

# **FIRE & SMOKE CURTAIN CONTROLLER MANUAL**

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## **Section 1. INTRODUCTION**

NAFFCO Fire & Smoke Curtain Releasing Device comprises four integral components: The Group Control Panel (NGC), Motor Control Panel (NMC), Building Management System Module (BMS), and LED Switch board.

Each NGC is capable of overseeing up to 3pcs (40W) or 6pcs (20W) NMCs. The Group Control Panel works seamlessly with motor control circuits to establish a comprehensive smoke and fire management system.

The NGC generates DC signals with distinct positive and negative polarities in response to the fire alarm signal. These signals power the NMC, enabling it to interpret control signals from the NGC and subsequently govern the motor's operation for lifting and lowering the curtain.

## **Section 2. GROUP CONTROLLER / POWER SUPPLY UNIT (NGC)**

### **FUNCTIONS & FEATURES**

#### **2.1. 24V AC/DC SUPPLY with automatic changeover and battery backup**

This is equipped with a built-in 24V AC/DC supply with automatic changeover and battery back-up. The output is rated at 24V, 16A. The output is fuse-protected by a 20A PCB mounted fuse. If the AC output falls below 85% of nominal, the system will automatically switch to the DC supply. Upon the mains input voltage rising above 90% of nominal, the supply will automatically switch back to AC. Maximum branch circuit rating is 15 amps, and it terminates in listed crimp on closed loop connector secured with nut and star washer.

#### **2.2. Onboard charging circuit suitable for 24V/7AH Batteries**

The on-board charge circuit enables the backup batteries to charge during normal mains operation. This circuit is designed for use with 2x12V/7AH batteries and includes a charge monitor capable of detecting both charge failure and battery disconnect.

#### **2.3. LOW VOLTAGE DISCONNECT CIRCUIT**

The battery backup 24V DC supply is safeguarded against deep discharge through a low voltage disconnect circuit. Before the battery disconnects, the NGC will automatically switch to fire mode. This action ensures the controlled rewinding of the curtains, allowing the two-stage descent feature (if enabled) to operate effectively.

#### **2.4. MANUAL TEST KEY SWITCH**

A manual test key switch is incorporated into the NGC panel, providing users with the capability to manually test the system without triggering the fire alarm system. The standard system is equipped with a key switch, which can only be removed during normal operation and is securely locked in place when in manual mode. It is crucial to note that the Manual Test Switch exclusively operates the local panel and does not control any panel wired in the fire loop.

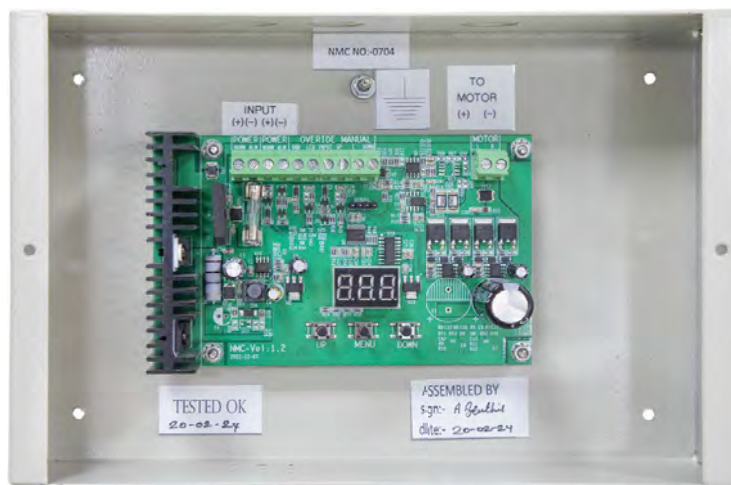
#### **2.5. MULTI FUNCTION INDICATORS**

System equipped with multi-function indicators such as power on, low battery, fire alarm & System error.

### Section 3. MODEL DESIGNATION

- **Main enclosure: NF-FGCP**
  - NGC
  - NBMS
  - NLED
  - Key Switch
  - Transformer
  - Battery
  
- **Sub enclosure: NF-FMC**
  - NMC

#### Motor Controller (NF-FMC)



#### Group Motor Controller (NF-FGCP)



## Section 4. SPECIFICATIONS

### 4.1. NGC SPECIFICATIONS (NGC)

SI	DESCRIPTIONS	RATINGS
1	Input Voltage	120V (5.0A) / 230V (3.75A)
2	Current	5.0 Amps / 3.75 Amps
3	Frequency	50Hz/60Hz
4	AC/DC Switchover	ON < 90%
5	Voltage	OFF < 85%
6	Ground impedance	0 Ohms
7	POWER OUT Circuit Voltage	24Vdc nominal output voltage (19.26-25.8Vdc), Non-Power Limited, Fail, Class D
8	POWER OUT Circuit Current	16 Amps Max
9	Duty	50%
10	Maximum number of NMC'S	6
11	Backup battery	24V 7Ah
12	Stand by time	4hrs (Full load – 6/20W motor)
13	Battery Charging Voltage	27.0 – 27.5V
14	Battery Charging Current	Max 1.5A
15	Low Voltage Disconnect	80% of Nominal (19.2V) +/- 5%
16	Fire Loop	N/C 5V 10Ma (Open Circuit Fault > 1MOhms), (Closed Circuit Fault > 1MOhms), (Restricted to same room, 20ft. in conduit), non-power limited, Class D
17	Test Switch	5V 5-10mA , Class D.
18	ALARM OUT Circuit	24 Vdc Nominal (19.22Vdc – 28.58Vdc), 300mA max current, Power Limited, restricted to same room, Class E

