

LP-M03 Industrial Wireless Switch Instruction Manual

Rev A



# List of contents

1	Over	rview 4	
2	Feat	ures and Benefits4	
3	Deta	iled Functional Description5	
4	Com	munications Architectures6	
	4.1	Communication Schematic to connect M01+ and M03 modules	6
	4.2	M01+ and M03 Transfer Switch Schematic	7
5	Prot	ocol support (Via LP-C01)9	
	5.1	Modbus TCP	9
	5.2	Modbus RTU	9
	5.3	Modbus MAP	9
6	Harc	lware 11	
	6.1	LP-M03 Front view	11
	6.2	Install Antenna	11
7	Prod	luct operation 12	
	7.1	Configure the product via USB.	12
	7.2	Configuration Software	
	7.2.1	USB port Drivers installation	
	7.2.2	Interface layout	
	7.2.3	Dropdown manual layout	15
	7.2.4	Connect the USB-C cable from Computer to LP-M03 via USB-C port.	16
	7.2.5	Firmware Upgrade	
	7.2.6	Analog Input setting	20
	7.2.7	Transfer Switch mode setting	
8	Spec	ifications 23	
	8.1	Product Specification	23
9	Revi	sion History 25	



# List of Tables

Table 5-1 LP-M03 Input Register Modbus Map (Analog Input)	9
Table 5-2 LP-M03 Holding Register Modbus Map (Controls)	10
Table 7-1 LP-M01 parameter settings	14
Table 9-1 Document Revision History	25

# List of Figures

Figure 4.1 LP-C01 M01&M03 Comm Schematic	6
Figure 4.2 LP- M01&M03 Transfer Switch point to point status follow/pulse	7
Figure 4.3 LP- M01input to multiple M03 output	7
Figure 4.4 LP- M01input bundled to multiple M03	8
Figure 6.1 LP-M03 Front view	
Figure 7.1 LP-M01 USB Driver	
Figure 7.2 LP-M03 USB Driver Installation	
Figure 7.3 LP-M03 Setting Tool	
Figure 7.4 LP-M03 Setting Tool Interface	
Figure 7.5 LP-M03 Setting Tool Dropdown manual	
Figure 7.6 LP-M01 Setting Tool COM Interface	
Figure 7.7 LP-M01 Setting Tool COM port setting	
Figure 7.8 LP-M03 Setting Tool COM port status	
Figure 7.9 LP-M03 Setting Tool Firmware upgrade Select	
Figure 7.10 LP-M03 Firmware version check	
Figure 7.11 LP-M03 Firmware Upgrade window	
Figure 7.12 LP-M03 Firmware bin file pickup	
Figure 7.13 LP-M03 Firmware upgrade confirmation	
Figure 7.14 LP-M03 Firmware upgrade process	
Figure 7.15 LP-M03 Firmware upgrade process finished	
Figure 7.16 LP-M03 Reset after firmware upgrade finished	
Figure 7.17 LP-M03 firmware version check	
Figure 7.18 LP-M03 Setting Tool Analog Input setup select	
Figure 7.19 LP-M03 Analog Input Setting Window	
Figure 7.20 LP-M03 RAW to EU setting example	
Figure 7.21 LP-M01&M03 LoRa Parameter setup	
Figure 7.21 LP-M03 Transfer Switch setting tool	
Figure 7.22 LP-M03 Transfer Switch setting tool select	
Figure 7.23 LP-M03 Transfer Switch setting window	
Figure 8.1 LP-M01 Dimensions	.错误!未定义书签。



# **1** Overview

The LP-M03 Module is an encrypted wireless "LoRa" IO module with 1 Digital input, 1 analog input and 1 DO relay output. The analog input supports voltage and current signal input. It can communicate with LP-C01 receiver for Modbus input/output. The LP-C01 wirelessly controls LP-M03 modules via Modbus TCP or Modbus RTU for any SCADA or Control System client. Each LP-C01 will support up to 128 LP-M03 Modules.

LP-M01+, LP-M02 & LP-M03 and LP-C01 with LoRa wireless technology implements secure 128bit encryption with embedded signals that can control and monitor via the Modbus client. With a very low power consumption and a wireless communication range between an LP-C01 and an LP-M03 of up to 2 miles, it would significantly reduce material, design, and labor costs when compared to a traditional hard-wired solution.

