MS1UE-63DC 1U Smart Circuit Breaker for Communication

Instruction Manual

Document version 1.4

Release date 2024-08-02

Shanghai Matis Electric Co., Ltd.

matismart
AIoT Electric

FOREWORD

Overview

The product manual includes: scope of application, model description, main parameters, external interface and installation dimensions, model and communication, and standard. The product manual describes the complete functions of MS1UE-63DC.

The pictures of the device on the following pages are provided for reference only. Actual device features and specifications may vary.

Target Persons

This manual is mainly applicable to the following:

- Sales Engineer
- Technical Support Engineer
- Maintenance Engineer

Revision Record

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Document Version 1.1 (2024-06-11)

This is the first official release.

CONTENTS

1. PRODUCT INTRODUCTION

1.1 Overview

MS1UE-63DC is a multi-functional intelligent circuit breaker. The product integrates advanced low-voltage electrical equipment technology and digital intelligent communication technology to realize high switching life, low-power operation, remote switching, dual protection, metering, and other functions in small size.

1.2 Application Scope

- Power distribution of 4G/5G telecom system
- Power management of low voltage DC application
- Special field application

1.3 Part Number Introduction

M	S	1U	E	-	63	DC
Enterprise Code	Smart breaker	Height	Mechanical Type		Frame Current	Direct Current

2. Main Tech. Specs

2.1 Electrical Specs

Unless otherwise stated, it's generally regarded as the resistance load in 25℃ RT environment.

Parameter	Min.	Typical	Max.	Unit
Operating voltage range	-40		-80	Vdc
Interrupting rating(Icu=Ics)		10		kA
Voltage metering accuracy			0.5	%FS Mark 1
Current metering accuracy Mark 2			0.5	%FS Mark 1
Electricity metering accuracy			1	%
On-Resistance of negative electrode		1.5		mΩ
Insulation resistance @500Vdc	10			MΩ
Electrical life Mark 3	10000			cycles
Setting current range	5		100	%
Mechanical life	10000			cycles
Rated current setting step		1		A

- Note1: %FS means %Full Scale, the corresponding full scale of 63DC frame is 80V, 63A.
- Note2：Considering the influence of device characteristics, temperature drift and the practical application range meeting the measurement accuracy, the current value smaller than 1.5%FS（0.945A）is zeroed.
- Note3： In case of continuous and frequent operation, the interval between

switching on/off operations should not be less than 20s to avoid overheating of the actuator coil.

2.2Protection Feature

Protection function	Protection feature	Description
Under voltage	Self-recovery	At default settings, the breaker will disconnect the main circuit when its DC voltage is below – 40V for > 10s. When it returns to above – 42V, the breaker will automatically return to previous status.
Over voltage	Limited Self-recovery	At default settings, when its voltage is above –85V, the breaker will disconnect the main voltage. When it returns to below –82V, the breaker will automatically return to previous status.

<table>
<tr>
<td>Over current</td>
<td>Limited Self-recovery</td>
<td>Over current alarm and protection functions can be customized by customers
Under the default setting
<table>
<tr><th></th><th>63DC/63A</th></tr>
<tr><td>Overcurrent alarm threshold</td><td>66.15A</td></tr>
<tr><td>Level 1 overcurrent protection threshold</td><td>69.3A</td></tr>
<tr><td>Level 1 overcurrent protection delay</td><td>5S</td></tr>
</table>
The secondary overcurrent protection function is related to the rated current：
More than 145%In for several seconds (influenced by the sampling refresh time of metering chip, the typical delay is around 5 ± 2s), the breaker will disconnect.
Alarm self-recovery: Self-recovery of electronic switch disconnection protection for primary and secondary overcurrent protection can be set, but it is not restored by default</td>
</tr>
<tr>
<td>Short circuit</td>
<td>No Self-recovery</td>
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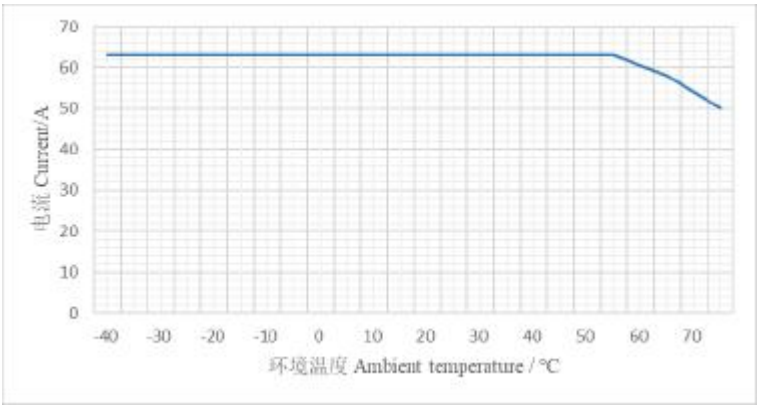
</tr>
<tr>
<td>Over temperature</td>
<td>Self-recovery</td>
<td>Triggered by inside or connecting terminal, the breaker will disconnect</td>
</tr>
</table>

