NOV3S Protection Relay

User Manual

DECLARATION

We reserve all the rights to revise product specification without notice. Please consult local agent to get the latest information of our products specification.

Table of content

1 Instruction

1.1 Product overview

The NOV3S relay has the modular design and it can be optimized to almost all type of feeder protction applications in medium voltage distribution systems.

Main characteristic

➢ **Robust hardware**

The NOV3S Protection Relay adopts the 168MHz processor, 16-bit synchronous sampling A/D, 48 points high-speed sampling per cycle, and real-time parallel computing. The relay has sufficient hardware resources and high reliability, with 512K bytes Flash, (192 + 4) K bytes Sram, external 4M bytes NorFlash, external 512K bytes Sram.

➢ **Protection functions**

The NOV3S relay has a modular design and it can be optimized to the line, transformer, distribution transformer, motor, capacitor, busbar, PT protection appications in medium voltage distribution systems.

➢ **Rich measuring inputs**

3 phase currents

2 Residual currents

3 phase voltages

1 Residual voltage

20 digital inputs

10 digital outputs

2 programmable 4-20mA DC outputs

Trip and close circuit supervision, which can adapt to 0.25~5A trip-and-close current.

➢ **Communication**

2 RS485 ports

2 Ethernet ports

1 IRIG/B port

1 USB connection for NOV3S setting software

1 RS232 port

Powerful CPU supporting Modbus-RTU/TCP,IEC 60870-5-103,101

➢ **User-machine interface(UMI)**

Clear LCD display for alarms and events

Programable functions keys and LEDs

Programable tripping output matrix

➢ **Logs and Records**

The relay has sequence of event record and disturbance record .

1.2 Selection guide by application

Analogue inputs	NOV3S														
	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Input current	8	8	8	8	8	9	9	9	8	6	8	8	8	0	/
Input voltage	6	4	4	6	4	4	4	4	4	8	6	6	6	8	/
Digital	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Digital Input	20	20	20	20	20	20	20	20	20	20	20	20	20	20	12
Digital Output	10	10	10	10	10	10	10	10	10	10	10	10	10	10	64
Rear port	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
RS485 (2 ports)	√														
Ethernet(2 ports)	■														
USB(1 port)	√														
Protocols	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Modbus Serial	√														
Modbus over Ethernet	■														
IEC 60870-5-103	√														
TCP IEC 60870-5-103	■														
IEC 60870-5-101	√														
Measurment	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
4-20mA analog output	■														
Electric parameter	U、I、P、Q、PF、Fr、Ep、Eq、Es												U、Fr		
Logs and Records	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Fault recorder	√														
Number of circuit breaker trip and close	√														
Sequence of event record	√														
Monitoring function	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Trip-and-Close Circuit Supervision	√														
Remote control	√														
Others	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
GPS	√														
Protection Function	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
3 stages directional overcurrent (with voltage dependant)[ANSI 67]	√			√					√	√					
3 stages overcurrent (with composite voltage blocking)[ANSI 50/51]	√	√		√					√	√					
Differential protection with ratio restraining[ANSI 87]						√	√	√							
Instantaneous Differential protection[ANSI 87]						√	√	√							
Motor overcurrent(motor start,motor run,2 stages)			√			√									
Overcurrent (2 stages) [ANSI 50/51]					√										
Overcurrent IDMT [ANSI 51N]	√	√	√	√	√	√			√	√					
Bus charge				√											

Protection Function	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Bus tie protection and standby power automatic switch				√											
2 stages Directional earth fault [ANSI 67N]	√			√					√	√					
2 stages earth fault [ANSI 50N/51N]		√	√		√	√			√						
Earth fault IDMT[ANSI 50N/51N]	√	√							√	√					
Clearance earth fault protection(2 stages)									√						
Negative sequence overcurrent (2 stages)[ANSI 46]			√			√									
Negative sequence overcurrent IDMT[ANSI 46]			√			√									
Overload [ANSI 49F]	√	√	√			√			√						
Starting air-cooled water chiller									√						
On-load tap charge lock-out									√						
Undervoltage (trip)[ANSI 27]			√			√				√	√	√			
Undervoltage (alarm)[ANSI 27]			√			√				√	√	√		√	
Capacitor undervoltage(trip)					√										
Loss of voltage (trip)	√														
Loss of voltage (alarm)	√														
Overvoltage protection[ANSI 59]	√		√		√	√				√	√			√	
Residual voltage protection(trip)[ANSI 59N]	√				√	√			√	√		√			
Residual voltage protection(alarm)[ANSI 59N]			√									√		√	
PT supervision[ANSI 60]	√	√	√	√	√	√			√	√	√	√		√	
Unbalance voltage[ANSI 60]			√		√	√									
Unbalance current[ANSI 60]					√	√									
Motor starting time-out[ANSI 48]			√			√									
CT supervision[ANSI 60]	√	√				√	√	√		√					
Three phase Auto-reclose[ANSI 79]	√														
Thermal overload protection[ANSI 49M]			√			√									
Locked rotor[ANSI 51LR]			√			√									
FC block[ANSI 86]	√	√	√			√			√	√					
Post-accelerated overcurrent	√			√											
Under frenquency[ANSI 81U]	√									√	√	√			
Over frequency[ANSI 81O]	√									√	√	√			
Incorrect phase sequence			√			√									
Voltage Phase loss protection			√			√									
Directional power protection[ANSI 32]	√									√					
Power recovery protection										√					
Under power protection										√					
Non-electricity	√	√	√		√	√			√	√					√
PT supervision and parallel connection														√	
Synchro-check[ANSI 25]	√			√						√					
Rate of change of frequency[ANSI 81R]											√	√			
Trip-and-Close Circuit Supervision(alarm)	√	√	√	√	√	√			√	√	√	√			

Protection Function	-F	-T	-M	-B	-C	-MD	-D2	-D3	-TB	-IS	-FE	-FA	-K	-UB	-FD
Auto-close with voltage recovery										√					
PT harmonic elimination														√	
Overhaul-lockout[ANSI 86]	√														

Note: √ means with this function, ■ means optional function, blank means without this function.

1.3 Relay Selection Table

```
┌─┬─┬─┬─┬─┬─┬─┬─┬─┐
│ │ │ │ │ │ │ │ │ │
└─┴─┴─┴─┴─┴─┴─┴─┴─┘
```

	Value
Ethernet Interface: without	0
with 1	1
with 2	2
Anti-pumping: without	0
with	1
4-20mA output: without	0
with 2	2
Power : 110V AC/DC	1
220V AC/DC	2
Zero sequence current input : 1A	1
Zero sequence current input : 5A	5
Current input: 1A	1
Current input: 5A	5
Version: Line Protection Relay	F
Transformer Protection Relay	T
Motor Protection Relay	M
Capacitor Protection Relay	C
Standby power Automatic Transfer Relay	B
Voltage Transformer Supervision and Parallel Connection Relay	UB
Transformer Differential Protection Relay	D2
Transformer Differential Protection Relay	D3
Transformer protection Relay	TB
Motor Differential Protection Relay	MD
Public measurement and control relay	K
Anti-islanding protection relay	IS
Frequency and voltage Seperation relay	FE
Fault disconnection relay	FA
Non-electricity relay	FD
Serial number:	5SE
Product series:	
Manufacturer: NOVO ELECTRIC TECHNOLOGY UK LTD	

2 Technical Characteristics

2.1 Rated Characteristics

Version Characteristics	NOV3S-F,NOV3S-T,NOV3S-M,NOV3S-C, NOV3S-B,NOV3S-D2,NOV3S-D3, NOV3S-TB,NOV3S-MD	NOV3S-UB, NOV3S-IS,NOV3S -FE, NOV3S-FA,NOV3S-K
Power Supply		
Rated voltage	AC/DC 110V or AC/DC 220V	
Range	Rated voltage × (1±20%)	
Burden	≤15 VA	
PT Inputs		
Rated value	AC 100V or $100/\sqrt{3}$ V	AC 380V or 220V
PT rated secondary range	0.1V～120V	
Accuracy	0.5S	
Burden	≤0.5VA (each phase)	
Voltage withstand	Continuous: 1.2 Un 10s: 2 Un	
PT rated secondary range	$0.1V \sim 456V$	
Phase CT Inputs (Protection Current)		
CT rated secondary range	AC 5A or 1A	
Dynamic	20 × CT rated current	
Accuracy	0.5S	
Burden	≤0.5VA (each phase)	
Thermal withstand	Continuous: 2 In 1s: 40 In	
Phase CT Inputs (Measurement Current)		
CT rated secondary range	AC 5A or 1A	
Dynamic	1.5 × CT rated current	
Accuracy	0.5S	
Burden	≤0.5VA (each phase)	
Thermal withstand	Continuous: 1.5 In 1s: 4 In	
Frequency		
Rated frequency	50Hz or 60Hz	
Frequency range	$40 \sim 70Hz$	
Accuracy	±0.1Hz	

Digital Inputs	
Operating nominal voltage	AC/DC 110V or AC/DC 220V
Voltage threshold	70% of nominal voltage
Reset threshold	55% of nominal voltage
Burden	≤ 1W (each phase) (DC220V)
Digital Outputs	
Make and carry	≥ 10000 operations
Making capacity	≥ 1000W, L / R = 40ms
Continuous current	≥ 5A
Short duration carry current	≥ 30A for 200ms
Breaking capacity	≥ 30W, L/R = 40ms

2.2 Protection characteristics

Characteristics	Accuracy	Resolution	Disengaging ratio
Voltage	±3%	0.001V	0.95 and 1.05
Current	±3%	0.001A	0.95 and 1.05
Frequency	±0.02Hz	0.001Hz	
Operation delay|t>(DT)	40ms or ±2% setting value	0.001s	-
Operation delay|t>(IDMT)	40ms or ±5% setting value	0.001s	-

2.3 Environmental characteristics

During operation: 10℃～＋55℃, temperature; 5%～95%, humidity

Storage: -25℃～＋70℃

Altitude:≤ 2000m

Enclosure: IP20 (local panel)

2.4 Product safety

Insulation：Insulation resistance >100MΩ at 500Vdc

High voltages withstand：2kV rms AC, 1 min:between all case terminals connected together, and the case earth/ground;

2 kV rms AC, 1 min:between all terminals of independent circuits

Impulse voltage：±5kV (1.2/50μs, 0.5J)

2.5 Electromagnetic Compatibility Characteristics

Characteristics	Standard	Level/Class
Radiated emission	IEC-60255-26:2023——5.1	A
Conducted emission	IEC-60255-26:2023——5.2	A
Radiated radio frequency fields	IEC-60255-26:2023	A
Electrostatic discharge	IEC-60255-26:2023——6.1	B
Conducted radio frequency disturbance	IEC-60255-26:2023——6.2-6.5	A
Fast transient bursts	IEC-60255-26:2023——6.2-6.5	B
Slow damped oscillatory waves	IEC-60255-26:2023——6.2-6.4	B
Surges	IEC-60255-26:2023——6.2-6.4	B
Voltage dips and short interruptions test (AC or DC)	IEC-60255-26:2023——6.2	A/C 1
Magnetic field at power frequency	IEC-60255-26:2023——6.1	B

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1   AC and DC voltage dips meet the criteria A/C of the IEC60255-26:2023—6.2. AC and DC voltage interruptions meet the criteria C of the IEC60255-26:2023—6.2.Ripple on DC input power port immunity meet the criteria A of the IEC60255-26:2023—6.2. DC auxiliary power supply ports gradually shortdown/start-up meet the criteria C of the IEC60255-26:2023—6.2.