## 2 Features and Benefits

## a) Flexible Monitoring Application

Employ hardwired analog voltage and current inputs and digital outputs from remote devices to the Control house or central PLC location without the need for new cables, digging trenches, or adding conduit. The encrypted communications provide a secure and reliable communication.

## b) Easy Integration

LP-M03 expands the availability of monitoring/control any remote I/O contact status and any analog sensor inputs via Modbus TCP/RTU in combination with the LP-C01 with any PLC / Automation Controller.

## c) High Dependability

Debounce support in both software and hardware. Communications monitoring will alarm for low battery, interrupted communication, or any device malfunction.

Rugged case suitable for tough environments. Conformal coating on all electronic circuit boards.

## d) Improved Safety & Data Transfer Reliability

Secured and encrypted wireless communications.

Replace control wiring to outside cabinets with wireless antenna, eliminating unnecessary outages or the need to go through existing paths with dangerous voltage levels.

## e) Savings on Capital Cost Investments

Reduce project costs and time using wireless communication instead of traditional wired applications. No trench, conduit, or raceway requirements, less labor for design, documentation, installation, testing and maintenance. Additionally, with the Modbus communication, this device can be used for virtually any application in the automation and control industry.



## f) Transfer Switch System

Create a wireless version of pilot signals for any remote monitoring and control. The transfer switch system at M01+ reads an input and with the M03 module it quickly asserts the designated output to emulate, mirror, or momentary pulse. Inputs and outputs can be designated and configured via LP's configuration software.

## **3** Detailed Functional Description

LP-M03 LoRa the IO module collects the analog input signal from remote location and sends the signal to the gateway through encrypted LoRa signal wirelessly. It holds 1 DO relay outputs, and users can remotely control the relay on and off.

When the analog input is higher than the upper limit alarm value, lower than the lower limit alarm value or the change exceeds the threshold, the module immediately reports the current IO status to the gateway. IO status includes device status, power supply voltage, device address, device SN number, analog value, DO value, etc.

When the analog quantity returns to the normal range from exceeding the upper limit/lower limit, the IO status will be reported again. The module reports the IO status at heartbeat intervals.

The analog input channel supports 0-24 mA & 0-10 VDC input, voltage input and current input is designed to connected to different terminals for jumper mistake proof. The same input channel cannot be connected to voltage signal and current signal at the same time.

4 DOs are all relay outputs. The DO1 and DO2 are NO&NC contacts, DO3 and DO4 are NO contacts only.

Wireless data is encrypted using AES128. Users can set AES 128 KEY value.

LP-M03 reports the IO status immediately after the product is powered on, without waiting for a receiver response. This design is to proof the M03 randomly delays to reports of the first heartbeat and waits for the gateway to respond.

Users can write module DO output through gateway MODBUS. Only when writing to the corresponding DO register of the gateway, the gateway will communicate with the module through LORA, and set/reset the corresponding DO channel. Thus LP-M0x modules holds very stable connection because the connection logic consumes minimal bandwidth compared to other LoRa based wireless devices. LoRa is a low-bandwidth communication technology. In the network, each node sends as little data as possible to avoid network congestion. Each node should set a larger Heartbeat reporting time interval as much as possible if the requirements are met.



#### **Communications Architectures** 4

## 4.1 Communication Schematic to connect M01+ and M03 modules

For Setup the LP-C01, M01, M02&M03 LoRa network. Please see Section 7.2.2



Rev. 20220723

Figure 4.1 LP-C01 M01&M03 Comm Schematic



### 4.2 M01+ and M03 Transfer Switch Schematic



Figure 4.2 LP- M01&M03 Transfer Switch point to point status follow/pulse



Figure 4.3 LP- M01input to multiple M03 output





Figure 4.4 LP- M01input bundled to multiple M03

# LP SENSOR TECHNOLOGY

# 5 Protocol support (Via LP-C01)

## 5.1 Modbus TCP

Modbus TCP uses the default port number 502. The gateway can set a static IP address or obtain an IP address through DHCP. Users can use PC Tool to view the current IP address.

Enter the current IP address in the browser to configure network parameters. The login username and password are both admin.

## 5.2 Modbus RTU

Modbus can also be used via RS485. Users can set parameters such as Modbus communication address and baud rate via web interface.

