LC-103H User Manual

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

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Date: 2012/01/10

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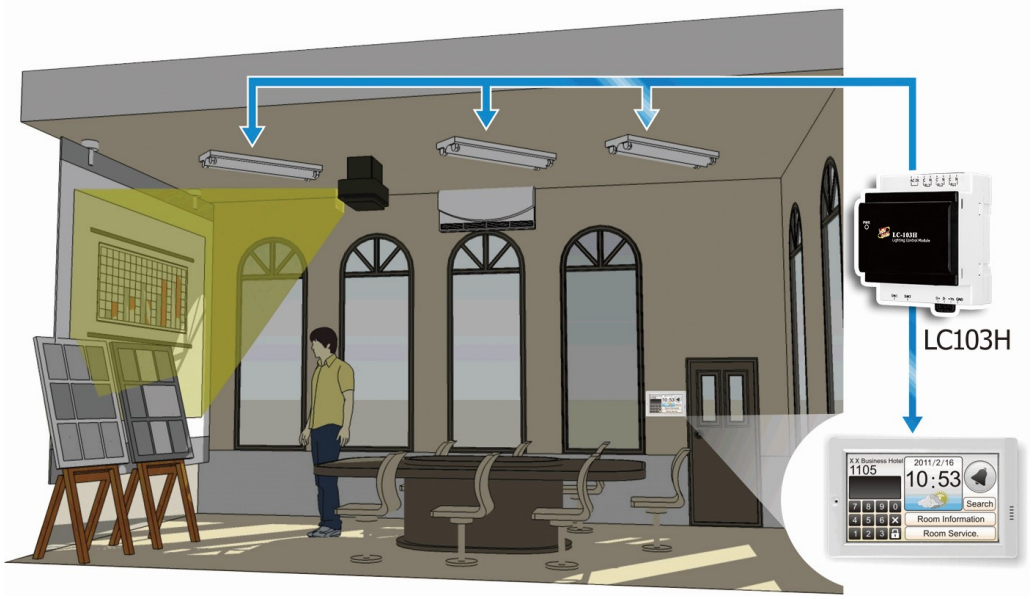
Introduction

The LC-103H is an easy-to-use lighting control module that requires no specialist skills to install and operate, and no software is needed in order to control the DO channels.

The LC-103H provides 1 channel for digital input (photo couple isolation) and 3 channels for relay output. All output channels are form A type relays, while the input channel is based on a sink-type using a wire connection. The input channel can directly control a 3-channel relay ON and OFF sequence without requiring a remote host controller. 4 kV ESD protection and 5000 Vrms intra-module isolation are also provided.

When required, communication with the LC-103H is programmable based on the DCON & Modbus RTU protocol, and an added benefit is that different addresses can be set for DCON & Modbus RTU communication via hardware configuration.

1 Applications



2 Hardware Information

1.1 IO Specifications

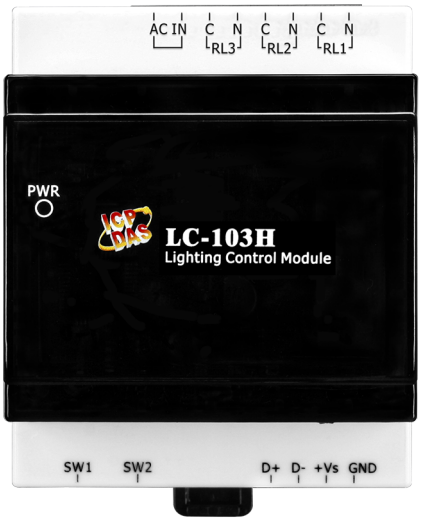
Digital Input	
Input Channels	1
Type	90~240VAC
On Voltage Level	65 VAC
Off Voltage Level	56 VAC
Input Impedance	68 KΩ, 1 W
Isolation	5000 Vrms
Function	Local and Remote Direct Control Relay ON/OFF and Remote Status Monitoring
Relay Output	
Output Channels	3
Type	Power Relay, Form A (SPST N.O.)
Operating Voltage	250 VAC or 30 VDC
Max. Load Current	16 A (Res. Load) (1).250 VAC (Recommend Working Current 1.5A)
Operating Time	10 ms Max.
Release Time	5 ms Max.
Electrical Life (Resistive load)	100,000 ops