3 Use

3.1 Front panel

The NOV3S relay is equipped with a user friendly local panel which is shown in Figure 3.1
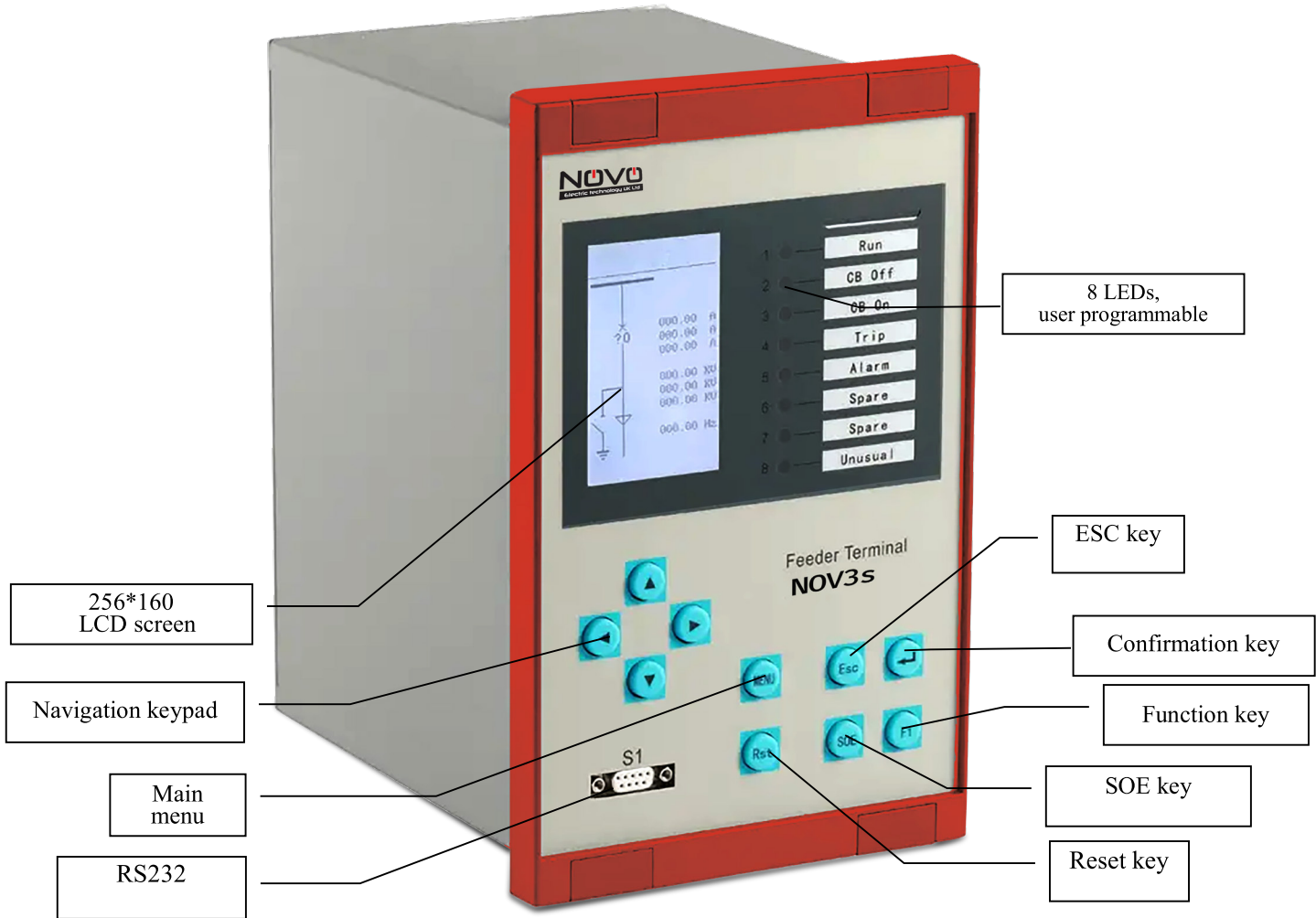

Figure 3.1 NOV3S surface

3.2 Push buttons

Table 3.1 Push buttons

Symbol	Function	Symbol	Function
MENU	Home key to return to the main screen.	▲	Up navigation push-button for moving up in the menu or increasing a numerical value.
Rst	Reset key to release latches and reset LED status.	▼	Down navigation push-button for moving down in the menu or decreasing a numerical value.
Esc	Esc key to return to the previous view.	◄	Left navigation push-button for moving back across a menu or selecting a digit in a numerical value.
↵	Enter push-button for activating or confirming a function.	►	Right navigation push-button for moving forwards across a menu or selecting a digit in a numerical value.
SOE	SOE key for viewing sequence of event.	F1	Programable function push-button for NOV3S.

3.3 Menu Description

The relay is powered on to enter the main screen(Mimic screen), and can take turns display Measurement, Remote Signal, DO Mappping by pushing the ► key.


```
               NOV3S
   ┌──────────────────────────┐
   │                          │
   │         000.00   A       │
   │   ?0    000.00   A       │
   │         000.00   A       │
   │                          │
   │         000.00   KV      │
   │         000.00   KV      │
   │         000.00   KV      │
   │                          │
   │         000.00   Hz      │
   │                          │
   └──────────────────────────┘
```
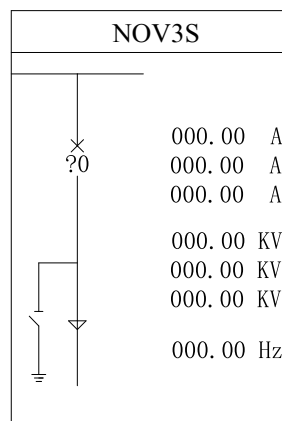
Figure 3.2 Mimic screen

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Measurement		
Ia	0000.000	A
Ib	0000.000	A
Ic	0000.000	A
I1	0000.000	A
I2	0000.000	A
I01	0000.000	A
I02	0000.000	A
IA	0000.000	A
IB	0000.000	A
IC	0000.000	A
UAB	0000.000	V
UBC	0000.000	V

Measurement		
UCA	0000.000	V
U4	0000.000	V
Fr	0000.000	Hz
P	0000.000	KW
PF	0000.000	
U1	0000.000	V
U2	0000.000	V
Uav	0000.000	V
U20	0000.000	V
Q	0000.000	KVar
Ep	0000.000	kw*h
Eq	0000.000	kVar*h

Measurement		
AO_1	0000.000	mA
AO_2	0000.000	mA
Ia_H2	0000.000	A
Ib_H2	0000.000	A
Ic_H2	0000.000	A
Uub	0000.000	%
Iub	0000.000	%
S	0000.000	KW
Es	0000.000	kw*h
QFcnt	0000.000	
Ep+	0000.000	kw*h
Ep-	0000.000	kw*h

Figure 3.3 Measurement

RemoteSignal	
CB ON	OFF
CB OFF	OFF
Work Posi.	OFF
Test Posi.	OFF
GroundSwitch	OFF
Remote	OFF
Discharge	OFF
Spare6	OFF
Non-elec.1	OFF
Non-elec.2	OFF
Heat Recovery	OFF
Low Speed	OFF

RemoteSignal	
ManualTrip	OFF
ManualClose	OFF
Spare5	OFF
ResetSignal	OFF
LoadSW.On	OFF
LoadSW.Off	OFF
Spare2	OFF
Spare1	OFF
Power.L.Det	OFF
DO Test	OFF
Posi.Aft.CB.On	OFF
ManualTrip.M	OFF

RemoteSignal	
CB On.M	OFF
CB Off.M	OFF
ManualClose.M	OFF

Figure 3.4 Remote Signal

All of the digital inputs can be showed on the "Remote Signal" screen.When the digital input is be tied to the supply voltage, the state of this DI will be "ON",otherwise the state of the DI is "OFF".

DO Mapping
RemoteTrip
00000 00100 00100 0
RemoteClose
00000 00000 00010 0
3I>>>.S
00000 00100 10000 0
3I>>>.R
00000 00100 10000 0
3I>
00000 00100 10000 0
I0>
00000 00100 10000 0

DO Mapping
U.Ampi.T
00000 00100 10000 0
U.Phase.T
00000 00100 10000 0
Non-elec1.T
00000 00100 10000 0
OverHeat.T
00000 00100 10000 0
Sta.OutT.T
00000 00100 10000 0
CloseBlock
00000 00000 00000 1

DO Mapping
Trip Load
00010 00000 00000 0
FC Block
00000 00010 00000 0
Alarm
00000 00100 00000 0
Accident.S
00000 00000 00001 0
DO Test
11111 11111 11111 0
Ph.Se.S
00000 00100 00000 0

Figure 3.5 DO Mapping

In the DO mapping interface, the mapping relationship between protection function and digital output is shown in the following table with 1-16 binary digits.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 – 10 represent passive output DO1 – DO10, respectively; 11 – 15 represent protection trip, protection close, remote trip, remote close, and accident signal in trip-and-close circuit, respectively; and 16 represents internal closing block relay. If one of the number from 1 to 16 is 1, indicating that the protection function is configured to this output; if it is 0, indicating that the output is not configured.

3.3.1 Navigation

The menu of relay is multi-level menu; Press the [↵] key to enter the main menu. There are 9 submenus in the main menu, as shown as figure 3.6, which is composed of names and icons of submenus. Press the [↵] key to enter either submenu in the main menu, and press the [Esc] key to return to the superior menu. Figure 3.7 shows the navigation diagram of the relay, which can be used to find relevant parameters quickly.

Figure 3.6 Main menu

Running ⟷ Measurement ⟷ Remote Signal ⟷ DO Mapping

MENU   Esc

Meun

Enter   Esc

CONF ⟷ PARA ⟷ DEBG ⟷ REC ⟷ COMM ⟷ CTRL ⟷ TIME ⟷ INFO ⟷ Wave

Enter Esc | Enter Esc | Enter Esc | Enter Esc | Enter Esc | Enter Esc | Enter Esc | Enter

CONF
LCD Backlight
Current Type
(Language)
CBImage Display
Sample Frequency

PARA
View
Modify
Group

DEBG
AI View
DI View
WireMapping
AI AutoZero OffSet
AI AutoSpan Set
DO Mapping
DO Test
LED Configure
LED Test
AO ZeroOff Set
AO SpanSet
AI Manual ZeroOff Set
AI Manual SpanSet

REC
SOE REC
SYS REC
LOG REC

COMM
CommAddr
Ether Net
RS-485
RS232
USB Transport

CTRL
Signal Revert
Remote Control

TIME
Time Modify

INFO
Information

Figure 3.7 Navigation diagram

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3.3.2 Configuration

The "Conf" menu can set the LCD backlight time, as shown in Figure 3.8. After modification, press the ⏎ key to confirm the modification and press the (Esc) to return to main menu .The data saving interface will pop up, as shown in Figure 3.9 ;Press the ⏎ key to save the modification and return to the main menu, or press the (Esc) key to return to the main menu directly without saving the modification.

CONF	
LCD Backlight	000s
Current Type	Measure
(Language)	English
CBImage Display	Mode 1
Sample Freq	50Hz

CONF	
LCD Backlight	000s
Current Type	Measure
💾 Save?	
Sample Freq	50Hz
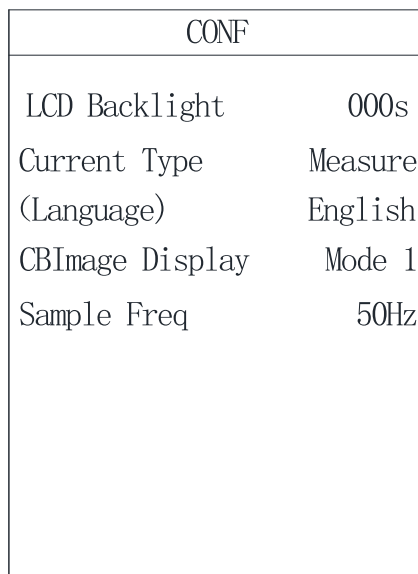
Figure 3.8 LCD backlight time setting   Figure 3.9 Data saving
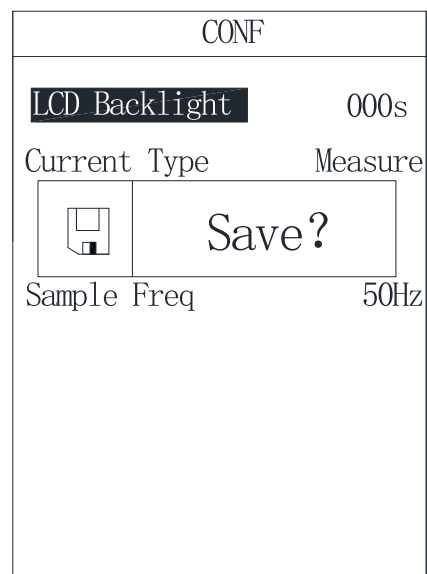
3.3.3 Parameter

The "Para" menu includes 3 sub-menus: Value View, Value Modify and Switch Group, as shown in Figure 3.10.

A)   Value View

The "Value View" menu includes two sub-menus: "Selected" and "Running". There are 4 groups of vaild value in the "Selected",which are 00, 01, 02, and 03 areas. After selecting the corresponding area, as shown in Figure 3.11, press the ⏎ key to enter the "Value View" menu.

All values can be viewed page by page by the ◀ and ▶ key , as shown as figure 3.12. The "Running" shows the current running area of the relay.