### 4.2. NMC SPECIFICATION (NMC)

SI	DESCRIPTIONS	RATINGS
1	POWER - Primary Operating Supply	24Vdc; 2.2A; Non-power limited; Fail Safe, Class D
2	MOTOR Output	24Vdc nominal, maximum one motor. Recorded voltage for compatibility: 16.22Vdc – 33.59Vdc Non-power limited; Restricted to same room; Fail Safe, Class D
3	OVERRIDE	5V DC Rated Voltage; 5 mA Maximum (Current – Fail Safe), restricted to same room, (20 feet in Conduit), Class D

### 4.3. CABLE RATING

SI	DESCRIPTIONS	RATINGS
1	MC Output	2 x 12 AWG / 14A
2	Override	2 x 12 AWG / .01A (restricted to within Room)
3	Fire Circuit	2 x 12 AWG / .01A (restricted to within Room)
4	Mains Input	1 x 14 AWG / 15A
5	Test Switch	2 x 12 AWG / .01 (restricted to within Room)

**4.4. MOTOR DETAILS**

SI	DESCRIPTIONS	RATINGS
1	NFGR42/40 - UL Listed	24VDC/18.5W
2	NFGR53/30 - UL Listed	24VDC/37.7W

**4.5. FUSE RATING**

SI	DESCRIPTIONS	RATINGS	Board Description
1	F1 – Output fuse	5 A	NMC
2	FU 2 – Battery fuse	20 A	NGC
3	FU 1 – Transformer O/P fuse	20 A	NGC
4	Main fuse	5.0A	Fuse Carrier

**4.6. BOARD RELAYS**

SI	BOARD REFERENCE	RATINGS	DESIGNATION
1	NGC	16A, 30VDC	Common
2	NBMS	8A, 30VDC, 1.0 pf	Common

**4.7. LED INDICATOR (INCLUDING TEST SWITCH (NLED))**

NAME	INSTRUCTIONS
Power on indicator / Green	Lights up when power is good
Low battery indicator / Yellow	Lights up when the battery voltage is lower than 20.4V
Fire alarm indicator / Red	Lights up when a fire warning occurs
System error / Red	Lights up when the micro-controller on the control board malfunctions and stops working

**4.8. NBMS**

NAME	INSTRUCTIONS
Power On	Action when power fails
Low Battery	Action when battery voltage is lower than 20.4V
Fire Alarm	Action when a fire alarm occurs
System Error	Action when the micro-controller on the control board malfunctions and stops working

**Section 5. NGC - Power Supply**

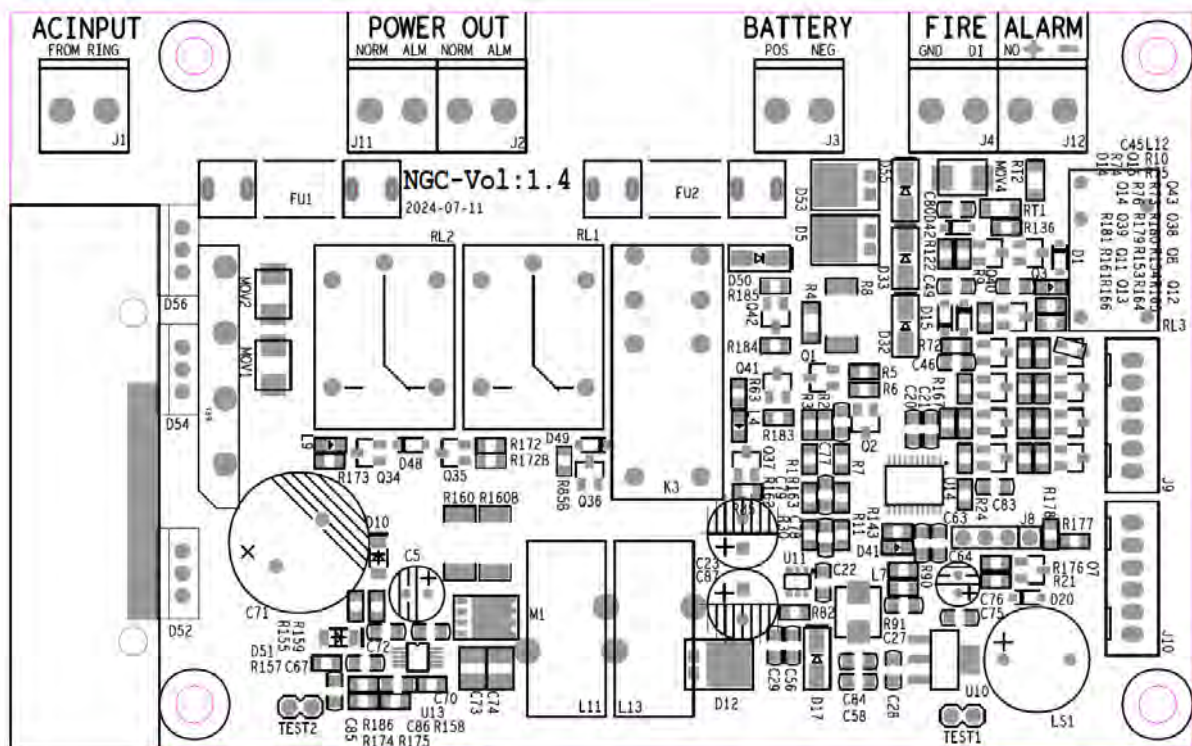
**5.1. TERMINAL CONNECTION INSTRUCTIONS**