Mechanical Life	5,000,000 ops at no load (300 ops/minute)
Application Specification	(1).Incandescent Lamp: 40W/ 220VAC * 8 Sets (2).LED(Electronic ballast): 40W/ 220VAC * 10 Sets
Safety Approval	UL/CUL, TÜV
Power-on Value	No
Safe Value	No

2.1 System Specifications

Communication	
Interface	RS-485
Format	N,8,1
Baud Rate	9600 bps
Protocol	DCON & Modbus RTU
Node Addresses	1~31
Connector	DINKLE-0177-5104
LED Indicators	
Power	1 LED as Power Indicator
EMS Protection	
ESD (IEC 61000-4-2)	±4 kV Contact for Each Terminal
	±4 kV Air for Random Point
EFT (IEC 61000-4-4)	±2 kV for Power
SURGE(IEC 61000-4-5)	±2 kV for Power
Power Requirements	
Input Voltage Range	10 ~ 30 VDC
Consumption	1.5 W Max.
Connector	DINKLE-0177-5104
Mechanical	
Dimensions (W x L x H)	72 mm x 100 mm x 59 mm
Installation	DIN Rail Mounting
Environment	
Operating Temperature	-25°C ~ +75°C
Storage Temperature	-30°C ~ +75°C
Humidity	10 ~ 95% RH, Non-condensing

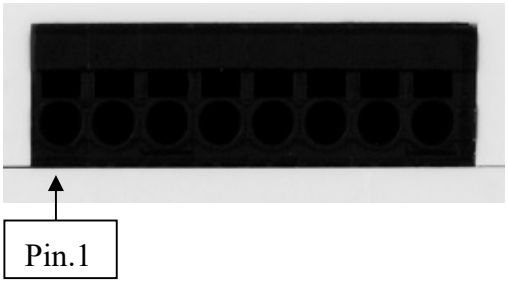
2.2 Pin Assignments



2.3.1 CN1 Connector

No.	Pin	Function
1	GND	Ground
2	VSS	Power Supply
3	D-	RS-485 Data-
4	D+	RS-485 Data+

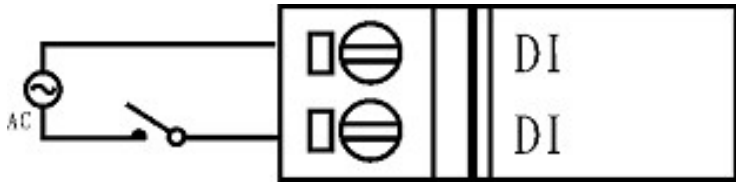
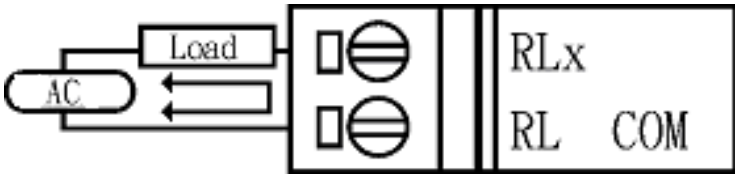
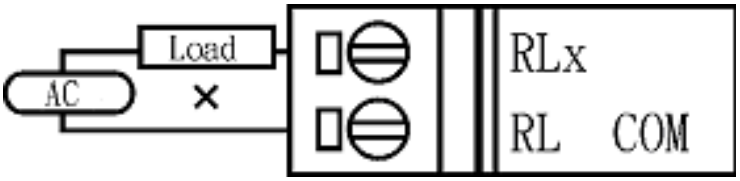
2.3.2 CN2 Connector