Communication loss	Self-recovery	Under the default setting, the switch will report an alarm(switch does not act)when it does not receive the command from the hose computer after more than 300s, and the alarm disappears after the communication restored

2.3Working Environment

Parameter	Condition Description	Min.	Typical	Max.	Unit
Operating temperature	Altitude<2000m	-40		+75	℃
		See below derating curve			
Temperature derating curve					
Storage Condition	-40 ~ +85℃, 10 ~ 95% RH without condensing, ≤24 months after production				
Cooling method	Natural air cooling				
Altitude	1% current derating for every 100m increase above 2000m			3000	m

Humidity		5		95	%
Salt spray	Neutral salt spray, no red rust or obvious corrosive substances	48			h
Wiring capacity	Screwing	0.75		16	mm^2
Insertion and extraction force	Complete machine insertion	35		85	N
	Complete machine extraction	20		60	
Insertion and extraction times	Allowed insertion and extraction times with normal functions	200			
Pollution degree	3				
Installation method	No interference or external force at button position. Recommended to install horizontally and use with power distribution box				

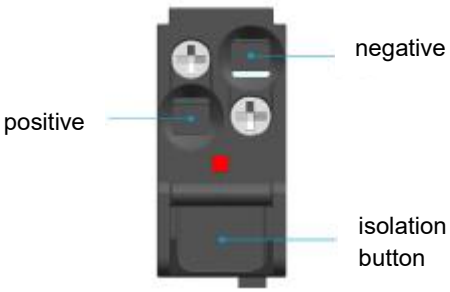
2.4Insulation Specs

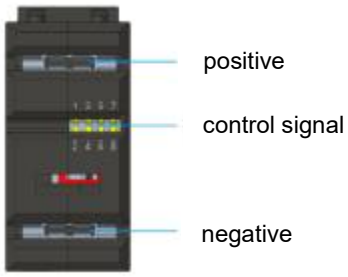
Control signal and switch circuit (with mechanical contact closed)	500Vac@1min, <2mA without breakdown and flashover
Input and output (with mechanical contact open)	4000Vdc@1min, <2mA without breakdown and flashover

Control signal and input/output (with mechanical contact open)	500Vac@1min, <2mAwithout breakdown and flashover

3. Interfaces and Dimensions

3.1 Product shape and interfaces

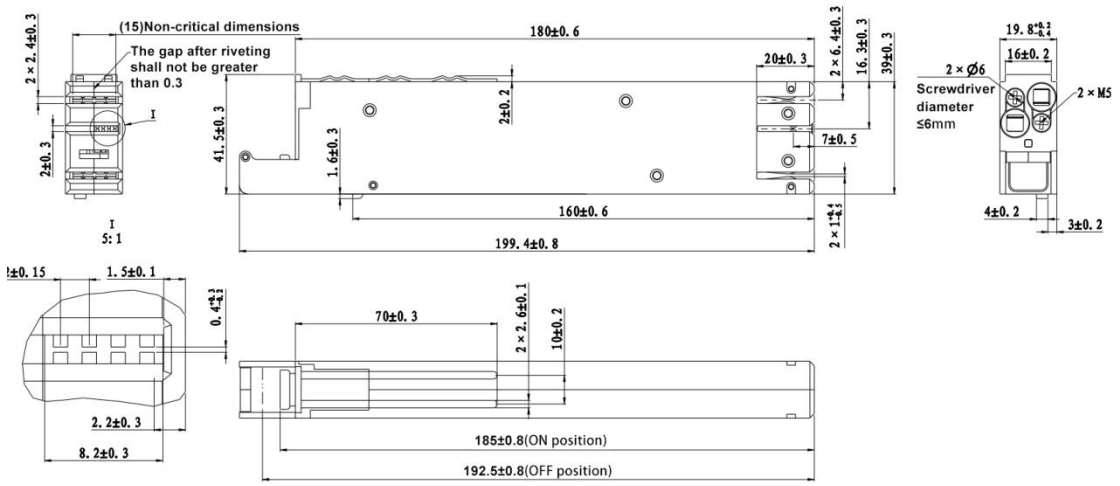




Control signal

Bit No.	1	2	3	4	5	6	7	8
Function	Power+	Power-	Vx	Vy	PRS+	PRS-	RS485 A	RS485 B
	External power supply positive pole	External power supply negative pole	X-bit address	Y-bit address	In-place signal - positive	In-place signal - negative	Digital communication - positive	Digital communication - negative

