



## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 1x CPU Module Slot
- 8x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Pins and Definition

PROFIBUS-DP interface			
Pin No.	Label		Definition
	DP1	DP2	
1	B1	B2	--
2	A1	A2	--
3	B1'	B2'	DP+
4	A1'	A2'	DP-

Pin No.	RS-232		RS-485	
	Label	Definition	Label	Definition
1	T	TXD, Transmit	D+	RS-485+
2	R	RXD, Receive	D-	RS-485-
3	⏏	GND, Signal Ground	⏏	GND, Shielded Signal Ground

Pin No.	RS-232 MODEM interface	
	Label	Definition
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	--	--

Pin No.	Ethernet Port		
	Label	Wiring color	Definition
1	Tx Data+	White-Orange	Transmit Data +
2	Tx Data-	Orange	Transmit Data -
3	Recv Data+	White-Green	Receive Data +
4	NC	Blue	--
5	NC	White-Blue	--
6	Recv Data-	Green	Receive Data -
7	NC	White-Brown	--
8	NC	Brown	--

Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5	⏏	Shielded GND

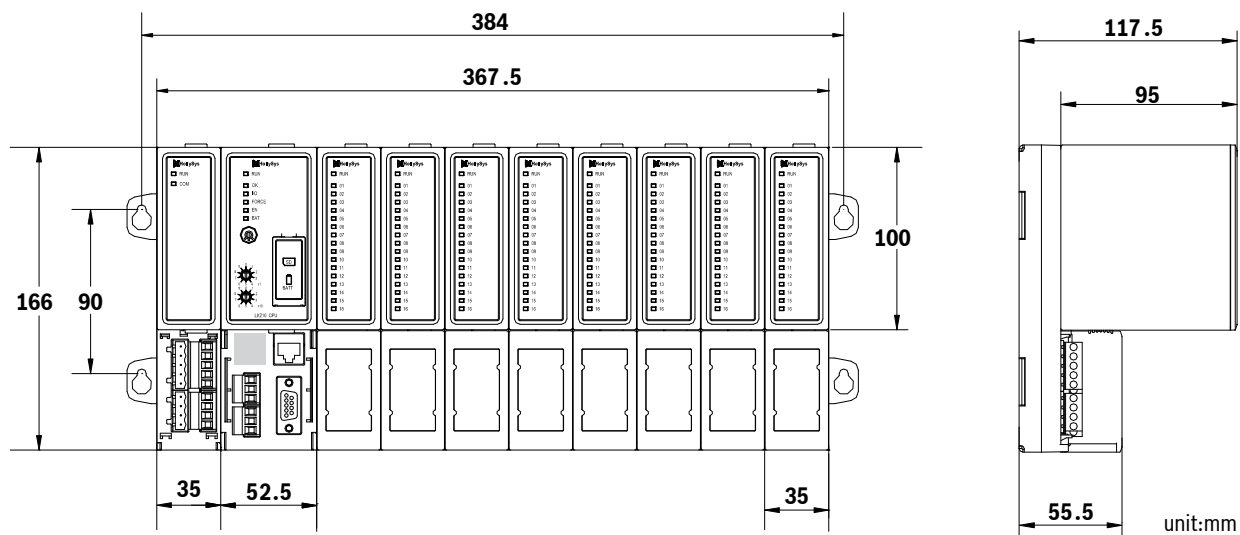
# TECHNICAL SPECIFICATION

LK101 Single CPU Local Backplane - 10 Slots	
<b>Slots and Interfaces</b>	
Module Slots	10 slots (1xCOM + 1xCPU + 8xI/O)
Interrupt Input Slots	The first 4x I/O slots closes to the controller CPU can support interrupt
Ethernet Port	RJ45 with LED light
COM1 interface	DB9
COM2 interface	Double socket, 3x terminal pins. (RS-485 or RS-232, selectable)
PROFIBUS-DP interface	Double socket, 4x terminal pins.
Communication Extension Interface	5x terminal pins, pins defination depends on the communication module
System Input Power Interface	5x terminal pins, dual parallel redundany, 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 18 pins (2 column) per I/O module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Terminal Resistor and matching	One fixed end, active matching
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of backplane	367.5mm x 166mm x 35mm (W x H x D)
Weight of backplane	1360g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

BP

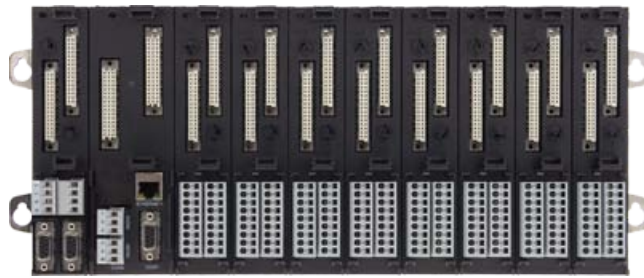
LK  
101

## Dimensions





# LK102 - SINGLE CPU LOCAL BACKPLANE - 10 slots (DB9)



**LK 102**

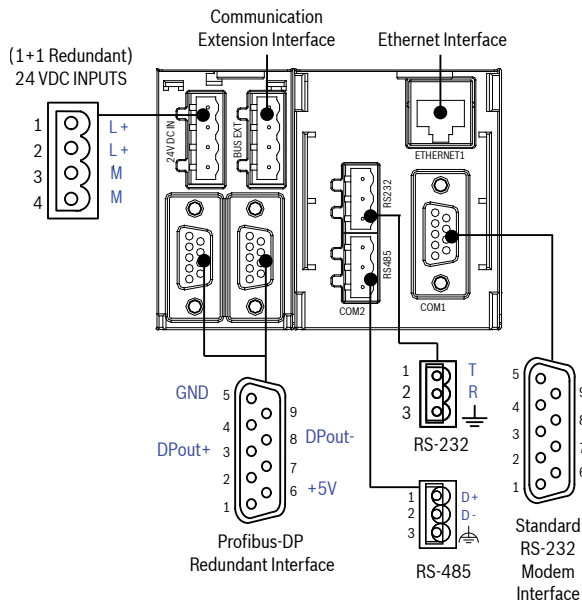
## Description

LK102 Single CPU local backplane are designed to accommodate one Communication, CPU, and I/O modules. The difference with Lk101 is on the DP interface which is changed into DB9 interfaces. This is used together with LK230, which is a DB9 interface plug for PROFIBUS-DB for easy connection.

## Features

- 1x COM + 1x CPU + 8x I/O slots
- Redundant PROFIBUS-DP communication interfaces. (2xDB9)
- Redundant 24VDC system input power.
- Expansion interface: RS-485/RS-232. (2x)
- Expansion interface: Standard RS-232 MODEM interface. (DB9)
- Spring-cage wiring terminal.
- Support highspeed 32Mbps local bus.
- Ethernet port (1x)
- Safety mechanical key preventing incorrect module insertion.

## Interface and Connections



## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 1x CPU Module Slot
- 8x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Pins and Definition

PROFIBUS-DP interface		
Pin No.	Label	Definition
1	--	--
2	--	--
3	DPOUT+	DP positive + signal
4	--	--
5	GND	GND, signal ground
6	+5V	5VDC, supplied by communication module
7	--	--
8	DPOUT -	DP negative - signal
9	--	--

Pin No.	RS-232		RS-485	
	Label	Definition	Label	Definition
1	T	TXD, Transmit	D+	RS-485+
2	R	RXD, Receive	D-	RS-485-
3	⏏	GND, Signal Ground	⏏	GND, Shielded Signal Ground

Pin No.	RS-232 MODEM interface	
	Label	Definition
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	--	--

Pin No.	Ethernet Port		
	Label	Wiring color	Definition
1	Tx Data+	White-Orange	Transmit Data +
2	Tx Data-	Orange	Transmit Data -
3	Recv Data+	White-Green	Receive Data +
4	NC	Blue	--
5	NC	White-Blue	--
6	Recv Data-	Green	Receive Data -
7	NC	White-Brown	--
8	NC	Brown	--

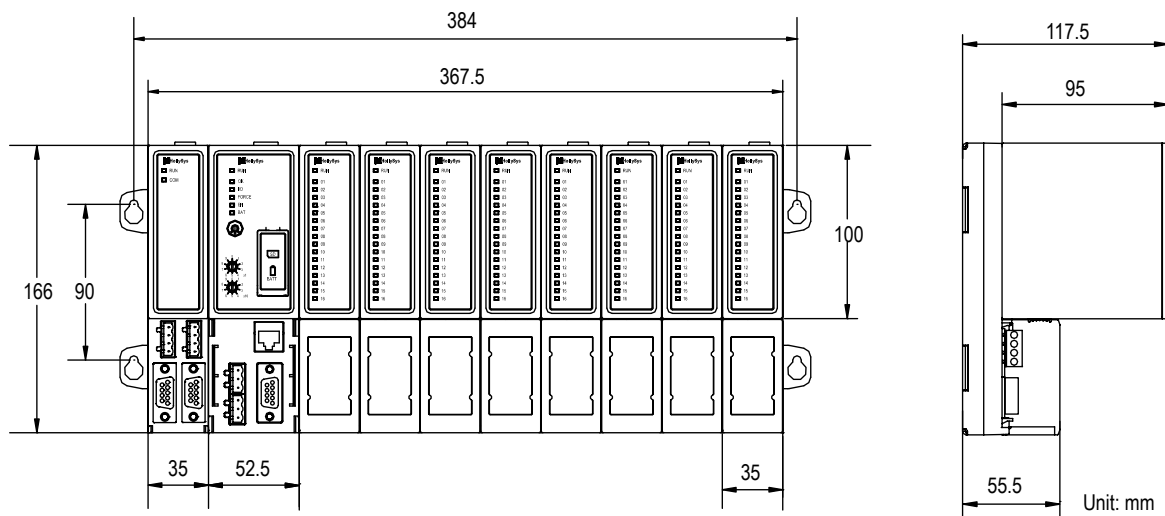
Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND



# TECHNICAL SPECIFICATION

LK102 Single CPU Local Backplane - 10 Slots	
<b>Slots and Interfaces</b>	
Module Slots	10 slots (1xCOM + 1xCPU + 8xI/O)
Interrupt Input Slots	The first 4x I/O slots closes to the controller CPU can support interrupt
Ethernet Port	RJ45 with LED light
COM1 interface	DB9
COM2 interface	Double socket, 3x terminal pins. (RS-485 or RS-232, selectable)
PROFIBUS-DP interface	Double socket, DB9
Communication Extension Interface	4x terminal pins, pins defination depends on the communication module
System Input Power Interface	4x terminal pins, dual redundancy 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 18 pins (2 column) per I/O module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Terminal Resistor and matching	One fixed end, active matching
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Backplane	367.5mm x 166mm x 35mm (W x H x D)
Weight of Backplane	1360g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

## Dimensions



BP

LK  
102

# LK121 - REDUNDANT CPU LOCAL BACKPLANE - 11 slots



**LK 121**

## Description

LK121 redundant CPU local backplane are designed to accommodate one Communication, two CPU controller running in redundancy, and I/O modules.

## Features

- 1x Comm + 2x CPU + 8x I/O slots
- First 4 out of the 8 slots can be use for interrupt.

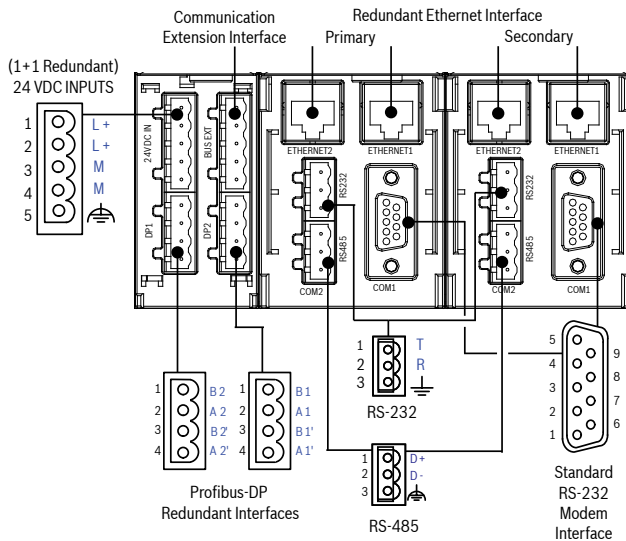
## Interfaces

- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- COM2: RS-485/RS-232 -- 3-terminal pins.
- COM1: RS-232 MODEM interface -- DB9.
- 10x spring-cage wiring terminal sets for I/O.
- 2x Ethernet ports -- RJ-45.
- Safety mechanical key preventing incorrect module insertion.

## Weight & Size

- 420mm x 166mm x 35.5 mm
- 1940g

## Interface and Connections



## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 2x CPU Module Slot
- 8x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Pins and Definition

Pin No.	Label		Definition
	DP1	DP2	
1	B1	B2	--
2	A1	A2	--
3	B1'	B2'	DP+
4	A1'	A2'	DP-

Pin No.	RS-232		RS-485	
	Label	Definition	Label	Definition
1	T	TXD, Transmit	D+	RS-485+
2	R	RXD, Receive	D-	RS-485-
3		GND, Signal Ground		GND, Shielded Signal Ground

Pin No.	RS-232 MODEM interface	
	Label	Definition
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	--	--

Pin No.	Ethernet Port		
	Label	Wiring color	Definition
1	Tx Data+	White-Orange	Transmit Data +
2	Tx Data-	Orange	Transmit Data -
3	Recv Data+	White-Green	Receive Data +
4	NC	Blue	--
5	NC	White-Blue	--
6	Recv Data-	Green	Receive Data -
7	NC	White-Brown	--
8	NC	Brown	--

Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5		Shielded GND

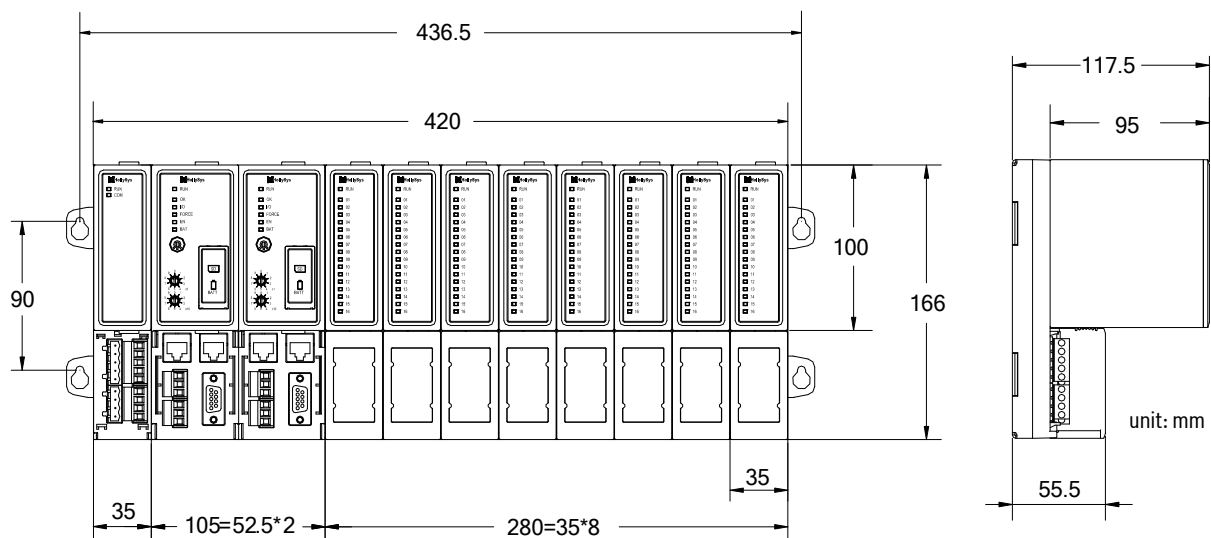
# TECHNICAL SPECIFICATION

LK121 CPU Redundancy Local Backplane - 11 Slots	
<b>Slots and Interfaces</b>	
Module Slots	11 slots (1xCOM + 2xCPU + 8xI/O)
Interrupt Input Slots	The first 4x I/O slots closes to the controller CPU can support interrupt
Ethernet Port	4x RJ45 with LED light
COM1 interface	DB9
COM2 interface	Double socket, 3x terminal pins. (RS-485 or RS-232, selectable)
PROFIBUS-DP interface	Double socket, 4x terminal pins
Communication Extension Interface	5x terminal pins, pins defination depends on the communication module
System Input Power Interface	5x terminal pins, dual redundany 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 18 pins (2 column) per I/O module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Terminal Resistor and matching	One fixed end, active matching
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Backplane	420mm x 166mm x 35mm (W x H x D)
Weight of Backplane	1940g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

BP

LK  
121

## Dimensions



# LK122 - REDUNDANT CPU LOCAL BACKPLANE - 11 slots (DB9)



**LK 122**

## Description

LK121 redundant CPU local backplane are designed to accommodate one Communication, two CPU controller running in redundancy, and I/O modules.

## Features

- 1x Comm + 2x CPU + 8x I/O slots
- First 4 out of the 8 slots can be use for interrupt.

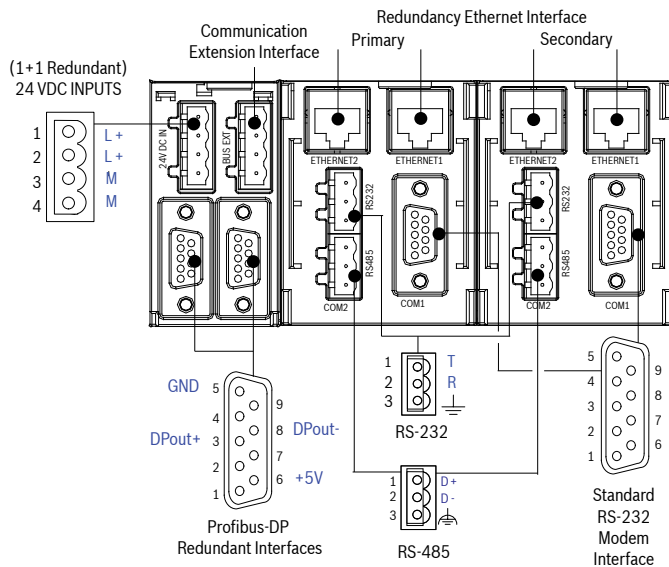
## Interfaces

- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- COM2: RS-485/RS-232 -- 3-terminal pins.
- COM1: RS-232 MODEM interface -- DB9.
- 10x spring-cage wiring terminal sets for I/O.
- 2x Ethernet ports -- RJ-45.
- Safety mechanical key preventing incorrect module insertion.