## **5.3 Modbus MAP**

Main Input	registers for LPM	)3
Offset	Register name	Description
0	AI1	65535-Not available; other value is for current/voltage
		uint: uA/mV
1	unused	unused
2	unused	unused
3	unused	unused
4	unused	unused
5	unused	unused
6	unused	unused
7	unused	unused

 Table 5-1 LP-M03 Input Register Modbus Map (Analog Input)



	Table	5-2 LP-M03 Holding Register Modbus Map (Controls)
Main H	olding registers for	: LPM03
Offset	Register name	Description
0	DO1	65535: Error
		For DO channel, when writing nonzero value means logic 1, relay switch on; when
		writing 0 means logic 0, relay switch off.
		After writing, current value will be written in this register: 0-switch off, 1-switch on,
		65535-invalid
1	unused	unused
2	unused	unused
3	unused	unused
4	unused	unused
5	unused	unused
6	unused	unused
7	unused	unused



## 6 Hardware

## 6.1 LP-M03 Front view



Figure 6.1 LP-M03 Front view

- Power Supply Terminals
   PWR+ & PWR-: Supports 100-480VAC power inputs.
   GND: Power Ground.
- 2) Digital Outputs (See Section 8 for specs) LOAD1: NO
- 3) Analog Inputs (See Section 8 for specs)

Channel 1support 4-20mA and 0-10V inputs. The dead band, measuring range, RAW data or Engineer units output is configurable via Setting tools.

4) Antenna Port

RG174 Coax SMA Female Antenna port. Requires SMA Male cable/Antenna.

## 6.2 Install Antenna

Install the antenna or coax cable onto the SMA threaded interface. Antenna installation is crucial for signal transmission. Setup up antenna at a high position when needed.



## 7 Product operation

## 7.1 Configure the product via UART pin.

Users can connect UART USB adapter to configure the product, read logs, perform device upgrades, etc. Using the PC tool, you can configure the product timing reporting time interval, alarm reporting time interval, sampling time interval, positioning time interval, upper and lower limit alarm values, display units, network access parameters, etc.

## 7.2 Configuration Software

estomer Fig. = 01312023 = 1.P USB Port Dr	ver 🗢	6	,A. Stach D
	Status	Owter	notified
DRVIETUP64		10340	MILLIO PM
CHEMIFTERS		111/2	022 T1:51 AM
CHOHISSESVS		7/11/3	NA 11:11 100
CH641598.5V5		mid	1022-11-ET AMA
CH6419ER.CAT		2014	022 11:51 AM
CHEATERINE		2012	1022 11:51 444
CIG419R9/S		7/11/2	022 11/01 AM
CHEATSER MD		1/1///	022 T1:51 AM
To DRIVETUPations		7/11.0	ANA THE FLAMA
A STREET	•	2/11/2	\$22 1131 AM

## 7.2.1 USB port Drivers installation

Figure 7.1 LP-M01 USB Driver

#### Click "INSTALL"



Figure 7.2 LP-M03 USB Driver Installation



## 7.2.2 Interface layout

Open the LP-M03 setting tools.

Name	Status	Oute modified	1ge	Size
archive	😁 R.	7/7/2824 9-30 PM	Filefolder	
Log	🖷 A.	9/23/2024 10:52 AM	File folder	
Ipc01cadV2.0.12.bin	🖷 A	7/10/2024 5:40 PM	BIN File	80 KB
pm85_v1.85.bin	🖷 A.	10/7/2023 2:06 AM	BIN File	71 KB
Ipvd35ettingTout_V2.03.exe		9/4/2023 3-35 PM	Application	3,228 KB

