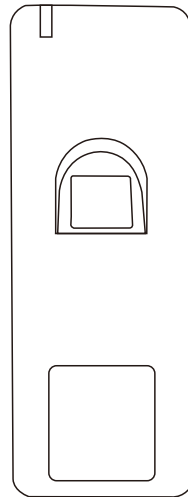# SF1 - Waterproof
Fingerprint & RFID Access Control

User Manual

INTRODUCTION

SF1 is a waterproof metal case standalone fingerprint access control with integrated EM reader. IP66 waterproof makes it very suitable for outdoor use; with the slim design, it is an ideal choice to install on door frame.

SF1 supports up to 1000 fingerprint users and 2000 card users, with Wiegand 26~44bits output, it can also work as a slave reader to connect to a 3rd party controller.

SF1 equips with an infrared remote control and master cards for easy operation, and supports fingerprint access, EM cards access and multi users access; with external alarm, door contact, exit button.
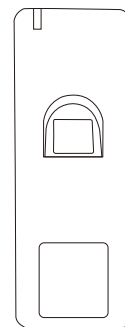
Main Features:
- Waterproof, conforms to IP66
- Metal case, anti-vandal
- One programming relay output
- 1000 fingerprint users, 2000 card users
- Wiegand 26~44 bits output
- Standalone or Pass-through operation
- Multi cards / fingerprints access
- Support setting Authorizing Users
- 2 devices support interlock for 2 doors
- Latch Mode to hold door or gate open
- Anti-tamper alarm
- Multi-color LED status display
- Integrated alarm & buzzer output

Specifications:

User Capacity	3,000
Fingerprint	1000
Card	2000
Operating Voltage	**12VDC±10%**
Idle Current	≤45mA
Active Current	≤150mA
Fingerprint Reader	**Optical Fingerprint Module**
Resolution	500DPI
Identification Time	≤1S
FAR	≤0.01%
FRR	≤0.1%

Proximity Card Reader	**Industry Standard 26bits**
Radio Technology	125KHz
Read Range	≥2cm
Wiring Connections	**Relay Output, Exit Button, DOTL, Alarm, Wiegand Output**
Relay	**One (NO, NC, Common)**
Adjustable Relay Output Time	0-99 Seconds (default: 5 seconds)
Adjustable Alarm Output Time	0-3 Minutes (default: 1 minute)
Lock Output Load	2 Amp Maximum
Alarm Output Load	5 Amp Maximum
Wiegand Interface	**Wiegand 26~44 bits output** (default: 26bits)
Environment	**Meets IP66**
Operating Temperature	-30℃~60℃ (-22℉~140℉) - Default
	-40℃~60℃ (-40℉~140℉) - Optional
Operating Humidity	20%RH-90%RH
Physical	**Zinc-alloy Enclosure**
Surface Finish	Powder Coat
Dimensions	L128 × W48 × D26 (mm)
Unit Weight	300g
Shipping Weight	365g

Carton Inventory

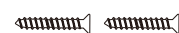SF1   Remote Control

Diode 1N4004 (For relay circuit protection)
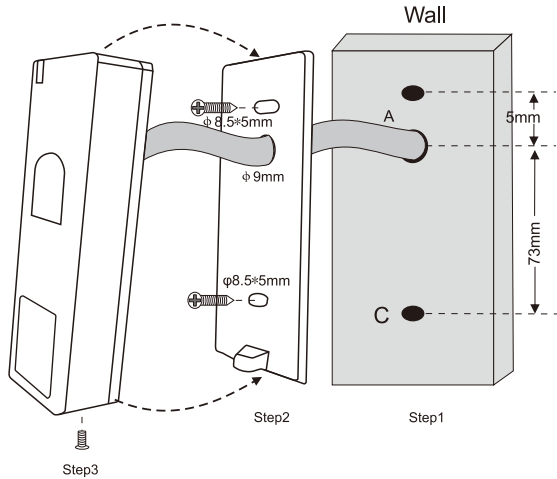
Wall Anchors