## Weight & Size

- 420mm x 166mm x 35.5 mm
- 1940g

## Interface and Connections



## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 2x CPU Module Slot
- 8x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Pins and Definition

PROFIBUS-DP interface		
Pin No.	Label	Definition
1	--	--
2	--	--
3	DPOUT+	DP positive + signal
4	--	--
5	GND	GND, signal ground
6	+5V	5VDC, supplied by communication module
7	--	--
8	DPOUT -	DP negative - signal
9	--	--

Pin No.	RS-232		RS-485	
	Label	Definition	Label	Definition
1	T	TXD, Transmit	D+	RS-485+
2	R	RXD, Receive	D-	RS-485-
3	⏏	GND, Signal Ground	⏏	GND, Shielded Signal Ground

Pin No.	RS-232 MODEM interface	
	Label	Definition
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	--	--

Pin No.	Ethernet Port		
	Label	Wiring color	Definition
1	Tx Data+	White-Orange	Transmit Data +
2	Tx Data-	Orange	Transmit Data -
3	Recv Data+	White-Green	Receive Data +
4	NC	Blue	--
5	NC	White-Blue	--
6	Recv Data-	Green	Receive Data -
7	NC	White-Brown	--
8	NC	Brown	--

Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5	⏏	Shielded GND

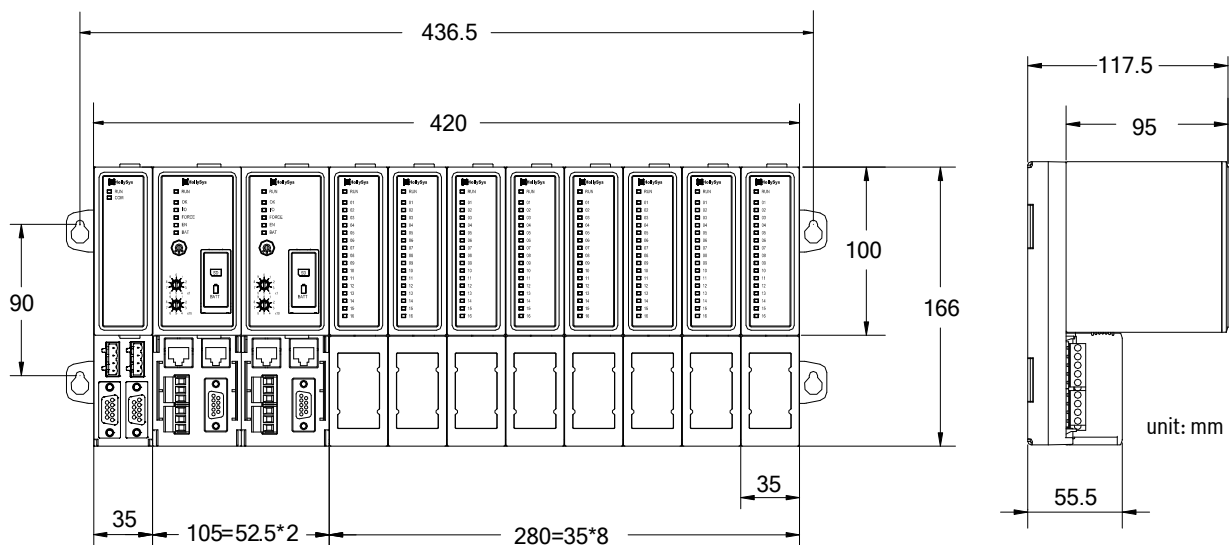
# TECHNICAL SPECIFICATION

LK121 CPU Redundancy Local Backplane - 11 Slots	
<b>Slots and Interfaces</b>	
Module Slots	11 slots (1xCOM + 2xCPU + 8xI/O)
Interrupt Input Slots	The first 4x I/O slots closes to the controller CPU can support interrupt
Ethernet Port	4x RJ45 with LED light
COM1 interface	DB9
COM2 interface	Double socket, 3x terminal pins. (RS-485 or RS-232, selectable)
PROFIBUS-DP interface	Double socket, 4x terminal pins
Communication Extension Interface	5x terminal pins, pins defination depends on the communication module
System Input Power Interface	5x terminal pins, dual redundany 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 18 pins (2 column) per I/O module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Terminal Resistor and matching	One fixed end, active matching
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Backplane	420mm x 166mm x 35mm (W x H x D)
Weight of Backplane	1940g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0°C ~ 60°C
Relative Humidity	10% ~ 95% non-condensing
Storage Environment	-40°C ~ 70°C, (25°F ~ 55°F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

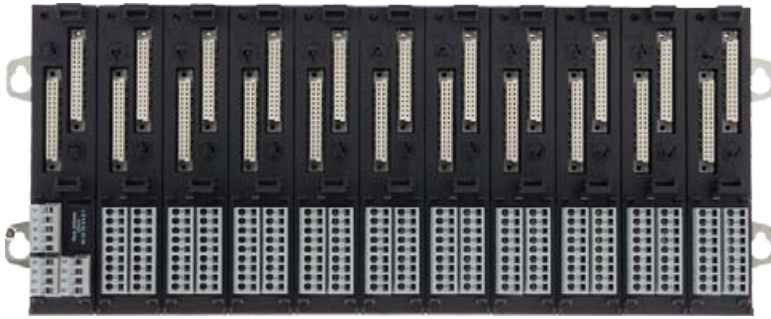
BP

LK  
122

## Dimensions



# LK111 - EXPANSION BACKPLANE - 11 slots



**LK111**

## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 10x or 4x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Description

The Expansion backplanes are designed to accommodate one Communication module and multiple I/O modules providing further I/O expansion for the local backplane controller using Profibus-DP.

## Features

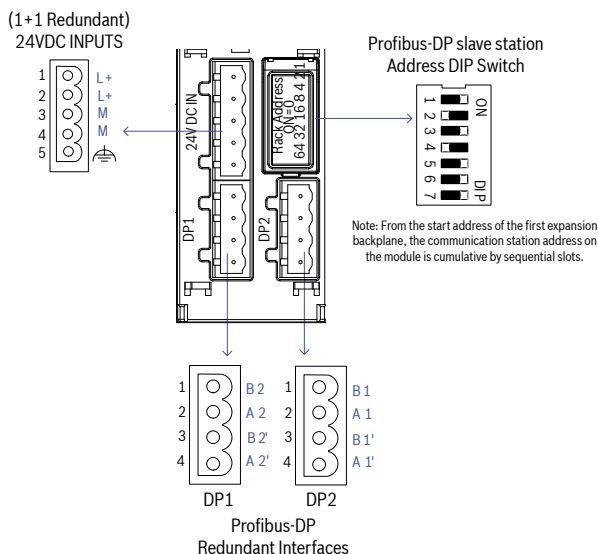
- 1x Comm + 10x or 4x I/O slots
- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- 10x spring-cage wiring terminal sets for I/O.
- Safety mechanical key preventing incorrect module insertion.

## Pins and Definition

PROFIBUS-DP interface			
Pin No.	Label		Definition
	DP1	DP2	
1	B1	B2	--
2	A1	A2	--
3	B1'	B2'	DP+
4	A1'	A2'	DP-

Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5		Shielded GND

## Interface and Connections



BP  
LK  
111



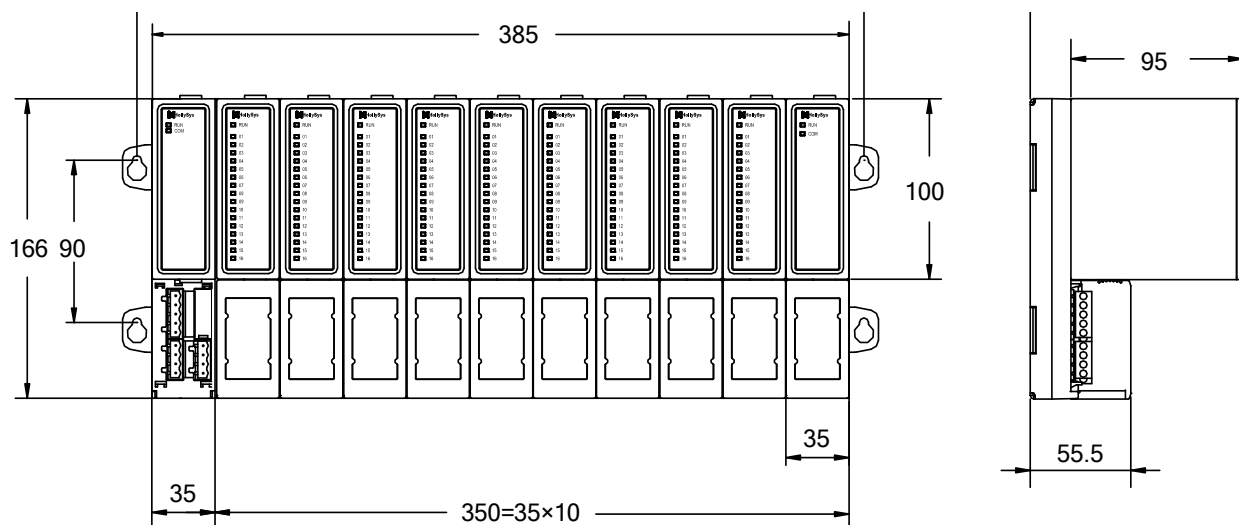
# TECHNICAL SPECIFICATION

LK111 Expansion Backplane - 11 Slots	
<b>Slots and Interfaces</b>	
<b>LK111</b>	
Module Slots	11 slots (1x COM + 10x IO)
PROFIBUS-DP interface	4x terminal pins, double socket
Terminal Resistor and matching	None, can be provided by the communication module
System Input Power Interface	5x terminal pins, (1+1 redundant) 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 9 pins x 2 column per module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Module	385mm x 166mm x 35mm (W x H x D)
Weight of Backplane	1740g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

BP

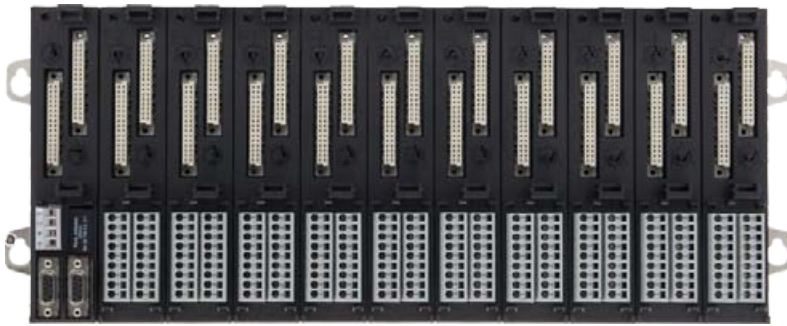
LK  
111

## Dimensions



LK111 Expansion Backplane  
11 slots

# LK114 - EXPANSION BACKPLANE - 11 slots [DB9 interface]



**LK114**

## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 10x or 4x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Description

The Expansion backplanes are designed to accommodate one Communication module and multiple I/O modules providing further I/O expansion for the local backplane controller using Profibus-DP.

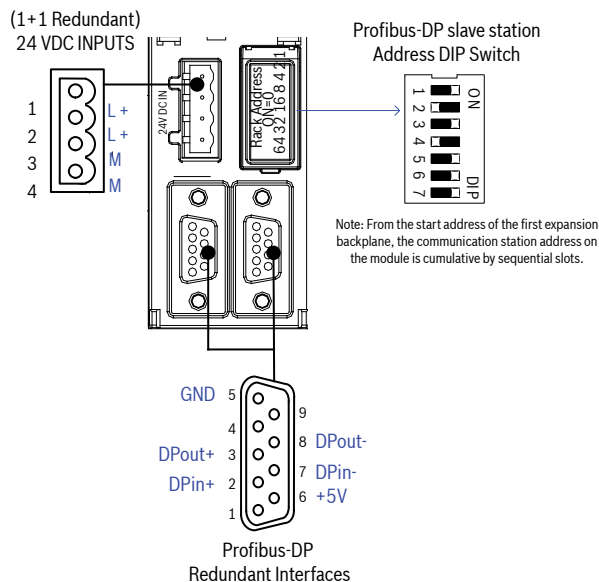
## Features

- 1x Comm + 10x or 4x I/O slots
- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- 10x spring-cage wiring terminal sets for I/O.
- Safety mechanical key preventing incorrect module insertion.

## Pins and Definition

PROFIBUS-DP interface		
Pin No.	Label	Definition
1	--	--
2	DPIN+	DP+ positive signal INPUT
3	DPOUT+	DP+ positive signal OUTPUT
4	--	--
5	GND	GND, signal ground
6	+5V	5VDC, supplied by communication module
7	DPIN -	DP - negative signal INPUT
8	DPOUT -	DP - negative signal OUTPUT
9	--	--

## Interface and Connections



Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5		Shielded GND

BP  
LK  
114

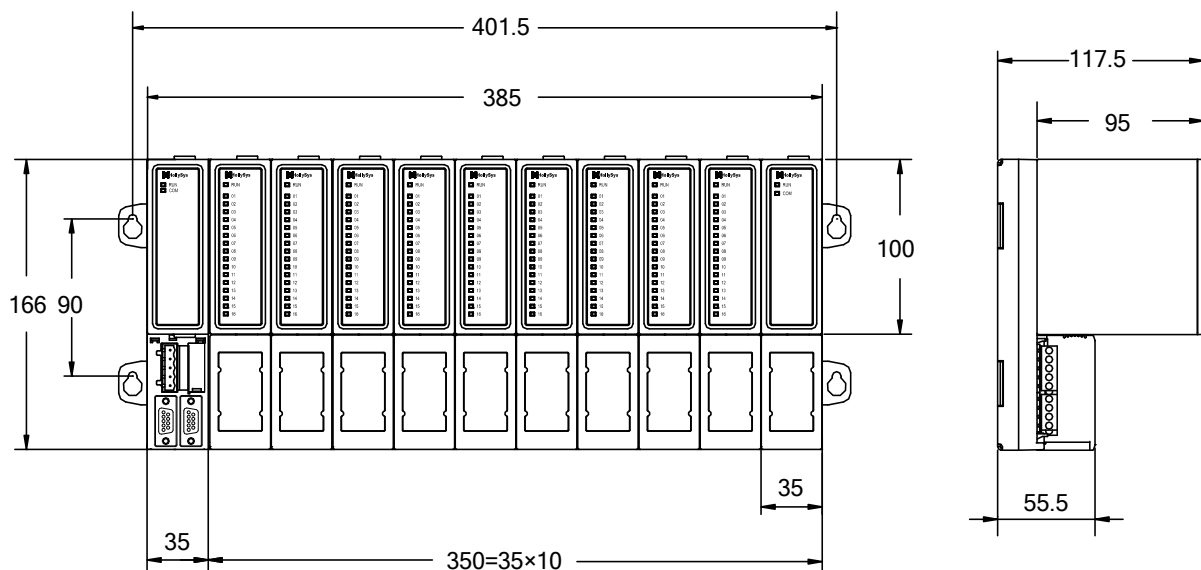
# TECHNICAL SPECIFICATION

LK114 Expansion Backplane - 11 Slots	
<b>Slots and Interfaces</b>	
<b>LK114</b>	
Module Slots	11 slots (1x COM + 10x IO)
PROFIBUS-DP interface	2x DB9
Terminal Resistor and matching	None, can be provided by the communication module
System Input Power Interface	4x terminal pins, (1+1 redundant) 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 9 pins x 2 column per module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Module	385mm x 166mm x 35mm (W x H x D)
Weight of Backplane	1740g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

BP

LK  
114

## Dimensions



LK114 Expansion Backplane  
11 slots, DB9 Profibus-DP interface

# LK112 - EXPANSION BACKPLANE - 5 slots



**LK112**

## Description

The Expansion backplanes are designed to accommodate one Communication module and multiple I/O modules providing further I/O expansion for the local backplane controller using Profibus-DP.

## Features

- 1x Comm + 10x or 4x I/O slots
- 2x Redundant PROFIBUS-DP -- 4-terminal pins
- 2x Parallel 24VDC power supply inputs - 5 pins.
- 10x spring-cage wiring terminal sets for I/O.
- Safety mechanical key preventing incorrect module insertion.

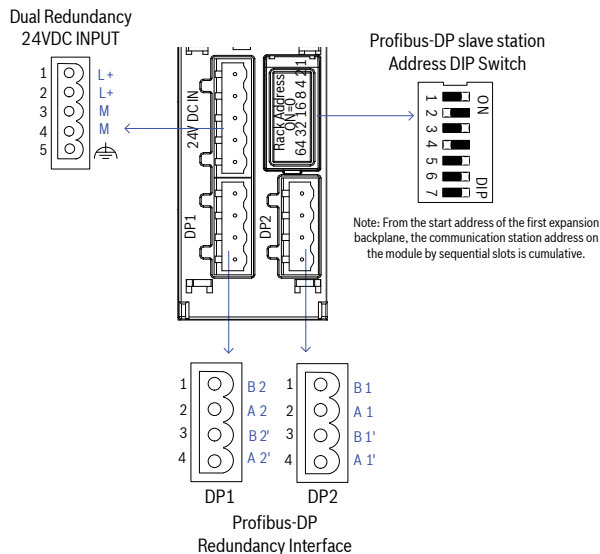
## Module Slots

- 1x COMMUNICATION Module Slot
  - PROFIBUS-DP module
  - PROFIBUS-DP Repeater module
  - PROFIBUS-DP Expansion module
- 10x or 4x INPUT/OUTPUT Module Slots
  - AI module
  - RTD module
  - TC module
  - AO module
  - AIO module
  - DI module
  - DO module
  - SOE module
  - COUNTER module
  - DP-Slave Interface module
  - MODBUS module
  - Optic-Fiber module

## Pins and Definition

PROFIBUS-DP interface			
Pin No.	Label		Definition
	DP1	DP2	
1	B1	B2	--
2	A1	A2	--
3	B1'	B2'	DP+
4	A1'	A2'	DP-

## Interface and Connections



Pin No.	24VDC Input Power	
	Label	Definition
1	L+	24V+
2	L+	24V+
3	M	GND
4	M	GND
5		Shielded GND

BP  
LK  
112

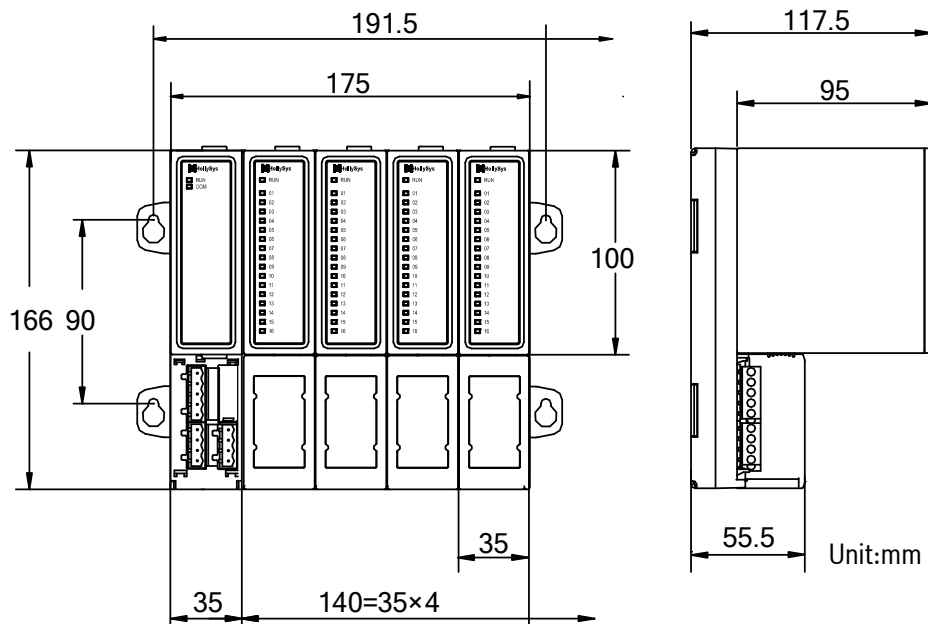
# TECHNICAL SPECIFICATION

LK112 Expansion Backplane - 5 Slots	
<b>Slots and Interfaces</b>	
<b>LK112</b>	
Module Slots	5 slots (1x COM + 4x IO)
PROFIBUS-DP interface	4x terminal pins, double socket
Terminal Resistor and matching	None, can be provided by the communication module
System Input Power Interface	5x terminal pins, (1+1 redundant) 24VDC input
I/O Terminals	Spring-cage I/O Terminals, 9 pins x 2 column per module slot
<b>Isolation</b>	
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
<b>Physical Characteristic</b>	
Methods of Installation	Flat surface installation
Size of Module	175mm x 166mm x 35mm (W x H x D)
Weight of Backplane	880g
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	10% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 5%~95% humidity
Environmental IP Protection	IP20, IEC60529

BP

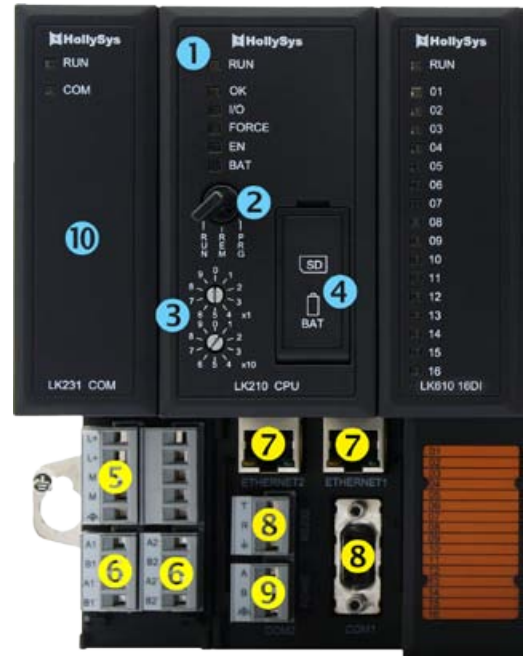
LK  
112

## Dimensions



LK112 Expansion Backplane  
5 slots

CPU CONTROLLER MODULE



CPU

LK  
202  
205

Description

CPU controller is the brain of the whole PLC control system. It is installed only on the local backplane and communicates with all the modules that it links via the PROFIBUS-DP. LK controllers are available in two types of models, Single CPU or Dual CPU with redundancy. The variation of the CPU speed available are 533MHz, 266MHz, and 100MHz.

Features

- High performance controller
- 533MHz at 13 nanoseconds processing speed.
- Large Memory Capacity.
- LK210 supports two cpu in redundancy mode.
- Support SD memory card for program logic backup.
- Backup battery is available in case of power loss.
- Easy configuration, Station ID selectable switch.
- Easy Operating Mode Selection via switch knob.