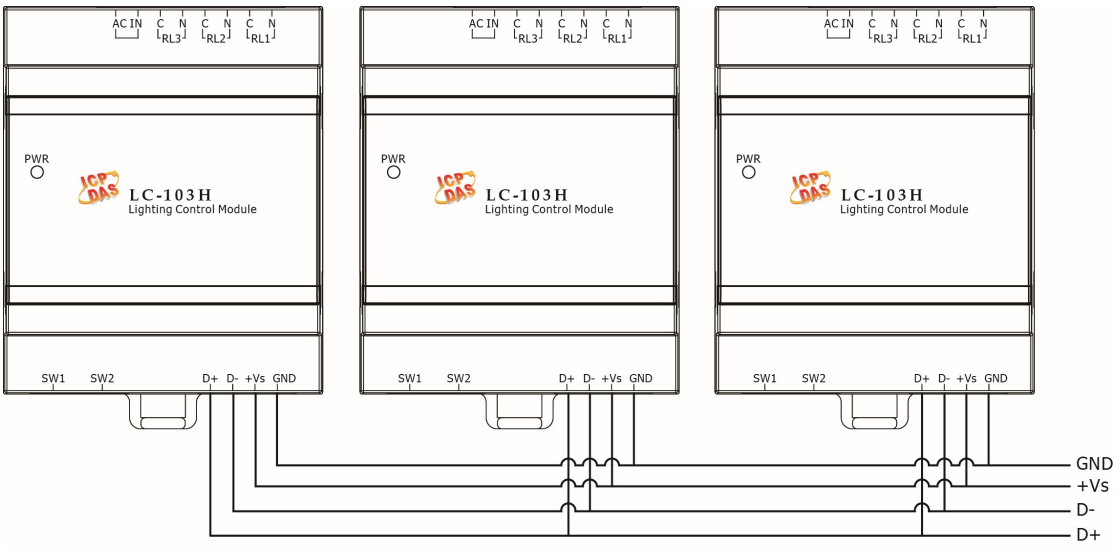
No.	Pin	Function
1	RL.N	DO1 RL1 Relay Output
2	RL.C	
3	RL.N	DO2 RL2 Relay Output
4	RL.C	
5	RL.N	DO3 RL3 Relay Output
6	RL.C	
7	AC_IN	DI Wet Contact Input Channel
8	AC_IN	

2.4 Wire Connections

DIO Wire Connections

DI

Relay Output ON

Relay Output OFF


2.4.1 Power and communication

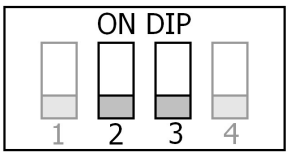
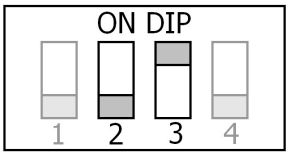


2.5 DIP Switch and Jumper Settings

2.5.1 Configuration(SW2)

SW2 	1	Protocol	ON	DCON
			OFF	Modbus RTU
	2	Configuration	ON	By Software
			OFF	By Hardware
	3	Address	ON	Added by 16
			OFF	Added by 0
	4	INIT mode	ON	INIT
			OFF	Normal

2.5.2Address Settings via Hardware Configuration(SW1)

SW1 		0 ~ F for Addresses 0 ~ 15 (Low Node Address)
		0 ~ F for Addresses 16 ~ 31 (High Node Address)

3 Modbus RTU Protocol

The Modbus protocol was originally developed for Modicon controllers by Modicon Inc. Detailed information can be found at http://www.modicon.com/techpubs/toc7.html. Visit http://www.modbus.org to find more valuable information.

The LC-103H module supports the Modbus RTU protocol. The communication Baud Rate is 9600bps, and the parity, data bits and stop bits are fixed as no

parity, 8 data bits and 1 stop bit. The following Modbus functions are supported.

Code	Description	Address
0x01	Read coils status	0xxxx
0x02	Read discrete inputs	1xxxx
0x03	Read multiple registers	4xxxx
0x04	Read multiple input registers	3xxxx
0x05	Write to a single coils	0xxxx
0x06	Write toa single register	4xxxx
0x0F	Write to multiple coils	0xxxx
0x10	Write to multiple registers	4xxxx

If the function specified in the message is not supported, then the module responds as follows.