NUMBER	NAME	INSTRUCTIONS
J1	AC Input	Connect to the secondary of the AC transformer
J2	Power Out to NMC	NORM 24VDC (Fire Alarm State: 0V)
		ALM OV (Fire Alarm State: 24VDC)
J8	Power Out to NMC	NORM No Connection
		ALM No Connection
J3	Battery	POS Connect to the Positive pile head of the battery
		NEG Connect to the Negative pile head of the battery
J4	Fire	DI Fire alarm signal input (disconnection alarm)
		GND
J12	Alarm	+ This circuit is only for Door warning. It can be hooked up to a speaker or a warning light.
		-

**\*Note: Warning light or external alarm.**

- This output is not to be used for evacuation, only for door warning.
- Battery type: Lead Acid

**5.2. NGC SILK DIAGRAM**

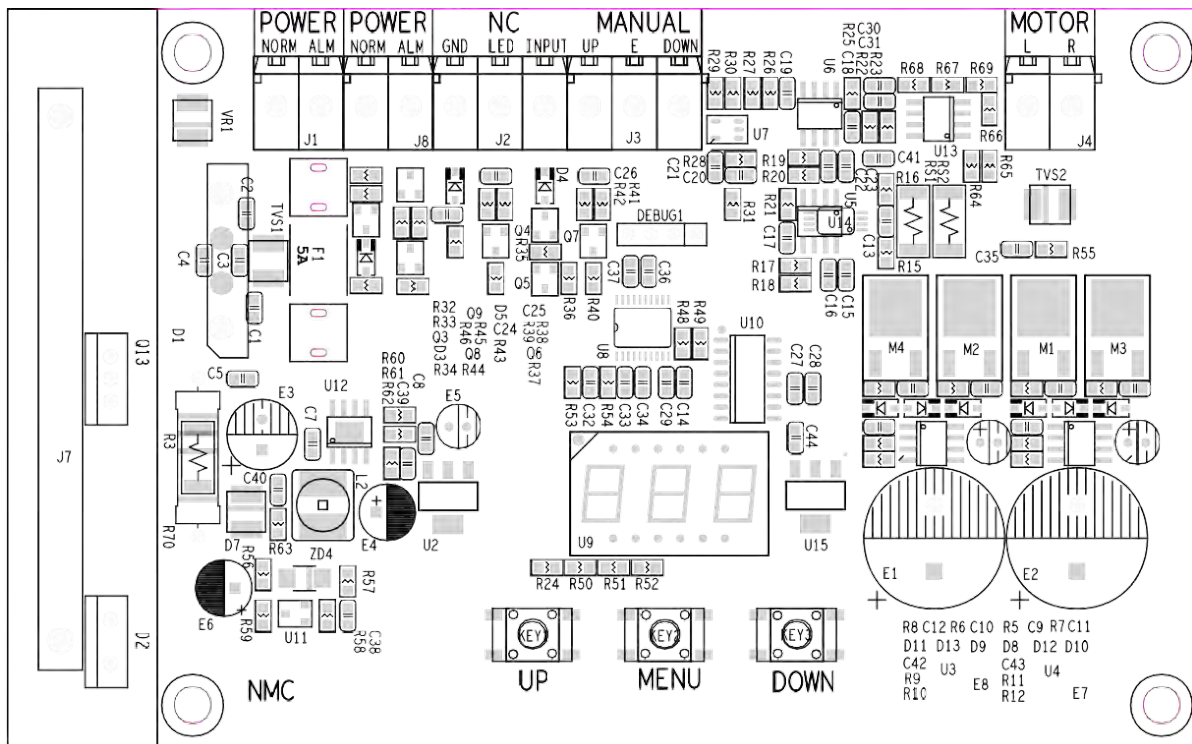


## 6. NMC - Motor Controller & Setting

### 6.1. TERMINAL CONNECTION INSTRUCTIONS

NUMBER	NAME	INSTRUCTIONS
J1	Power in	NORM 24VDC (Fire Alarm State: 0V)
		ALM OV (Fire Alarm State: 24VDC)
J8	Power loop out next NMC	NORM 24VDC (Fire Alarm State: 0V)
		ALM OV (Fire Alarm State: 24VDC)
J2	External Override Switch & Led	GND GND, restricted to same room
		LED No connection
		INPUT The external switch is short-circuited with GND to realize the override function, restricted to same room
J3	Manual	UP No connection
		Down No connection
J4	Motor	L Connecting the Curtain DC Motor
		R Connecting the Curtain DC Motor

### 6.2. NMC SILK DIAGRAM





**Notes:**

1. Now the controller can realize the breaking through the internal electronic circuit without the need of external braking device.
2. **EXTERNAL OVERRIDE SWITCH**  
 Terminals are provided that allows an external override push switch to be installed which will prevent the NMC going into alarm condition and deploying the curtains. An audible indicator will sound and a visual indicator will illuminate when the NMC panel is in override mode.  
**Note:** A suitable UL approved momentary key switch or push switch must be used.

**6.3. 20-WATTS PARAMETERS**

PROGRAM NO.	SETTINGS	VALUE
P.01	AUTO / MANUAL	0
P.02	AUTO RESET	1
P.03	ONE/TWO STAGE REWINDING	1
P.04	DELAY UNWINDING TIME	Seconds as per drop
P.05	DELAY REWINDING TIME	Seconds as per drop
P.06	2 STAGE RATIOS	percentage %
P.07	2-STAGE HOLD TIME	Seconds
P.08	OVERRIDE TIME	Seconds
P.09	MOTOR REVERSING	CW-0 / CCW-1
P.10	HOLD VOLTAGE	135
P.11	UP/ REWINDING SPEED	99
P.12	DOWN/ UNWINDING SPEED	35
P.13	LOCKED CURRENT	240
P.14	CURTAIN LENGTH TEST	Auto measurement as per drop
P.15	POWER DETECTION	3.9
P.16	MAXIMUM UP TIME	From P.14 it will be saved as Auto
P.17	PASSWORD	023