- 1 LED status indicator
- 2 Operating Mode Selectable Switch (RUN, REM, PRG)
- 3 Station ID Selectable Switches
- 4 Compartment slot for SD card and backup battery
- 5 Power Supply Input Terminals
- 6 PROFIBUS-DP Terminals
- 7 10/100Mbps Ethernet ports
- 8 RS-232 interface port
- 9 RS-485 interface terminal
- 10 Communication module



## Operating Mode Selectable Switch Knob

Swich Dial Position	Operating Mode	Definition
RUN	Running Mode	<ul style="list-style-type: none"> <li>• CPU is in running mode.</li> <li>• Cannot stop the operation via software.</li> <li>• Cannot change the PLC program, including downloading of PLC program.</li> <li>• Variables cannot be forced to a new value, re-written, reset, or soft-reset.</li> <li>• User program cannot be cleared.</li> </ul>
REM	Remote Control Mode	<ul style="list-style-type: none"> <li>• The CPU maintain its running status from either "RUN" mode to "REM" mode or "PRG" mode to "REM" mode.</li> <li>• User can stop or starts the CPU operation using software.</li> <li>• User can change the PLC program while online.</li> <li>• Variables are forcable to a new value, rewritable, resetable, or soft-resetable.</li> <li>• User program can be cleared.</li> </ul>
PRG	Programmable Mode	<ul style="list-style-type: none"> <li>• CPU STOPS ITS OPERATION.</li> <li>• User cannot starts its operation using software.</li> <li>• User can change and download the PLC program.</li> <li>• Variables are forcable to a new value, rewritable, resetable, or soft-resetable.</li> <li>• User program can be cleared.</li> </ul>

## LED Status Indicators

Indicator	Status	Definition
<b>RUN</b> Yellow or Green	GREEN - ON	Active CPU - User program in operation.
	GREEN - Fast Flashing	Standby CPU - User program in operation. Flash four times per second. (4Hz)
	GREEN - Slow Flashing	Single CPU Only (LK207) - User program in operation, Flash once per second. (1Hz)
	YELLOW - ON	Active CPU - User program STOPPED.
	YELLOW - Fast Flashing	Standby CPU - User program STOPPED. Flash four times per second. (4Hz)
	YELLOW - Slow Flashing	Single CPU Only (LK207) - User program STOPPED, Flash once per second.
<b>OK</b> Red or Green	RED - Fast Flashing	System in initialize mode after power is on. Flash four times per second. (4Hz)
	RED - Slow Flashing	PLC user program is not found. Flash once per second. (1Hz)
	GREEN - ON	Controller operating normally.
	GREEN- Fast Flashing	Downloading of PLC program or the Remote Panel is synchronizing data under redundancy. Flash four times per second. (4Hz)
	GREEN - Slow Flashing	Controller Operating Normally but the symbol database file is not found. (Symbol database is used to predefine the periodic data communication) Flash once per second. (1Hz)
<b>I/O</b> Yellow or Green	OFF	I/O not configured or no communication.
	GREEN - ON	Active CPU - Communicating normally with one or more I/Os.
	GREEN - Slow Flashing	Active CPU - Not communication with any I/Os. Flash once per second. (1Hz)
	YELLOW - Slow Flashing	Standby CPU - Communicating normally with one or more I/Os. Flash once per second. (1Hz)
<b>FORCE</b> Yellow	OFF	There is no force value data.
	YELLOW - ON	Force value data is available.
<b>EN</b> Green	OFF	Outputs are inhibited
	GREEN - ON	Outputs are enabled
<b>BAT</b> Red	OFF	Backup battery power is OK, operation is normal.
	RED - ON	Backup battery not installed or its power is less than 90% of the rated value. Change the battery immediately.

CPU

LK  
207  
210

**CPU CONTROLLER MODULES (SINGLE & REDUNDANCY)**

Model		Single CPU LK202	Single CPU LK205	
<b>CPU Speed</b>		100 Mhz	266 MHz	
<b>Storage Memory</b>	FLASH: Programmable	4 MB	8 MB	
	SDRAM: Data	8 MB	16 MB	
	SRAM: Power-loss protection	512 KB	1 MB	
	EEPROM	256 Byte		
	SD memory card	512MB ~ 2GB		
<b>Backup Battery</b>	Voltage and current	3.0V, constant 120mAh		
	Power-loss protection timing	6 months		
	Low battery voltage alarm	Supported, alarm when voltage < 2.7V (3.0V x 90%)		
<b>Cycle Time</b>	Binary operation, minimum	0.08 μS per step	0.03 μS per step	
	Floating-point operation, maximum	1.06 μS per step	0.4 μS per step	
<b>C O M M U N I C A T I O N</b>	<b>Ethernet</b>	Protocol	TCP/IP, IEEE802.3/u	
		Type of interface via backplane	1x RJ45 interface	
		Redundancy	Not Supported!	Not Supported!
		Communication baud rate	10 M/100 Mbps, auto-adaptive	
		Network Topology	Star or Ring	
	<b>Fieldbus</b>	Protocol	PROFIBUS-DP	
		Type of interface via backplane	2-channel, 4-pins interface	
		Type of cable used	PROFIBUS-DP cable type A or B, shielded or unshielded twisted pair cable	
		Redundancy	Supported	
		Communication baud rate	1.5 Mbps, 500 Kbps, 187.5 Kbps, 93.75 Kbps, 45.45 Kbps, 31.25 Kbps, 19.2 Kbps, 9.6 Kbps	
	Standards	IEC61158-3 Type 3, EN50170		
	<b>Serial Port Expansion</b>	RS-232 port (COM 1)	1-channel, 9-pins D-type interface (female)	
		RS-232 / RS-485 port (COM 2)	1-channel, 2x 3pins terminal connector socket, configurable as either RS-232 or RS-485, programmable as freeport mode or MODBUS.	
	<b>Supporting CPU Redundancy</b>		NO	
	<b>Support Hot Swap</b>		YES	
<b>Watchdog Timer</b>		Supported, 0.1s ~ 25.5s configurable		
<b>Counters</b>		maximum counting range: 15 bits		
<b>Timers</b>		Unlimited instructions: 1ms to max. of 49 days		
<b>Real-time Clock (RTC)</b>		YES, yyyy-mm-dd hh:mm:ss, BCD format		
<b>Input Power Supply Voltage</b>		24VDC (20.4 ~ 28.8 VDC)		
<b>Module Power Consumption</b>		250mA @ 24VDC, max.		
<b>Program Execution</b>	Periodic	Supporting a max. of 32 task		
	Events			
<b>Programming Languages</b>		Comply with IEC61131-3 international standard: Ladder Diagram (LD), Instruction List (IL), function Block Diagram (FBD), Structural Text (ST), Sequence Function Chart (SFC), Continuous Function Chart (CFC), 6 types of programming languages		
<b>Physical Characteristic</b>	Module dimension	52.5 x 100 x 100 mm (Wx H x D)		
	Weight	280g		
<b>Environmental Specification</b>	Operating temperature	0 °C ~ 60 °C		
	Relative humidity	5% ~ 95% (non-condensing)		
	Storage temperature	-40 °C ~ 70 °C, 5% ~ 95% (non-condensing)		
	IP Protection	IP20, IEC60529		

CPU  
LK  
202  
205

# TECHNICAL SPECIFICATION

Model		Single CPU LK207	Redundancy CPU LK210	
<b>CPU Speed</b>		533 Mhz		
<b>Storage Memory</b>	FLASH: Programmable	16 MB		
	SDRAM: Data	64 MB		
	SRAM: Power-loss protection	1 MB		
	EEPROM	256 Byte		
	SD memory card	512 MB ~ 2GB		
<b>Backup Battery</b>	Voltage and current	3.0V, constant 120mAh		
	Power-loss protection timing	6 months		
	Low battery voltage alarm	Supported, alarm when voltage < 2.7V (3.0V x 90%)		
<b>Cycle Time</b>	Binary operation, minimum	0.013 μS per step		
	Floating-point operation, maximum	0.02 μS per step		
<b>C O M M U N I C A T I O N</b>	<b>Ethernet</b>	Protocol	TCP/IP, IEEE802.3/u	
		Type of interface via backplane	1-channel x RJ45 interface	2-channel x RJ45 interface
		Redundancy	Not Supported!	Supported
		Communication baud rate	10 M/100 Mbps, auto-adaptive	
		Network Topology	Star or Ring	
	<b>Fieldbus</b>	Protocol	PROFIBUS-DP	
		Type of interface via backplane	2-channel, 2 interface socket (either 4-pins type or DB9)	
		Type of cable used	PROFIBUS-DP cable type A or B, shielded or unshielded twisted pair cable	
		Redundancy	Supported	
		Communication baud rate	1.5 Mbps, 500 Kbps, 187.5 Kbps, 93.75 Kbps, 45.45 Kbps, 31.25 Kbps, 19.2 Kbps, 9.6 Kbps	
	<b>Serial Port Expansion</b>	Standards	IEC61158-3 Type 3, EN50170	
		RS-232 port (COM 1)	1-channel, 9-pins D-type interface (female)	
		RS-232 / RS-485 port (COM 2)	1-channel, 2x 3pins terminal connector socket, configurable as either RS-232 or RS-485, programmable as freeport mode or MODBUS master/slave mode.	
	<b>Supporting CPU Redundancy</b>		NO	YES
	<b>Support Hot Swap</b>		YES	
<b>Watchdog Timer</b>		Supported, 0.1s ~ 25.5s configurable		
<b>Counters</b>		maximum counting range: 15 bits		
<b>Timers</b>		Unlimited instructions: 1ms to max. of 49 days		
<b>Real-time Clock (RTC)</b>		YES, yyyy-mm-dd hh:mm:ss, BCD format		
<b>Input Power Supply Voltage</b>		24VDC (20.4 ~ 28.8 VDC)		
<b>Module Power Consumption</b>		250mA @ 24VDC, max.		
<b>Program Execution</b>	Periodic	Supporting a max. of 32 task		
	Events			
<b>Programming Languages</b>		Comply with IEC61131-3 international standard: Ladder Diagram (LD), Instruction List (IL), function Block Diagram (FBD), Structural Text (ST), Sequence Function Chart (SFC), Continuous Function Chart (CFC), 6 types of programming languages		
<b>Physical Characteristic</b>	Module dimension	52.5 x 100 x 100 mm (Wx H x D)		
	Weight	280g		
<b>Environmental Specification</b>	Operating temperature	0 °C ~ 60 °C		
	Relative humidity	5% ~ 95% (non-condensing)		
	Storage temperature	-40 °C ~ 70 °C, 5% ~ 95% (non-condensing)		
	IP Protection	IP20, IEC60529		

**CPU**  
**LK**  
**207**  
**210**

# LK231 - PROFIBUS-DP COMMUNICATION ADAPTER MODULE



## Description

LK231 communication module provides interconnection for the Profibus-DP bus from the current backplane to the next backplane allowing cascading connection. The termination matching resistor for the Profibus-DP bus at both ends are configured on the module hardware via the jumper switches.

## Features

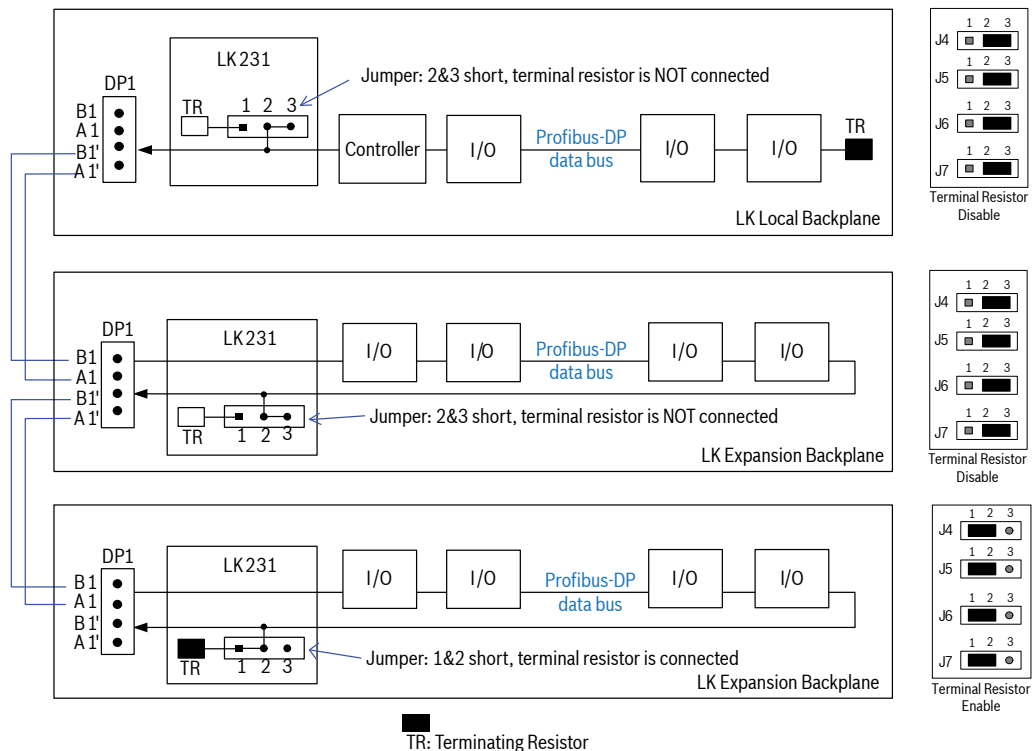
- Interconnect Profibus-DP from the current backplane to the next backplane allowing cascading connection.
- Providing the termination matching resistors for the Profibus-DP.
- Installed on the first slot starting from the left on the local or expansion backplane.
- Support Hot-Swap
- Support redundant Profibus-DP bus.

## LED Indicators

RUN Green	COM Yellow	Definition
ON	ON	Communication established, Profibus-DP network operating normally.
Flashing	OFF	Just powered on and communication not established or error occurs.
OFF	OFF	No powered supplied or faulty module.

## Operating Principles

Using LK231 module, the Profibus-DP data bus of the local backplane is connected to the LK231 module of the expansion backplane via the DP terminal connectors found on the backplane. Cascading, the Profibus-DP will then be connected to the next expansion backplane via the LK231 module. This cascading connection establishes the communication link in between the controller and all the I/O modules found on the expansion backplanes. Please see diagram for more details.



The cascading Profibus-DP wiring diagram using LK231

COM

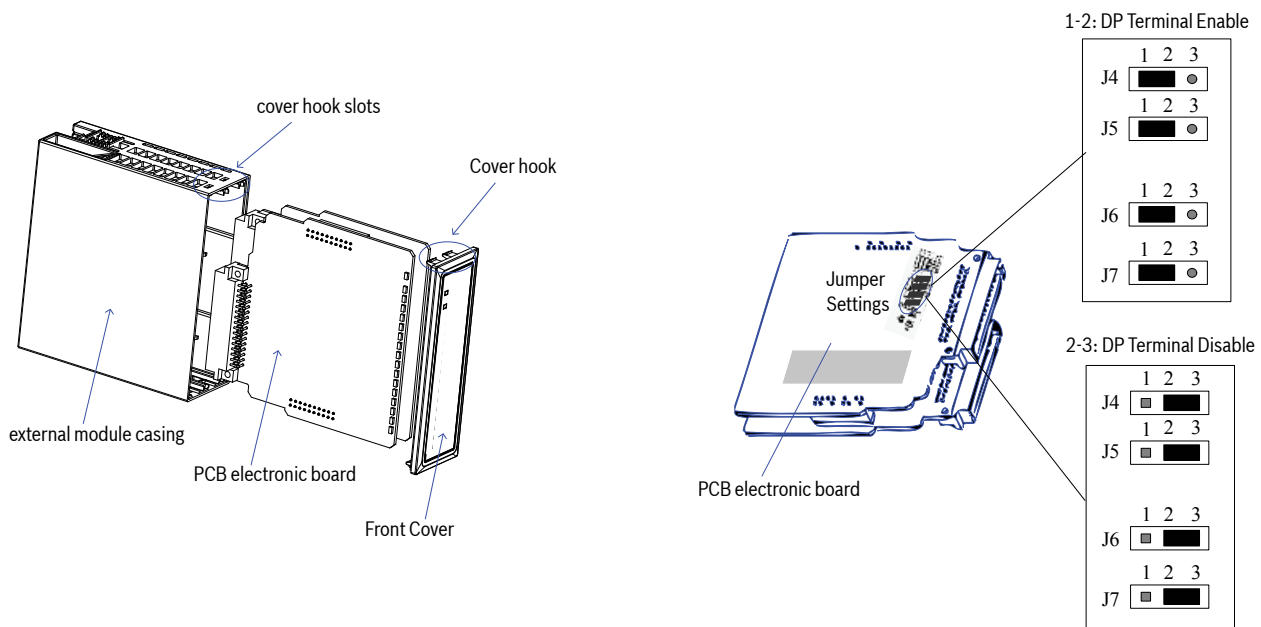
LK  
231

# TECHNICAL SPECIFICATION

LK231 PROFIBUS-DP Communication Modules	
PROFIBUS-DP	LK231
Communication Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard
Communication Interface	Profibus-DP interface double socket, 4x terminal pins per socket
Communication Mode	Slave mode: Providing only the PROFIBUS-DP physical layer switching and matching, do not send any data to the DP bus
Baud Rate	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps
Redundancy	Supported
Hot Swap	Supported
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Current Consumption (max)	50mA @ 24VDC
<b>Physical Characteristic</b>	
Modules Insertion Mechanical Key	A5
Size of Module	35mm x 100mm x 100mm (W x H x D)
Weight of Module	170g
Backplane Installation	Any first slot #0 of local or expansion backplane.
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity
Environmental IP Protection	IP20, IEC60529

COM

LK  
231



Module External Casing and Internal PCB

DP Termination Matching Resistor Jumper Setting

# LK232 - PROFIBUS-DP & REPEATER MODULE



## Description

LK232 communication module provides the repeater function for the Profibus-DP network as when the data transmission distance is too long or the load is too high. With the repeater, the quality of the signals being transmitted on the twisted pair cable shall be boosted. The repeater module selects either one of the redundant DP signal channel that works normally and output two channel of DP signals after signal regulation and amplification.

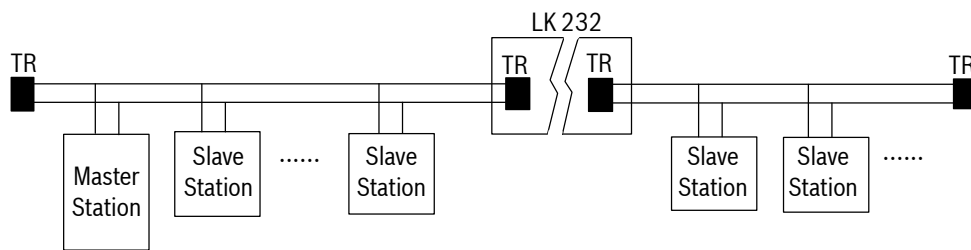
## Features

- Profibus-DP Repeater Function: Extend the physical DP cable lengths of the existing DP data bus
- Allowing change of topology of the existing Profibus-DP data bus
- Providing isolation in between two segments of the Profibus-DP data bus
- Installed on the local or expansion backplane.
- Providing the termination matching resistors for the Profibus-DP.
- Support hot swap

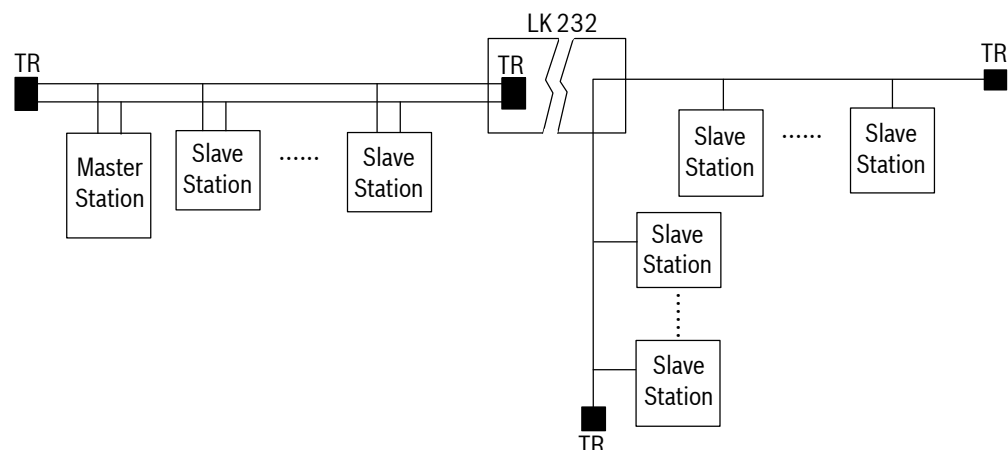
## LED Indicators

RUN Green	COM Yellow	Definition
ON	ON	Communication established, Profibus-DP network operating normally.
Flashing	OFF	Just powered on and communication not established or error occurs.
OFF	OFF	No powered supplied or faulty module.