Figure 7.3 LP-M03 Setting Tool

11 ST	LoRa parametera			22	
SN 10017 G	e Spread factor	SF7		Set	
Ferrivare version 2.0.8 G	et Yrequency plan	US915	4	Set	
Hardware version A	e Fequency	902300000_BW12	9 V 🛛	Set	
	Tis power(dbm)	22		Set	
-	Heartbeat(S)	60		Set.	
Reset Restore	2) 0	1		Set	
	AES128 key	3C4FCF098815F74	BASD2AE281	16157E28	Set
47-57-237] HEARTBEATINTL=65535 17:57:331]					
47:57:237] HEARTBEATIBITL=65635 47:57:331] ARTBEATINTL:65535 47:50:576] 190] Begin to send report mag					
47:57:237] HEARTBEATINTL=65635 47:57:331] ARTBEATINTL:65535 47:59:576] 'RO] Begin to send report mag 'RO] Power voltage is 24055mv 'RO] Begin to send report mag 'RO] Power voltage is 24055mv 'RO] Begin to send report mag 'RO] Send report mag done 17:59:056] 'RO] Send report mag done 17:59:119] 'RO] RF is done: Len 16; RSSI -124; SNR -5 'RO] Begin process rov mag 'RO] Descrypt data	3				
47:57:237] HEARTBEATINTL=65635 47:57:331] ARTBEATINTL:65535 47:59:576] 'RO] Begin to send report mag 'RO] Power voltage is 24055mv 'RO] Begin to send report mag (R) 59:0565] 'RO] Send report mag done 47:59:159] 'RO] Send report mag done 47:59:159] 'RO] Riv adow: Len 16; RSSI -124; SNR -5 'RO] Begin process rov mag 'RO] Descrypt data 'RO] Rev adds with good status 42:15:100] HEARTBEATINTL=60 42:15:153]	3				

Figure 7.4 LP-M03 Setting Tool Interface



#### 1) Device Parameter setting zone. (Setup M01&M03 to C01 LoRa network.)

To connect M01/M03 to C01. Use this area to setup the parameters of the device. The M01and M03 should be share same **Spread Factor, Frequency Plan, Frequency, AES128 KEY** to establish the connect. A hardware reset (click the Reset button in Zone 2) is recommended after each setting changes.

parameter	Definition	Scope	Defaults
Spread factor	LoRa spreading factor	SF7-SF12	SF7
Frequency Plan	US915/EU868		
Frequency	Communication Frequency	902.3 MHZ -914.2 MHZ	902.3 MHZ
Tx power	Antenna Transmit power	- 3 ~ 22dbm	22dbm
Heartbeat(S)	Regular polling rate cycle	1-65535	60
ID:	Module communication	0 ~ 127	1
Node number (Only	address		
for LP-M modules)			
AES128 key	AES128 key	128bit encryption key	

Table 7-1 LP-M01	parameter settings
------------------	--------------------

#### 2) Function buttons for device

- a) Restore Defaults: Restore all parameters back to factory default setting. (Only use for trouble shooting.)
- b) Reset: reset the hardware. (Required after key parameter change or firmware update.)

#### 3) Data log window

Show Realtime info of LP-M03 comm status.

4) USB-C port comm status



## 7.2.3 Dropdown manual layout

Device	Help	
0	M	
< B	mware upgrade	and a second sec
Tr	p sattings	Get
A	ulog settings	1 10 64
Fi	ctory settings	10.96
P	adware Version:	Get

Figure 7.5 LP-M03 Setting Tool Dropdown manual

- a) COM:
  - Setup connection from PC to LP-M03, See section 7.2.4
- b) Firmware Upgrade:Firmware Upgrade function. See section 7.2.5
- c) Trip Settings: Transfer Switch settings See Section 7.2.6
- d) Analog Settings: Analog Input Settings See Section 7.2.7
- e) Factory Settings: For manufacturer use only.



7.2.4 Connect the Uart pin port from Computer to LP-M03 via USB adapter.

1) Similar to LP-M01, Click "COM"

COM	
lutue Simmune upgrade	Ger.
factory settings	
Hardware version	Get

Figure 7.6 LP-M01 Setting Tool COM Interface

2) Select "COM# - USB - SERIAL CH340" Then click connect. (Setting tools can only be connected to specific device. E.g., M01 tools can only connect to LP-M01. Force option is only used for trouble shooting.)

COM Port COM3 - USB-SERIAL CH340	~	
Baud rate 115200 V Disconnect	Force	

Figure 7.7 LP-M01 Setting Tool COM port setting

3) Check Port connection status at left bottom of main setting window.