Error Response

00	Address	1 Byte	1 ~ 247
01	Function code	1 Byte	Function code + 0x80
02	Exception code	1 Byte	01

If a CRC mismatch occurs, the module will not respond.

3.1 Modbus Mapping Table

LC-103H Modbus RTU Tables

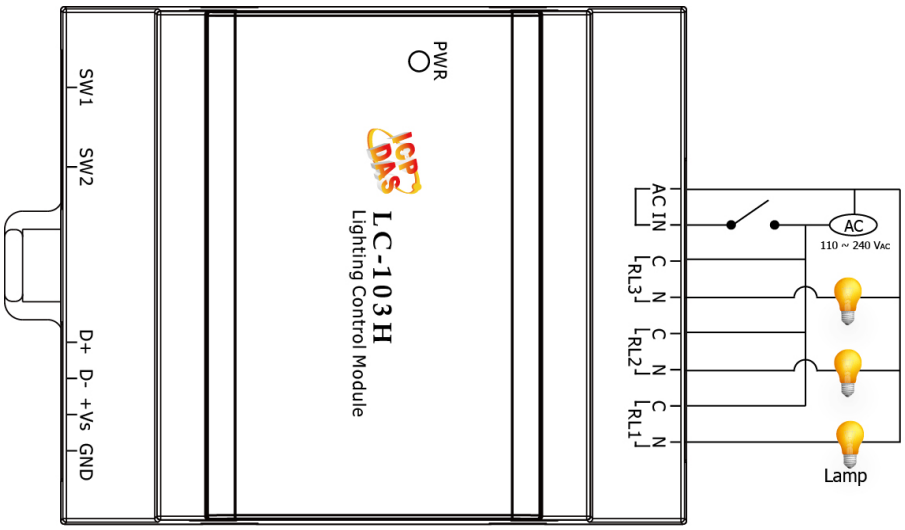
Coils

Number	Address (Hex)	Function Code(s)	Access	Data Type	Name	Comments
00001	0 (0x00)	01, 02, 05, 15	R/W	Bit	AC relay output of channel 0.	
00002	1 (0x01)	01, 02, 05, 15	R/W	Bit	AC relay output of channel 1.	
00003	2 (0x02)	01, 02, 05, 15	R/W	Bit	AC relay output of channel 2.	
00033	32 (0x20)	01, 02	R	Bit	AC input of channel 0.	
00257	256 (0x100)	01, 02	R	Bit	Protocol indicator bit.	The response value is a hex value of 1 which denotes the Modbus RTU protocol.
00273	272 (0x110)	01, 02	R	Bit	Reset Bit.	This bit only returns a value of 1 when reading it for the first time. In all other cases, it always returns a value of 0.
10001	0 (0x00)	01, 02	R	Bit	AC input of channel 0.	

Registers

Number	Address (Hex)	Function Code(s)	Access	Data Type	Name	Comments
40481	480 (0x1E0)	03, 04	R	Word	Firmware Version (low word).	
40482	481 (0x1E1)	03, 04	R	Word	Firmware Version (high word).	
40483	482 (0x1E2)	03, 04	R	Word	Module Name (low word).	The response value is a hex value. The high byte denotes 0x01, and the low byte denotes 0x03.
40484	483 (0x1E3)	03, 04	R	Word	Module Name (high word).	The response value is the ASCII value. The high byte denotes ‘L’, and the low byte denotes ‘C’.
40485	484 (0x1E4)	03, 04	R	Word	Module Address..	
40486	485 (0x1E5)	03, 04	R	Byte	Module Baud Rate.	The response value is a hex value. The high byte is reserved, and the low byte denotes 0x06.

4 Function Descriptions



The LC-103H has a single AC input that can be used to connect a lighting control switch and three relay outputs that can be used to connect the lighting, lamp or AC LED lighting etc. Please refer to the above diagram for detailed wire connection information. The input channel of the LC-103H can directly control its 3-channel relay ON and OFF sequence without requiring a remote host controller, so it's very easy to test any lighting circuits for incomplete applications.

If an application requires software control, such as building automation or scenario control, etc., communication with the LC-103H is programmable based on the DCON & Modbus RTU protocol.