PARA	Value Group	View[00] (001/113)
Value View		**CT**
	Selected: 0**0**	0300.00
		PT
Value Modify	Running: 00	0100.00
		PT Mode
		2PT
Switch Group		CT Mode
		2CT
		U Unit
		KV
		Ie1
		300.000A

Fig. 3.10 Parameter	Fig. 3.11 Selection area	Fig. 3.12 Value View

B) Modify

The "Modify" menu includes two submenus: "Selected" and "Running" .The initial password of this menu is "0008".

Set the group code in the "Selected", and enter the "Modify" by the the [↵] key. All the values are showed page by page, and select the values which need to be modified by the [▲], [▼], [◄] and [►] keys. The values can be selected by the [↵] key, and be modified by the [▲] and [▼] key, as shown as figure 3.14.After the modification, press the [↵] key to confirm the modification, and then set the next value as the same way.

After all modifications, press the [Esc] key to quit the "Modify". If value has been changed, the data saving interface will pop up, as showm as figure 3.9.Press the [↵] key to save the modification and return to the "Menu" .If press the [Esc] key, relay will return to the "Menu" directly without saving the modification.

The"Running" interface only shows the current running area of the relay, and no modification is made here.

```
    Value Modify              Modify[00]    (005)              Switch Group

                           CT
                                    0030.00
                           PT                                Selected:  0█
         ┌────┬─────────┐            0100.00
         │ 🔒 │  0008   │  U Unit                            Running:   01
         └────┴─────────┘                 kV

                           PT Mode
                                        3PT
                           CT Mode
                                       2CT
                           E.3I>>>
                                        OFF
```
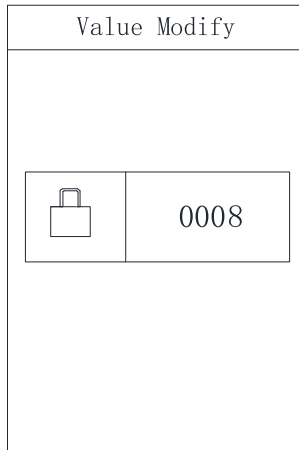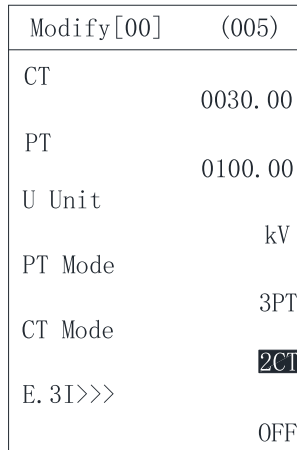
Fig. 3.13 Enter Password   Fig. 3.14 Modify   Fig. 3.15 Group
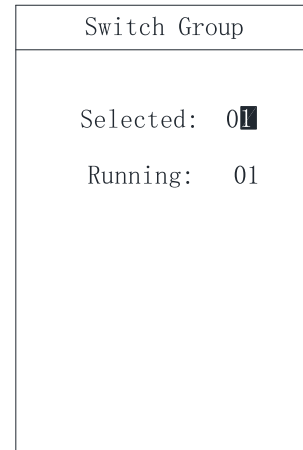
C) Group

The"Group"menu includes two submenus:"Selected" and "Running". The initial password of this menu is"0008". There are four valid groups from 00 to 03 in the "Group". After setting, the modification can be confirmed by the the "Enter" key, and then return to the main menu by the "Esc"key.The running value area will display the current running value area of the relay, as shown in Figure 3.15.

3.4 Debug

The "Debg" menu is used to test before delivery.The function includes zero adjustment, amplitude adjustment, relay output test,LED test, LED color configuration, and relay output configuration.

When use the "Debg" menu, please contact the manufacturer first!

3.5 Record

The "REC" includes 3 types of record: SOE Record、System Record and LOG Record.

A) SOE Record

The "SOE" menu shows the event sequence, total number of events, event code, event time, event name, action type (trip or alarm), and other information. It can also record the action values and time of the protection event, as shown in Figure 3.16. The relay can save more than 200 event records.

B）System Record

The "SYS" menu shows the error sequence, error counts, error time, error name, error code and so on, as shown in Figure 3.17. The relay can save more than 200 error records.

```
         SOE REC                            SYS REC

NO.    [010/012]      (000) ——Code      [002/005]
ALL          2022-09-14 ——————Time         2022-02-22
             16:18:47.304                    23:27:51
                3I>>> ————————Name        Software Init
                [Set]                      code: 0x00000003
         SOE Para:
           Ia          4.987A
           Ib          4.987A
           Ic          4.985A
           UAB         0.035V ——Parameter
           UBC         0.059V
           UCA         0.025V
           U2          0.019V
           Ia_H2       0.008A
```

<div align="center">

Figure 3.16 Event record screen   Figure 3.17 System record screen

</div>

C）Log Record

As shown in Figure 3.18, the "Log" menu records all operations and setting changes of the relay.

```
      LOG Rec    [001/033]
      20011223-123456.0123

      Device power on/off
             ON
```

<div align="center">

Figure 3.18 Log record screen

</div>

3.6 Communication

As shown in Figure 3.19, the "Comm" menu can set the communication address of relay and baud rate. Figure 3.20 shows the relay's communication address set. The communication mode has four interface settings: Ethernet interface, RS485 interface, RS232 interface, and USB interface.

As shown as Figure 3.21, 3.22, and Table 3.3, the communication parameters of 2 Ethernet ports (network A and network B) can be setted.

Table 3.3 Ethernet port communication parameters setting

Local TCP mode	Set on demand, can be set to the same within the same network
Local TCP port	Set on demand, can be set to the same within the same network
Local UDP port	Set on demand, can be set to the same within the same network
Local Mac address	Non-repeatable within the same network
Local IP address	Non-repeatable within the same network
Remote IP address	The IP of the backend machine, which can be set to the same within the same network
Remote TCP port	The IP of the backend machine, which can be set to the same within the same network
Gateway	Set on demand, can be set to the same within the same network
Subnet Mask	Set on demand, can be set to the same within the same network

As shown in Figure 3.23, the communication parameters of two RS485 ports (com1 and com2) can be set.

As shown in Figure 3.24, communication parameters of RS232 port (com3) can be set to realize relay program upgrade.

As shown in Figure 3.19, enter the "USB Transport" menu to upgrade the program of the relay.

Please contact the manufacturer when using this menu function.

Communication parameters can be set by selecting parameters from Table 3.4. After setting, press the "Esc" key to exit, then press the "Enter" key to save and then press the "Esc" key to return to the main menu.

```
           COMM                          CommAddr

                                  CommAddr           00001

        CommAddr
       Ether Net
        RS-485
        RS-232
      USB Transport
```

Fig. 3.19 Communication menu   Fig. 3.20 Relay address setting interface

```
Ether Net      Enet_A    Ether Net      Enet_A    Ether Net      Enet_B    Ether Net      Enet_B
Protocol:                RemoteTcpPort:           Protocol:                RemoteTcpPort:
            Modbus                     1048                   Modbus                     1048
LocalTcpMode:            RemoteIpAddr:            LocalTcpMode:            RemoteIpAddr:
            Server         172.020.000.000                    Server         172.021.000.000
LocalTcpPort:            Gateway:                 LocalTcpPort:            Gateway:
              7710         192.168.001.001                      7720         192.168.001.001
LocalUdpPort:            SubnetMask:              LocalUdpPort:            SubnetMask:
              1032         255.255.255.000                      1032         255.255.255.000
LocalMacAddr:                                     LocalMacAddr:
    41-63-72-65-6C-41                                 41-63-72-65-6C-42
LocalIpAddr:                                      LocalIpAddr:
      192.168.001.002                                    192.168.001.003
```

Fig. 3.21 Enet_A communication parameters   Fig. 3.22 Enet_B communication parameters

```
            RS-485

COM1 Protocol:  Modbus
COM1 BaudRate:  19200
COM1 DataBit:       8
COM1 StopBit:       1
COM1 Parity:     NONE


COM2 Protocol:  Modbus
COM2 BaudRate:  19200
COM2 DataBit:       8
COM2 StopBit:       1
COM2 Parity:     NONE
```

Fig. 3.23 RS-485 communication parameters

```
                  RS-232

COM3 Protocol:  Modbus
COM3 Baudrate:  115200
COM3 DataBit:        8
COM3 StopBit:        1
COM3 Parity:      NONE
```

Fig. 3.24 RS-232 communication parameters

Table 3.3 Communication parameter setting

Setting	Parameter
Relay address	0 to 255
Baud rate	110, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 56000, 57600, 115200, 128000, 256000
Data bits	8, 9
Stop bits	1, 1.5, 2
Parity mode	No parity, Even parity, Odd parity
Protocol selection	Modbus-RTU、IEC103、IEC101、LoopB
Local TCP mode	Server, Client

3.7 Control

The "Control" menu is used to test before delivery. The function in this menu includes remote trip、remote close and signal reset.

When use the "Ctrl" menu, please contact the manufacturer first!

3.8 Time

The "Time" menu is used to modify the clock. As shown in Figure 3.26, press the "Enter" key after the time setting is completed, then press the "Esc" key to return to the main menu.

```
┌─────────────────────────────┐
│        Time Modify          │
├─────────────────────────────┤
│        Current Time         │
│         2023-06-20          │
│          11:24:14           │
│                             │
│  ▐Y-M-D:▌      2023-06-20   │
│                             │
│  H:M:S        11:22:18      │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```

Fig. 3.26 Time Setting

3.9 Information

The "Information" menu can display the basic information includes relay's name、 version、 check code、 hardware、 software、 logic、 logic version and so on, as shown in Figure 3.27.