3.1.1 Dimensions (mm)



4. Signal and Communication

4.1 Signal and Communication

RS485, baud rate 9600, character format adopts asynchronous serial communication format of no check bit, 8-bit data bit and 1-bit stop bit, and data response time is <30ms (data response time refers to the time between the last byte of query data packet sent by upper computer and the first effective byte of breaker response received).

The RTU (remote terminal unit) mode based on RS485/Modbus protocol is adopted. Each byte takes two hexadecimal numbers with effective data range is 0~9, A~F.

The communication protocol refers to "Matis Modbus protocol" developed by Shanghai Matis Electric Co.Ltd. Specific communication protocol reference standard: Modicon Modbus Protocol Reference Guide PI-MBUS-300 Rev.J.

4.2 LED indicator

Working mode

LED	①	②	③	④	⑤
	Const. red	Const. green	Const. yellow	Slow blink	Fast blink
Device status	Closed	Open or standby	Open or standby	Status of corresponding color in ①②③	Status of corresponding color in ①②③

Working status	Normal working of DC output	Disconnection of DC output	Unauthorized	Alarm or fault protection triggered	P2P function status

Boot mode

LED	⑥	⑦
	Slow blink of yellow	Fast blink of yellow
Device status	Not limited	Not limited
Working status	Boot mode running due to power-on start or other causes	Software upgrading

5. Standards and Certification

Standards and Certification

Standard certification	Reference standard	Refer to GB14048.2 and IEC60947-2
	Certification	CCC、CE
Lightning stroke	Inrush Current	Cooperate with the DC lightning protection of the system, which can pass 15kA (8/20μs) Inrush current, ± 5 times

6. TECHNICAL SREVICE

Anyone who purchases this MS1UE-63DC remote control auto-recloser enjoys a 24-month warranty period from the date of purchase. During the warranty period, if the quality of the device itself affects the normal use, you can enjoy free repair and replacement, and the condition of paid service as follows: the improper use, drop, installation and wiring errors that cause irreversible damage. Besides, if you disassemble and modify the device yourself, you will not enjoy the warranty service.

If you have any questions about the operation or malfunction of the device, please contact Matis technical support service.

Statement:

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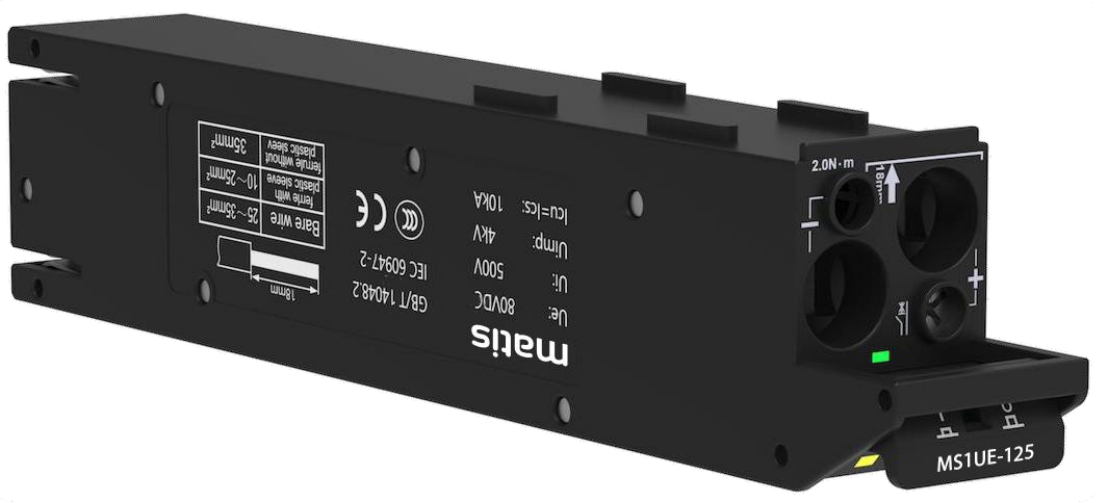

MS1UE-125DC 1U Smart Circuit Breaker for Communication

Instruction Manual

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Shanghai Matis Electric Co., Ltd.