**6.4. 40-WATTS PARAMETERS**

Program No	Settings	Value
P.01	AUTO / MANUAL	0
P.02	AUTO RESET	1
P.03	ONE/TWO STAGE REWINDING	1
P.04	DELAY UNWINDING TIME	Seconds as per drop
P.05	DELAY REWINDING TIME	Seconds as per drop
P.06	2 STAGE RATIOS	percentage %
P.07	2-STAGE HOLD TIME	Seconds
P.08	OVERRIDE TIME	Seconds
P.09	MOTOR REVERSING	CW-0 / CCW-1
P.10	HOLD VOLTAGE	150
P.11	UP/ REWINDING SPEED	99
P.12	DOWN/ UNWINDING SPEED	35
P.13	LOCKED CURRENT	330
P.14	CURTAIN LENGTH TEST	Auto measurement as per drop
P.15	POWER DETECTION	3.7
P.16	MAXIMUM UP TIME	From P.14 it will be saved as Auto
P.17	PASSWORD	023

## Section 7. SETTING PARAMETERS

- Press the MENU BUTTON to enter the settings menu. Utilize the UP BUTTON and DOWN BUTTON to select an Item, and then press the MENU BUTTON again to enter the corresponding item and modify specific PARAMETERS.

### 7.1. DEFINITIONS

**P.01 AUTO/MANUAL**

Locked at 0 for AUTO. MANUAL setting not available.

**P.02 AUTO RESET**

Putting it in the **OFF** position is the fire alarm manual reset mode. You need to manually reset the FA to remove the fire alarm, and return to the standby state after reset.

Putting it in the **ON** position is the fire alarm automatic reset mode. When the shutter is lowered to the lower limit position and limited to the lower limit position, once the fire alarm signal is removed, it will automatically return to the standby mode.

**P.03 ONE/ TWO STAGE REWINDING**

One-stage or two-stage unwinding options, one stage means one unwinding to the end, two stages means one pause in the middle.

**P.04 DELAY UNWINDING TIME**

If the user wishes to delay the deployment of the curtains in both fire mode and manual test mode. NMC panels have a feature called Latency Drop. This delays the panel's release of the shades in fire mode, while still indicating that the fire circuit is disconnected.

**P.05 DELAY REWINDING TIME**

A user can delay the retraction of the smoke curtains by activating the delay reset function of the NMC.

**P.06 2 STAGE RATIOS**

By multiplying the measured length by the set ratio, the value obtained is the distance of 2 stage of descent.

**P.07 2 STAGE HOLD TIME**

2-stage hold set time.

**P.08 OVERRIDE TIME**

Override time set time.

**P.09 MOTOR REVERSING**

The forward and reverse rotation of the motor can be adjusted by modifying this parameter to reduce the difficulty of wiring.

**P.10 HOLD VOLTAGE**

The driving voltage at both ends of the motor when the curtain is in a maintained state.

**P.11 UP/ REWINDING SPEED**

The larger the value, the more control the speed and the higher the required current.

**P.12 DOWN/ UNWINDING SPEED**

The larger the value, the slower the speed.

**P.13 LOCKED CURRENT**

Locked current set value.

**P.14 LENGTH TEST**

Curtain length Value. Displays the measured length value of the curtain, the value is incremented by 1 unit, representing 0.16 revolutions.

**P.15 POWER DETECTION**

NMC is used to detect the power setting of the power supply information. NMC will send a pulse every 3 seconds to detect the power supply information and calculate the motor power in the hold state. This value sets the maximum hold power.

**P.16 MAXIMUM UP TIME**

The curtain shall not exceed the set value for the longest time calculated from the beginning.

**P.17 PASSWORD**

Password to be verified before entering the settings men.

**NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES**

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.

SI	PROGRAM FEATURE AND OPTION	PERMITTED IN UL 864 (Y/N)	POSSIBLE SETTINGS	SETTING PERMITTED IN UL864
1	P.04 Delay Unwinding Time	Y	0-120	0-60
2	P.05 Delay Rewinding Time	Y	0-120	0-60
3	P.07 2 Stage Hold Time	Y	0-240	0-60
4	P.12 Down/Unwinding Speed	Y	0-99	0-60
5	P.13 Locked Current	Y	0-360	250-360