## Operating Principles



## Changing Profibus-DP Network Topology



COM  
LK  
232



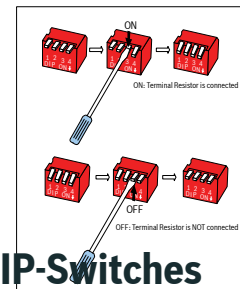
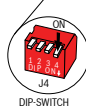
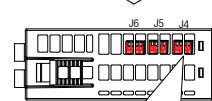
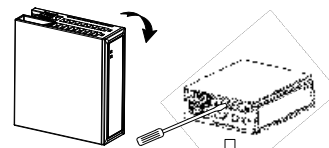
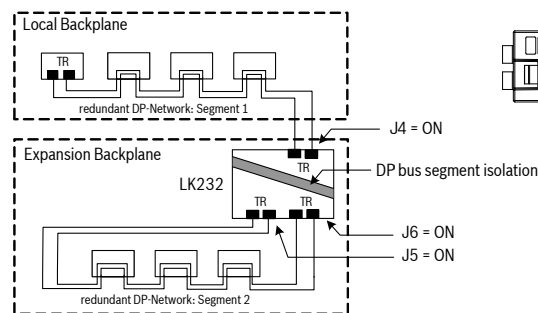
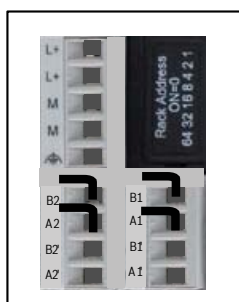
# TECHNICAL SPECIFICATION

LK232 PROFIBUS-DP Bus Repeater Modules	
PROFIBUS-DP	LK232
Communication Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard
Communication Interface	Profibus-DP interface double socket, 4x terminal pins per socket
Communication Mode	Profibus-DP Repeater function, allows changing of DP network topology.
DP Segment Isolation	500VAC for 1 minute, 5mA leakage current
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps
Redundancy	Supported
Hot Swap	Supported
<b>Isolation</b>	
Network Segment 1 & 2	500VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Current Consumption (max.)	60mA @ 24VDC
<b>Physical Characteristic</b>	
Modules Insertion Mechanical Key	A5
Size of Module	35mm x 100mm x 100mm (W x H x D)
Weight of Module	170g
Backplane Installation	Any first slot #0 of the local or expansion backplane
<b>Environmental Requirements</b>	
Ambient Operating Environment	0°C ~ 60°C
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40°C ~ 70°C, (25°F ~ 55°F), 95% humidity
Environmental IP Protection	IP20, IEC60529

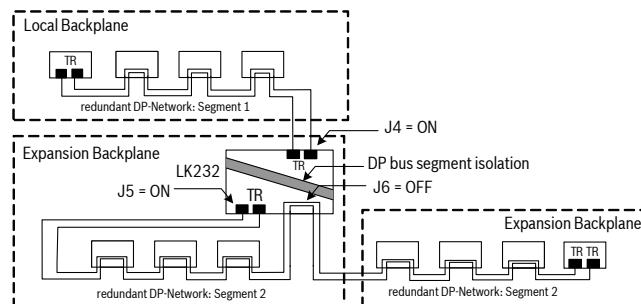
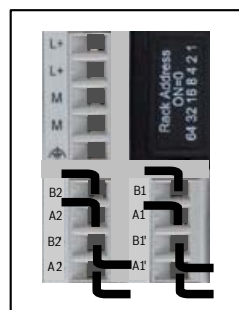
COM

LK  
232

## Terminal Wiring



DIP-Switches



TR: Terminating Resistance

# LK233 - PROFIBUS-DP OPTICAL FIBER INTERFACE MODULE



## Description

LK233 is a PROFIBUS-DP optical tranceiver module installed only on the I/O module slot of the backplane allowing communication data transmission over very long distance which was not possible with PROFIBUS-DP. It is used to extend the distance limit of the PROFIBUS-DP.

Over fiber optics, data communication is immune from electromagnetic interference, lightning, chemical, corrosion, etc which maybe required for use in special project which has harsh or noisy environment.

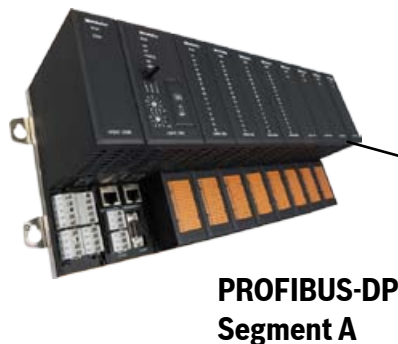
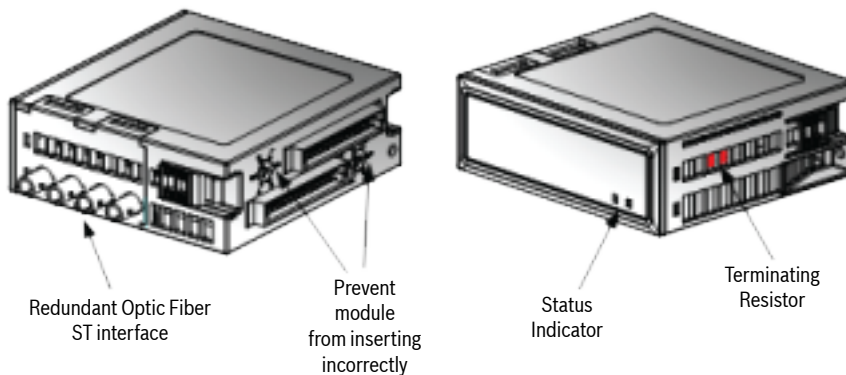
LK233 achieve DP-bus network at the physical layer of the optical transmission. Each conversion expands the physical length of the DP-bus ensuring data safety and effectiveness. Two fiber optic channels are used to fulfill DP redundancy data transmission.

LK233 is installed on the I/O module slot for the local or expansion backplane. It work together with LK231 or Lk232 PROFIBUS-DP Communication module.



## Features

- Extend PROFIBUS-DP transmission distance by using fiber optics.
- 2-channel optical fiber redundancy data communication.
- Support multi-mode optical glass fiber.
- Terminating resistor are provided.
- Installable on Local or Expansion Backplane on the I/O module slot.
- Support hot swap.



**2-channel Redundancy Fiber Optic Data Transmission**



COM  
LK  
233

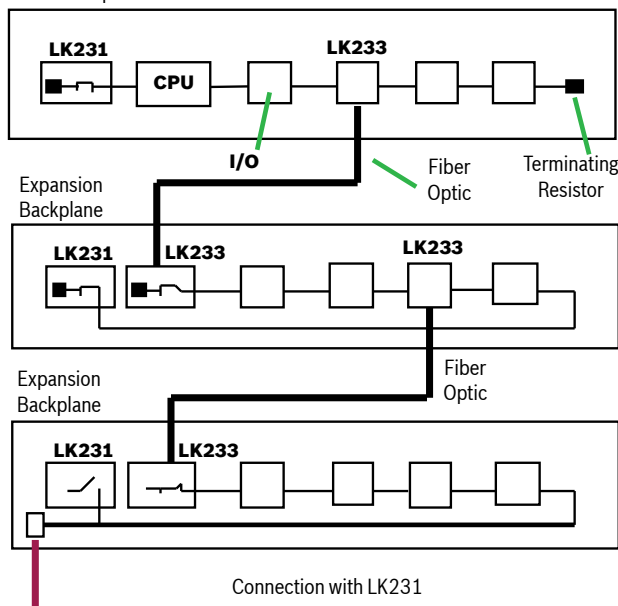
# TECHNICAL SPECIFICATION

LK233 Optical Fiber Interface Modules		
<b>Optical Fiber Interface</b>	<b>LK233</b>	
Type of Interface	4x ST Interface (Ceramic or plastic)	
Number of Channel	2	
Optical Fiber type	62.5/125um or 50/125um multi-mode optical glass fiber	
Wavelength	1300nm	
Transmission Distance	0 to 5km	
<b>Drive Capability</b>		
Load capacity (optical side)	Able to drive Multi-mode glass fiber length (longest of 5km)	
Load capacity (electrical side)	Able to drive LK I/O module (max. of 256)	
Number of Cascade	4 cascade (max. of 8x LK233, every pair of LK233 with Data Delay of 1.2us)	
<b>PROFIBUS-DP</b>		
Communication Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy	Supported	
Hot Swap	Supported	
<b>System Power</b>		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption (Max.)	80mA max. @ 24VDC	
<b>Physical Characteristic</b>		
Status Indicator	RUN	Green, communicating with the controller
	COM	Yellow, communicating with I/O module
Modules Insertion Mechanical Key	A5	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Hot-swappable	Supported	
Backplane Installation	Any I/O module slot of Local or Expansion Backplane	
<b>Environmental Requirements</b>		
Ambient Operating Environment	0 °C ~ 60 °C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

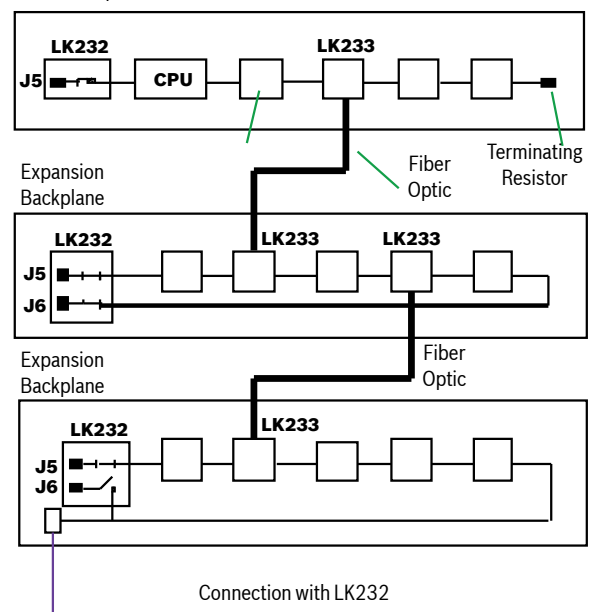
COM

LK  
233

Local Backplane



Local Backplane



# LK239 - MODBUS COMMUNICATION MODULE (MASTER/SLAVE)



## Description

LK239 module provides the same PROFIBUS-DP communication as LK231 in additional of MODBUS protocol communication interfaces supporting up to a maximum of 28 MODBUS slave station.

## Features

- Support MODBUS Master/Slave Mode.
- Support PROFIBUS-DP Slave to communicate with the LK Controller.
- Linking-up LK Controller with External MODBUS devices.
- Up to maximum of 28 MODBUS station nodes depending on its bandwidth not more than 244 bytes.
- Installed into the I/O module slot.
- Support hot swap.

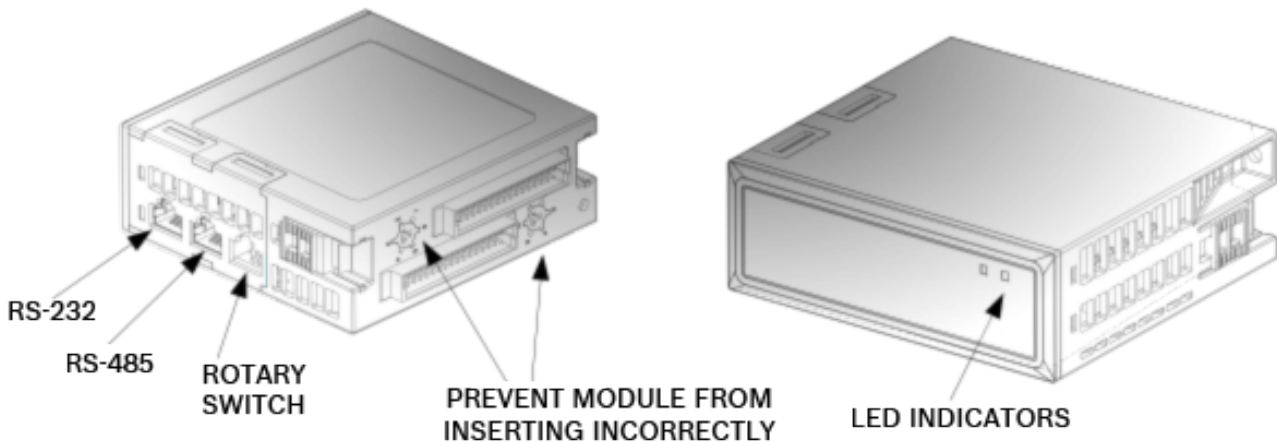
## LED Indicators

Indicator	Status	Definition
RUN Green	ON	LK239 and LK controller communication establish normally.
	Flashing	LK239 and LK controller communication not established or error occurs.
	OFF	Power is NOT supplied to the module or faulty.
COM Yellow	ON	LK239 communications normally with one or more MODBUS slave station.
	Flashing	MODBUS communication not established or error occurs.
	OFF	LK239 is not setup with any MODBUS slave station

## Terminal Wiring

Interface	Material Code	Cable Specification	DB9 Pin Definition
RS-485	2140200577	Shield cable with magnetic ring, 3m, One end of the cable is RJ45 connector and ther other end is DB9 connector.	1 -- GND
			5 -- RS485+
			9 -- RS485-
RS-232	2140200576	Shield cable with magnetic ring, 3m, One end of the cable is RJ45 connector and ther other end is DB9 connector.	2 -- TXD
			3 -- RXD
			5 -- GND

## Interfaces



\*special cables are required to connect to LK239, RS-232 and RS-485. Ethernet interface to standard DB9 serial interface.

COM  
LK  
239

# TECHNICAL SPECIFICATION

<b>LK239 MODBUS MODULE (MASTER/SLAVE)</b>	
<b>MODBUS</b>	
Communication Protocol	MODBUS MASTER or SLAVE (configurable)
Communication Interface	RS-232 or RS-485 Comm (via 5x special comm terminal pin)
Communication Mode	RTU
Data Format	Standard MODBUS format
MODBUS function code	01, 02, 03, 04, 05, 06, 15, 16 (decimal)
CRC	Odd parity, Even parity, or No parity
Maximum no. of slave station	28 nodes at max. (cannot exceed the I/O data length.)
Input/Output data length	244 bytes (at max)
Communication Baud Rate	115.2kbps, 57.6kbps, 38.4 kbps, 19.2kbps, 9.6kbps, 4.8kbps, 2.4kbps, 1.2kbps
<b>PROFIBUS-DP</b>	
Communication Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard
Communication Interface	Profibus-DP interface double socket, 4x terminal pins per socket
Communication Mode	Slave mode: Providing only the PROFIBUS-DP physical layer switching and matching, do not send any data to the DP bus
Baud Rate	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 19.2Kbps, 9.6Kbps (auto-adaptive)
Redundancy	Supported
Hot Swap	Supported
<b>Isolation</b>	
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current
<b>System Power</b>	
Power Supply	24VDC (20.4VDC ~ 28.8VDC)
Current Consumption (max.)	80mA @ 24VDC
<b>Physical Characteristic</b>	
Modules Insertion Mechanical Key	F1
Size of Module	35mm x 100mm x 100mm (W x H x D)
Weight of Module	190g
Backplane Installation	Any I/O module slot of Local or Expansion Backplane
<b>Environmental Requirements</b>	
Ambient Operating Environment	0 °C ~ 60 °C
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity
Environmental IP Protection	IP20, IEC60529

COM

LK  
239

# LK250 - PROFIBUS-DP INTERFACE MODULE (for DP-node expand)



## Description

The main purpose of LK250, equipped with a controller processor, is to allow additional expansion of I/O modules to be installed in a single Profibus-DP network segment. Within a DP network, the maximum limitation is 127 DP-nodes addresses. By using LK250, it helps to reduce the number of DP-slave station node in the network segment where the master controller resides.

## Features

- Expand additional 30 DP-slave station nodes per LK250 (Expand I/O modules).
- Interconnect this extra Profibus-DP slave stations to LK250.
- Used to reduce the number of Profibus-DP slave station nodes in the network segment where the controller resides.
- **Can only be installed on extension backplanes.**
- Providing termination matching resistors for Profibus-DP.
- Support hot swap.

## LED Indicators

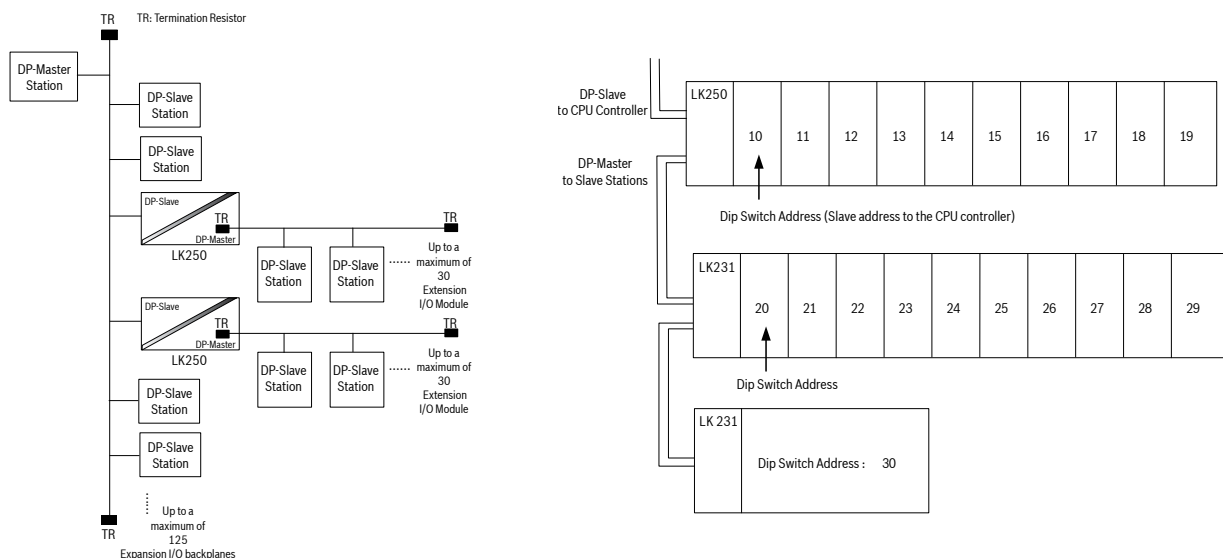
RUN Green	COM Yellow	Definition
ON	ON	Communication established, Profibus-DP network operating normally.
Flashing	OFF	Just powered on and communication not established or error occurs.
OFF	OFF	No powered supplied or faulty module.

## Operating Principles

One logical Profibus-DP network segment can only support up to 127 nodes addresses (address=0 to 126). Address 126 is reserved for broadcast and address 0 is used by the master station. Hence, Profibus-DP network can support at most up to 125 slave station. When Profibus-PA equipment are used, it is even more likely to use more than 125 DP-slave station since each PA equipment (one I/O channel) will occupy a single DP note address after the DP conversion with a DP/PA coupler device.

## How it works

To resolve and increase the number of slave station within a single Profibus-DP segment, LK250 Profibus-DP network extension module is used. Each LK250 may carries at most additional 30 DP-slave station nodes (or 30 extended I/O module). Logically speaking, LK250 uses the DP-slave station protocol to connects to the master controller occupying one single DP node address as seen by the controller. At the same time, it uses the DP-master station protocol to connects to the extended I/O module forming a DP logical network segment. The extended I/O modules exchange data with the master controller through the LK250 module and uses only one DP node as seen by the master controller.



COM

LK  
250

# TECHNICAL SPECIFICATION

LK250 PROFIBUS-DP Network Extension Modules		
<b>Processor &amp; Storage</b>		
<b>LK250</b>		
CPU	32-bit processor	
SRAM Storage	256KB	
Flash RAM Storage	2MB	
<b>PROFIBUS-DP</b>		
Communication Protocol	DP-Slave mode to DP-Master controller, compliance with IEC61158-3/EN50170 standard	
DP-Slave Station Support	Input Data Size	244 byte
	Output Data Size	244 byte
	User Parameters Data size	239 byte
	No. of Slave Station Module	Max. of 30 DP-slave stations
Baud Rate	DP-Slave Protocol	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps
	DP-Master Protocol	500Kbps
Redundancy	Supported	
Hot Swap	Supported	
<b>System Power</b>		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption (Max.)	100mA @ 24VDC	
<b>Physical Characteristic</b>		
Modules Insertion Mechanical Key	B5	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Weight of Module	170g	
Backplane Installation	Install on first slot #0 of the Expansion Backplane only.	
<b>Environmental Requirements</b>		
Ambient Operating Environment	0°C ~ 60°C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40°C ~ 70°C, (25°F ~ 55°F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

COM

LK  
250



# LK255 - PROFIBUS-DP SLAVE INTERFACE MODULE



## Description

LK255 module installed only on the I/O module slot act as a PROFIBUS-DP slave mode allows communication to any third party's PROFIBUS-DP master controller, for example Siemens Controller using PROFIBUS-DP.

## Features

- Support backplane data bus. (highspeed and Profibus-DP)
- Supports PROFIBUS-DP Slave mode protocol, DB9 pin interface.
- Act as DP-Slave for the LK system and provide communication with 3rd party controller acting as DP-Master.
- Installed only on the local backplane I/O module slot.
- Hot swap.

## LED Indicators

Indicator	Status	Definition
RUN Green	ON	LK255 and LK controller communication establish normally.
	Flashing	LK255 and LK controller communication not established or error occurs.
	OFF	Power is NOT supplied to the module or faulty.
DP Yellow	ON	LK255 and DP-Master communication establish normally.
	Flashing	LK255 and DP-Master communication not established or error occurs.
	OFF	No communication established with the DP-Master or not connected.