```
┌─────────────────────────────┐
│            INFO             │
├─────────────────────────────┤
│          NOV3S-M            │
│  HalVer：1.21               │
│  CRC code：0x1f37           │
│                             │
│  Hardware：                 │
│  2021-12-20_01:07:26        │
│                             │
│  Software：                 │
│  2021-12-20_01:07:28        │
│                             │
│  LogicVer:                  │
│  T0025 1.16                 │
│  2021-12-20_01:07:37        │
└─────────────────────────────┘
```

Fig 3.27 Information

4 Dimensions and Installation

4.1 Dimensions and Cut-out dimensions
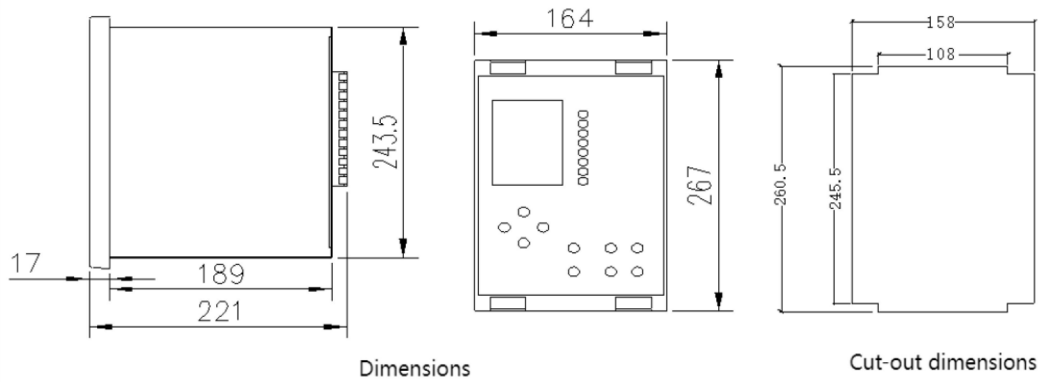
Figure 4.1 Dimensions and cut-out dimensions

Note: Length unit is millimeter (mm).

4.2 Installation procedure
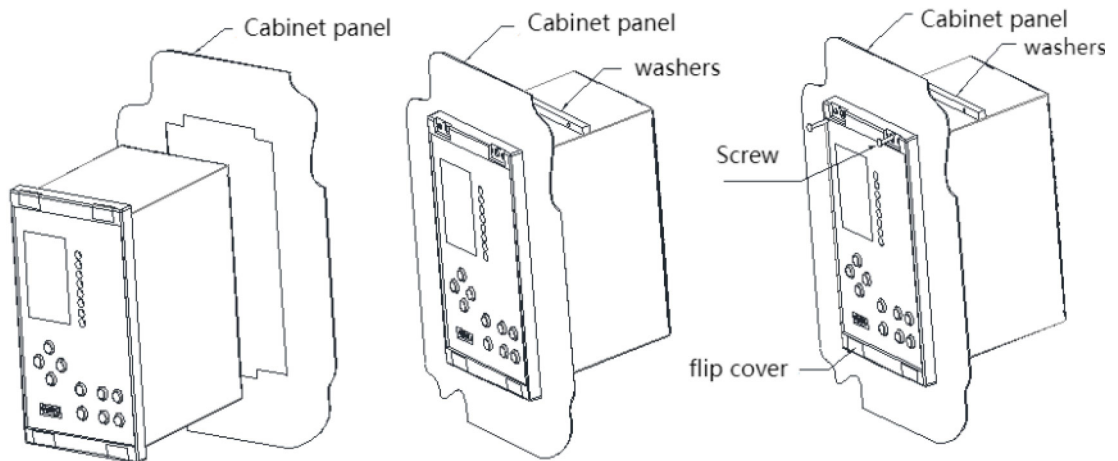
Figure 4.2   Figure 4.3   Figure 4.4

1.Prepare the cut-out in the panel for the flush installation according to the above dimensions.

2.Fasten the NOV3S protection relay in its position with for four M3×12mm screws with washers.

3.Cover four small flip covers on the four screws again.

5 Wiring

5.1 NOV3S rear panel

X5 X6

X1

Ia* ① ② Ia
Ib* ③ ④ Ib
ETH1
Ic* ⑤ ⑥ Ic
ETH2
IO1* ⑦ ⑧ IO1
IO2* ⑨ ⑩ IO2
IA* ⑪ ⑫ IA
X2
IB* ⑬ ⑭ IB
IC* ⑮ ⑯ IC

X5
1 DI1
2 DI2
3 COM1
4 DI3
5 DI4
6 COM2
7 DI5
8 DI6
9 DI7
10 DI8
11 DI9
12 DI10
13 COM3
14 DI11
15 DI12
16 DI13
17 DI14
18 DI15
19 DI16
20 COM4
21 DI17
22 DI18
23 DI19
24 DI20

X6
1 DO1
2
3 DO2
4
5 DO3
6
7 DO4
8
9 DO5
10
11 DO6
12
13 DO7
14
15 DO8
16
17 DO9
18
19 DO10
20
21 Signal COM
22 Accident.S
23 Trip.S
24 Unusual.S
25 Ctrl-circuit supervision
26 Close.S
27 Protection Trip
28 Protection Close
29 +KM
30 Anti-pumping
31 Manual Trip
32 Trip Inlet
33 Trip Coil
34 Close Inlet
35 Close Coil
36 TWJ
37 Manual Close
38 -KM

X2
1
2 RS485-
3 RS485+
4 IRIG-B-
5 IRIG-B+
6
7 RS485-
8 RS485+

XU
USB

X1
17 UA
18 UN
19 UB
20 UN
21 UC
22 UN
23 UO
24 UN
25 U'
26 UN'
27 U''
28 UN''

X7
1 AO1+
2 AO2+
3 AO-
4-20mA

X4
1 L/+
2 N/-
3 GND

Figure 5.1　NOV3S

X1　1-16　Current

X1　17-28　Voltage

X2　1-8　RS-485 and IRIG-B

X4　1-2　Power supply

X4　3　Power ground

X5　1-24　Digital inputs

X6　1-20　Digital outputs

X6　21-38　Anti-pumping and trip and close supervision

X7　1-3　Analog output

ETH　1-2　Ethernet

XU　USB

5.2 Typical application

The following describe typical application diagrams. 3CTs and residual current, 3PTs and residual voltage have been showed in the diagrams.
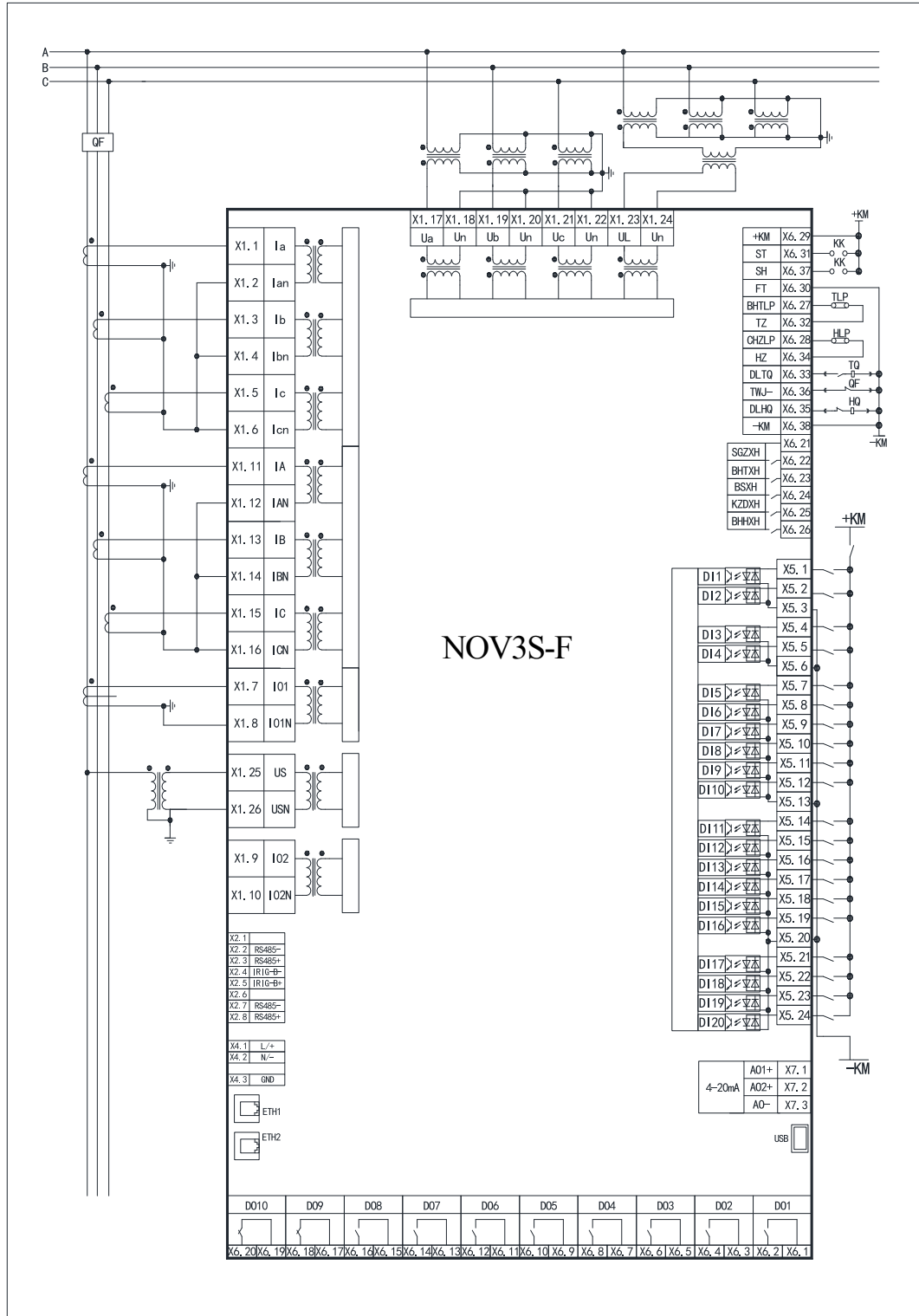
Figure 5.2 Typical application diagrams
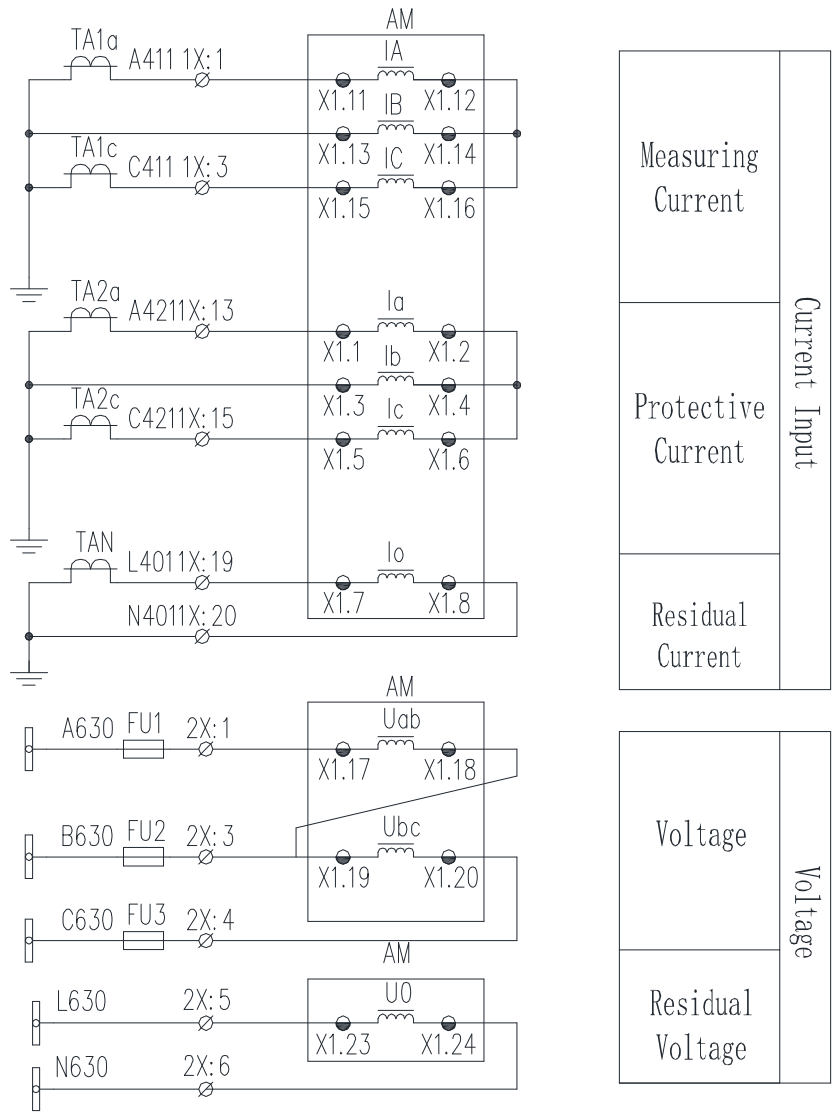
Figure 5.3 2PT &2CT Wiring

6 Product maintenance

The following table shows the common problems and treatment methods of the NOV3S during use.

Table 6.1 Common problems and treatment methods

Questions	Possible causes	Treatment suggestion
The trip relay doesn't close.	1、Corresponding function is not enabled. 2、Conditions for closure. 3、Incorrect DO mapping.	1、Set the corresponding protection enable on; 2、Check the blocking condition. 3、Configure the corresponding digital output in the "DBG" menu. 4、Please contact after-sales staff.
Communication failure.	1、The polarity of communication cable is reversal. 2、Communication parameter and protocol are inconformity. 3、Communication cable break. 4、Wrong communication address.	1、Check the wiring. 2、Reset communication parameters and protocols. 3、Repair or replace the communication cable. 4、Reset the communication address in the "COMM" menu.
Ethernet communication failure.	1、Communication parameter and protocol are inconformity. 2、Communication cable break.	1、Reset communication parameters and protocols. 2、Repair or replace the communication cable.
No current on the main interface.	Wrong configuration option of "Current Type".	Reset the "Current Type" in the "CONF" menu.
The LED is always on . The color of LED doesn't match the setting.	1、The relay is initializing. 2、Wrong configuration of the LED'S color.	1、Please press "RST" button once. 2、Please contact after-sales staff
The voltage value is incorrect.	The "PT mode" is different from the wiring.	Reset the "PT mode" according to the wiring.
No digital signal acquisition.	No signal input to corresponding digital input.	Measure the voltage between the corresponding digital input and the common terminal of the relay. Check whether the voltage is normal.
Manual closing of the circuit breaker is unsuccessful.	Manual trip and manual close are short-circuit.	Remove the wirings of X6.33, X6.35 and X6.29 from the relay. Connect the X6.37 to positive power supply directly and check on-off state between X6.29 and X6.32 .
After manual closing, closing coil of circuit	There is no NC before the closing coil of circuit breaker.	Insert a NC between the X6.35 and the closing coil of circuit breaker.

breaker remains energized.		
Manual tripping of the circuit breaker is unsuccessful.	1.TBJ relay circuit is abnormal. 2. STJ relay circuit is abnormal. 3. Wiring to the X6.38 is unreliable.	1. Test whether the protective trip and remote trip are normal; 2. Check wiring of X6.38 and confirm that the wiring is correct and reliable; 3. Remove the wiring of X6.29 from the relay. Manual trip and check the on-off state between X6.29 and X6.32.

The procedure for testing the anti-pump function is as follows:

1、 Cancel the X6.30 anti-pump contact of relay, short the manual close contact, at this time the circuit breaker close, manual trip circuit breaker. After several manual operations, if the circuit breaker still keeps in the close state, it means that the circuit breaker does not equip with anti-pump function; After several manual operations, if the circuit breaker keeps in the trip state , it means that the circuit breaker equip with anti-pump function;

2、 After confirming that the circuit breaker does not equipped with anti-pump function, connect the X6.30 anti-pump contact to the negative power supply and use the NOV3S relay's anti-pump. At this time, short the manual closing contact, the circuit breaker is closed, and manual trip once. After several manual operations, the circuit breaker keeps in the trip state, which means that the anti-pump function is triggered; release the wire of manual closing.Waiting for 10s and then manual close the breaker. At this time, the circuit breaker can be closed normally, indicating that the anti-pump lock state is released.

Appendix A Setting value

NOV3S				
NOV3S Setting				
Protection Function	Value Name	Default	Range	Notice
	CT	10	0.1～9999	
	PT	100	0.1～9999	
	U Unit [Primary voltage display]	0	0～1	kV;V
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
3I>>> [50] [Instantaneous overcurrent]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	E.3I>>>.D[67] [Enable.3I>>> .direction]	0	0～1	OFF;Line；
	E.3I>>>.U [Enable.3I>>> .Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection

				DO is prepare work.]
	3I>>> [3I>>> value]	10A	0.04～100	
	3I>>>.T [3I>>> delay]	0s	0～60	
	E.3I>>>.B[67] [Enable 3I>>> Bus]	0	0～1	OFF；ON
	3I>>>B [Enable 3I>>>.Bus value]	10A	0.04-100	
	3I>>>B.T [3I>>> Bus delay]	0s	0～60	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>.]	0	0～1	OFF；ON
	E.3I>>.D[67] [Enable.3I>> .direction]	0	0～1	OFF；Line；
	E.3I>>.U [Enable.3I>> .Voltage]	0	0～1	OFF；ON [If enable 3I>>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
		7.5A	0.04～100	

	3I>> [3I>> value]			
	3I>>.T [3I>> delay]	0.2s	0～60	
	E.3I>>.B [Enable 3I>> Bus]	0	0～1	OFF；ON
	3I>>B [3I>>.Bus value]	7.5A	0.04-100	
	3I>>B.T [3I>> Bus.delay]	0.2s	0～60	
3I> [51] [Definite time overcurrent]	E.3I> [Enable.3I>]	0	0～1	OFF；ON
	E.3I>.D[67] [Enable.3I> .direction]	0	0～1	OFF；Line
	E.3I>.U [Enable.3I> .Voltage]	0	0～1	OFF；ON [If enable 3I>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	3I> [3I> value]	7A	0.04～100	

	3I>.T [3I> delay]	0.5s	0～60	
	E.3I>.B[67] [Enable 3I> Bus]	0	0～1	OFF；ON
	3I>B [3I>.Bus value]	7A	0.04-100	
	3I>B.T [3I> Bus delay]	0.5s	0～60	
I>Inv [51] [Inverse time overcurrent (IDMT)]	E. I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	E.I>.Inv.U [Enable I>Inverse Voltage]	0	0～1	OFF；ON [If enable I>.Inv.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	I>.Inv [Inverse current]	5A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.1s	0.1～100	
	I>.Inv.X	0	0～2	NI；VI；EI

32

	[Inverse curve]			
I>Lo.A [49F] Overload Alarm	E. I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Overload Alarm value]	6.5A	0.04～100	
	I>Lo.A.T [Overload Alarm delay]	5s	0～999	
I>Lo.T [49F] Overload Trip	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Overload Trip value]	6A	0.04～100	
	I>Lo.T.T [Overload Trip delay]	10s	0～60	
Post-Accelerated Overcurrent	E. I>P [Enable post-accelerated overcurrent]	0	0～1	OFF；ON
	I>P.U [Enable I>P voltage]	0	0～1	OFF；ON [If enable I>P.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]

	I>P [Post-accelerated overcurrent value]	6.5A	0.04～100	