- LPMP and Santhactory)				-	— X
Date Non					
		- Lifeseener			
P	ie .	Seethite	H	191	
Nexus ener [111	la .	Transie day	2000	1.04.11	
finite rate (1	ie.	hears.	Stramburger	- See	
		Samples		34	
And		(network)	H	14	
Riat angle			(2	34	
		HERE STATE	CONTRACTOR OF TABABLE	ALMAN ALMAN AL	M
(112) 91 201 a 1 - 4 (147) 92 2019 - 400000 2020 12 - 201 2020 12 - 2020 12 - 2020 2020 12 - 2020 12 - 2020 2020 12 - 2020 12 - 2020 12 - 2020 2020 12 - 2020 12 - 2020 12 - 2020 12 - 2020 2020 12 - 2020 12 - 2020 12 - 2020 12 - 2020 12 - 2020 12 - 2020 2020 12 - 2020					
In project and and part many The instance of the instance reserves and t		Ι			- 1



Figure 7.8 LP-M03 Setting Tool COM port status

## 7.2.5 Firmware Upgrade

1) The firmware update procedure is identical to LP-M01. Please select Firmware upgrade in Device dropdown manual.

svice Help	
COM	1
Firmware upgrade	
Trip settings	Get
Analog settings	54
Factory settings	
Hardware version A	Get



2) confirm the Firmware Revision before upgrading.

evice Help		
Da sr	¢ [10000	Get
Renware version	7.0.2	Get
Hardware vention	A	Get

Figure 7.10 LP-M03 Firmware version check

3) Follow the step to finish Firmware upgrade. Click on Enter Bootloader



Figure 7.11 LP-M03 Firmware Upgrade window



4) Next, select the firmware file to upgrade.

Name	Status	Date modified	Туре
Log	<b>2</b> 8	2023/3/6 18:32	File folder
📄 lpm02_v1.09.bin		2023/1/24 19:16	BIN File
Ipm02trip_v7.03.bin	2 R	2023/1/16 17:12	BIN File

Figure 7.12 LP-M03 Firmware bin file pickup

5) Confirm the firmware file revision before update.





6) Wait until update process finished. (Do NOT disconnect USB cable or power supply during firmware update.)

1/milijerta	distant					- K
Device Help						
				Li Pa constant		
	194.11	807		Served factor	(M7 · · · · )	54
Termoni or	-	11	54	Propulance plane	1119446	M
Hadman of	-		Cee .	Pequeico	902300000_8H125# -	1911
				Teametheat	10	м
				Peatwatti	80	Set .
Paul		Teame defaulte		0	1	
	I Fain	enter opprede			~ 0	x inter to
II. PRC: Provent red PRC: drawnad Ad PRC: draw	and other states	t da				
256 [14.25:45.213] A7+ENTERRI						
Non-Long in tradition (24. (24.25.45.27%) (non-traditionaler Records stranger di 1 Bookbaaring 1 1	iter	en L'Inchairte I i	letadiş i d	irfudig i tirfudig	, borhalig, ; Evriad	.
and the second se	in the second					

Figure 7.14 LP-M03 Firmware upgrade process

	LP SENSOR
4	TECHNOLOGY

D (Pritt's mynai					
Device Help					
		LoPe constant			
894 10000	-	Seveni factor	807	34	
Terrore senate (78.2	The I	Pepartypie	U2812 -	Sec	
Hardware research	126411	Pagent	914200000, #W900#	54	
		To present down	10	Set .	
10 AL 11		Hadwelli	14	34	
Passi	Final contract of the second s	0	<u>i</u>	34	
		ALCORE	SCAPCTION DIST NEWSLAW	10016157828	Sec
1990 Streamerry & Stall SPACEW & SUS PACE Town Stall			11000		
16 30 25 726 8 8900 Get render number 1823037 19 20 35 522 87+EWTERE	R. viter (10-42				
Non open in traditation					
DK DA DR NA NAL					
Permit subliater Receive poorghills, and hum are	112/02/02/02	10100-002		Sec. 11	1000
<ul> <li>Berhading - Gerhading - Ber Invitating - Serituating - Levis Berhading - Berhading - Berlio Berhading - Berhading - Berlio Berhading - Berhading - Berlio Berhading - Berhading - Berlio Berhading - Berhading - Berlio</li> </ul>	tadrą - dowinadrą - do akry - Borkadrą - Dor akry - Borkadrą - Dor akry - Dowinadry - Dor akry - Dowinadry - Dor akry - Dowinadry - Dor akry - Dowinadry - Dor	ertadry - berkadry kadry - berkadry kadry - berkadry kadry - berkadry Kadry - berkadry	- (perkading - doetkading doetkading - doetkading doetkading - doetkading doetkading - doetkading doetkading - doetkading doetkading - doetkading	i dombaling i dombaling i dombaling i dowbaling i dowbaling i dowbaling i dowbaling i	i Oreflading i distrikaling i Rostraling i Rostraling i Rostraling i Rostraling i
	uing. We lie over popele	the second s	second recently	· see and ·	menaby -

Figure 7.15 LP-M03 Firmware upgrade process finished

7) Click "Reset" after upgrade done.