## Terminal Wiring Diagram

Pin no.	Pin Defination	Description
1	Not used	Not used
2	DP1+	Channel 1 : DP + signal
3	DP2+	Channel 2 : DP + signal
4	Not used	Not used
5	Not used	Not used
6	Not used	Not used
7	DP1-	Channel 1 : DP - signal
8	DP2-	Channel 2 : DP - signal
9	Not used	Not used

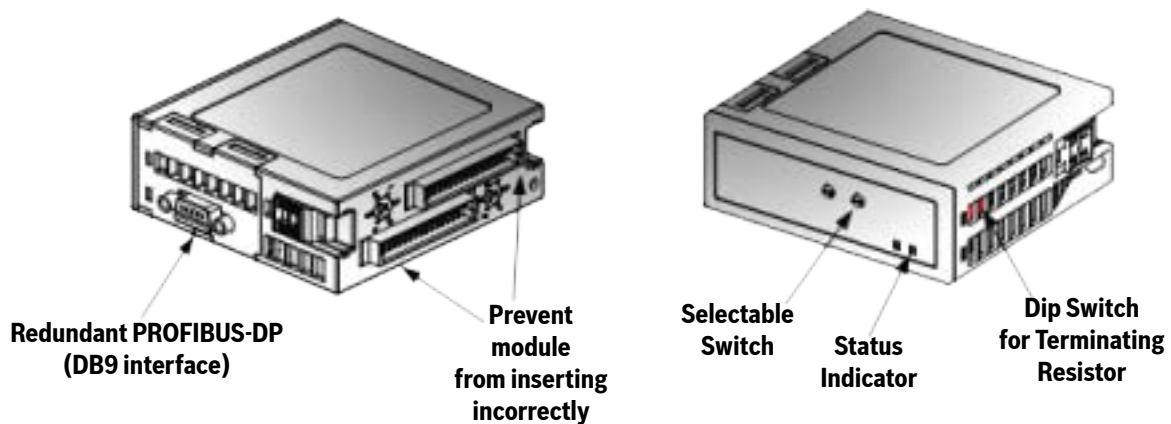
COM  
LK  
255

# TECHNICAL SPECIFICATION

LK255 PROFIBUS-DP Slave Interface Module		
PROFIBUS-DP		
LK255		
Communication Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Communication Interface	DB9 interface connection with external DP controllers	
Data Input/Output Word length	Data Input/Output not more than 100 words.	
DP Segment Isolation	500VAC for 1 minute, 5mA leakage current	
Baud Rate	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy	Supported	
Hot Swap	Supported	
System Power		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption (Max.)	60mA max. @ 24VDC	
Physical Characteristic		
Status Indicator	RUN	Green, communicating with the LK controller
	DP	Yellow, DP-Slave communicating with DP-Master
Modules Insertion Mechanical Key	B5	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Backplane Installation	Any I/O module slot of Local Backplane. Not design for Expansion Backplane.	
Environmental Requirements		
Ambient Operating Environment	0 °C ~ 60 °C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

COM

LK  
255



# ANALOG INPUT MODULE - VOLTAGE INPUT



## Description

LK410 module can manage up to 8 channels of voltage analog input signal. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

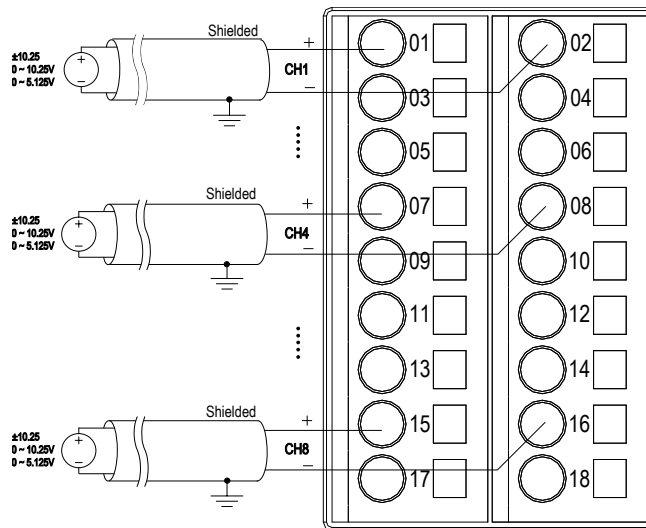
## Features

- 8 channel voltage inputs.
- Voltage range: **-10.25V ~ +10.25V** or **0 ~ +10.25V** or **0 ~ +5.125V**
- LED status indicator: **RUN** or **CAL**ibration
- Over-limit and over-range alarm.
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK410

## Data Signal Conversion

LK410		
Input Voltage Signal	Data Format (Decimal)	
±10.25V	0 ~ 10.25V	0 ~ 32767
	-10.25 ~ 0V	32767 ~ 65535
0 ~ 10.25V	0 ~ 65535	
0 ~ 5.125V	0 ~ 65535	

Input Signal and Data Conversion Format

AI  
LK  
410

# TECHNICAL SPECIFICATION

LK410 8 channels Analog Input Module, Voltage Input Signal				
<b>Analog Input</b>				
Number of Input	8 channels			
ADC Resolution	16 bits			
Input Range (Voltage)	±10.25V		0 ~ 10.25V	0 ~ 5.125V
	-10.25 ~ 0V	0 ~ 10.25V		
Data Conversion Format (Dex)	32768 ~ 65535	0 ~ 32768	0 ~ 65535	0 ~ 65535
Sampling Rate	Hardware Filter @ 50Hz	<480ms per 8 channels		
	Hardware Filter @ 60Hz	<480ms per 8 channels		
Input Impedence	> 1MΩ			
Analog Step Response Time	< 1s response time to reach 90% fullscale			
Normal mode rejection ratio (NMRR)	80dB @ 50 or 60Hz			
Common mode rejection ratio (CMRR)	100dB @ 50 or 60Hz			
Accuracy, typical 25 °C	< ±0.1% of fullscale			
Calibration Accuracy, typical 25 °C	< ±0.03% of fullscale			
Calibration Interval	12 months			
Temperature Drift	±12ppm/°C			
Over-voltage Protection	30VDC			
<b>Isolation</b>				
Isolation in-between channels	----			
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current			
<b>Diagnostic Functions</b>				
Over Limit Alarm (High/Low)	Supported, diagnostic report as 0x07/0x08			
Over Range Alarm (top/bottom)	Supported, diagnostic report as 0x03/0x02			
Open-wired Detection	Supported, diagnostic report as 0x06, fault recovery report as 0x00			
Hot Swap	Supported			
<b>Fieldbus Communication</b>				
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard			
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps			
Redundancy	Supported			
<b>System Power</b>				
Power Supply	24VDC (20.4VDC ~ 28.8VDC)			
Current Consumption	100mA @ 24VDC			
<b>Physical Characteristic</b>				
Modules Insertion Mechanical Key	A0			
Size of Module	35mm x 100mm x 100mm (W x H x D)			
Weight of Module	190g			
Backplane Installation	Any local or expansion backplane.			
<b>Environmental Requirements</b>				
Ambient Operating Environment	0 °C ~ 60 °C			
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas			
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity			
Environmental IP Protection	IP20, IEC60529			

AI

LK  
410

# ANALOG INPUT MODULES - CURRENT INPUT



## Description

LK411 and LK414 modules can manage up to 8 channels of current analog input signal. LK411 does not provide power to either the 2-wired or 4-wired transmitter devices whereas LK414 provide the 24VDC power to the 2-wired transmitter devices. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

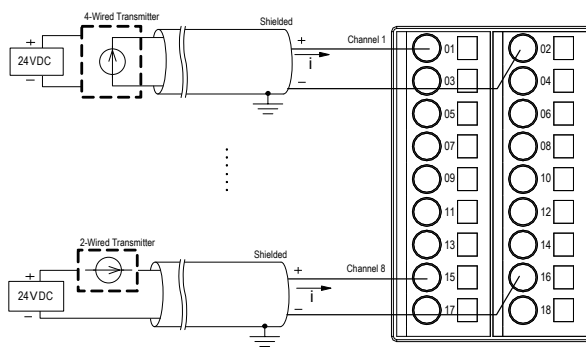
## Features

- 8 channel current inputs.
- Current range: **0~ +20.58mA** or **4 ~ +20.58mA**
- 2-wired or 4-wired transmitter
- LED status indicator: **RUN** or **CAL**ibration
- Over-limit and over-range alarm.
- Open wire detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

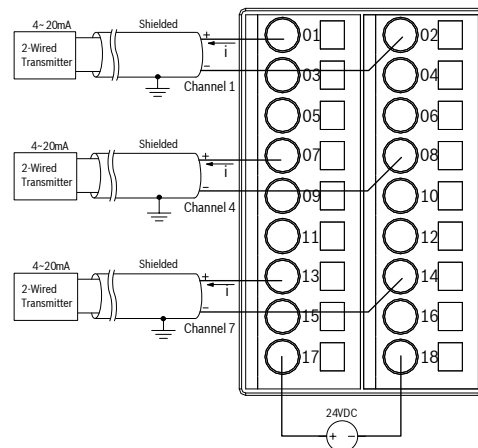
## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK411 for either 2-wired or 4-wired transmitter



Terminal Wiring Diagram of LK414 for 2-wired transmitter

## Data Signal Conversion

LK411	
Input Current Signal	Data Format (Decimal)
4 ~ 20.58 mA	0 ~ 65535
0 ~ 20.58 mA	0 ~ 65535

LK414	
Input Current Signal	Data Format (Decimal)
4 ~ 20.58 mA	0 ~ 65535

Input Signal and Data Conversion Format

AI  
LK  
411  
414

# TECHNICAL SPECIFICATION

LK411 and LK414 8 channels Analog Input Module, Current Input Signal			
Analog Input		LK411	LK414
Number of Input		8 channels	
ADC Resolution		16 bits	
Input Range		4 ~ 20.58mA / 0 ~ 20.58mA (4-wire/2wire current signal)	4 ~ 20.58mA (2-wired current signal)
Data Conversion Format (Dex)		0 ~ 65535	
Sampling Rate	Hardware Filter @ 50Hz	<480ms per 8 channels	480 ~ 960ms per 8 channels
	Hardware Filter @ 60Hz	<480ms per 8 channels	400 ~ 800ms per 8 channels
Input Impedence (current)		243Ω	239Ω
Analog Step Response Time		< 1s response time to reach 90% fullscale	
Normal mode rejection ratio (NMRR)		80dB @ 50 or 60Hz	
Common mode rejection ratio (CMRR)		100dB @ 50 or 60Hz	
Accuracy, typical 25 °C		< ±0.1% of fullscale	
Calibration Accuracy, typical 25 °C		< ±0.03% of fullscale	
Calibration Interval		12 months	
Temperature Drift		±25ppm/ °C	
<b>Isolation</b>			
Isolation in-between channels		----	----
Isolation Endurance (field-to-system)		500VAC for 1 minute, 5mA leakage current	
<b>Diagnostic Functions</b>			
Over Limit Alarm (High/Low)		Supported, diagnostic report as 0x07/0x08	
Over Range Alarm (top/bottom)		Supported, diagnostic report as 0x03/0x02	
Open-wired Detection		Supported, diagnostic report as 0x06, fault recovery report as 0x00	
Hot Swap		Supported	
<b>Fieldbus Communication</b>			
Protocol		PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*		1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy		Supported	
<b>System Power</b>			
Power Supply		24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption		60mA @ 24VDC	50mA @ 24VDC
<b>Physical Characteristic</b>			
Modules Insertion Mechanical Key		A1	
Size of Module		35mm x 100mm x 100mm (W x H x D)	
Weight of Module		190g	
Backplane Installation		Any local or expansion backplane.	
<b>Environmental Requirements</b>			
Ambient Operating Environment		0 °C ~ 60 °C	
Relative Humidity		5% ~ 95% non-condensing, no corrosive gas	
Storage Environment		-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection		IP20, IEC60529	

AI

LK  
411  
414



# ANALOG INPUT MODULE - ISOLATED VOLTAGE/CURRENT INPUT



## Description

LK412 module can manage up to 6 channel of either voltage or current analog input signals. every input channel are isolated. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

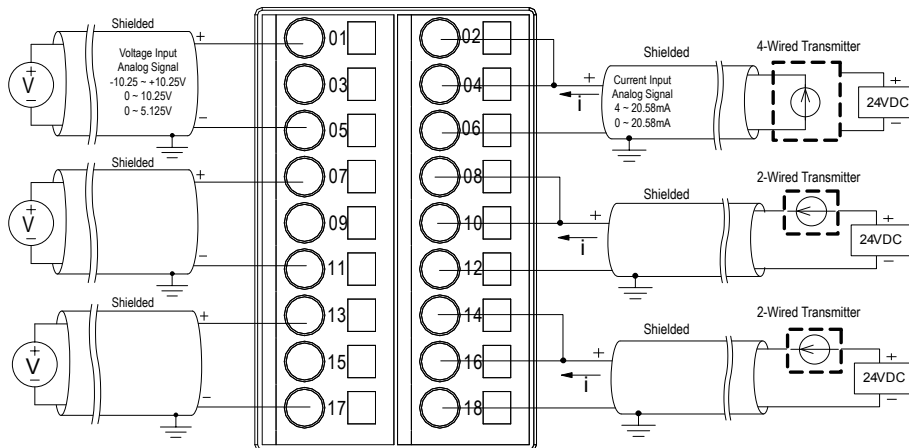
## Features

- 6 channel isolated voltage or current inputs.\*
- Voltage range: **-10.25V ~ +10.25V** or **0 ~ +10.25V** or **0 ~ +5.125V**
- Current range: **0 ~ +20.58mA** or **4 ~ +20.58mA** (2-wired or 4-wired transmitter)
- LED status indicator: **RUN** or **CAL**ibration
- Over-limits and over-range alarm.
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK415

## Data Signal Conversion

LK415		
Input Voltage Signal		Data Format (Decimal)
±10.25V	0 ~ 10.25V	0 ~ 32767
	-10.25 ~ 0V	32767 ~ 65535
0 ~ 10.25V		0 ~ 65535
0 ~ 5.125V		0 ~ 65535
Input Current Signal		Data Format (Decimal)
4 ~ 20.58mA		0 ~ 65535
0 ~ 20.58mA		0 ~ 65535

Input Signal and Data Conversion Format

AI  
LK  
412

# TECHNICAL SPECIFICATION

<b>LK412 6 channels Analog Input Module, Voltage or Current Input Signal with Channel Isolation</b>				
<b>Analog Input</b>				
Number of Input	6 channels			
ADC Resolution	16 bits			
Input Range (Voltage)	$\pm 10.25V$		0 ~ 10.25V	0 ~ 5.125V
	-10.25 ~ 0V	0 ~ 10.25V		
Data Conversion Format (Dex)	32768 ~ 65535	0 ~ 32767	0 ~ 65535	0 ~ 65535
Input Range (Current)	4 ~ 20.58mA		0 ~ 20.58mA	
Data Conversion Format (Dex)	0 ~ 65535		0 ~ 65535	
Sampling Rate (All channels)	< 50ms (without software filter)			
Input Impedence	> 1M $\Omega$ (voltage), 250 $\Omega$ (current)			
Analog Step Response Time	< 1s response time to reach 90% fullscale			
Normal mode rejection ratio (NMRR)	60dB @ 50 or 60Hz			
Common mode rejection ratio (CMRR)	100dB @ 50 or 60Hz			
Accuracy, typical 25 °C	< $\pm 0.1\%$ of fullscale			
Repeat Accuracy, typical 25 °C	< $\pm 0.02\%$ of fullscale			
Calibration Accuracy, typical 25 °C	< $\pm 0.03\%$ of fullscale			
Calibration Interval	12 months			
Temperature Drift	$\pm 25\text{ppm}/^\circ\text{C}$			
<b>Isolation</b>				
Isolation in-between channels	YES			
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current			
Isolation Endurance (Channels)	500VAC for 1 minute, 5mA leakage current			
<b>Diagnostic Functions</b>				
Calibration fault diagnostic	Supported, diagnostic report as 0x02; No report when no fault found.			
Over Limit Alarm (High/Low)	Supported, diagnostic report as 0x07/0x08			
Over Range Alarm (top/bottom)	Supported, diagnostic report as 0x03/0x02			
Open-wired Detection	Supported, diagnostic report as 0x06, fault recovery report as 0x00			
Hot Swap	Supported			
<b>Fieldbus Communication</b>				
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard			
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps			
Redundancy	Supported			
<b>System Power</b>				
Power Supply	24VDC (20.4VDC ~ 28.8VDC)			
Current Consumption	150mA @ 24VDC			
<b>Physical Characteristic</b>				
Modules Insertion Mechanical Key	A $\theta$			
Size of Module	35mm x 100mm x 100mm (W x H x D)			
Weight of Module	190g			
Backplane Installation	Any local or expansion backplane.			
<b>Environmental Requirements</b>				
Ambient Operating Environment	0 °C ~ 60 °C			
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas			
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity			
Environmental IP Protection	IP20, IEC60529			

AI

LK  
412

# ANALOG INPUT MODULE - RTD INPUT



## Description

LK430 module can manage up to 6 channels of RTD analog input signal. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

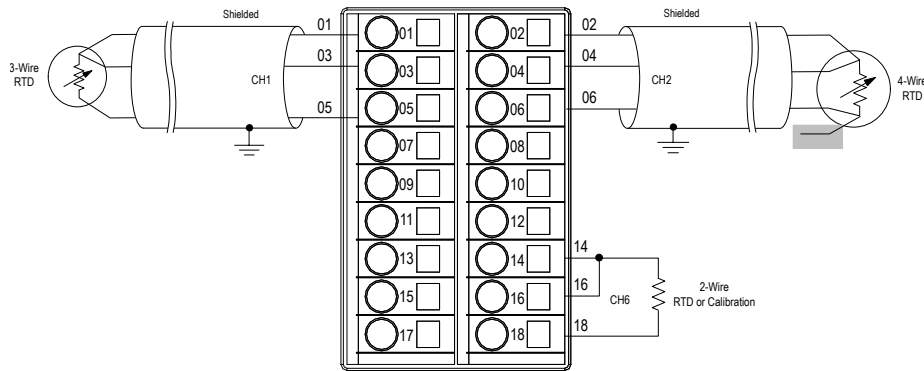
## Features

- 6 channel RTD input.
- Input range: **Pt100/200/500/1000**  
**Ni100/120/200/500**  
**Cu10/50**
- Temperature range: **-200°C ~ +870°C**
- Resistor range: **1 ~ 4020Ω**
- LED status indicator: **RUN** or **CAL**ibration
- Over-limits alarm.
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK430

## Data Signal Conversion

LK430	
Data Format (Decimal 0 ~ 65535)	
Temperature Input	(Measured Temperature x 10) + 10000
Resistance Input	65535 x (Measured Resistance - The measure range smallest resistance value) / the measure range largest resistance value

LK430			
Type	Temperature Range °C	Relative Resistance Ω	Measurable Resistance Range Ω
Copper427 10Ω	-200°C ~ +260°C	3.69980 ~ 21.1574	1~121.75
Chinese_CU 50Ω	-50°C ~ +150°C	39.243 ~ 82.136	
Nike618 100Ω	-60°C ~ +250°C	69.5204 ~ 343.584	
Nike618 120Ω	-60°C ~ +250°C	83.4245 ~ 412.301	1~487
Platinum385 100Ω	-200°C ~ +870°C	18.5201 ~ 396.311	
Platinum3916 100Ω	-200°C ~ +630°C	16.9960~327.744	2~1000
Nike618 200Ω	-60°C ~ +250°C	139.041~687.168	
Nike672 120Ω	-80°C ~ +320°C	66.6000~568.407	
Platinum385 200Ω	-200°C ~ +870°C	37.0402~792.622	
Platinum 3916 200Ω	-200°C ~ +630°C	33.992~655.488	
Nike618 500Ω	-60°C ~ +250°C	347.602~1717.92	
Platinum385 500Ω	-200°C ~ +870°C	92.6005~1981.56	4~2000
Platinum3916 500Ω	-200°C ~ +630°C	84.98~1638.72	
Platinum385 1000Ω	-200°C ~ +870°C	185.201~3963.11	
Platinum3916 1000Ω	-200°C ~ +630°C	169.960~3277.44	8~4020