	I>P.T [Post-accelerated overcurrent delay]	0s	0～60	
I01>>> [50N] [Instantaneous ground fault overcurrent]	E. I01>>> [Enable I01>>>]	0	0～1	OFF；ON
	I01>>>D[67N] [Enable.I01>>> .direction]	0	0～2	OFF；Line；Bus
	I01>>> [I01>>> value]	10A	0.04～100	
	I01>>>.T [I01>>> delay]	5s	0～60	
	I01>>>.3U0 [I01>>>.self-produced U0]	2V	0～200	
I01>> [51N] [Time limited ground fault overcurrent]	E. I01>> [Enable I01>>]	0	0～2	OFF；Alarm；Trip
	E. I01>>D[67N] [Enable.I01>>> .direction]	0	0～2	OFF；Line；Bus
	I01>> [I01>> value]	9A	0.04～100	
	I01>>.T [I01>> delay]	10s	0～60	

	I01>>.3U0 [I01>>.self-produced U0]	2V	0～200	
I02>>> [50N] [Instantaneous ground fault overcurrent]	E. I02>>> [Enable I02>>>]	0	0～1	OFF；ON
	E. I02>>>D[67N] [Enable.I02>>> .direction]	0	0～2	OFF；Line；Bus
	I02>>> [I02>>> value]	10A	0.04～100	
	I02>>>.T [I02>>> delay]	5s	0～60	
	I02 3U0 I02>>>.self-produced U0 [I02>>>.self-produced U0]	2V	0～200	
I02>> [50N] [Time limited ground fault overcurrent]	I02 E. I02>> [Enable I02>>]	0	0～2	OFF；Alarm；Trip
	I02 E. I02>>D [67N] [Enable.I02>> .direction]	0	0～2	OFF；Line；Bus
	I02>> [I02>> value]	9A	0.04～100	
	I02>>.T [I02>> delay]	10s	0～60	
	I02 3U0 I02>>.self-produced U0 [I02>>.self-produced U0]	2V	0～200	
PT supervision[60]	PT E.PtBr.A	0	0～1	OFF；ON

	[Enable PT Break alarm]			
	PtBr.T [PT Break delay]	10s	0～999	
	U.None [No-voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	I.None [No-current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	U2.Pt [Negative sequence voltage]	35V	0～200	
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
	U.Less [Under voltage threshold]	15V	0～200	
	U. Under [Under voltage value]	70V	0～200	
[81U] Under-Frequency Protection	E.UnderFr. [Enable Under Frequency]	0	0～1	OFF；ON
	E. UnderFr.U [Enable Under Frequency Voltage block]	0	0～1	OFF；ON
	E.UnderFr.I [Enable Under Frequency	0	0～1	OFF；ON

	current block]			
	E.UnderFr.dHz. [Enable Under Frequency slip block]	0	0～1	OFF；ON
	UnderFr. [Under Frequency value]	49Hz	40～70	
	UnderFr.T [Under Frequency delay]	3s	0～60	
	dHz.B [Under Frequency slip block value]	0.1Hz/s	0.1～10	
	I. B [Under Frequency current block value]	5A	0.2～100	
	U. B [Under Frequency voltage block value]	50V	0～200	
Auto-Recloser function [79]	E. Reclose [Enable Auto-Reclose]	0	0～1	OFF；ON
	Reclose.T [Auto-Reclose delay]	5s	0.1～ 9999.999	
	Reclose.X [Auto-reclose Mode]	0	0～1	Not Check；Check
	Rec.C.T [Auto-reclose charge delay]	5s	0.1～ 9999.999	
	RecC.RT [Auto-reclose charge return time]	1s	0～9999.999	

	T.R.T [Trip auto-reclose return time]	30s	0～9999.999	
	E. nonP. [Enable non-position auto-reclose]	1	0～1	OFF；ON
FC Block	E. FCBlock [Enable FC Block]	0	0～1	OFF；ON
	FCBlock.I [FC Block current value]	10A	0.04～100	
	FCBlock.T [FC Block delay]	5s	0～60	
I01.Inv [51N] [Inverse time ground fault]	E. I01.Inv [Enable I01.Inverse]	0	0～1	OFF；ON
	I01.Inv [I01.Inverse value]	5A	0.04～100	
	I01.Inv.K [I01.Inverse time coefficient]	0.5s	0～100	
	I01.Inv.X [I01.Inverse curves type]	0	0～2	NI；VI；EI
I02.Inv [51N] [Inverse time ground fault]	E. I02.Inv [Enable I02.Inverse]	0	0～1	OFF；ON
	I02.Inv [I02.Inverse value]	5A	0.04～100	
	I02.Inv.K [I02.Inverse time coefficient]	0.5s	0～100	
	I02.Inv.X [I02.Inverse curves type]	0	0～2	NI；VI；EI

LVP.T [27] [Undervoltage Trip]	E. LVP.T [Enable Undervoltage Trip]	0	0～1	OFF；ON
	LVP.T [Undervoltage Trip value]	50V	1～200	
	LVP.T.T [Undervoltage Trip delay]	5s	0～60	
	E.LVPT.I.B [Enable Undervoltage Trip current block]	0	0～1	OFF；ON [If enable LVP.I.B, when the current is less than I.None, under voltage protection will be blocked.]
	E.T.PT.B [Enable PT break trip block]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB.OnT.B [Enable circuit breaker on Trip block]	0	0～1	OFF；ON
	E.T.LVTHr. [Enable Undervoltage Trip threshold]	1	0～1	OFF；ON [If enable LVTHr. , when the voltage is greater than U.None and less than U.LVP , under voltage protection will act. If exit LVTHr. , under voltage protection is Loss voltage

				protection.]
	E.LVP.A [Enable Undervoltage Alarm]	0	0～1	OFF；ON
	LVP.A [Undervoltage Alarm value]	50V	1～200	
	LVP.A.T [Undervoltage Alarm delay]	5s	0～60	
LVP.A [27] [Undervoltage Alarm]	E.LVPA.I.B [Enable Undervoltage Alarm current block]	0	0～1	OFF；ON [If enable LVP.I.B, when the current is less than I.None, under voltage protection will be blocked.]
	E.A.PT.B [Enable PT break alarm block]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB OnA.B [Enable circuit breaker on Alarm block]	0	0～1	OFF；ON
	E.A.LVThr. [Enable Undervoltage Alarm threshold]	1	0～1	OFF；ON [If enable LVThr. , when the voltage is greater than U.None and less than U.LVP , under voltage protection will

				alarm. If exit E. A.LVTHr. , under voltage protection is Loss voltage protection.]
U0.OVP [59N] [Residual overvoltage]	E.U0.OVP [Enable Residual over voltage protection]	0	0～2	OFF；Alarm；Trip
	U0.OVP [Residual over voltage value]	20V	0～200	
	U0.OVP.T [Residual over voltage protection delay]	5s	0～60	
OVP [59] [Overvoltage Protection]	E.OVP [Enable overvoltage protection]	0	0～2	OFF；Alarm；Trip
	U. OVP [Overvoltage protection value]	120V	0～200	
	OVP.A.T [Overvoltage protection Alarm delay]	5s	0～999	
	OVP.T.T [Overvoltage protection Trip delay]	5s	0～60	
RP [32R] [Directional power protection]	E.RP [Enable Reverse-Power Protection]	0	0～1	OFF；ON
	RP [Reverse-Power Protection	0	0～ 10000000000	

	value]			
	RP.T [Reverse-Power Protection delay]	0	0～99	
OF [81O] [Over Frequency Protection]	E.OF [Enable Over Frequency]	0	0～1	OFF；ON
	OF [Over Frequency value]	50Hz	40～70	
	OF.T [Over Frequency delay]	5s	0～999	
Non-Electricity1 Protection	E. Non-el1 [Enable Non-Electricity1]	0	0～1	OFF；ON
	E. Non-el1.M [Enable Non-Electricity1 Mode]	0	0～1	Alarm；Trip
	Non-el1.T [Non-Electricity1. delay]	1s	0～999	
Non-Electricity2 Protection	E. Non-el2 [Enable Non-Electricity2]	0	0～1	OFF；ON
	E. Non-el2.M [Enable Non-Electricity2 Mode]	0	0～1	Alarm；Trip
	Non-el2.T [Non-Electricity2 delay]	1s	0～999	
[25] Synchro-Check	E.SameP. [Enable Synchro-Check]	0	0～1	OFF；ON
	SameP.StaT [Synchro-Check Stabilization	0.2s	0～999.999	

delay]			
SameP.Type [Synchro-Check type]	1	0～1	Dif.Fr；Same.Fr [Differential Frequency;Same Frequency]
Sy.CH [System Channel]	9	0～14	
SyPr.U [System Side Primary Voltage]	10kV	0～9999	
SyPT.Pr [System Side PT Primary Voltage]	10kV	0～9999	
SyPT.Se [System Side PT Secondary Voltage]	100V	0～9999	
Gr.C.CH [Generator voltage Channel]	13	0～14	
GrC.PriU [Generator Primary voltage]	10kV	0～9999	
GrC.PTPr [Generator PT Primary Voltage]	10kV	0～9999	
GrC.PTSe [Generator PT Secondary Voltage]	100V	0～9999	

Po.U.Dif% [Poaitive voltage difference allowed]	5%	0～30	
Ne.U.Dif% [Negative voltage difference allowed]	5%	0～30	
Rated Fr [Rated Frequency]	50Hz	40～70	
Sy.Fr.Di [System Frequency difference]	0.1Hz	0～5	
GrC.FrDi [Generator Frequency difference]	0.1Hz	0～5	
Po.Fr.Di [Positive Frequency difference allowed]	0.1Hz	0～5	
Ne.Fr.Di [Negative Frequency diffrence allowed]	0.1Hz	0～5	
Fr.Dif.A [Frequency difference accelation allowed]	1Hz/s	0～10	
SaFr.PhD [Same Frequency Phase Angle difference]	5°	0～60	
Differential frequency grid-connected phase angle difference	5°	0～60	

	DiFr.PhD [Difference Frequency Phase Angle difference]			
	Sys.Ph.C [System Phase Angle Compensation]	0°	0～330	
	SameP.Le.T [Synchronism Lead Time]	0.1s	0.02～999	
	Default.T [Trip Default Time]	0s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0.01～60	
	E.EMC.B [Enable EMC block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Underage return coefficient	1.05	1～2	

	Under R.C [Under Return Coefficient]			
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.I.N [CT Break No-Current]	0.125A	0.04～100	
	CTBr.I.S [CT Break Current setting]	0.2A	0.04～100	
	CTBr.T [CT Break Alarm time]	5s	0～999	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～ 1	CT same;CT diff. [protective CT is different from zero sequence CT] ; [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-T Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	20	0.1～9999	
	PT	100	0.1～9999	
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U Unit [Primary voltage display]	0	0～1	kV;V
3I>>> [50] [Instantaneous overcurrent]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	E.3I>>>.U2 [Enable.3I>>> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare

				work.]
	3I>>> [3I>>> value]	10A	0.04～100	
	3I>>>.T [3I>>> delay]	0s	0～60	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]	0	0～1	OFF；ON
	E.3I>>.U2 [Enable.3I>> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U2,composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	3I>> [3I>> value]	7.5A	0.04～100	
	3I>>.T [3I>> delay]	1s	0～60	
3I> [51] [Definite time	E.3I> [3I> value]	0	0～1	OFF；ON
	Recompression of three sections of meridian	0	0～1	exit; invest

overcurrent]	E.3I>.U2 [Enable.3I> .Composite Voltage]			OFF；ON [If enable 3I>>>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	3I> [3I> value]	7A	0.04～100	
	3I>.T [3I> delay]	2s	0～60	