Firmware upgrade			L –	x
Enter Boolloader	Get Image Info	Upgrade	Reat D	

Figure 7.16 LP-M03 Reset after firmware upgrade finished

8) Click Get for new firmware version check.

	10000	
Territory repairs	128	.64
-		54

Figure 7.17 LP-M03 firmware version check



## 7.2.6 Analog Input setting

1) Select Pulse in Device dropdown manual

Get
Get
Get

Figure 7.18 LP-M03 Setting Tool Analog Input setup select

2) Select AI01 – AI04 through drop down manual to setup Analog input channel parameters.

Contraction of the second s	24632				Al planet value					
High Value Triggins FANO	165535	SAM.	Get	Se		-			-	-
Low Value Tepper(RAW)	<b>a</b> .	white	Get	54	All year wature	R	skiel	\$17.99 <b>6</b> 9	1	-
Deathand(RAW)	A	oANV	Gel	(bec	N210w withit	1	in Arbert	EV vite	1	1
Sectoration(054W)	(9	LANY	- 64	Sec	All the rates	18	( where )	(Urake	1	11
Res To ENDANCY Midlant	owi wii solaw 18				Alter value	1	a and	El calor	1	7
Res High 0	wy europ is		(H	(e				-		
Overalisation			GH							
Daut datue	-							_		
(Bandele CEU			tie	34						
	Sec. March									

Figure 7.19 LP-M03 Analog Input Setting Window

- a) Current Channel: Select Analog channel to setup.
- b) AI Channel setup

i.**High Value Trigger (RAW):** This is the high reading level threshold to trigger M03 to send analog readings to C01 register. (M03 will report to C01 by heartbeat cycle normally if no trigger happened. If not needed, leave the value at 65535)

- ii. Low Value Trigger (RAW): This is the low reading level threshold to trigger M03 to send analog readings to C01 register. (M03 will report to C01 by heartbeat cycle normally if no trigger happened. If not needed, leave the value at 0)
- iii. **Deadband (RAW):** Setup deadband here. Only analog input value change is higher than the deadband will report to C01.



iv.	Raw to EU (Output to Modbus Only):			
	Use this window to setup RAW to EU conversi	sion.		
	E.g., 4-20mA RAW current analog input for a (	0-100 EU output should setup as below	':	
	Here To LU(Output to Modeus Only)			
	Raw Low 4 a/VinV EU Low 0			
	Hew High 20 INVINV 101 ligh 100			
	Opennel logof type			
	🛞 Clarett 🔅 🔅 Walage	Cer Set		

Figure 7.20 LP-M03 RAW to EU setting example

- v. Channel Input Type: Config current or voltage input for the AI channel. (Critical)
- vi. **Output data type**: Config M03 is sending RAW or EU data to C01 register.
- vii. AI Channel Value: Realtime AI value readings in M03

## 7.2.7 Transfer Switch mode setting

- 1) Upgrade both Paired M01 & M03 to **7.0X Firmware** first (important).
- 2) The LoRa parameters of M01 & M03 bundle need to be the same. (except ID#)

Tolks parameters			
Spread Factor	SF7 ~	1 Million	
Irequencyplan	US915 v	Set	
Inequency	902300000_BW 125# ~	Set .	
Ta power(dari)	22	tiel .	
Eleatheat(S)	9)	Set	
ID.	1	Set	
ALS12Ekwy	DOLC (COMPACIALISATION	s 2005/020 Sc	1
	Read Al		

Figure 7.21 LP-M01&M03 LoRa Parameter setup

3) Select Transfer Switch Setting Tools:

Status	Date woothind	Type	See
	2023/3/6 19/04	File fuider	
	2023/1/24 19:16	BM File	73.68
	2023/3/10 17/16	Application	3,025 KH
	2023/1/16 17:12	BNI File	71.60
		Automotions	- Literatur
	Status U	Status Date wonlifed D 2023/104 19/34 C 2023/104 19/34 C 2023/104 19/16 D 2023/1	Status Date workfiel Type D 2023/06 1954 File future 2023/024 1956 BPS File 2023/024 1956 BPS File 2023/026 1756 Application 2023/026 1752 BPS File 2023/026 1753 Application

Figure 7.22 LP-M03 Transfer Switch setting tool

4) Have the device COM connected and select Transfer Trip in device drop manual:



Nevice Help	
COM	
Firmware upgrade	
Trif settings	Get
Analog settings	- Get
Factory settings	

Figure 7.23 LP-M03 Transfer Switch setting tool select

5) Select Output channel on M03 in dropdown manual to setup:

Teplogecurity						
Evolution to a	ut channel 1	] Diverted	Type False v	False suffriend	<u>[9</u> ]	
				2	94	
Source (D	1					

Figure 7.24 LP-M03 Transfer Switch setting window

- a) Output Channel: Select the output DO channel to setup bundle with M01 DI input.
- b) Trip Logic Config:
  - i. Enabled: Select to enable bundle with LP-M01 DI input.
  - ii. Input channel: This is the source Binary Input channel on M01 which bundled with M03.
  - iii. Inverted: Select the Output Binary value to be inverted as input value.
  - iv. Type: There are two types to select as options:
    - Follow: M03 output will send exactly same output as M01 input
    - Pulse: M03 output will send a user defined pulse when M01 input value send.
  - v. Source ID: Select the M01 module ID to read the input. (Critical)

## 8 Specifications

#### 8.1 Product Specification

**Power Supply:** 100-480VAC, 3 Watts maximum

#### **Digital Output Ratings:**

Contact configuration: 1 NO contacts Rated current: 3 A @ 480VAC Rated voltage / Max switching voltage AC: 240/480 VAC Maximum breaking capacity AC: 1250 VA Mechanical endurance: 15x106 cycles Rated frequency of operation with/without load: 6/1200 min

#### **Analog Input Ratings:**

Current: 4-20mA (Range: 0-27mA) Voltage: 0-10V (Range: 0-12.8V) Accuracy: 0.25%

#### **Communications:**

Input latency: <100ms

Output latency: <200ms when under normal wireless environment

LP SENSOR

TECHNOLOGY

#### Wireless communication encryption:

AES-128bit custom authorization key support.

#### **Output Protocol:**

- LoRa Based encrypted wireless communication
- MODBUS TCP & MODBUS RTU (via LP-C01)



#### Supported LoRa Wireless Frequencies:

915MHz (US), 868 MHz (EU)

#### Antenna:

External

#### Channel:

Single

#### Maximum wireless communication range:

2.5 mile (with 4db Antenna installed)

#### **UART Port:**

3pin Uart wire part (For settings & firmware update only)

#### **Operating Temperature:**

 $-40^{\circ}$ C to  $+85^{\circ}$ C ( $-40^{\circ}$ F to  $+185^{\circ}$ F)

#### Weight

572g

#### **Dimensions:**

8.2"L\*2.2"W\*1.7"H 206(mm)L\*54(mm)W\* 34(mm)H

#### Compliance

Designed and manufactured under an ISO 9001 certified quality management system.

Notes:

It is a Class A product, and it may cause interference if used in residential areas. Such use should be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the



equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The device generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons.

SIMPLIFIED EU DECLARATION OF CONFORMITY: Hereby, LP Sensor Technology declares that the radio equipment type LP-M0 Series Industrial IoT module LP-M03 is in compliance with Directive 2014/53/EU.

Frequency Band:

Uplink: 868.1 MHz-868.3MHz for EU, 902.5 MHz-914.9 MHz for US Downlink: 868.1 MHz-868.3MHz for EU, 903 MHz-914.2 MHz for US

# C€F©

## 9 Revision History

Table 3-1 Document Revision Instory	Table 9-1	Document	Revision	History
-------------------------------------	-----------	----------	----------	---------

Date	Version	Revise
2024/9/5	Rev A	initial version