Input and Data Conversion Format

RTD  
LK  
430

# TECHNICAL SPECIFICATION

LK430 6 channels RTD Input Module			
<b>Analog Input</b>			
Number of Input		6 channels	
ADC Resolution		16 bits	
Methods of Measurement		3-wire connection RTD input	
Types of RTD input sensors and its accuracy	RTD Code		Temperature Range
	Copper427: 10Ω		-200 °C ~ 260 °C
	Chinese_Cu: 50Ω		-50 °C ~ 150 °C
	Nickel618: 100Ω/120Ω/200Ω/500Ω		-60 °C ~ 250 °C
	Nickel672: 120Ω		-80 °C ~ 320 °C
	Platinum385: 100Ω/200Ω/500Ω/1000Ω		-200 °C ~ 870 °C
	Platinum3916: 100Ω/200Ω/500Ω/1000Ω		-200 °C ~ 630 °C
Max. Allowed Resistance Range		1 ~ 4020Ω	
Max. Allowed Temperature Range		-200 °C ~ 870 °C	
Data Conversion Format (Dex)	Resistance	65535 x ( Resistance - Smallest Resistance Value ) / Maximum Resistance Value	
	Temperature	65535 X 10 + 10000	
Resistance Accuracy		±0.1% of fullscale	
Sampling Rate per 6 channels	Resistance	min: 100ms; max: 1.5s	
	Temperature	min: 150ms; max: 2s	
Normal mode rejection ratio (NMRR)		60dB @ 50Hz	
Common mode rejection ratio (CMRR)		100dB @ 50Hz	
Temperature Drift		±50ppm/ °C	
Calibration Accuracy, typical 25 °C		±0.05% of fullscale	
Calibration Interval		12 months	
<b>Isolation</b>			
Isolation Endurance (field-to-system)		500VAC for 1 minute, 5mA leakage current	
<b>Data Conversion Format (Dex 0 ~ 65535)</b>			
Temperature Input		(Measured Temperature x 10) + 10000	
Resistance Input		65535 x (Measured Resistance - The measure range smallest resistance value) / The measure range largest resistance value	
<b>Diagnostic Functions</b>			
Over Limit Alarm (High/Low)		Supported, diagnostic report as 0x07/0x08	
Open-wired Detection		Supported, diagnostic report as 0x06	
Hot Swap		Supported	
<b>Fieldbus Communication</b>			
Protocol		PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*		1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy		Supported	
<b>System Power</b>			
Power Supply		24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption		65mA @ 24VDC	
<b>Physical Characteristic</b>			
Modules Insertion Mechanical Key		A2	
Size of Module		35mm x 100mm x 100mm (W x H x D)	
Weight of Module		180g	
Backplane Installation		Any local or expansion backplane.	
<b>Environmental Requirements</b>			
Ambient Operating Environment		0 °C ~ 60 °C	
Relative Humidity		5% ~ 95% non-condensing, no corrosive gas	
Storage Environment		-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection		IP20, IEC60529	

RTD

LK  
430

# ANALOG INPUT MODULES - THERMOCOUPLE INPUT



## Description

LK440, LK441, and LK442 modules can manage up to 8 channels of thermocouple or millivolt-level signal. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

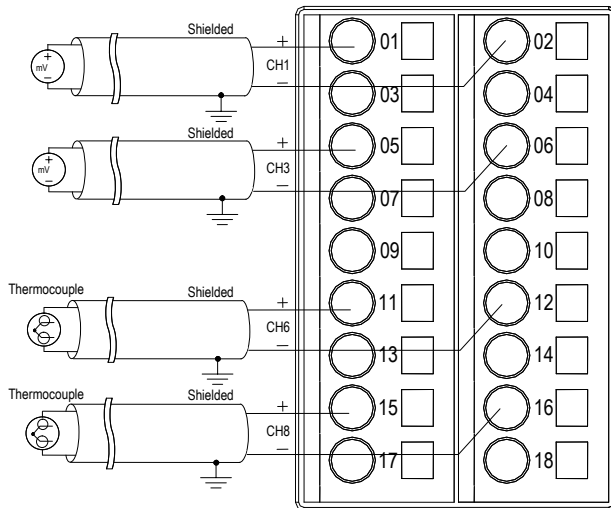
## Features

- 8 channel thermocouple/millivolt inputs
- Thermocouple type: **B / C / E / J / K / N / R / S / T**
- LED status indicator: **RUN** or **CAL**ibration
- Over-limit and over-range alarm.
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.
- LK440 is TC without cold-end compensation.
- LK441 and LK442 is TC with cold-end compensation but LK441 is without isolated channels.

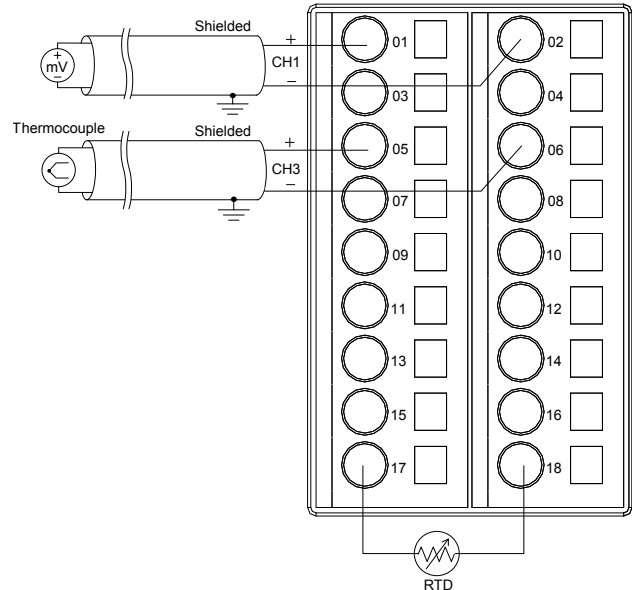
## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK440



Terminal Wiring Diagram of LK441/442

## Data Signal Conversion

LK440, LK441 and LK442		
Data Format (Decimal 0 ~ 65535)		
Temperature Input		$(\text{Measured Temperature} \times 10) + 10000$
Millivolt Input	-12mV ~ +78mV	$65535 \times (\text{Measured Millivolt} + 12) / 90$
	-12mV ~ +32mV	$65535 \times (\text{Measured Millivolt} + 12) / 44$

Input and Data Conversion Format

TC  
LK  
441  
442

# TECHNICAL SPECIFICATION

LK440, LK441, and LK442 8 channels Thermocouple Input			
Analog Input		LK441	LK442
Number of Input		8 Channels + 1 Cold-junction Compensation	6 Channels + 1 Cold-junction Compensation
Cold-end Compensation		Supported	Supported
ADC Resolution		16 bits	
Input Type	Thermocouple	B, C, E, J, K, N, R, S, T thermocouple	
	Millivolt	-12mV ~ +78mV or -12mV ~ +32mV, configurable	
Thermocouple Temperature Range		-12mV ~ +78mV	-12mV ~ +32mV
B type			300~1820°C (572~3308°F)
C type		0~2315°C (32~4199°F)	0~1725°C (32~3137°F)
E type		-270~1000°C (-454~1832°F)	-270~415°C (-454~779°F)
J type		-210~1200°C (-346~2192°F)	-210~550°C (-346~1022°F)
K type		-270~1372°C (-454~2502°F)	-270~725°C (-454~1337°F)
N type		-270~1300°C (-454~2372°F)	-270~840°C (-454~1544°F)
R type			-50~1768°C (-58~3215°F)
S type			-50~1768°C (-58~3215°F)
T type			-270~400°C (-454~752°F)
Temperature Resolution	Type: B, R, S, C, E, J, K, T, N	±0.05°C (±0.09°F)	
Accuracy, typical 25°C		< ±0.1% of fullscale	
Normal mode rejection ratio (NMRR)		60dB @ 50Hz or 60Hz	
Common mode rejection ratio (CMRR)		100dB @ 50Hz or 60Hz	
Input Impedance		10MΩ	
Scanning time for all channels		95ms, 410ms, 500ms, 1460ms, configurable	< 50ms
Settling Time to 90% of fullscale		1s (maximum)	
Channel Bandwidth		15Hz	
Calibration Accuracy, typical 25°C		< ±0.04% of fullscale	
Calibration Interval		12 months	
Temperature Drift		±15 ppm/°C	
<b>RTD (Cold-End Compensation)</b>			
RTD Type		Chinese_Cu: 50Ω, Pt385 100Ω, Pt3916 100Ω	
Temperature Resolution (0 ~ 60°C)	Chinese_Cu: 50Ω	±1.1°C (±33.98°F)	
	Pt385 100Ω	±0.7°C (±33.26°F)	
	Pt3916 100Ω	±0.8°C (±33.44°F)	
<b>Isolation</b>			
Isolation Endurance (field-to-system)		500VAC for 1 minute, 5mA leakage current	
Isolation Endurance (Channels)		----	500VAC for 1 minute, 5mA leakage current
<b>Data Conversion Format (Dex 0 ~ 65535)</b>			
Temperature Input		(Measured Temperature x 10) + 10000	
Millivolt Input		65535 x (Measured Millivolt + 12) / Millivolt Range	
<b>Diagnostic Functions</b>			
Over Limit Alarm (High/Low)		Supported, diagnostic report as 0x07/0x08	
Over Range Alarm (top/bottom)		Supported, diagnostic report as 0x03/0x02	
Open-wired Detection		Supported, diagnostic report as 0x06	
(RTD) Open-wired Detection		#7 channel (open-wire), Supported, diagnostic report as 0x06	
Hot Swap		Supported	
<b>Fieldbus Communication</b>			
Protocol		PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*		1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy		Supported	
<b>System Power</b>			
Power Supply		24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption		60mA @ 24VDC	
<b>Physical Characteristic</b>			
Modules Insertion Mechanical Key		B1	B2
Size of Module		35mm x 100mm x 100mm (W x H x D)	
Weight of Module		180g	
Backplane Installation		Any local or expansion backplane.	
<b>Environmental Requirements</b>			
Ambient Operating Environment		0°C ~ 60°C	
Relative Humidity		5% ~ 95% non-condensing, no corrosive gas	
Storage Environment		-40°C ~ 70°C, (25°F ~ 55°F), 95% humidity	
Environmental IP Protection		IP20, IEC60529	

TC  
LK  
441  
442



# ANALOG OUTPUT MODULES - VOLTAGE / CURRENT OUTPUT



## Description

LK510 module can manage up to 4 channel of isolated voltage analog outputs. LK511 module can manage up to 4 channel of isolated current analog outputs. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

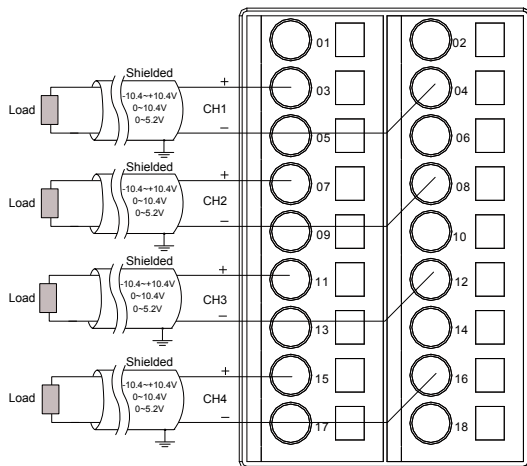
## Features

- 4 channel isolated voltage or current outputs
- Voltage range:  
**0~5.125V / 0~10.25V / -10.25~+10.25V**
- Current range:  
**0~21mA / 4~20mA**
- LED status indicator: **RUN** or **CAL**ibration
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

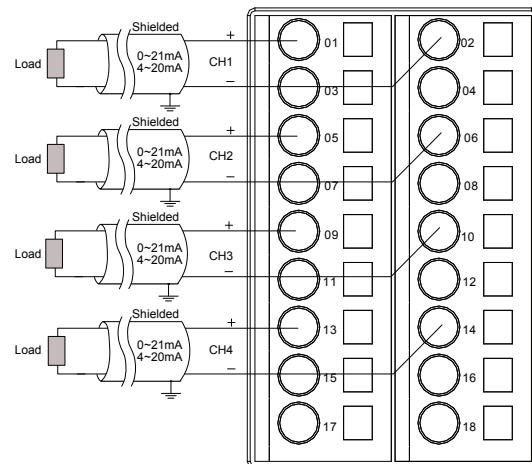
## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK510



Terminal Wiring Diagram of LK511

## Data Signal Conversion

	LK510				LK511	
	Data Format (Decimal 0 ~ 65535)					
Output Range	0 ~ 5.125V	0 ~ 10.25V	-10.25 ~ 0V	0 ~ +10.25V	4 ~ 20mA	0 ~ 21mA
Data Conversion Format (Dex)	0 ~ 65535	0 ~ 65535	32768 ~ 65535	0 ~ 32767	0 ~ 65535	0 ~ 65535
Read Back - Data Conversion Format (Dex)	----				0 ~ 255	0 ~ 255

Output and Data Conversion Format

AO  
LK  
510  
511

# TECHNICAL SPECIFICATION

LK510 & LK511 4 channels Analog Output Module, Voltage or Current Output Signal						
Analog Output	LK510				LK511	
Number of Output	4 channels					
DAC Resolution	14 bits				12 bits	
Read Back ADC Resolution	----				8 bits	
Output Range	0 ~ 5.125V	0 ~ 10.25V	-10.25 ~ 0V	0 ~ +10.25V	4 ~ 20mA	0 ~ 21mA
Data Conversion Format (Dex)	0 ~ 65535	0 ~ 65535	32768 ~ 65535	0 ~ 32767	0 ~ 65535	0 ~ 65535
Read Back - Data Conversion Format (Dex)	----				0 ~ 255	0 ~ 255
Output Setting Time	< 2ms					
Load Capability	≥2KΩ				≤750Ω	
Output Accuracy	±0.2% of fullscale				Output 0~4mA: ±0.6% of fullscale	
					Output 4~21mA: ±0.3% of fullscale	
					Read Back: ±5% of fullscale	
Stability	±0.05% of fullscale				Output: ±0.05% of fullscale	
					Read Back: ±2.5% of fullscale	
Temperature Drift	±25ppm/°C				----	
<b>Isolation</b>						
Isolation in-between channels	500VAC for 1 minute, 5mA leakage current					
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current					
<b>Diagnostic Functions</b>						
Calibration Data Error	Supported, diagnostic report as 0x02				----	
Open-wired Detection	----				Supported, diagnostic report as 0x06	
Output Error Detection	----				Supported, diagnostic report as 0x12	
Hot Swap	Supported				Supported	
<b>Fieldbus Communication</b>						
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard					
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps					
Redundancy	Supported					
<b>System Power</b>						
Power Supply	24VDC (20.4VDC ~ 28.8VDC)					
Current Consumption	125mA @ 24VDC				180mA @ 24VDC	
<b>Physical Characteristic</b>						
Modules Insertion Mechanical Key	C0				C1	
Size of Module	35mm x 100mm x 100mm (W x H x D)					
Weight of Module	180g					
Backplane Installation	Any local or expansion backplane.					
<b>Environmental Requirements</b>						
Ambient Operating Environment	0°C ~ 60°C					
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas					
Storage Environment	-40°C ~ 70°C, (25°F ~ 55°F), 95% humidity					
Environmental IP Protection	IP20, IEC60529					

**AO**
**LK  
510  
511**

# ANALOG INPUT & ANALOG OUTPUT MODULE



## Description

LK810 AIAO mix module can manage up to 4 channel of voltage or current analog inputs and 2 channel of voltage or current analog outputs. It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

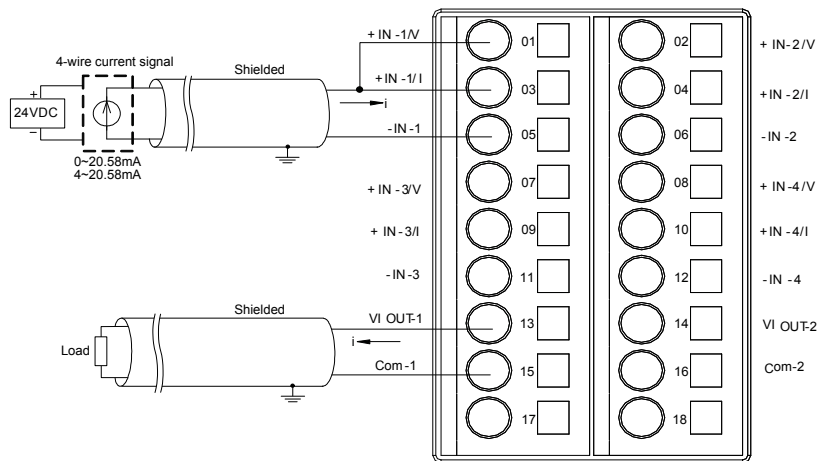
## Features

- 4 channel voltage or current inputs.
- 2 channel voltage or current outputs.
- Voltage range:  
**0~5.125V / 0~10.25V / -10.25~+10.25V**
- Current range:  
**0~21mA / 4~20mA**
- LED status indicator: **RUN** or **CAL**ibration
- Open-wired detection.
- Field calibration.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

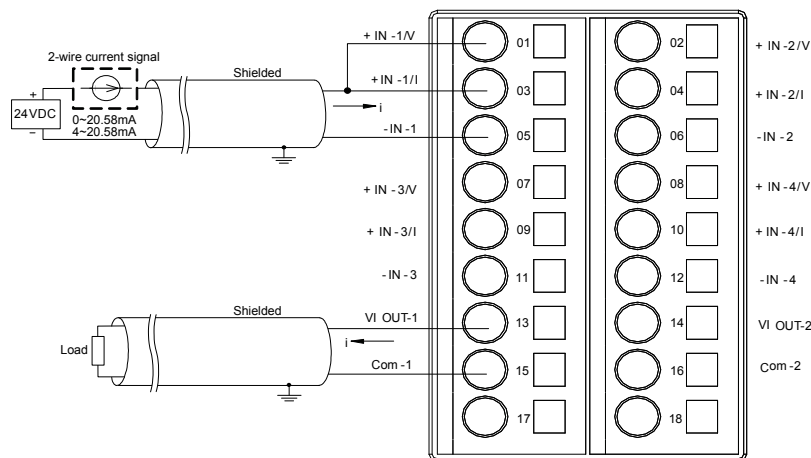
Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>CAL</b> Yellow	ON	Calibration Mode is ON and it is performing its calibration.
	Flashing	Did not perform any calibration or calibration is completed
	OFF	No powered supplied or not in calibration mode

## Terminal Wiring Diagram

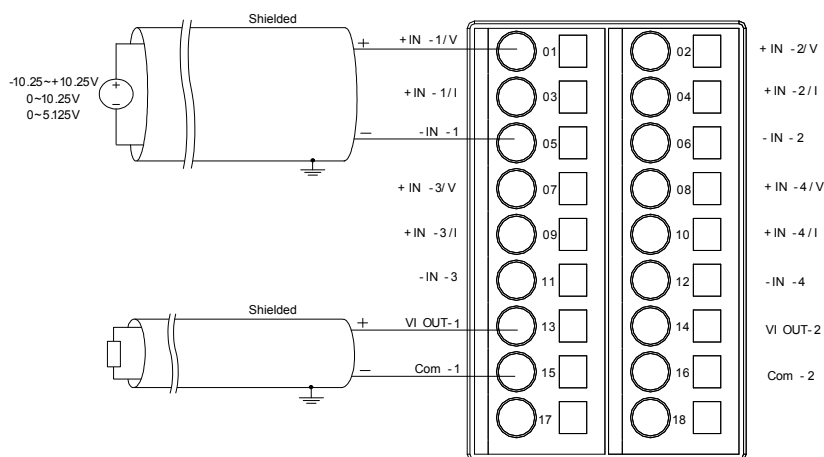


Terminal Wiring Diagram of LK810 (4-wire current signal)

# TECHNICAL SPECIFICATION



Terminal Wiring Diagram of LK810 (2-wire current signal)



Terminal Wiring Diagram of LK810 (voltage signal)

## Data Signal Conversion

LK810		
Input Voltage Signal		Data Format (Decimal)
±10.25V	0 ~ 10.25V	0 ~ 32767
	-10.25 ~ 0V	32767 ~ 65535
0 ~ 10.25V		0 ~ 65535
0 ~ 5.125V		0 ~ 65535
Input Current Signal		Data Format (Decimal)
4 ~ 20.58mA		0 ~ 65535
0 ~ 20.58mA		0 ~ 65535
Output Voltage Signal		Data Format (Decimal)
±10.25V	0 ~ 10.25V	0 ~ 32767
	-10.25 ~ 0V	32767 ~ 65535
0 ~ 10.25V		0 ~ 65535
0 ~ 5.125V		0 ~ 65535
Output Current Signal		Data Format (Decimal)
4 ~ 20.58mA		0 ~ 65535
0 ~ 20.58mA		0 ~ 65535

AIO

LK  
810

TECHNICAL SPECIFICATION

AIO  
LK  
810

LK810 4 channels Analog Input and 2 channels Analog Output Module				
Analog Input				
Number of Input		4 channels		
Input Type		Voltage or Current		
Input Range (Voltage)	±10.25V	Input Range	Data Conversion Format (Dex)	Calibration Accuracy, typical 25 °C
		0 ~ 10.25V	0 ~ 32768	< ±0.1% of fullscale
	-10.25 ~ 0V	32768 ~ 65535	< ±0.1% of fullscale	
	0 ~ 10.25V	0 ~ 65535	< ±0.1% of fullscale	
	0 ~ 5.125V	0 ~ 65535	< ±0.15% of fullscale	
Input Range (Current)		4 ~ 20.58mA	0 ~ 65535	< ±0.15% of fullscale
		0 ~ 20.58mA	0 ~ 65535	< ±0.15% of fullscale
Calibration Interval		12 months		
Input Impedence	Voltage	> 1MΩ		
	Current	247Ω		
Normal mode rejection ratio (NMRR)		60dB @ 50 or 60Hz		
Common mode rejection ratio (CMRR)		100dB @ 50 or 60Hz		
Analog Step Response Time		< 1s response time to reach 90% fullscale		
Scanning Time (All Channels)	Hardware Interference Filter	Scan time		
	10Hz	95ms		
	50Hz	410ms		
	60Hz	500ms		
	400Hz	1460ms		
Input Accuracy, typical 25 °C	Input Range	Accuracy (50Hz Filtering at FS)		
	±10.25V	< ±0.2% of fullscale		
	0 ~ 10.25V	< ±0.2% of fullscale		
	0 ~ 5.125V	< ±0.3% of fullscale		
	4 ~ 20.58mA	< ±0.3% of fullscale		
		0 ~ 20.58mA	< ±0.3% of fullscale	
Temperature Drift		±25ppm/°C		
Repeat Accuracy		< ±0.2% of fullscale		
Analog Output				
Number of Output		2 channels		
Input Type		Voltage or Current		
Output Range (Voltage)	±10.25V	Output Range	Data Conversion Format (Dex)	Calibration Accuracy, typical 25 °C
		0 ~ 10.25V	0 ~ 32768	< ±0.1% of fullscale
	-10.25 ~ 0V	32768 ~ 65535	< ±0.1% of fullscale	
	0 ~ 10.25V	0 ~ 65535	< ±0.1% of fullscale	
	0 ~ 5.125V	0 ~ 65535	< ±0.15% of fullscale	
Output Range (Current)		4 ~ 20.58mA	0 ~ 65535	< ±0.15% of fullscale
		0 ~ 20.58mA	0 ~ 65535	< ±0.15% of fullscale
Over current protection		The maximum allowed current < 25mA		

specification continue on next pages...