**7.2. PARAMETER TABLE:**

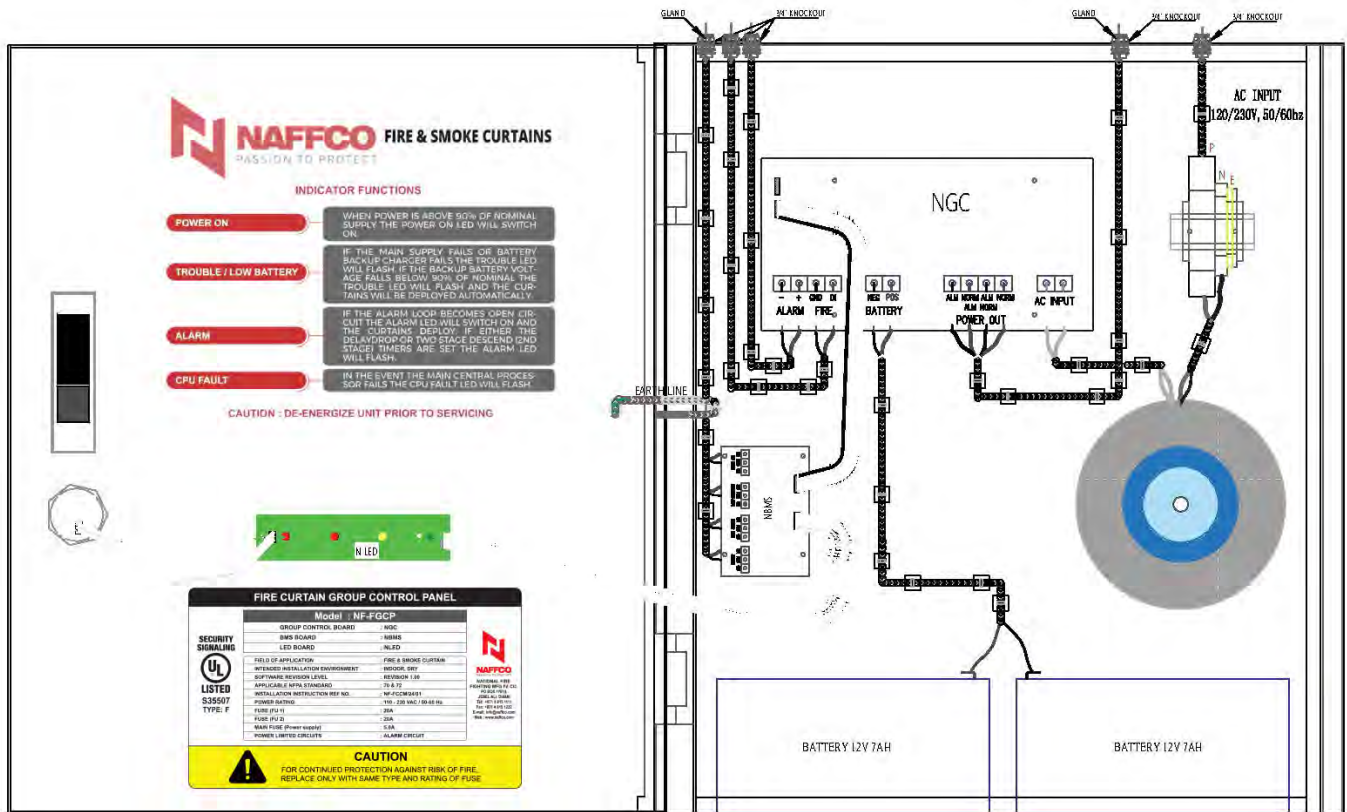
NO.	ITEM	CONTENT	SCOPE	IV	UNIT	MANDATORY LIMIT AS PER UL864
P.02	AUTO RESET	Automatically roll up the curtain upon fire signal reset	0-OFF; 1-ON	1	-	-
P.03	ONE/ TWO STAGE REWINDING	1 rewinding or 2 rewinding function selection	1-Single stage; 2-Double stage	1	-	-
P.04	DELAY UNWINDING TIME	Time delay to drop against FA signal	0-120	0	s	Set value range 0-60
P.05	DELAY REWINDING TIME	Time delay to rolls up after the FA signal disappears	0-120	0	s	Set value range 0-60
P.06	2 STAGE RATIOS	The ratio of the length of the curtain vs total drop height.	30-100	-	%	-
P.07	2 STAGE HOLD TIME	Hold time in 2 stage	0-240	60	s	Set value range 0-60
P.08	OVERRIDE TIME	Emergency opening time	0-240	240	s	
P.09	MOTOR REVERSING	Change the direction of rotation	0-Clockwise 1-Anti Clockwise	-	-	-
P.10	HOLD VOLTAGE	Holding voltage	30-450	386	-	-
P.11	UP/ REWINDING SPEED	The larger the value, the more control the speed and the higher the required current.	0-99	99	-	-
P.12	DOWN/ UNWINDING SPEED	The larger the value, the slower the speed	0-99	45	-	Set value range 0-60
P.13	LOCKED CURRENT	Locked Current	0-360	360	-	Set value range 250-360
P.14	CURTAIN LENGTH TEST	Curtain remains on top, set to rewinding manually to bottom after test to measure rewinding distance	0-normal; 1-Length Measuring Mode	1	-	-
P.15	POWER DETECTION	Power detection pulse ratio	-	-	-	-
P.16	MAXIMUM UP TIME	Curtain raising time set	30-360	90	s	Set value range 30-90
P.17	PASSWORD	Parameter setting password	0-999	0	-	Factory setting

**Note:** P.04 & P.05 delay timing value not to be more than 60.

• Permissible Curtain Size and Weight Vs Motor

SI	Motor type	Maximum weight allowed	Fabric Weight	Bottom bar weight
1	20W	20.0 KG	0.67kg/ m2	4.5kg/ Lm
2	40W	38 .0 KG	0.67kg/ m2	4.5kg/ Lm