FOREWORD

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The product manual includes: scope of application, model description, main parameters, external interface and installation dimensions, model and communication, and standard. The product manual describes the complete functions of MS1UE-125DC.

The pictures of the device on the following pages are provided for reference only. Actual device features and specifications may vary.

Target Persons

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CONTENTS

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MS1UE-125DC is a multi-functional intelligent circuit breaker. The product integrates advanced low-voltage electrical equipment technology and digital intelligent communication technology to realize high switching life, low-power operation, remote switching, dual protection, metering, and other functions in small size.

1.2 Application Scope

- Power distribution of 4G/5G telecom system
- Power management of low voltage DC application
- Special field application

1.3 Part Number Introduction

M	S	1U	E	-	125	DC
Enterprise Code	Smart breaker	Height	Mechanical Type		Frame Current	Direct Current

2. Main Tech. Specs

2.1 Electrical Specs

Unless otherwise stated, it's generally regarded as the resistance load in 25℃ RT environment.

Parameter	Min.	Typical	Max.	Unit
Operating voltage range	-40		-80	Vdc
Interrupting rating(Icu=Ics)		10		kA
Voltage metering accuracy			0.5	%FS Mark 1
Current metering accuracy Mark 2			0.5	%FS Mark 1
Electricity metering accuracy			1	%
On-Resistance of negative electrode		0.9		mΩ
Insulation resistance @500Vdc	10			MΩ
Electrical life Mark 3	10000			cycles
Setting current range	5		100	%
Mechanical life	10000			cycles
Rated current setting step		1		A

- Note1: %FS means %Full Scale, the corresponding full scale of 125DC frame is 80V, 125A.
- Note2：Considering the influence of device characteristics, temperature drift and the practical application range meeting the measurement accuracy, the current value smaller than 1.5%FS（1.875A）is zeroed.Note3：In case of continuous and frequent operation, the interval between switching on/off operations should not be

less than 20s to avoid overheating of the actuator coil.

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2.2Protection Feature

Protection function	Protection feature	Description
Under voltage	Self-recovery	At default settings, the breaker will disconnect the main circuit when its DC voltage is below – 40V for > 10s. When it returns to above – 42V, the breaker will automatically return to previous status.
Over voltage	Limited Self-recovery	At default settings, when its voltage is above –85V, the breaker will disconnect the main voltage. When it returns to below –82V, the breaker will automatically return to previous status.

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The secondary overcurrent protection function is related to the rated current：
More than 145%In for several seconds (influenced by the sampling refresh time of metering chip, the typical delay is around 5 ± 2s), the breaker will disconnect.
Alarm self-recovery: Self-recovery of electronic switch disconnection protection for primary and secondary overcurrent protection can be set, but it is not restored by default</td>
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Over temperature	Self-recovery	Triggered by inside or connecting terminal, the breaker will disconnect
Communication loss	Self-recovery	Under the default setting, the switch will report an alarm(switch does not act)when it does not receive the command from the hose computer after more than 300s, and the alarm disappears after the communication restored

2.3Working Environment

Parameter	Condition Description	Min.	Typical	Max.	Unit
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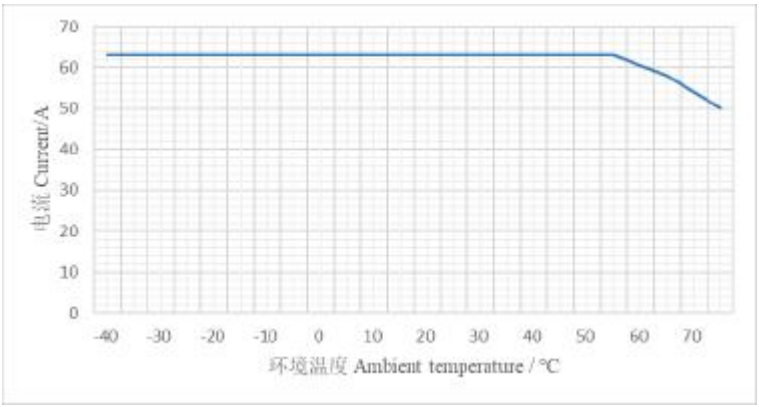
Temperature derating curve					
Storage Condition	-40 ~ +85℃, 10 ~ 95% RH without condensing, ≤24 months after production				
Cooling method	Natural air cooling				