I>Inv. [51] [Inverse time overcurrent (IDMT)]	E.I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	E. I>.Inv [Enable I>Inverse Composite Voltage]	0	0～1	OFF；ON [If enable I>.Inv, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater

				than U2 the overcurrent protection DO is prepare work.]
	I>.Inv [Inverse current]	6A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.1s	0～100	
	I>.Inv.X [Inverse curves]	0	0～2	NI；VI；EI
I>Lo.A [49F] [Overload Alarm]	E. I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Overload Alarm value]	6A	0.04～100	
	I>Lo.A.T [Overload Alarm delay]	5s	0～999	
I>Lo.T [49F] Overload Trip]	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Overload Trip value]	7A	0.04～100	
	I>Lo.T.T [Overload Trip delay]	10s	0～60	
I01>>> [50N] [Instantaneous ground fault overcurrent]	E. I01>>> [Enable I01>>>]	0	0～1	OFF；ON
	I01>>>	10A	0.04～100	

	[I01>>> value]			
	I01>>>.T [I01>>> delay]	5s	0～60	
I01>> [51N] [Time limited ground fault overcurrent]	E. I01>> [Enable I01>>]	0	0～2	OFF；Alarm；Trip
	I01>> [I01>>>value]	9A	0.04～100	
	I01>>.T [I01>> delay]	10s	0～60	
I01.Inv [51N] [Inverse time ground fault]	E. I01.Inv [Enable I01.Inv]	0	0～1	OFF；ON
	I01.Inv [I01 Inverse current]	6A	0.04～100	
	I01.Inv.K [I01 Inverse time coefficient]	0.1s	0～100	
	I01.Inv.X [I01 Inverse curves]	0	0～2	NI；VI；EI
I02>>> [50N] [Instantaneous ground fault overcurrent]	E.I02>>> [Enable I02>>>]	0	0～1	OFF；ON
	I02>>> [I02>>> value]	10A	0.04～100	
	I02>>>.T [I02>>> delay]	5s	0～60	
102 Overcurrent Stage 2	102 Second Section Surrender	0	0～2	exit;alarm;trip

I02>> [51N] [Time limited ground fault overcurrent]	E. I02>> [Enable I02>>]			OFF；Alarm；Trip
	I02>> [I02>>>value]	9A	0.04～100	
	I02>>.T [I02>> delay]	5s	0～60	
I02.Inv [51N] [Inverse time ground fault]	E.I02.Inv. [Enable I02.Inv]	0	0～1	OFF；ON
	I02.Inv [I02 Inverse current]	6A	0.04～100	
	I02.Inv.K [I02 Inverse time coefficient]	0.1s	0～100	
	I02.Inv.X [I02 Inverse curves]	0	0～2	NI；VI；EI
PT supervision[60]	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	PtBr.T [PT Break delay]	5s	0～999	
	U.None [No-voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	I.None [No-current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	U2.Pt [Negative sequence voltage]	35V	1～200	

Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
	U. Less [Under voltage threshold]	15V	0～200	Composite voltage criterion
	U. Under [Under voltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
LGas. [Light Gas Alarm]	E.LGas.A [Enable Light Gas.Alarm]	0	0～1	OFF；ON
	LGas.T [Light Gas Alarm delay]	1s	0～999	
SGas [Heavy Gas Trip]	E.SGas.T [Enable Heavy Gas Trip]	0	0～1	OFF；ON
	SGas.T [Heavy Gas Trip. delay]	1s	0～60	
Pre.Re [Pressure Release]	E. Pre.Re [Enable Pressure Release]	0	0～2	OFF；Alarm；Trip
	Pre.Re.T [Pressure Release delay]	1s	0～60	

OTem [High Temperation Alarm]	E.OTem.A [Enable High Temperation Alarm]	0	0～1	OFF；ON
	OTem.T [High Temperation Alarm delay]	1s	0～999	
HTem. [Over Temperation Trip]	E.HTem.T [Enable Over Temperation Trip]	0	0～1	OFF；ON
	HTem.T [Over Temperation Trip delay]	1s	0～60	
DoOp. [Transformer Door Opening Protection]	E.DoOp. [Enable Transformer Door Opening]	0	0～2	OFF；Alarm；Trip
	DoOp.T [Transformer Door Opening delay]	1s	0～60	
E.Th.Fa. [Thermostat Failure Protection]	E.Th.Fa. [Enable Thermostat Failure]	0	0～2	OFF；Alarm；Trip
	Th.Fa.T [Thermostat Failure delay]	1s	0～60	
Non-Electricity1 Protection	E.Non-el1 [Enable Non-Electricity1]	0	0～2	OFF；Alarm；Trip
	Non-el1.T	1s	0～60	

	[Non-Electricity1 delay]			
Non-Electricity2 Protection	E. Non-el2 [Enable Non-Electricity2]	0	0～2	OFF；Alarm；Trip
	Non-el2.T [Non-Electricity2 delay]	1s	0～60	
I2>>> Trip [46] [Negative sequence instantaneous overcurrent]	E. I2>>>T [Enable I2>>> Trip]	0	0～1	OFF；ON
	I2>>>T [I2>>> Trip value]	10A	0.04～100	
	I2>>>T.T [I2>>>Trip delay]	2s	0～60	
I2>>> Alarm [46] [Negative sequence instantaneous overcurrent]	E. I2>>>A [Enable I2>>> Alarm]	0	0～1	OFF；ON
	I2>>>A [I2>>> Alarm value]	10A	0.04～100	
	I2>>>A.T [I2>>>Alarm delay]	1s	0～60	
I2>>Trip [46] [Negative sequence time-limited overcurrent]	E. I2>>T [Enable I2>> Trip]	0	0～1	OFF；ON
	I2>>T [I2>> Trip value]	9A	0.04～100	
	I2>>T.T [I2>>Trip delay]	4s	0～999	
	I2	0	0～1	

I2>>Alarm [46] [Negative sequence time-limited overcurrent]	E.I2>>A [Enable I2>> Alarm]			OFF；ON
	I2>>A [I2>> Alarm value]	9A	0.04～100	
	I2>>A.T [I2>>Alarm delay]	3s	0～999	
I2>Inv [46] [Negative sequence inverse overcurrent (IDMT)]	E. I2>Inv [Enable I2>Inverse]	0	0～1	OFF；ON
	I2>Inv [I2>Inverse value]	6A	0.04～100	
	I2>Inv.K [I2>Inverse time coefficient]	0.1s	0～100	
	I2>Inv.X [I2>Inverse curves]	0	0～2	NI；VI；EI
FC Block	E. FCBlock [Enable FC Block]	0	0～1	OFF；ON [When the fault current is greater than FCBlock.I, the relay's DO will be blocked,in order to ensure that the fuse is first blown.]
	FCBlock.I [FC Block current value]	10A	0.04～75	
	FCBlock.T [FC Block delay]	5s	0～60	
	Acci.S.T [Accident Signal delay]	0.3s	0～60	
	E.EMC.B	1	0～1	OFF；ON

	[Enable EMC block]			
	Default.T [Default delay]	0s	0～60	
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit breaker trip and close time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.I.N [CT Break No-Current]	0.125A	0.04～100	
	CTBr.I.S [CT Break Current setting]	0.2A	0.04～100	
	CTBr.T [CT Break Alarm time]	5s	0～999	
U0.OVP	E.U0.OVP	0	0～2	OFF；Alarm；Trip

[59N] [Residual over voltage]	[Enable Residual over voltage protection]			
	U0.OVP [Residual over voltage value]	20V	0～200	
	U0.OVP.T [Residual over voltage protection delay]	5s	0～60	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～ 1	CT same;CT diff. [protective CT is different from zero sequence CT] ; [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-M Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	300	0.1～9999	

	PT	100	0.1～9999	
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U Unit [Primary voltage display]	0	0～1	kV；V
	Ie1 [Rated primary current]	300A	0.04～9999	
	Te [Rated start time of motor]	5	0～9999	
	Start Delay	0.04s	0～10	
3I>>>.S [50] [Instantaneous Overcurrent of Starting]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	3I>>>.S [3I>>> value of Starting]	30A	0.04～100	
	3I>>>.Ts [3I>>>.start delay]	0s	0～60	
3I>>>.R [50] [Instantaneous Overcurrent of Running]	3I>>>.R [3I>>> value of Running]	15A	0.04～100	
	3I>>>.Tr [3I>>>.Running delay]	0s	0～60	
		0	0～1	

3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]			OFF；ON
	3I>> [3I>> value]	2A	0.04～100	
	3I>>.T [3I>> delay]	2s	0～60	
I>Inv. [51] [Inverse time overcurrent (IDMT)]	E.I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	I>.Inv [Inverse current]	6A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.1s	0～100	
	I>.Inv.X [Inverse curves]	0	0～2	NI；VI；EI
I>Lo.A [49F] [Overload Alarm]	E. I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Overload Alarm value]	6A	0.04～100	
	I>Lo.A.T [Overload Alarm delay]	5s	0～999	
I>Lo.T [49F] [Overload Trip]	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Overload Trip value]	7A	0.04～100	
	I>Lo.T.T [Overload Trip delay]	10s	0～60	

E.SoutT [48] [Motor Start time supervision]	E.SoutT [Enable Start out time]	0	0～1	OFF；ON
	SoutT.I [Start out time delay]	1.125	0.04～100	
[51LR] Locked rotor	E.Stall [Enable locked rotor]	0	0～1	OFF；ON
	Stall.I [Locked rotor Current value]	6.5A	0.04～100	
	Stall.T [Locked rotor delay]	5s	0～60	
I01>>> [50N] [Instantaneous ground fault overcurrent]	I01 一 E. I01>>> [Enable I01>>>]	0	0～1	OFF；ON
	I01 I01>>> [I01>>> value]	5A	0.04～100	
	I01 I01>>>.T [I01>>> delay]	1s	0～60	
I01>> [51N] [Time limited ground fault overcurrent]	I01 E. I01>> [Enable I01>>]	0	0～2	OFF；Alarm；Trip
	I01 I01>> [I01>>>value]	3A	0.04～100	
	I01 I01>>.T [I01>> delay]	2s	0～60	
I2>>>	E. I2>>>	0	0～1	OFF；ON

[46]	[Enable I2>>>]			
[Negative sequence instantaneous overcurrent]	I2>>> [I2>>> value]	10A	0.04～100	
	I2>>>.T [I2>>> delay]	5s	0～60	
I2>> [46] [Negative sequence time-limited overcurrent]	E. I2>> [Enable I2>>]	0	0～1	OFF；ON
	I2>> [I2>> value]	9A	0.04～100	
	I2>>.T [I2>> delay]	10s	0～999	
I2>Inv [46] [Negative sequence inverse overcurrent(IDMT)]	E. I2>Inv [Enable I2>Inverse]	0	0～1	OFF；ON
	I2>Inv [I2>Inverse value]	6A	0.04～100	
	I2>Inv.K [I2>Inverse. time coefficient]	0.1s	0～100	
	I2>Inv.X [I2>Inverse curves]	0	0～2	NI；VI；EI
[49M] Thermal overload	E. OverHeat [Enable thermal overload]	0	0～1	OFF；ON
	Heat.Al.P [Thermal overload Alarm percentage]	70%	0～100	
	Heat.Tr.P [Thermal overload Trip percentage]	100%	0～200	
	Heating time constant	15min	0～100	

		HeatPro.K [Thermal overload coefficient]			
		HeatEmi.K [Thermal overload emission coefficient]	30min	0～300	
		HeatRe [Thermal overload Restart block]	50%	0～100	
LVP.T [27] [Undervoltage Trip]		E. LVP.T [Enable Undervoltage Trip]	0	0～1	OFF；ON
		LVP.T [Undervoltage Trip value]	50V	1～200	
		LVP.T.T [Undervoltage Trip delay]	5s	0～60	
		E.LVPT.I.B [Enable Undervoltage Trip current block]	0	0～1	OFF；ON [If enable LVP.I.B, when the current is less than I.None, under voltage protection will be blocked.]