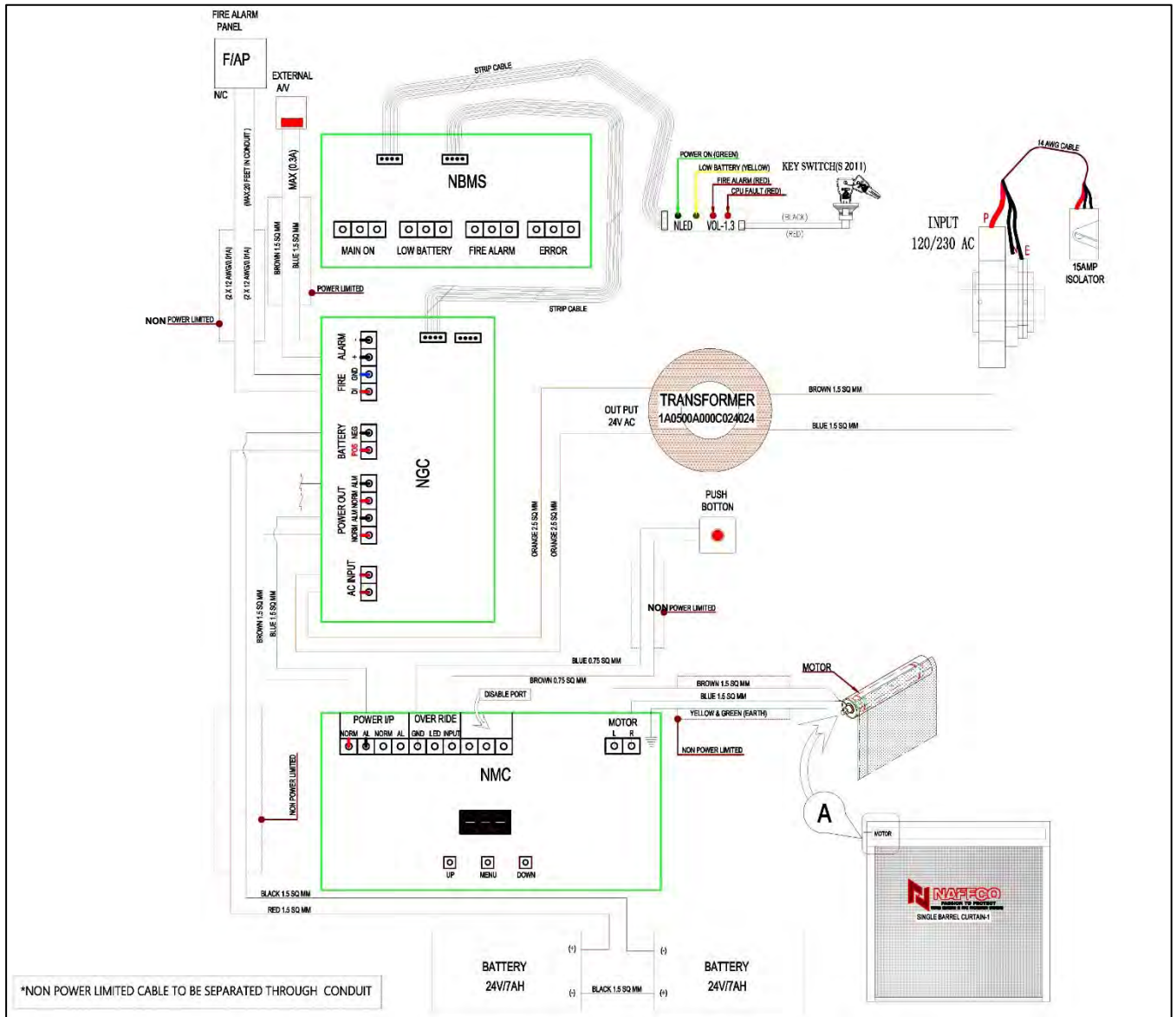
NF-FGCP



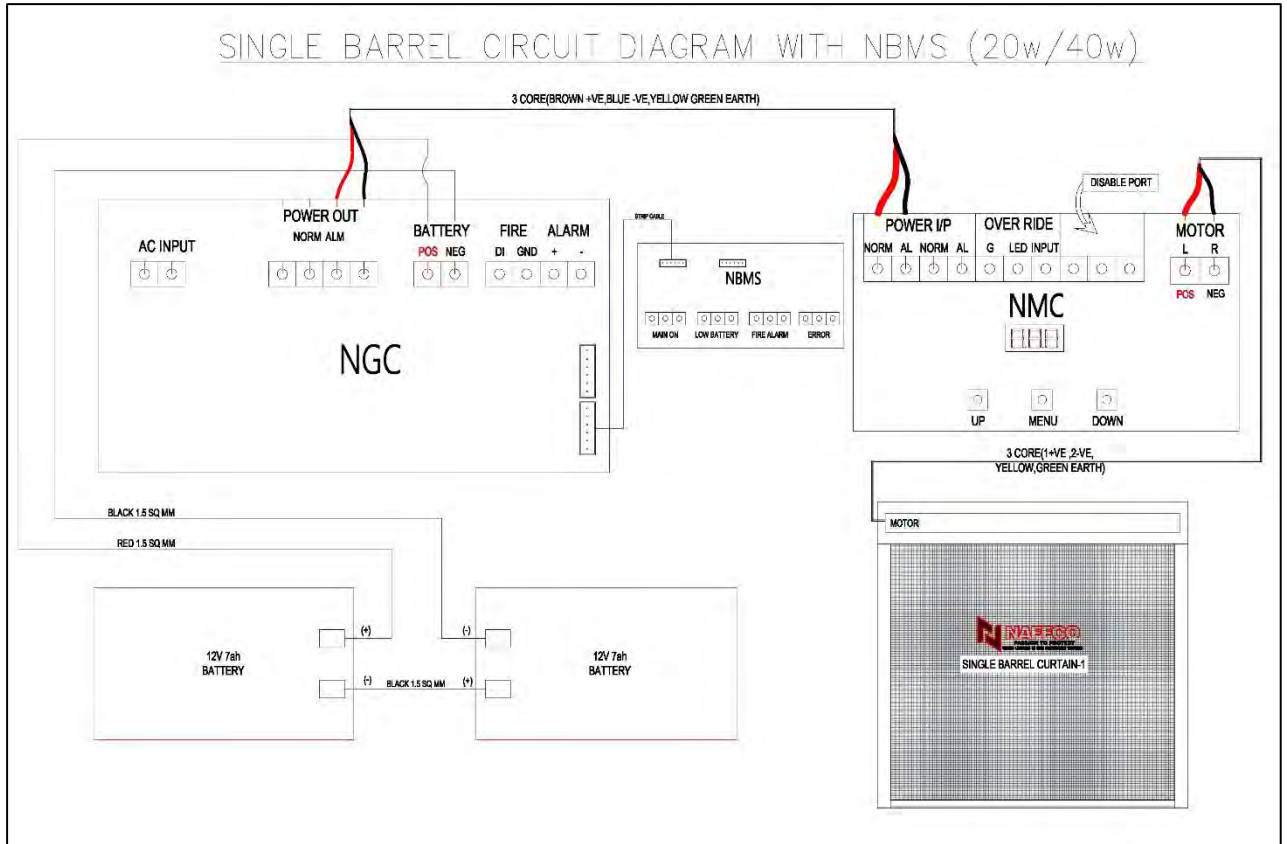
**Note: Power limited and non-power limited circuit to be separated with minimum ¼ In.**