Altitude	1% current derating for every 100m increase above 2000m			3000	m
Humidity		5		95	%
Salt spray	Neutral salt spray, no red rust or obvious corrosive substances	48			h
Wiring capacity	Screwing	10		35	mm^2
Insertion and extraction force	Complete machine insertion	50		110	N
	Complete machine extraction	25		75	
Insertion and extraction times	Allowed insertion and extraction times with normal functions	200			
Pollution degree	3				
Installation method	No interference or external force at button position. Recommended to install horizontally and use with power distribution box				

2.4Insulation Specs

Control signal and switch circuit (with mechanical contact closed)	500Vac@1min, <2mA without breakdown and flashover
Input and output (with mechanical contact open)	4000Vdc@1min, <2mA without breakdown and flashover
Control signal and input/output (with mechanical contact open)	500Vac@1min, <2mAwithout breakdown and flashover

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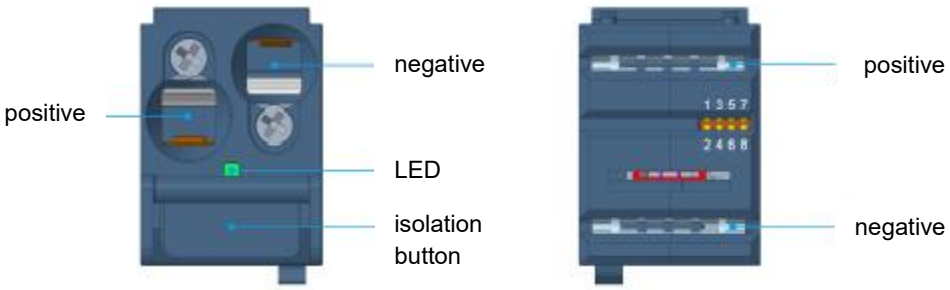
3.1 Product shape and interfaces



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Bit No.	1	2	3	4	5	6	7	8
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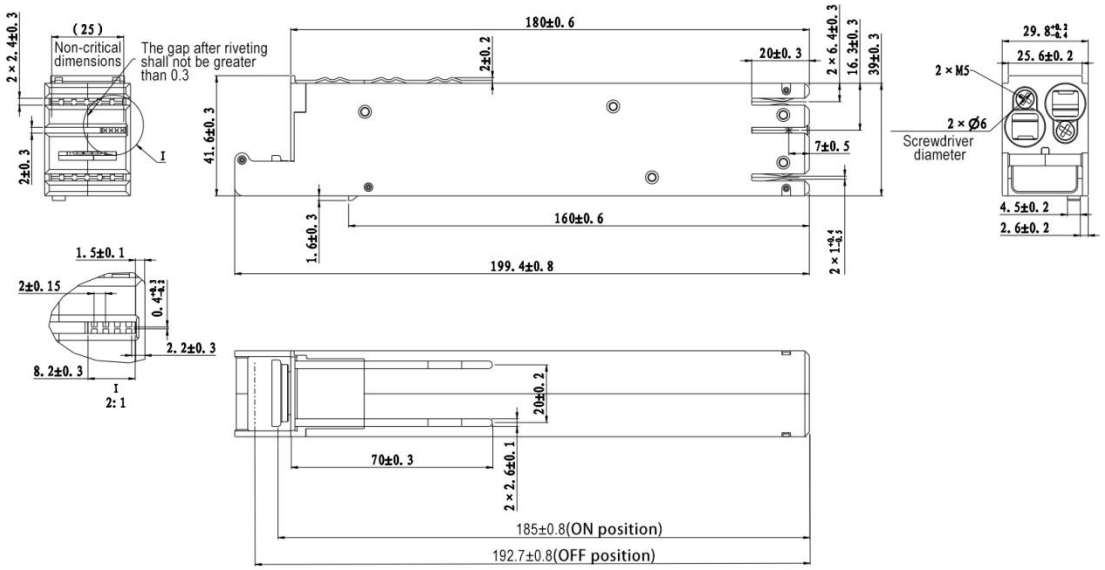

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LED	①	②	③	④	⑤
	Const. red	Const. green	Const. yellow	Slow blink	Fast blink
Device status	Closed	Open or standby	Open or standby	Status of corresponding color in ①②③	Status of corresponding color in ①②③

Working status	Normal working of DC output	Disconnection of DC output	Unauthorized	Alarm or fault protection triggered	P2P function status

Boot mode

LED	⑥	⑦
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Standards and Certification

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