		E. T.PT.B [Enable PT break block trip]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
		E.CB.OnT.B [Enable circuit breaker on Trip block]	0	0～1	OFF；ON

	E. T.LVTHr. [Enable Undervoltage Trip threshold]	1	0～1	OFF；ON [If enable LVTHr. , when the voltage is greater than U.None and less than U.LVP , under voltage protection will act. If exit LVTHr. , under voltage protection is Loss voltage protection.]
LVP.A [27] [Undervoltage Alarm]	E.LVP.A [Enable Undervoltage Alarm]	0	0～1	OFF；ON
	LVP.A [Undervoltage Alarm value]	50V	1～200	
	LVP.A.T [Undervoltage Alarm delay]	5s	0～60	
	E.LVPA.I.B [Enable Undervoltage Alarm current block]	0	0～1	OFF；ON [If enable LVP.I.B, when the current is less than I.None, under voltage protection will be blocked.]
	E.A.PT.B [Enable PT break block alarm]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB OnA.B	0	0～1	OFF；ON

	[Enable circuit breaker on Alarm block]			
	E.A.LVThr. [Enable Undervoltage Alarm threshold]	1	0～1	OFF；ON [If enable LVThr., when the voltage is greater than U.None and less than U.LVP , under voltage protection will alarm. If exit LVThr. , under voltage protection is Loss voltage protection.]
U0 OVP [59N] [Residual over voltage]	E.U0.OVP [Enable Residual over voltage protection]	0	0～2	OFF；Alarm；Trip
	U0.OVP [Residual over voltage value]	120V	0～200	
	U0.OVP.T [Residual over voltage protection delay]	10s	0～999	
PT supervision[60]	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	PtBr.T [PT Break delay]	10s	0～999	
	U.None [No-voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	I.None [No-current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	PT disconnection negative sequence voltage	35V	0～200	

	U2.Pt [Negative sequence voltage]			
Trip and close circuit supervision	E. CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
Non-Electricity1 Protection	E.Non-el1 [Enable Non-Electricity1]	0	0～1	OFF；ON
	Non-el1.T [Non-Electricity1 delay]	2s	0～60	
Non-Electricity2 Protection	E. Non-el2 [Enable Non-Electricity2]	0	0～1	OFF；ON
	Non-el2.T [Non-Electricity2 delay]	2s	0～999	
FC Block	E. FCBlock [Enable FC Block]	0	0～1	OFF；ON [When the fault current is greater than FCBlock.I, the relay's DO will be blocked,in order to ensure that the fuse is first blown.]
	FCBlock.I [FC Block current value]	10A	0.04～120	
	FCBlock.T [FC Block delay]	5s	0～60	

	E. Unb.V [Enable Unbalance Voltage]	0	0～1	OFF；ON
[60] Unbalance Voltage Protection	Unb.V.R. [Unbalance Voltage factor]	20%	0～100	
	Unb.V [Unbalance Voltage value]	30V	0～200	
	Unb.V.T [Unbalance Voltage delay]	0.03s	0～100	
	E. Ph.Se. [Enable Staggered Phase]	0	0～1	OFF；ON
	LiV.HSet. [Line voltage high setting]	120V	0～200	
	LiV.LSet. [Line voltage low setting]	70V	0～200	
Incorrect Phase Protection	U1 Ratio [Positive voltage Ratio]	30%	0～100	
	U2 Ratio [Negative voltage Ratio]	50%	0～100	
	Ph.Se.T [Staggered Phase delay]	0s	0～100	
	Ph.Se.SRT [Staggered Phase signal reset]	2s	0～60	
Voltage Phase Break	E.Ph.Br	0	0～1	OFF；ON

Protection	[Enable Voltage Phase Break]			
	Ph.Br.T [Voltage Phase Break delay]	5s	0～60	
	Ph.BrUmax [Maximum Voltage of Phase Break]	30V	0～200	
	Ph.BrUmin [Minimum Voltage of Phase Break]	18V	0～200	
	Ph.BrU.Dif [Phase Break differential Voltage]	18V	0～200	
OVP [59] [Overvoltage Protection]	E.OVP [Enable Overvoltage]	0	0～2	OFF；Alarm；Trip
	U.OVP [Overvoltage value]	120V	0～200	
	OVP.T [Overvoltage delay]	5s	0～60	
Unb.I [60] Unbalance Current Protection	E.Unb.I [Enable Unbalance Current]	0	0～2	OFF；Alarm；Trip
	Unb.I [Unbalance Current value]	15%	0～200	
	Unb.I.T [Unbalance Current delay]	5s	0～999	
	E.Acci.S	1	0～1	OFF；ON

	[Enable Accident Signal]			
	Acci.S.T [Accident Signal delay]	0.3s	0～60	
	E.EMC.B [Enable EMC block]	0	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
I01.Inv [51N] [Inverse time ground fault]	E.I01.Inv [Enable I01.Inv]	0	0～1	OFF；ON
	I01.Inv [I01 Inverse current]	6A	0.04～100	
	I01.Inv.K [I01 Inverse time coefficient]	0.1s	0～100	
	I01.Inv.X [I01 Inverse curves]	0	0～2	NI；VI；EI
I02>>> [50N] [Instantaneous ground fault	E. I02>>> [Enable I02>>>]	0	0～1	OFF；ON
	I02>>>	10A	0.04～100	

overcurrent]	[I02>>> value]			
	I02>>>.T [I02>>> delay]	5s	0～60	
I02>> [51N] [Time limited ground fault overcurrent]	E. I02>> [Enable I02>>]	0	0～2	OFF；Alarm；Trip
	I02>> [I02>>>value]	9A	0.04～100	
	I02>>.T [I02>> delay]	5s	0～60	
I02.Inv. [51N] [Inverse time ground fault]	E.I02.Inv. [Enable I02.Inv]	0	0～1	OFF；ON
	I02.Inv [I02 Inverse current]	6A	0.04～100	
	I02.Inv.K [I02 Inverse time coefficient]	0.1s	0～100	
	I02.Inv.X [I02 Inverse curves]	0	0～2	NI；VI；EI
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.I.N	0.125A	0.04～100	

	[CT Break No-Current]			
	CTBr.I.S [CT Break Current setting]	0.2A	0.04～100	
	CTBr.T [CT Break Alarm time]	5s	0～999	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～ 1	CT same;CT diff. [protective CT is different from zero sequence CT] ; [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-B Setting				
Protection Name	Value Name	Default	Range	Remark
	PT	100	0.1～9999	
	CT	50	0.1～9999	
	One-time graph display mode	0	0～4	Mode 0-Mode 4

	Pri.Sys. [Primary system display]			Mode0～4
	U Unit [Primary voltage display]	0	0～1	KV；V
	PT Mode [Voltage measurement mode]	1	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	1QF On [1QF circuit breaker on]	8	1～16	
	2QF On [2QF circuit breaker on]	9	1～16	
Standby Power Automatic Transfer	E.In.V.C [Enable Incoming voltage control]	0	0～1	OFF；ON
	Spa.Mode [Spare mode]	0	0～4	OFF; Bus Standby; Incoming Standby; Self-adapt Standby; Joint Cut Standby
	E.1-In.Spa. [Enable 1-Incoming spare]	0	0～1	OFF；ON
	E.2-In.Spa. [Enable 2-Incoming spare]	0	0～1	OFF；ON
	4U.S [Enable 4-channnel incoming	0	0～1	OFF；ON

voltage spare]			
On OFF.I [Circuit Breaker On/Off indicator light]	0	0～2	Busbar; 1-Incoming; 2-Incoming
I1 Source [1-Incoming current source]	0	0～2	CH4;CH5;CH1
I2 Source [2-Incoming current source]	1	0～2	CH4;CH5;CH1
I0 Source	0	0～3	Self-produced; CH2; CH4; CH5
In.U.None [Loss Incoming Voltage]	10V	0～200	
B. U.None [Loss Bus Voltage]	10V	0～200	
In.Vo.St.V [Incoming Voltage Store]	20V	0～200	
B. Vo.St.V [Bus Voltage Store]	20V	0～200	
I1.None [1-Incoming Current none]	0.1A	0.04～100	
I2.None [2-Incoming Current none]	0.1A	0.04～100	
B. Cha.D	15s	0～9999	

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	[Bus charge delay]			
	1-I.C.D [1-Incoming charge delay]	15s	0～9999	
	2-I.C.D [2-Incoming charge delay]	15s	0～9999	
	1-In.T.D. [1-Incoming Trip delay]	2s	0～9999	
	2-In.T.D. [2-Incoming Trip delay]	2s	0～9999	
	Bus.T.D. [Bus Trip delay]	2s	0～9999	
	1-In.C.D. [1-Incoming Close delay]	2s	0～9999	
	2-In.C.D. [2-Incoming Close delay]	2s	0～9999	
	Bus.C.D. [Bus Close delay]	2s	0～9999	
	U. Less [Under Voltage threshold]	15V	0～200	
	U. Under [Under Voltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
	No current value	0.2A	0～100	[Less than I.None means

	I.None [No-Current]			that there is no current]
	U.None [No-Voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
3I>>> [50] [Instantaneous overcurrent]	E.3I>>>.U [Enable.3I>>> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	E.3I>>>.D[67N] [Enable.3I>>> .direction]	0	0～1	OFF;Line；Bus
	3I>>> [3I>>> value]	6A	0.04～100	
	3I>>>.T [3I>>> delay]	1s	0～99	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]	0	0～1	OFF；ON
	E.3I>>.U2	0	0～1	OFF;ON

	[Enable.3I>> .Composite Voltage]			[If enable 3I>>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	E.3I>>.D[67N] [Enable.3I>> .direction]	0	0～1	OFF;Line；Bus
	3I>> [3I>> value]	5A	0.04～100	
	3I>>.T [3I>> delay]	2s	0～99	
3I> [51] [Definite time overcurrent]	E.3I> [Enable.3I>]	0	0～1	OFF；ON
	E.3I>.U2 [Enable.3I> .Composite Voltage]	0	0～1	OFF；ON. [If enable 3I>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]

	E.3I>.D[67N] [Enable.3I> .direction]	0	0~1	OFF；Line；Bus
	3I> [3I> value]	5A	0.04~100	
	3I>.T [3I> delay]	5s	0~99	
Post-Accelerated Overcurrent	E. I>P [Enable post-accelerated overcurrent]	0	0~1	OFF；ON
	E. I>P.U [Enable I>P Composite Voltage]	0	0~1	OFF；ON [If enable I>P.U, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	I>P [Post-accelerated value]	4A	0.04~100	
	I>P.T [Post-accelerated delay]	1s	0~99	
I0>>> [50N] [Instantaneous ground fault overcurrent]	E. I0>>> [Enable I0>>>]	0	0~2	OFF；Alarm；Trip
	I0>>>D[67N] [Enable.I0>>> .direction]	0	0~2	OFF;Line;Bus
	10 segments of fixed value	5A	0.04~100	

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	I0>>> [I0>>> value]			
	I0>>>.T [I0>>> delay]	5s	0~99	
	I0>>>.3U0 [I0>>>.self-produced U0]	2V	0~200	
I0>> [51N] [Time limited ground fault overcurrent]	E. I0>> [Enable I0>>]	0	0~2	OFF；Alarm；Trip
	E. I0>>D[67N] [Enable.I0>>> .direction]	0	0~2	OFF;Line;Bus
	I0>> [I0>> value]	5A	0.04~100	
	I0>>.T [I0>> delay]	5s	0~99	
	I0>>.3U0 [I0>>.self-produced U0]	2V	0~200	
I0 Post-Accelerated Overcurrent	E. I0>P [Enable I0 post-accelerated overcurrent]	0	0~1	OFF；ON