## Section 8. CIRCUIT DIAGRAM

### 8.1. GA Drawing



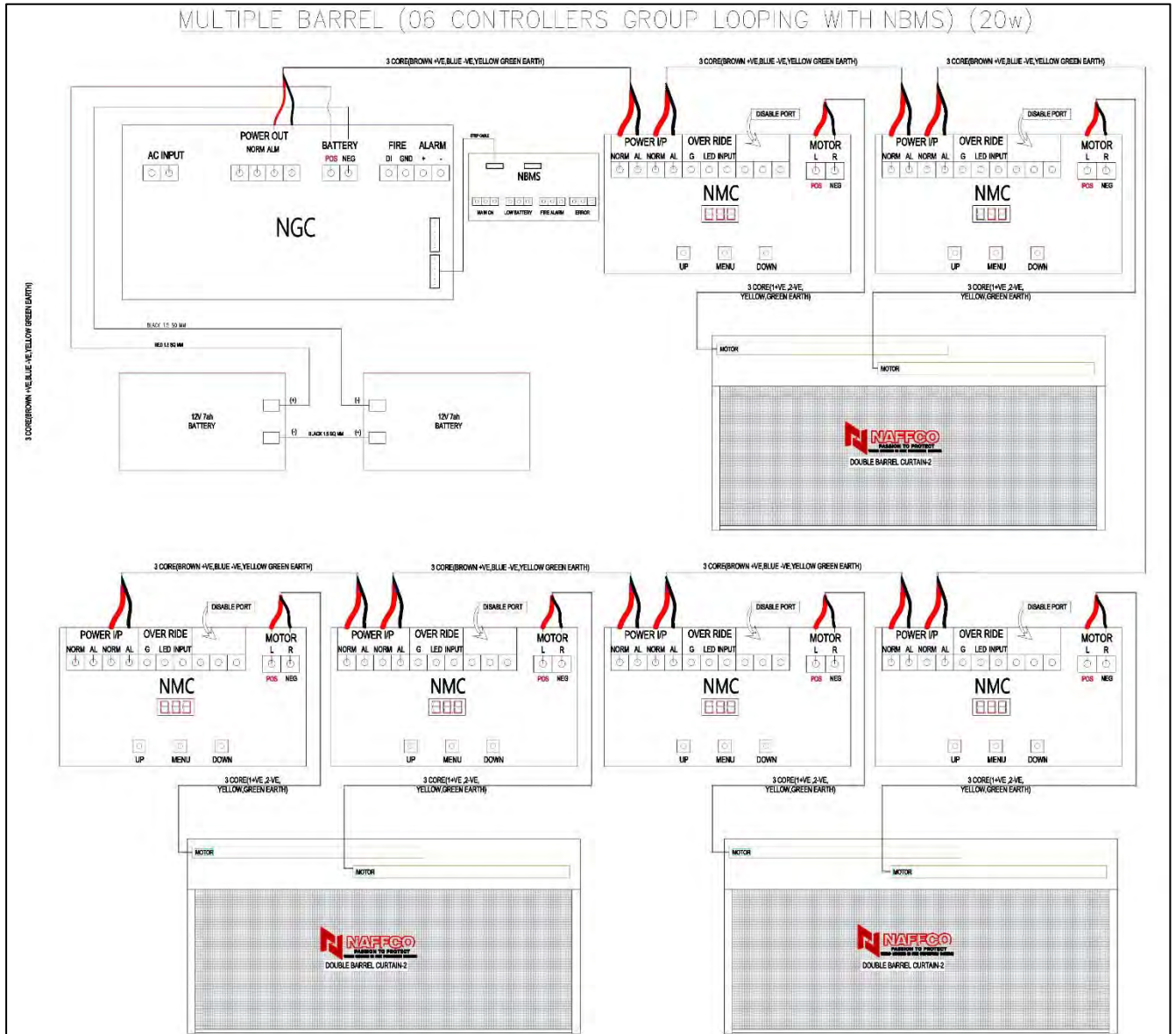
## 8.2. Single Barrel Circuit Diagram with BMS (20 W/ 40W)