Self Tapping Screws: Φ4*25mm

Screw Driver

Master Cards

INSTALLATION

Wall

φ8.5*5mm

φ9mm

5mm

73mm

A

C

φ8.5*5mm

Step2   Step1

Step3

Wiring

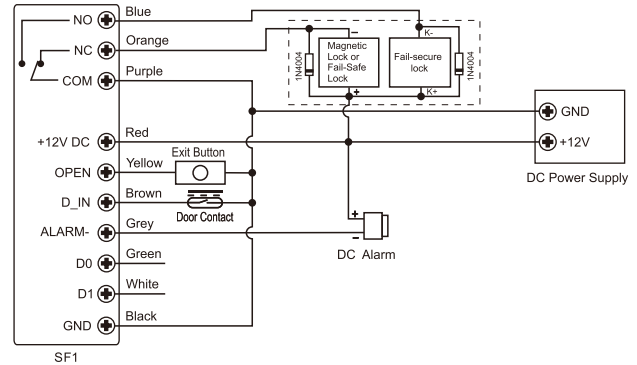| Wire Color	Function	Notes
Basic Stand Alone Wiring		
Red	12V DC	12V DC Regulated Power Input
Black	GND	Ground
Blue	Relay NO	Normally Open Relay Output (Install diode provided)
Purple	Relay Common	Common Connection for Relay Output
Orange	Relay NC	Normally Closed Relay Output (Install diode provided)
Yellow	OPEN	Request to Exit (REX) Input
Pass -through Wiring (Wiegand Reader)		
Green	Data 0	Wiegand Output (Pass-through) Data 0
White	Data 1	Wiegand Output (Pass -through) Data 1
Advanced Input and Output Features		
Grey	Alarm Output	Negative contact for Alarm
Brown	Contact Input	Door/Gate Contact Input (Normally Closed)

Sound and Light Indication

Operation Status	LED	Finger Sensor Light	Buzzer
Stand by	Red light bright	Off	-
Enter into programming mode	Red light shines	Off	One beep
In the programming mode	Orange light bright	-	One beep
Operation error	-	-	Three beeps
Exit from the programming mode	Red light bright		One beep
Open lock	Green light bright	Off	One beep
Alarm	Red light Shines quickly	Off	Beeps

Connection Diagram

Lock 1: Fail-Safe Lock or Door/Gate Operator
Lock 2: Fail-Secure Lock or Magnetic Lock

Common Power Supply

NO Blue
NC Orange
COM Purple
+12V DC Red
OPEN Yellow
D_IN Brown
ALARM- Grey
D0 Green
D1 White
GND Black
SF1

Exit Button
Door Contact

Magnetic Lock or Fail-Safe Lock
Fail-secure lock
1N4004
1N4004
K-
K+

GND
+12V
DC Power Supply

DC Alarm

Attention: Install a 1N4004 or equivalent diode is needed when use a common power supply, or the reader might be damaged. (1N4004 is included in the packing)

Access Control Power Supply
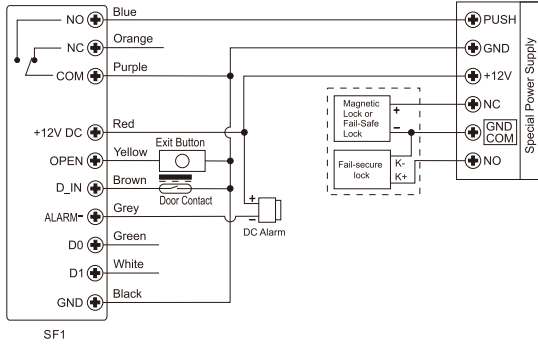
Pass-through: Please check No.4 Pass-through Operation

PROGRAMMING

GENERAL PROGRAMMING INFORMATION

>**User ID Number:** Assign a user ID number in order to keep track of the users of access fingerprints or cards. The user ID number can be any number from 1~3000. IMPORTANT: User IDs do not have to be proceeded with any leading zeros. Recording of User ID is critical. Modifications to the user require the User ID or card be available.

Remark: User ID 997 and 998 are for Authorized Fingerprints.
User ID 999 and 1000 are for Master Add Fingerprint and Master Delete Fingerprint.
User ID 2999 and 3000 are for Authorized Cards.

> **Proximity Card:** Any 125KHz industry standard 26bits EM proximity card

Set Master Code

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) # (Factory default is 123456)
2. Update Master Code	0 (New Master Code) # (Repeat New Master Code) # (Master code is any 6 digits)
3. Exit Program Mode	*

Add Fingerprint Users by Auto ID
(Allows SF1 to assign Fingerprint to next available User ID, ID number is 1~1000)

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Add Fingerprint	1 (Fingerprint) (Repeat Fingerprint) Fingerprints can be added continuously
3. Exit	*

Add Fingerprint Users by Specific ID
(Allows Master to define a specific ID to the fingerprint, ID number is 1~1000)

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Add Fin gerprint	1 (User ID) # (Fingerprint) (Repeat Fingerprint) Fingerprints can be added continuously
3. Exit	*

Add Card Users by Auto ID
(Allows SF1 to assign Card to next available User ID, ID number is 1001~3000)

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Add Card : by Reading Card OR	1 (Read Card) Cards can be added continuously
2. Add Card : by Card Number	1 (Input8/10 Digits Card Number) #
3. Exit	*