LK810 4 channels Analog Input and 2 channels Analog Output Module			
<b>Analog Output</b>			
Output Setting Time	Resistive Load	1ms	
	Capacitive Load	1.5ms	
	Inductive Load	1.5ms	
Drive Capability	Load	Voltage Output	Current Output
	Capacitive Load	>2000Ω	0 ~ 600Ω
	Resistive Load	< 1μF	-
	Inductive Load	-	<1mH
Calibration Interval	12 months		
Temperature Drift	±25ppm/°C		
Output Accuracy, typical 25°C	Output Range	Accuracy (50Hz Filtering at FS)	
	±10.25V	< ±0.2% of fullscale	
	0 ~ 10.25V	< ±0.2% of fullscale	
	0 ~ 5.125V	< ±0.3% of fullscale	
	4 ~ 20.58mA	< ±0.3% of fullscale	
	0 ~ 20.58mA	< ±0.3% of fullscale	
Repeat Accuracy	< ±0.2% of fullscale		
<b>Isolation</b>			
Isolation in-between channels	----		
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current		
<b>Diagnostic Functions</b>			
Over Limit Alarm (High/Low)	Input is over limit, diagnostic report as 0x07/0x08		
Over Range Alarm (top/bottom)	Input is out of the range, diagnostic report as 0x03/0x02		
Open-wired Detection	Input channel is open-wired, diagnostic report as 0x06		
Overload Detection	Voltage: Short-Circuit	Output is overload, diagnostic report as 0x04	
	Current: Open-Circuit		
Hot Swap	Supported		
<b>Fieldbus Communication</b>			
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard		
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps		
Redundancy	Supported		
<b>System Power</b>			
Power Supply	24VDC (20.4VDC ~ 28.8VDC)		
Current Consumption	150mA @ 24VDC		
<b>Physical Characteristic</b>			
Modules Insertion Mechanical Key	F0		
Size of Module	35mm x 100mm x 100mm (W x H x D)		
Weight of Module	180g		
Backplane Installation	Any local or expansion backplane.		
<b>Environmental Requirements</b>			
Ambient Operating Environment	0°C ~ 60°C		
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas		
Storage Environment	-40°C ~ 70°C, (25°F ~ 55°F), 95% humidity		
Environmental IP Protection	IP20, IEC60529		

AIO

LK  
810

# DIGITAL INPUT MODULES - DC INPUT



## Description

LK610 is a 16 channels Digital Input modules.

It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

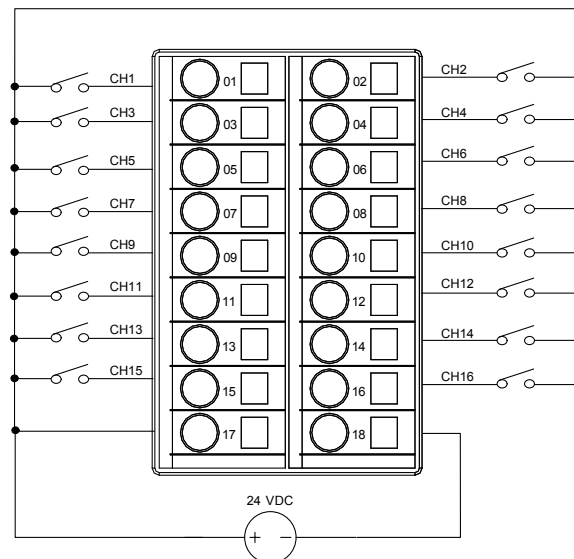
## Features

- 16 channels DC voltage inputs.
- Voltage range:  
LK 610: **12/24VDC Sink**
- LED status indicator: **RUN & Channels**
- Power loss detection.
- Reverse power polarity protection.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established, module operating normally
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>01~16</b> Channel Indicator Yellow	ON	Channel is closed
	OFF	Channel is opened

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK610 (Sink)

DI  
LK  
610



# TECHNICAL SPECIFICATION

LK610 16 channels Digital Input Module, DC Input Signal		
Digital Input		
LK610		
Number of Input	16 channels	
Input Type	Dry contact, DC ,Sink	
Channel closure rated current	7mA@24VDC	
Input Voltage	Rated Value	12/24VDC
	ON-state	10VDC @ 2mA ~31.2VDC @ 10mA
	OFF-state	0 ~ 5VDC @ 1.5mA
Input Delay Time	OFF->ON	Hardware delay: 50μs ; Software Filtering: 1/3/5/10/15/20/25/30ms, configurable
	ON->OFF	Hardware delay: 50μs ; Software Filtering: 1/3/5/10/15/20/25/30ms, configurable
Reverse power polarity protection	60VDC (max)	
Isolation		
Isolation in-between channels	--	
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current	
Diagnostic Functions		
Power Loss detection	Supported, diagnostic report as 0x04 when power loss, 0x00 when power is recovered.	
Hot Swap	Supported	
Fieldbus Communication		
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy	Supported	
System Power		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption	50mA @ 24VDC	
Physical Characteristic		
Modules Insertion Mechanical Key	D0	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Weight of Module	180g	
Backplane Installation	Any local or expansion backplane.	
Environmental Requirements		
Ambient Operating Environment	0 °C ~ 60 °C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

DI

LK  
610

# DIGITAL OUTPUT MODULES - TRANSISTOR OUTPUT, DC



## Description

LK710 digital transistor output module can manage up to 16 channels of VDC output.

It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

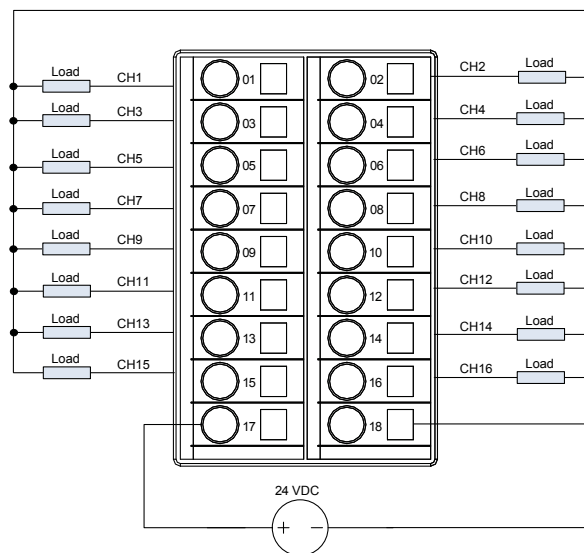
## Features

- 16 channels transistor DC outputs.
- Voltage range: **10 ~ 31.2VDC**
- LED status indicator: **RUN & Channels**
- Fail-safe output
- Output read-back diagnostic
- Power loss detection.
- Over-current protection
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established, module operating normally
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>01~16</b> Channel Indicator Yellow	ON	Channel is closed
	OFF	Channel is opened

## Terminal Wiring Diagram



Terminal Wiring Diagram of LK710

DO  
LK  
710

# TECHNICAL SPECIFICATION

LK710 16 channels Digital Transistor Output Module, DC Output Signal		
<b>Digital Output</b>		
Number of Output		16 channels
Output Type		Transistor, solid-state MOSFET
Output Voltage	Rated Value	24VDC
	Allowed Range	10~31.2VDC
Output Current	per Channel	0.5A @ 40 °C and 0.4A @ 60 °C (linear decremental)
	per Module	8A @ 40 °C and 6.4A @ 60 °C (linear decremental)
Surge Current per Channel		1A for 10ms, cycle at 2s @ 60 °C
Over-current protection		Supported, every 2 channels uses a common self-recovering fuse protection
Load Current (minimum)		3mA per channel
ON-state Voltage Drop (maximum)		150mV @ 0.5A
OFF-state Leakage Current		1mA per channel
Output Delay Time	OFF->ON	1ms (maximum)
	ON->OFF	1ms (maximum)
Program mode output		Hold last state (default), or Program mode state
Program mode state		ON or OFF, every channels are configurable
Fault mode output		Hold last state (default), or Fault mode state
Fault mode state		ON or OFF, every channels are configurable
<b>Isolation</b>		
Isolation in-between channels		--
Isolation Endurance (field-to-system)		500VAC for 1 minute, 5mA leakage current
<b>Diagnostic Functions</b>		
Power Loss detection		Supported, diagnostic report as 0x04 when power loss, 0x00 when power is recovered
Hot Swap		Supported
<b>Fieldbus Communication</b>		
Protocol		PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard
Baud Rate*		1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps
Redundancy		Supported
<b>System Power</b>		
Power Supply		24VDC (20.4VDC ~ 28.8VDC)
Current Consumption		70mA @ 24VDC
<b>Physical Characteristic</b>		
Modules Insertion Mechanical Key		E0
Size of Module		35mm x 100mm x 100mm (W x H x D)
Weight of Module		180g
Backplane Installation		Any local or expansion backplane.
<b>Environmental Requirements</b>		
Ambient Operating Environment		0 °C ~ 60 °C
Relative Humidity		5% ~ 95% non-condensing, no corrosive gas
Storage Environment		-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity
Environmental IP Protection		IP20, IEC60529

DO

LK  
710

# DIGITAL OUTPUT MODULES - RELAY OUTPUT (NO), AC / DC



## Description

LK720 digital relay output (normally open) module can manage up to 8 channels of VAC or VDC output.

It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

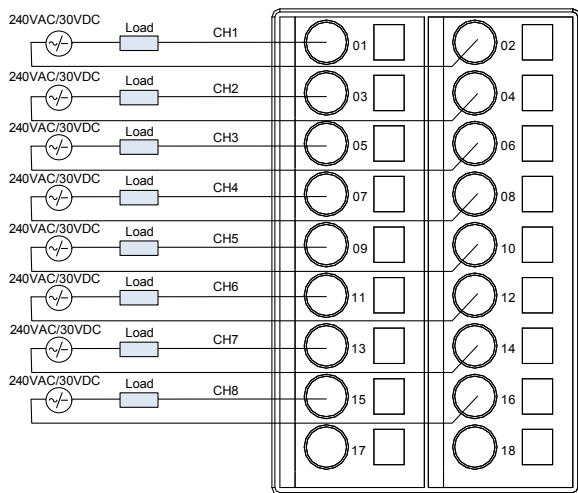
## Features

- 8 channel relay AC/DC outputs, normally open.
- AC voltage range: **10 ~ 265VAC**
- DC voltage range: **5~125VDC**
- LED status indicator: **RUN & Channels**
- Fail-safe output
- Output read-back diagnostic
- Power loss detection.
- Over-current protection
- Channel to channel isolation.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

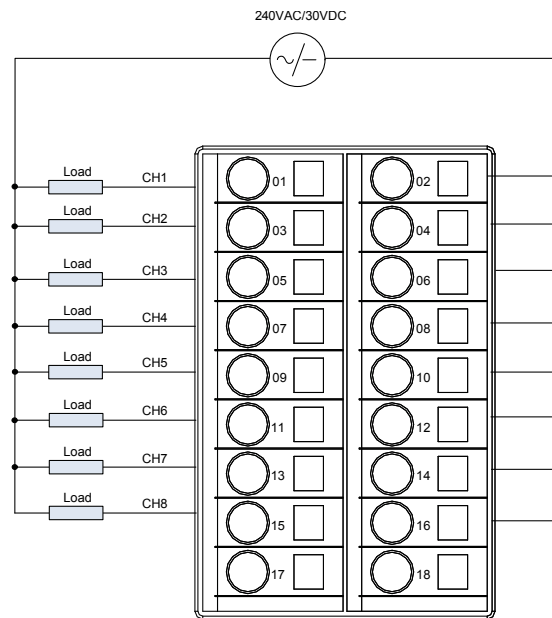
## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established, module operating normally
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>01~16 Channel Indicator</b> Yellow	ON	Channel is closed
	OFF	Channel is opened

## Terminal Wiring Diagram



Independent Power Source



Share Single Power Source

Terminal Wiring Diagram of LK720

DO  
LK  
720

# TECHNICAL SPECIFICATION

LK720 8 channels Digital Relay Output Module, AC/DC Output Signal			
<b>Digital Output</b>			
Number of Output	8 channels		
Output Type	Relay, Normally Open		
Output	Allowed Range	10 ~ 265VAC @ 47~67Hz or 5 ~ 125VDC	
Output Voltage (load dependent)	Resistive Load		
	5 ~ 30VDC @ 2A		
	48VDC @ 0.5A		
	100VDC @ 0.2A		
	125VAC @ 2A		
Rated Current Output (at stable state)	240VAC @ 2A		
	Resistive	Inductive	
	2A @ 5~30VDC	2A @ 5~30VDC	
	0.5A @ 48VDC	0.5A @ 48VDC	
	0.2A @ 100VDC	0.2A @ 100VDC	
Rated Power Output (at stable state)	2A @ 125VAC	2A @ 125VAC	
	2A @ 240VAC	2A @ 240VAC	
	Resistive	Inductive	
	60W @ 30VDC	60W @ 30VDC	
	24W @ 48VDC	24W @ 48VDC	
Load Current (minimum)	10mA per channel		
	20W @ 100VDC		
	250W max @ 125VAC		
480W max @ 240VAC		480W max @ 240VAC	
OFF-state Leakage Current (maximum)	1.5mA per channel		
ON-state Contact Resistance	30mΩ		
Mechanical Characteristic of the Relay	Switching Frequency (at rated load)	6 operations per minutes, (Maximum)	
	Switching Frequency (at minimum load)	1200 operations per minute, (Maximum)	
	Bounce Timing	1ms	
	Operating Timing	5ms	
	Release Timing	1ms	
Life Expectancy	Resistive Load	200,000 operations	
	Inductive Load	30,000 operations	
Output Delay Time	OFF->ON	10ms (maximum)	
	ON->OFF	10ms (maximum)	
Program mode output	Hold last state (default), or Program mode state		
Program mode state	ON or OFF, every channels are configurable		
Fault mode output	Hold last state (default), or Fault mode state		
Fault mode state	ON or OFF, every channels are configurable		
<b>Isolation</b>			
Isolation in-between channels	1000VAC for 1 minute, 5mA leakage current		
Isolation Endurance (field-to-system)	1000VAC for 1 minute, 5mA leakage current		
<b>Diagnostic Functions</b>			
Power Loss detection	Supported, diagnostic report as 0x04 when power loss, 0x00 when power is recovered		
Hot Swap	Supported		
<b>Fieldbus Communication</b>			
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard		
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps		
Redundancy	Supported		
<b>System Power</b>			
Power Supply	24VDC (20.4VDC ~ 28.8VDC)		
Current Consumption	150mA @ 24VDC		
<b>Physical Characteristic</b>			
Modules Insertion Mechanical Key	D3		
Size of Module	35mm x 100mm x 100mm (W x H x D)		
Weight of Module	210g		
Backplane Installation	Any local or expansion backplane.		
<b>Environmental Requirements</b>			
Ambient Operating Environment	0 °C ~ 60 °C		
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas		
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity		
Environmental IP Protection	IP20, IEC60529		

DO

LK  
720

# SOE MODULES - 16 CHANNEL SOE INPUT, Sink Type, DC



## Description

LK630 is a SOE (Sequential of Event) module. It has enough buffer and will not miss any event while ensuring accurate signal resolution. In addition, it also provides anti-bouncing function to deal with contact bouncing.

It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

*Refer to PROFIBUS-DP cable type specification table for more details.*

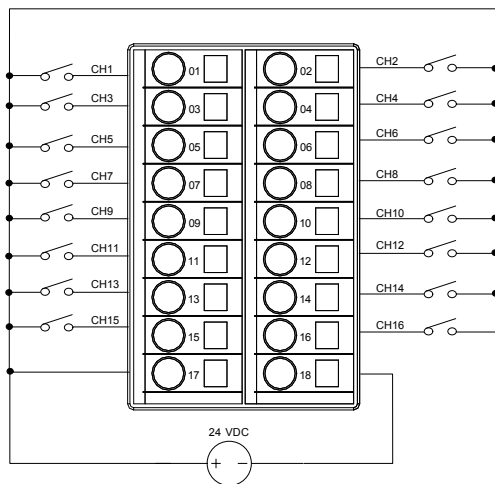
## Features

- 16 channels sink type SOE inputs.
- Voltage range: **10~31.2VDC Sink**
- Anti-bouncing filter
- SOE resolution, 1ms
- GPS or CPU controller time synchronization mode
- LED status indicator: **RUN & Channels**
- Power loss detection.
- Reverse power polarity protection.
- System to field isolation.
- Hot swap.
- Supports PROFIBUS-DP slave mode.

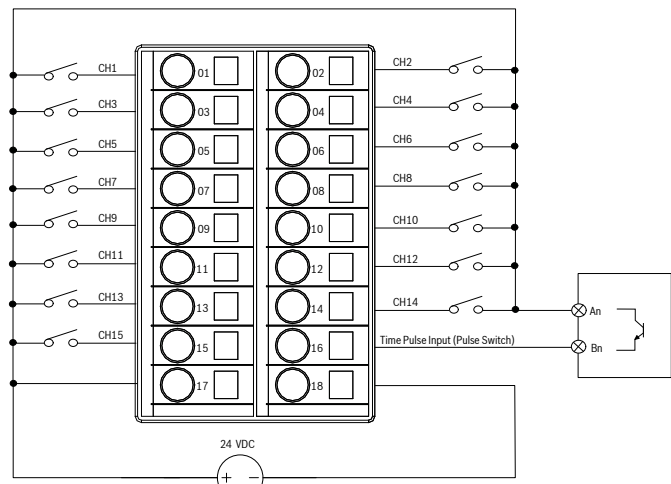
## LED Indicators

Indicator	Status	Definition
<b>RUN</b> Green	ON	Communication Established, module operating normally
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
<b>01~16 Channel Indicator</b> Yellow	ON	Channel is closed
	OFF	Channel is opened

## Terminal Wiring Diagram



16 channel SOE input



15 channel SOE input + 1 channel Time Pulse Input

Terminal Wiring Diagram of LK630 (Sink)

SOE

LK  
630

# TECHNICAL SPECIFICATION

<b>LK630 16 channels SOE Input Module, Sink type, DC</b>		
<b>Digital Input</b>		
Number of Input	16 SOE channels or (15 SOE channels + 1 Time pulse channel)	
Input Type	SOE	
Input Voltage	Rated Value	24VDC
	ON-state	10VDC @ 2mA ~31.2VDC @ 10mA
	OFF-state	0 ~ 5VDC @ 1.5mA
Programmable Anti-bounce Filter	OFF->ON	1/3/5 ms (default) or 10/15/20/25/30 ms, configurable
	ON->OFF	1/3/5 ms (default) or 10/15/20/25/30 ms, configurable
Hardware Delay	50µs	
Reverse power polarity protection	Supported	
<b>SOE Features</b>		
SOE Resolution	1ms	
Sampling Period	0.833µs	
SOE Time Synchronization Mode	GPS Sync (default) or CPU Controller Sync, configurable	
Time Synchronization Interval	1 minute	
SOE data storage	Primary Cache	Maximum of 42 events save when the CPU does not readout the SOE
	Secondary Cache	During a communication failure to timely report the SOE, a maximum of 1023 events can be save
<b>Isolation</b>		
Isolation in-between channels	--	
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current	
<b>Diagnostic Functions</b>		
Power Loss detection	Supported, diagnostic report as 0x04 when power loss, 0x00 when power is recovered.	
Overtime Diagnostic	Over 65 sec without receiving time synchronize information; diagnostic report as 0x020, 0x24 when both power loss and overtime.	
Hot Swap	Supported	
<b>Fieldbus Communication</b>		
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 19.2Kbps, 9.6Kbps	
Redundancy	Supported	
<b>System Power</b>		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption	80mA @ 24VDC	
<b>Physical Characteristic</b>		
Modules Insertion Mechanical Key	D0	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Weight of Module	195g	
Backplane Installation	Any local or expansion backplane.	
<b>Environmental Requirements</b>		
Ambient Operating Environment	0 °C ~ 60 °C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

SOE

LK  
630



# COUNTER MODULES



## Description

LK620 is a counter module designed to perform bidirectional counting for inputs from encoder and high-speed switches. It provides two-channel inputs and can receive pulse input signals at a frequency up to 1MHz.