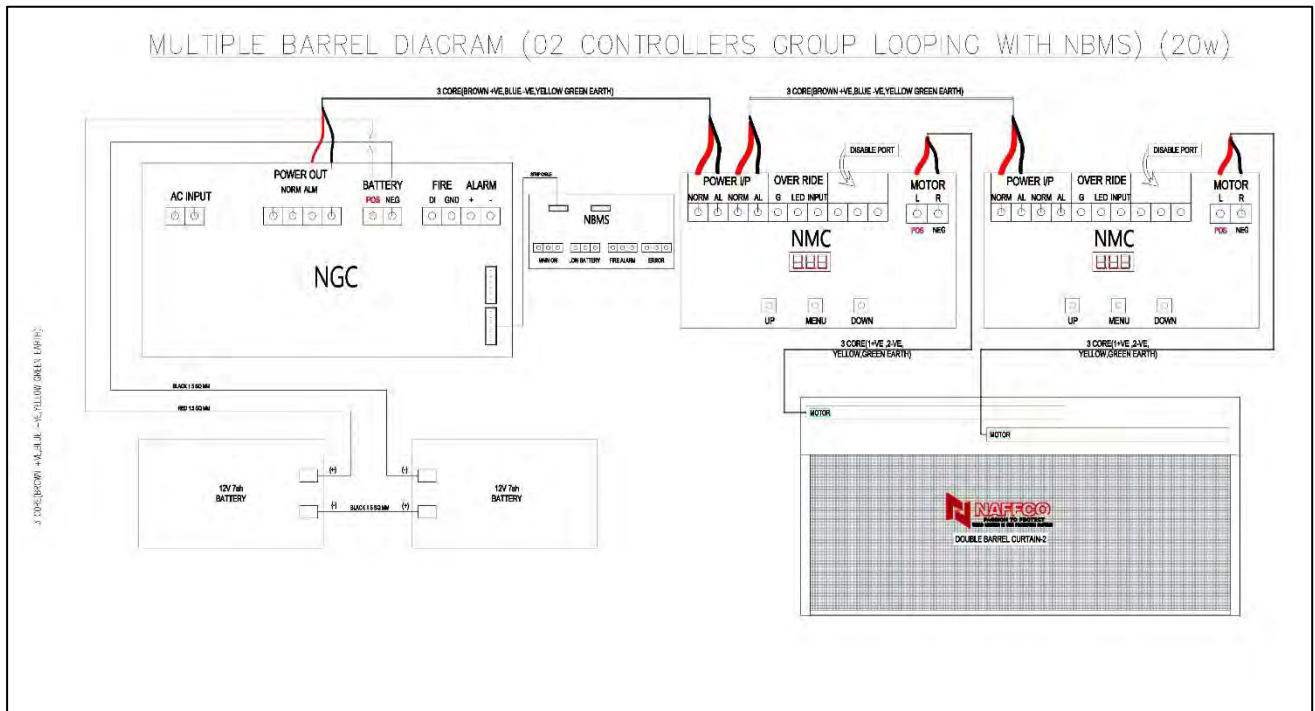




### 8.4. Multiple Barrel Circuit Diagram with 6 motor controllers in group looping with BMS (20W)



### 8.5. Multiple Barrel Circuit Diagram with 02 motor controller’s in-group looping with BMS (20W)



## Section 9. NGC POWERUP / PRE-CHECKS

Prior to connecting the NMC(s) to the NGC, it is recommended that pre-checks are undertaken on the panel in 'stand-alone' condition as per the following procedure:

1. At the NGC, ensure all output/field wiring cables are disconnected.
2. Connect the batteries, ensuring correct polarity is adhered to.
3. Connect the mains supply power. The NGC panel will then commence a start-up procedure, and the LEDs will scroll through a start-up sequence.
4. After the completion of the start-up, using a low-voltage multi-meter, check that the MC output terminals have a reading of 24-30 VAC +/-.
5. Turn the Panel-mounted Key Switch to the test position and make a note that the MC output voltage switches to 0V.
6. Return the Key-switch to the Normal Position and note that the 26 VAC +/- is reinstated.
7. Remove the factory-installed wire link that is connected across the 'single panel alarm' terminals; this will place the Panel in an Alarm Condition. Using a low-voltage multi-meter, check that the MC Output terminals have a reading of 0V.
8. Re-connect the wire link, and the system will return to the normal state.
9. This completes the pre-check of the stand-alone NGC.
10. Before connecting the field wiring, switch off the mains power and disconnect the battery pack.
11. Prior to connecting the loop/ring wiring, check all cables for continuity and ensure they are free of Earth faults.

## **Section 10. MAINTENANCE**

Maintenance Programs, in terms of regularity are typically driven by local code. Below is recommendation for periodic checks:

### **10.1. MONTHLY TEST**

1. Before testing the curtain, visually inspect the surrounding areas for any changes, including alterations to cladding or modifications to wall finishes. Ensure there are no obstructions beneath the curtain and verify that no modifications have been made to the ceiling slots through which the curtains deploy. Such alterations could lead to snags, potentially causing damage to the fabric or preventing the curtain from deploying.
2. Turn the test key-switch to “TEST” and verify that the curtain descends to the correct level. Note that there might be several curtains controlled by the NGC, and some may not be visible from the panel position. Prior to the test, ensure that all curtain lines are checked. Also, inspect the operation of the LEDs mounted on the front of the NGC to confirm they indicate the correct mode.
3. Turn the test key-switch to “NORMAL” and verify that all curtains retract correctly. Pay close attention to ensure that the bottom bar is properly seated against the underside of the head box or stopping bracket.

### **10.2. ANNUAL TEST (to be carried out by qualified personnel)**

1. Test the curtain following the monthly test guidelines provided above.
2. Disconnect the terminals from the battery and, using a low-voltage multi-meter, verify that the charge voltage is set at 27.5 Vdc.
3. Examine the battery for any signs of swelling.
4. Turn off the mains supply to the NGC and confirm that the curtains remain in the retracted position.
5. After 1 hour, record the battery voltage.
6. Activate the fire alarm and ensure that the curtains descend in a controlled manner.
7. Inspect curtain fixings for any signs of damage, which may require removing the head-box cover plates.
8. Restore the mains supply and reset the fire alarm. Verify that the curtain retracts satisfactorily. Any fault during retraction may impede the correct operation of the curtain when needed.
9. If the curtain fails to retract correctly, conduct a further check to ensure that the curtain is not obstructed or deflected. If the issue persists, contact the installer or an approved service agent.