Add Card Users by Specific ID
(Allows Master to define a specific ID to the Card, ID number is 1001~3000)

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Add Card : by Reading Card OR	1 (User ID) # (Read Card) Cards can be added continuously
2. Add Card : by Card Number OR	1 (User ID) # (Input 8/10 Digits Card Number) #
2. Add Card: by Block Enrolment	9 (User ID) # (Card Quantity) # (Input 8/10 Digits Card Number of the First Card) #
3. Exit	*

How Authorized Cards / Fingerprints Work?
In standby mode, read the Authorized Card or input the Authorized Fingerprint once, the red LED of SF1 blinks 4 times, then all the valid users are unable to open the door, and the buzzer sounds 3 short beeps (the exit button inside can still open the door); read the Authorized Card or input the Authorized Fingerprint again, the Green LED of SF1 blinks 4 times, then SF1 returns to normal use.

Delete Users

Programming Step	Keystroke Combination
1. Enter Program Mode	*** (Master Code) #**
2. Delete Fingerprint: by Fingerprint **OR**	**2 (Input Fingerprint)** Fingerprints can be deleted continuously
2. Delete Card: by Reading Card **OR**	**2 (Read Card)** Cards can be deleted continuously
2. Delete Card: by Card Number **OR**	**2 (Input 8/10 Digits Card Number) #**
2. Delete Card or Fingerprint : by ID Number **OR**	**2 (User ID) #**
2. Delete ALL Users	**2 (Master Code) #**
3. Exit	*****

Master Cards Usage

Using Master Cards to add and delete users	
Add Card or Fingerprint User	1. Read Master Add Card 2. Read User Card / Input Fingerprint Twice (Repeat Step 2 for additional users) 3. Read Master Add Card Again
Delete Card or Fingerprint User	1. Read Master Delete Card 2. Read User Card / Input Fingerprint Once (Repeat Step 2 for additional users) 3. Read Master Delete Card Again

Remark: can also use Master Fingerprints to add and delete users, the operations are the same with Master Cards.

Set Relay Configuration
The relay configuration sets the behavior of the output relay on activation.

Programming Step	Keystroke Combination
1. Enter Program Mode	*** (Master Code) #**
2. Pulse Mode **OR**	**3 (1-99) #** *(Factory default)* The relay time is 1 - 99 seconds (1 is 100Sm) *(Factory default: 5 seconds)*
2. Latch Mode	**3 0 #** Sets the relay to ON/OFF latch mode
3. Exit	*****

Set Access Mode
For Multi Cards/ Fingerprints access mode, the interval time of reading cards/inputting fingerprints can not exceed 10 seconds, or else, the SF1 will exit to standby automatically; In each access, the same card or fingerprint can not be used repeatedly, or else, the SF1 will exit to stand by automatically.

Programming Step	Keystroke Combination
1. Enter Program Mode	*** (Master Code) #**
2. Card Access ONLY **OR**	**4 0 #**
2. Card or Fingerprint Access **OR**	**4 2 #** *(Factory default)*
2. Fingerprint Access ONLY **OR**	**4 3 #**
2. Multi Cards / Fingerprints Access	**4 4 (2~9) #**
3 Exit	*****

Set Alarm

Programming Step	Keystroke Combination
1. Enter Program Mode	*** (Master Code) #**
2. Di sable Alarm **OR**	**5 0 #**
2. Enable Alarm	**5 (1~3) #** *(Factory default: 1 minute)*
3. Exit	*****

Set Strike-out Alarm
The strike-out alarm will engage after 10 failed Card/Fingerprint attempts, factory default is OFF, it can be set to deny access for 10 minutes or enable alarm after engaging.

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Strike -out OFF OR 2. Strike -out ON OR 2. Strike -out ON	5 4 # (factory default) 5 5 # Access will be denied for 10 minutes 5 6 # Enable alarm, need enter Valid Card or Fingerprint to silence
3. Exit	*

Set Door Open Detection
Door Open Too Long (DOTL) Detection
When use with an optional magnetic contact or built-in magnetic contact of the lock, if the door is opened normally, but not closed after 1 minute, the inside buzzer will beep automatically to remind people to close the door. The beep can be stopped by closing the door, master users or valid users, or else, it will continue to beep the same time with the alarm time set.

Door Forced Open Detection
When use with an optional magnetic contact or built-in magnetic contact of the lock, if the door is opened by force, the inside buzzer and external alarm (if there is) will both operate, they can be stopped by master users or valid users, or else, it will continue to sound the same time with the alarm time set.

Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Disable Door Open Detection OR 2. Enable Door Open Detection	6 0 # (factory default) 6 1 #
3. Exit	*

Users Operation & Reset to Factory Default
> **Open the door**: Read valid user card or input valid fingerprint
> **Open the door in Multi cards / Fingerprints Mode:** Read valid multi cards or fingerprints within 10 seconds.
> **Remove Alarm:** Read valid user card or input valid fingerprint, or read master cards, master fingerprints or input Master Code #
> **To reset to factory default & Add Master Cards:** Power off, press the Exit Button, hold it and power on, there will be two beeps, release the button, the LED light turns into Orange, then read any two 125KHz EM cards within 10 seconds, the LED will turn into red, means reset to factory default successfully. Of the two cards reading, the 1st one is Master Add Card, the 2nd one is the Master Delete Card.

Remarks:
> If no Master Cards added, must press the Exit Button for at least 10 seconds before release.
> Reset to factory default, the user's information is still retained.

Set Device ID (Only apply for Fingerprint Users)

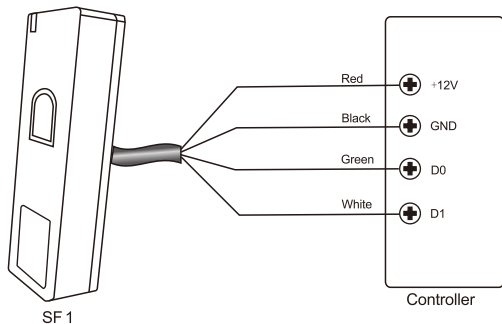| Programming Step	Keystroke Comb ination
1. Enter Program Mode	* (Master Code) #
2. Set Device ID	7 (0~255) # (factory default: 0)
3. Exit	*

If use SF1 as a Wiegand reader, can set its Device ID for recognition.When input the valid fingerprint, it will output a virtual card number as the way of Wiegand 26 output.For example, if set the Device ID as 255, and the Fingerprint User ID is 3, then it will output the virtual card number as 255,00003 (only apply for Wiegand 26bits input controller).

PASS-THROUGH OPERATION
SF1 can work as a Wiegand output reader to the controller. Below the operations for adding fingerprint users:
1) Add fingerprint on SF1 (refer to Page 06)
2) Operate the controller to enter into adding card users, then read this added fingerprint on SF1, this fingerprint's corresponding User ID will generate a virtual card number and send to the controller, the controller save this number, and then the fingerprint added successfully.

Connection Diagram

Red — +12V
Black — GND
Green — D0
White — D1

SF 1   Controller

Set Wiegand Output Format

Please set the Wiegand output format of Reader according to the Wiegand input format of the Controller.

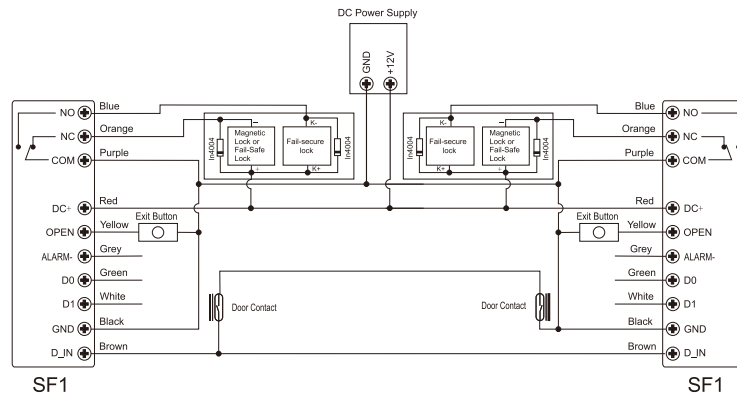| Programming Step	Keystroke Combination
1. Enter Program Mode	* (Master Code) #
2. Set Wiegand output bits Or Disable Wiegand output	8 (26~44) # (factory default: 26bits) 8 0 #
3. Exit	*

ADVANCED APPLICATION

Interlock

The SF1 supports the Interlock function. It is of two devices for two doors, and mainly used for banks, prisons, and other places where a higher level security is required

Connection Diagram

Remarks: The Door Contact must be installed and connected as the diagram.

SF1   SF1

Let's name the two SF1 as "A "and "B" for two doors "1" and "2"

Step 1:
Enroll the users to the two SF1 (refer to Page 06)

Step 2:
Set both of the two readers (A and B) to Interlock function

Programming Step	Keystro ke Combination
1. Enter Program Mode	* (Master Code) #
2. Interlock‑OFF OR	6 2 # (factory default)
2. Interlock‑ON	6 3 #
3. Exit	*

The interlock operation is finished,
When and only door 2 is closed, the user can read the valid card or input valid fingerprint on Reader A, door 1 will open; then when and only door 1 closed, read valid card or input valid fingerprint on Reader B, door 2 will open.