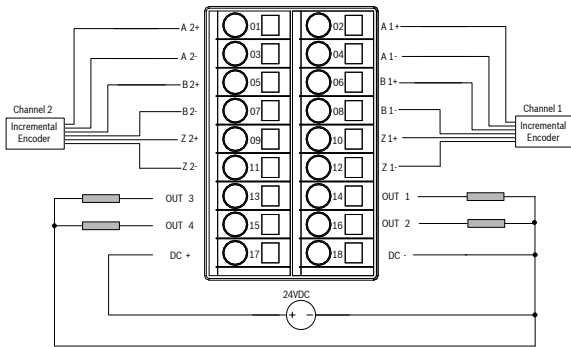
It communicates with its controller using PROFIBUS-DP fieldbus with a maximum baud rate up to 1.5Mbps depending on cable length and type.

Refer to PROFIBUS-DP cable type specification table for more details.

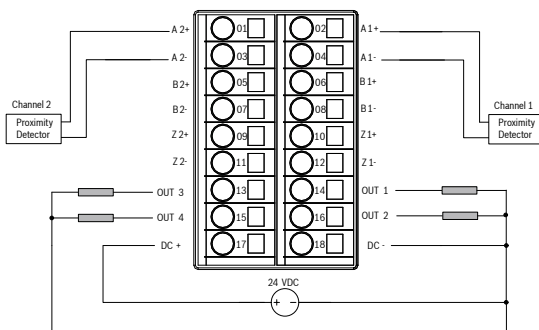
## Features

- 2-channel inputs counter.
- Bidirectional counters, frequency measurement.
- Z signal inversion
- Count storage
- Debounce filtering
- Disable counter function
- Counting Range: 0 ~ 4,294,967,295 (32 bits)
- Frequency Measurement Range: 0.1~1MHz
- Channels LED indicator
- Channel to channel isolation.
- Power loss detection
- System to field isolation.
- Hot swap.
- Support PROFIBUS-DP protocol.

## Terminal Wiring Diagram



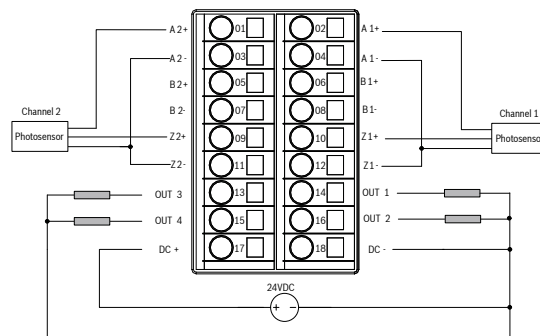
Connection with Incremental Encoder



Connection with Proximity Detector

## LED Indicators

Indicator	Status	Definition
RUN Green	ON	Communication Established
	Flashing	Communication not established or error occurs
	OFF	No powered supplied
CNT 1	ON	Counter 1 is operating in counter mode
Freq 1	ON	Counter 1 is operating in frequency measurement mode
CH1.1	ON	Counter 1, Channel 1 is ON
	OFF	Counter 1, Channel 1 is OFF
CH1.2	ON	Counter 1, Channel 2 is ON
	OFF	Counter 1, Channel 2 is OFF
CNT 2	ON	Counter 2 is operating in counter mode
Freq 2	ON	Counter 2 is operating in frequency measurement mode
CH2.1	ON	Counter 2, Channel 1 is ON
	OFF	Counter 2, Channel 1 is OFF
CH2.2	ON	Counter 2, Channel 2 is ON
	OFF	Counter 2, Channel 2 is OFF



Connection with Photosensor

## Terminal Wiring Diagram of LK620

# TECHNICAL SPECIFICATION

LK620 24VDC 2-Channel Counter Module		
<b>Counter</b>		
Number of counter	2 counters	
Counting Range	0 ~ 4,294,967,295 (32 bits)	
Counting Error	±1 digit	
No. of input channels per counter	3 input (A, B, Z) of voltage pulse signal, A1,B1,Z1 & A2,B2,Z2	
No. of output channels per counter	2 isolated MOSFET output channels, OUT1,OUT2,OUT3,OUT4	
<b>Counter Input Channels (A1,B1,Z1,A2,B2,Z2)</b>		
Rated Voltage Pulse	24VDC	
Voltage Pulse Range	ON	10~26.4VDC
	OFF	2mA~7mA
Current Pulse Range	ON	0~2VDC
	OFF	≤250μA
Max Pulse Input Frequency	1MHz (without software filter)	
<b>Counter Output Channels (OUT1 ~ OUT4)</b>		
Output Type	Source, MOSFET transistor	
Output Voltage Range	10 ~ 31.2VDC	
Output Current	1.0A @ 10~31.2VDC (maximum)	
Load Current	40mA per output (minimum)	
Voltage Drop	550mV (maximum)	
Off-state Leakage Current	300μA per output (maximum)	
Output Delay Time	OFF->ON	20μs (normal) ; 50μs (maximum)
	ON->OFF	60μs (normal) ; 300μs (maximum)
Over-current protection	Supported, self-recovering fuse protection per output	
Reverse power polarity protection	Not Available, channel is subject to damage if connected in reverse	
<b>Isolation</b>		
Isolation in-between channels	500VAC for 1 minute, 5mA leakage current	
Isolation Endurance (field-to-system)	500VAC for 1 minute, 5mA leakage current	
<b>Diagnostic Functions</b>		
Power Loss detection	Supported, diagnostic report as 0x04 when power loss, 0x00 when power is recovered.	
Hot Swap	Supported	
<b>Fieldbus Communication</b>		
Protocol	PROFIBUS-DP slave mode, compliance with IEC61158-3/EN50170 standard	
Baud Rate*	1.5Mbps, 500Kbps, 187.5Kbps, 93.75Kbps, 45.45Kbps, 31.25Kbps, 19.2Kbps, 9.6Kbps	
Redundancy	Supported	
<b>System Power</b>		
Power Supply	24VDC (20.4VDC ~ 28.8VDC)	
Current Consumption	80mA @ 24VDC	
<b>Physical Characteristic</b>		
Modules Insertion Mechanical Key	F2	
Size of Module	35mm x 100mm x 100mm (W x H x D)	
Weight of Module	185g	
Backplane Installation	Any local or expansion backplane.	
<b>Environmental Requirements</b>		
Ambient Operating Environment	0 °C ~ 60 °C	
Relative Humidity	5% ~ 95% non-condensing, no corrosive gas	
Storage Environment	-40 °C ~ 70 °C, (25 °F ~ 55 °F), 95% humidity	
Environmental IP Protection	IP20, IEC60529	

CNT

LK  
620

# 24VDC (5A, 120W) INPUT POWER SUPPLY, 115/230VAC



## Description

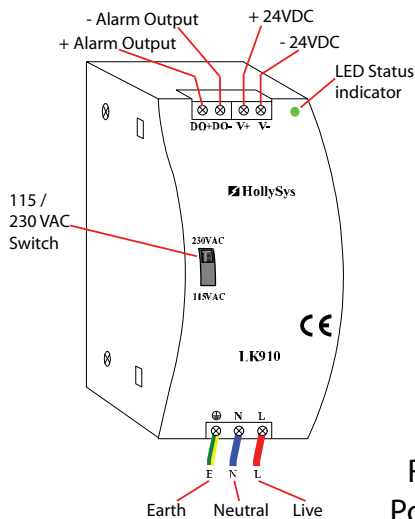
LK910 is a specially design power supply module for 115/230 AC Voltage input providing output power of 24VDC to the LK backplanes.

Unique features of LK910 includes :-

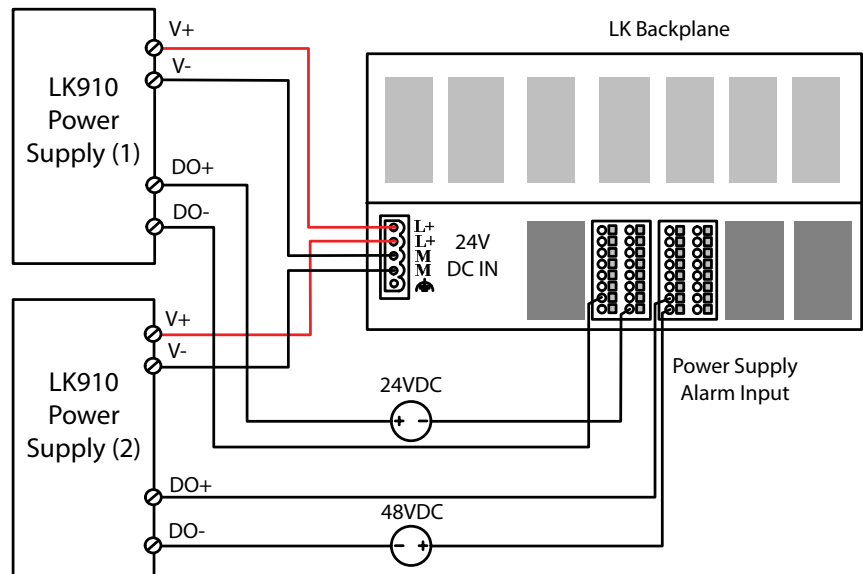
- Supporting parallel redundancy.
- Overload protection.
- Over voltage protection.
- Over temperation protection.
- Output current limiting.
- Alarm Output Status.

## Features

- Input Voltage: 115VAC / 230 VAC, switchable.
- Output Voltage: 24VDC.
- Rated Power: 120W
- Support 1+1 Parallel Redundancy.
- Switching Frequency: 55KHz.
- Output short circuit / Overload Protection.
- Output over voltage protection.
- Output over temperature protection.
- Output status query and LED indicator.
- Input / Output / Casing isolation.



## Redundant Power Supply



Circuit diagram of Dual LK910 parallel redundancy power supply with alarm connection.

PWR

LK  
910

# TECHNICAL SPECIFICATION

LK910 24VDC 5A 120W Power Supply	
<b>Input</b>	
Voltage Range	88~132VAC / 176~264AC, Switch Selectable
Frequency Range	47Hz~63Hz
Conversion Efficiency	> 80%
AC Current	3.3A/115VAC, 2A/230VAC
<b>Output</b>	
Rated Output Voltage	24VDC
Adjustable Output Range *	24~28VDC
Output Voltage Accuracy	±5%
Rated Output Current	5A
Output Current Range	0 ~ 5A
Rated Output Power	120W
Ripple Noise	<240mVP-P
Load Regulation	<±5%
Voltage Regulation	<±2%
Step-load characteristic	<± 5% @ from 20% to 70% of the load mutation, settling time <50ms
Maintenance time	220VAC input, 70% of the load, the power output not less than 95% after the rated voltage, maintaining 30ms
Cooling Method	Natural cooling
Boot Soft-Start	Power output voltage is gradually increased, the output peak voltage < rated voltage ± 5%
Cooling Method	Natural cooling
1+1 Parallel Redundancy	Supported
<b>Protection &amp; Alarm</b>	
Overload Protection	105% ~ 150% rated output power
	Protection Mode: Output current limiting, fault eliminated automatic recovery
Overvoltage Protection	29~33VDC
	Protection mode: Turn off the output, re-power on recovery
Over Temperature Protection	90°C±5%
	Protection mode: Turn off the output, automatic recovery after the temperature drop
Alarm Output Status	When power output is normal, the status switch turn-on, otherwise cut-off. Isolation in-between status switch and power
Output Status Indication	Indicator light is ON for normal output normal
<b>Insulation</b>	
Insulation Resistance	Input and Casing: 500VDC > 100MΩ
	Input and Output: 500VDC > 100MΩ
	Output and Casing: 500VDC > 100MΩ
Dielectric Withstand	Input and Casing: 1500VACrms, 1min
	Input and Output: 3000VACrms, 1min
	Output and Casing: 500VACrms, 1min
<b>Physical Characteristic</b>	
Size of Module	65.5mm x 125.2mm x 100mm (W x H x D)
Weight of Module	790g
Installation Method	35mm DIN rail installation
Status Indicator	Green color LED
<b>Environmental Requirements</b>	
Ambient Operating Environment	-10 °C ~ 60 °C (Reference output derating curve, when the full output at 45 °C)
Relative Humidity	10% ~ 95% non-condensing
Storage Environment	-20 °C ~85 °C, 95% humidity
<b>Certification</b>	
Safety Certification	UL508,TUV EN60950,CE

PWR

LK  
910

PRODUCT SELECTION LIST

SELECTION

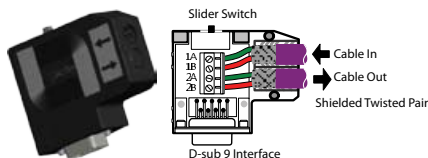
Module Type		Model	Description
Backplane with I/O terminal	Local Backplane	LK101	Local backplane, Single CPU slot, 10 slots, 367.5 x 166 x 35mm (WxHxD)
		LK102	Local backplane, Single CPU slot, 10 slots, DB9 (Profibus-DP) Interface, 367.5 x 166 x 35mm (WxHxD)
		LK121	Local backplane, Dual Redundant CPU slots, 11 slots, 420 x 166 x 35mm (WxHxD)
		LK122	Local backplane, Dual Redundant CPU slots, 11 slots, DB9 (Profibus-DP) Interface, 420 x 166 x 35mm (WxHxD)
	Expansion Backplane	LK111	Expansion backplane, 11 slots, DB9 (Profibus-DP) Interface, 385 x 166 x 35mm (WxHxD)
		LK114	Expansion backplane, 11 slots, 385 x 166 x 35mm (WxHxD)
LK112		Expansion backplane, 5 slots, 175 x 166 x 35mm (WxHxD)	
CPU Module	LK202	100MHz CPU Module, for single CPU backplane, Computation Speed: 0.08µs per step, program: 4MB, data: 8MB+512KB power-loss prot.	
	LK205	266MHz CPU Module, for single CPU backplane, Computation Speed: 0.03µs per step, program: 8MB, data: 16MB+1MB power-loss prot.	
	LK207	533MHz CPU Module, for single CPU backplane, Computation Speed: 0.013µs per step, program: 16MB, data: 64MB+1MB power-loss prot.	
	LK210	533MHz CPU Module, for redundant CPU backplane, Computation Speed: 0.013µs per step, program: 16MB, data: 64MB+1MB power-loss prot.	
Communication Modules	LK231	PROFIBUS-DP Communication Adapter Module (support max. of 125 modules or DP-slave nodes)	
	LK232	PROFIBUS-DP Bus Repeater Module	
	LK233	PROFIBUS-DP Optical Fiber Interface module	
	LK239	MODBUS Communication Module (Master or Slave)	
	LK250	PROFIBUS-DP Interface Module (For expanding max. of 30 modules per DP-slave node)	
	LK255	PROFIBUS-DP Slave interface module, LK act as DP slave system connecting with 3rd party.	
AI Modules	LK410	8-channel AI Module, Voltage Input, 16 bits, ±10V / 0~10V / 0~5V, no isolation	
	LK411	8-channel AI Module, Current Input, 16 bits, 4~20mA / 0~20mA, no isolation, 2 or 4-wired transmitter	
	LK412	6-channel AI Module, Voltage/Current Input, 16 bits, ±10V / 0~10V / 0~5V or 4~20mA / 0~20mA, channel isolation	
	LK414	8-channel AI Module, Current Input, external powered, 16 bits, 4~20mA, no isolation, 2-wired transmitter	
	LK430	6-channels AI Module, RTD Input, 16 bits, Pt100/200/500/1000, Ni100/120/200/500, Cu10/50	
	LK431	4-channels AI Module, RTD Input, Isolated channels 16 bits, Pt100/200/500/1000, Ni100/120/200/500, Cu10/50	
	LK441	8-channels AI Module Thermocouple with cold-end compensation, 16 bits, -12mV~+78mV, -12mV~+32mV, TC Type: B,C,E,J,K,N,R,S,T	
	LK442	6-channels AI Module Thermocouple with cold-end compensation, Isolated Channels, 16 bits, -12mV~+78mV, -12mV~+32mV, TC Type: B,C,E,J,K,N,R,S,T	

Module Type	Model	Description
AO Modules	LK510	4-channels AO Module, Voltage Output, 14 bits, $\pm 10V / 0\sim 10V / 0\sim 5V$ , isolation in-between channels
	LK511	4-channels AO Module, Current Output, 12 bits, 4~20mA / 0~20mA, isolation in-between channels
AI/AO Modules	LK810	4-channels AI / 2-channels AO Module, input: $\pm 10V / 0\sim 10V / 0\sim 5V$ or 4~20mA/ 0~20mA, output: $\pm 10V / 0\sim 10V / 0\sim 5V$ or 4~20mA / 0~20mA
DI Module	LK610	16-channels DI Module, 12/24VDC, sink, no isolation
DO Modules	LK710	16-channels DO Module, 10~30VDC, transistor DC output,
	LK720	8-channels DO Module, 10~265VAC / 5~125VDC, relay, normally open
SOE Module	LK630	16-channels SOE Module, 12/24VDC SOE input, sink type, no isolation, SOE, 1ms resolution
Counter Module	LK620	2-channels counter module (<500KHz), Profibus-DP, Counting Range: 0 ~ 4,294,967,295. Freq. Measurement Range: 0.1 ~ 1MHz
Power Supply	LK910	Power Supply input 115/230VAC, output: 24VDC, 5A, 120W
Accessories	LK230	PROFIBUS-DP Connector for DB9 Backplane (For use with LK102, LK122, LK114)
	LKX002	LK series PLC, PROFIBUS-DP expansion cable, 3 meters
	LKX006	LK series PLC, Serial RS-232 communication cable (For LK239)
	LKX007	LK series PLC, Serial RS-485 communication cable (For LK239)
	LKF003	LK series PLC, Rotational tools for backplane's mechanical key
	LKF006	LK series PLC, SD card, 2GB
	LKC131	LK Series PLC, Dummy Empty Module
	LKC170	LK Series PLC, Terminal Point Cover
Software	LKS001	LK series PLC, PROGRAMMING SOFTWARE, English

## Additional Accessories

### LK230

- PROFIBUS-DP connector adapter for interconnection between LK 102/122 and LK114. It provides a convenience way of cabling, increase protection from EMC interference, and cabling reliability.



### LKX002

- This is the PROFIBUS-DP cable (3 meters) for used with LK PLC.



### LKF003

- This is the Rotational Tools for the Backplane's mechanical key

### LKF006

This is the 2GB SD card for LK PLC for backup of programming logic. This SD card is preformatted for LK usage.



### LKC131

This is the dummy module without any electronic boards. It is used to fill in the unused LK module slots.



### LKC170

- This is the terminal cover to protect the terminal points.



### LKS001

This CD contains PowerPro programming software for LK PLC and other documentations.



### LKX006

This is the RS-232 cable for LK239 MODBUS module usage.



### LKX007

This is the RS-485 cable for LK239 MODBUS module usage.



Automation Technology for Better Work, Life, and Environment

### **International Business**

#### **Hollysys (Asia Pacific) Pte Ltd**

Address: 200 Pandan Loop, #08-01  
Pantech 21, Singapore 128388  
Tel: +65 6777-0950  
Fax: +65 6777-2730

**http://www.hollysys.com.sg**  
**Email: sales@hollysys.com.sg**

### **Beijing Hollysys Group**

#### **Beijing Hollysys Co., Ltd. Beijing Hollysys Automation & Drive Co., Ltd.**


Address: Di Sheng Middle Road, No. 2  
Economic-Technological Development Area  
100176 Beijing, P.R. China  
Tel: +86 10 5898-1000  
Fax: +86 10 5898-1100

#### **Hangzhou Hollysys Automation Co., Ltd.**

Address: North No.1, No 19 Road,  
Xiasha Economic and Technological Development Zone,  
Hangzhou, Zhejiang, 310018, P.R. China  
Tel: +86 571 8163-3800  
Fax: +86 571 8163-3700

**http://www.hollysys.com**

*This product is distributed by:*



### **Automation Technology for Better Work, Life, and Environment**

For many years, the Hollysys name has stood for quality and reliability. Hollysys proudly offers a wide range of automation and control products from PLCs to DCS to help you find the solution for any industrial automation and process control application. We are the global supplier of choice for innovative technology backed by the highest level of service and support. When you need products and solutions you can rely on, choose HollySys.

† Visit our Web site for the latest information.  
<http://www.hollysys.com.sg>

All Rights Reserved. Copyright© 2011  
Hollysys (Asia Pacific) Pte. Ltd.

Information found in this brochure is subject to changes without notice.