	I0>P [I0 Post-accelerated value]	5A	0~100	
	I0>P.T [I0 Post accelerated delay]	5s	0~99	
Bus Charging	E. B.Cha.	0	0~1	OFF；ON

Protection	[Enable Bus Charging Protection]			
	B. Cha. [Bus Charging value]	5A	0～100	
	Cha.Ac.T [Bus Charging action time]	3s	0～60	
	B. Cha.T [Bus Chaeging delay]	5s	0～60	
I>.Inv [51] [Inverse time overcurrent (IDMT)]	E. I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	E. I>.Inv.U2 [Enable I>Inverse Composite Voltage]	0	0～1	OFF；ON [If enable I>.Inv.U, composite voltage conditions should be considered for overcurrent protection.When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	I>.Inv [Inverse current]	5A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.5s	0.1～100	
	I>.Inv.X [Inverse curves]	0	0～2	S1;S2;S3
reclosing	Reclosing gate retreat	0	0～1	exit; invest

[79] Auto-Recloser function	E.Reclose [Enable Auto-Reclose]			OFF；ON
	Reclose.T [Auto-Reclose delay]	5s	0～9999.999	
	Reclose.X [Auto-reclose Mode]	0	0～1	Not Check;Check
	Rec.C.T [Auto-reclose charge delay]	15s	0～9999.999	
	RecC.RT [Auto-reclose charge return time]	15s	0～9999.999	
	E. nonP. [Enable non-position auto-reclose]	0	0～1	OFF；ON
I>Lo.T [49F] [Overload Trip]	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Enable Overload Trip value]	5A	0～100	
	I>Lo.T.T [Enable Overload Trip delay]	5s	0～99	
I>Lo.A [49F] [Overload Alarm]	E.I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Enable Overload Alarm value]	5A	0～100	
	Overload alarm delay	5s	0～99	

	I>Lo.A.T [Enable Overload Alarm delay]			
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	5s	0～999	
Bus PT supervision	E.BPtBr.A [Enable Bus PT Break]	0	0～1	OFF；ON
	BPtBr.T [Bus PT Break delay]	5s	0～999	
	E.EMC.B [Enable EMC Block]	1	0～1	OFF；ON
	Default.T [Default Time]	0s	0～60	
	Acci.S.T [Accident signal delay]	0.3s	0～999	
[25] Synchro-Check	E.SameP. [Enable Synchro-Check]	0	0～1	OFF；ON
	SameP.StaT [Synchro-Check Stabilization delay]	0.2s	0～999.999	
	SameP.Type [Synchro-Check type]	1	0～1	Dif.Fr；Same.Fr

	Sy.CH [System Channel]	13	0～14	
	SyPr.U [System Side Primary Voltage]	10kV	0～9999	
	SyPT.Pr [System Side PT Primary Voltage]	10kV	0～9999	
	SyPT.Se [System Side PT Secondary Voltage]	100V	0～9999	
	Gr.C.CH [Generator voltage Channel]	14	0～14	
	GrC.PriU [Generator Primary voltage]	10kV	0～9999	
	GrC.PTPr [Generator PT Primary Voltage]	10kV	0～9999	
	GrC.PTSe [Generator PT Secondary Voltage]	100V	0～9999	
	Po.U.Dif% [Poaitive voltage difference allowed]	5%	0～30	
	Ne.U.Dif% [Negative voltage difference	5%	0～30	

	allowed]			
	Rated Fr [Rated Frequency]	50Hz	40～70	
	Sy.Fr.Di [System Frequency difference]	0.1Hz	0～5	
	GrC.FrDi [Generator Frequency difference]	0.1Hz	0～5	
	Po.Fr.Di [Positive Frequency difference allowed]	0.1Hz	0～5	
	Ne.Fr.Di [Negative Frequency diffrence allowed]	0.1Hz	0～5	
	Fr.Dif.A [Frequency difference accelation allowed]	1Hz/s	0～10	
	SaFr.PhD [Same Frequency Phase Angle difference]	5°	0～60	
	DiFr.PhD [Difference Frequency Phase Angle difference]	5°	0～60	
	Sys.Ph.C [System Phase Angle Compensation]	0°	0～330	

	SameP.Le.T [Synchronism Lead Time]	0.1s	0.02～999	
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～ 1	CT same;CT diff. [protective CT is different from zero sequence CT]； [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-C Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	300	0.1～9999	

	PT	100	0.1～9999	
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U Unit [Primary voltage display]	0	0～1	kV；V
3I>>> [50] [Instantaneous overcurrent]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	3I>>> [3I>>> value]	30A	0.04～100	
	3I>>>.T [3I>>> delay]	0s	0～60	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]	0	0～1	OFF；ON
	3I>> [3I>> value]	2A	0.04～100	
	3I>>.T [3I>> delay]	2s	0～60	
I>Inv. [51] [Inverse time overcurrent (IDMT)]	E. I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	I>.Inv [Inverse starting current]	6A	0.04～100	

	I>.Inv.K [Inverse time coefficient]	0.5s	0〜100	
	I>.Inv.X [Inverse curves type]	0	0〜2	NI；VI；EI
I0>>> [50N] [Instantaneous ground fault overcurrent]	E. I0>>> [Enable I0>>>]	0	0〜1	OFF；ON
	I0>>> [I0>>> value]	10A	0.04〜100	
	I0>>>T [I0>>> delay]	5s	0〜60	
I0>> [51N] [Time limited ground fault overcurrent]	I0>> [Enable I0>>]	0	0〜2	OFF；Alarm；Trip
	I0>> [I0>> value]	9A	0.04〜100	
	I0>>T [I0>> delay]	10s	0〜60	
[27] Undervoltage Protection	E.LVP [Enable Undervoltage]	0	0〜2	OFF；Alarm；Trip
	E.LVP.NI.B [Enable Undervoltage　none current block]	0	0〜1	OFF；ON
	E.LVP.I.B [Enable Undervoltage　current block]	0	0〜1	OFF；ON
	U. LVP [Undervoltage value]	70V	0〜200	

	LVP.T [Undervoltage delay]	5s	0～999	
	E. PT.B [Enable PT break block]	1	0～1	OFF；ON
	E.CB.On.B [Enable circuit breaker on block]	0	0～1	OFF；ON
	E. LVTHr. [Enable Undervoltage threshold]	1	0～1	OFF；ON
PT supervision[60]	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	PtBr.T [PT Break delay]	10s	0～999	
	U.None [No-voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	I.None [No-current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	U2.Pt [Negative sequence voltage]	35V	0～200	
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	

	E.Non-el1 [Enable Non-Electricity1]	0	0～1	OFF；ON
Non-Electricity1 Protection	Non-el1.T [Non-Electricity1 delay]	5s	0～60	
Non-Electricity2 Protection	E. Non-el2 [Enable Non-Electricity2]	0	0～1	OFF；ON
	Non-el2.T [Non-Electricity2 delay]	5s	0～999	
Non-Electricity3 Protection	E.Non-el3 [Enable Non-Electricity3]	0	0～1	OFF；ON
	Non-el3.T [Non-Electricity3. delay]	5s	0～999	
OVP [59] [Overvoltage Protection]	E.OVP [Enable Overvoltage]	0	0～2	OFF；Alarm；Trip
	U.OVP [Overvoltage value]	120V	0～200	
	OVP.T [Overvoltage delay]	5s	0～999	
U0.OVP [59N] [Residual over voltage]	U4 Type	0	0～2	U0；self-produced 3U0； Unbalance voltage
	E.U0.OVP [Enable Residual over voltage protection]	0	0～1	OFF；ON

	U0.OVP [Residual over voltage value]	120V	0～200	
	U0.OVP.T [Residual over voltage protection delay]	10s	0～999	
Unbalance Voltage Protection	E.Unb.V [Enable Unbalance　voltage]	0	0～1	OFF；ON
	Unb.V [Unbalance voltage value]	5V	0～200	
	Unb.V.T [Unbalance Voltage delay]	0.03s	0～100	
Unb.I [51C] [Capacitor bank unbalance Protection]	E.Unb.I [Enable Unbalance Current]	0	0～1	OFF；ON
	Unb.I [Unbalance Current value]	5A	0.04～100	
	Unb.I.T [Unbalance Current delay]	5s	0～60	
	Acci.S.T [Accident Signal delay]	0.3s	0.01～60	
	E.EMC.B [Enable EMC block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Circuit breaker operating time	0.3s	0～999	

	Cir.Br.T [Circuit Breaker trip and close time]			
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
I>Lo.A [49] [Overload Alarm]	E.I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Overload Alarm value]	6A	0.04～100	
	I>Lo.A.T [Overload Alarm delay]	5s	0～999	
I>Lo.T [49] [Overload Trip]	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Overload Trip value]	7A	0.04～100	
	I>Lo.T.T [Overload Trip delay]	10s	0～60	
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.I.N	0.125A	0.04～100	

	[CT Break No-Current]			
	CTBr.I.S [CT Break Current setting]	0.2A	0.04～100	
	CTBr.T [CT Break Alarm time]	5s	0～999	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～ 1	[protective CT is different from zero sequence CT] ; [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-MD Setting				
Protection Name	Value Name	Default	Range	Remark
	[Rated Metor secondary current]	1A	0.04～120	
	Motor rated starting time Te	5s	0～100000	

	Te [Rated Metor starting time]			
	PT mode [Voltage measurement mode]	0	0～1	3PT；2PT
	Ue1 [Rated primary value]	110kV	0～100000	
	Ue [Rated secondary value]	0.1kV	0～10000	
	Ie1.H [Head CT rated primary current]	100A	0～100000	
	Ie.H [Head CT rated secondary current]	5A	1～100	
	Ie1.L [Tail CT rated primary current]	100A	0～100000	
	Ie.L [Tail CT rated secondary current]	5A	1～100	
	I0 Source	1	0～1	I0；self-produced
	U0 Source	1	0～1	U0；self-produced
	U.None [No-Voltage]	15V	0～200	
	No current value	0.2A	0.04～100	

	I.None [No-Current]			
[87M] Instantaneous Differential	E.Ins.Dif [Enable Instantaneous Differential]	0	0～1	OFF；ON
	Ins.Dif [Instantaneous Differential value]	8* I_e	0.05* I_e ～100* I_e	
[87M] Differential protection with ratio restraining	E.Dif.P.R [Enable Differential protection with ratio restraining]	0	0～1	OFF；ON
	Dif.P.R [Differential protection with ratio restraining value]	0.5* I_e	0.05* I_e ～100* I_e	
	SHD [Differential Current Coefficient of secondary harmonics]	0.15	0.001～2	
	Dif.I.OT [Differential current over limited delay]	10s	0～999	
[60] [CT supervision]	E.CTBr.B.Dif.R [Enable CT Break Block Differential protection]	1	0～1	OFF；ON
	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON

	CTBr.T [CT Break Alarm time]	0.5s	0～999	
	E.Ba.B [Enable Emergency variable Block]	1	0～1	OFF；ON
	E.S.Sta. [Enable self-start criterion]	0	0～1	OFF；ON
3I>>>.S [50] [Instantaneous Overcurrent of Starting]	E.3I>>>.S [Enable.3I>>> of Starting]	0	0～1	OFF；ON
	3I>>>.S [3I>>> value of starting]	10A	0.04～100	
	3I>>>.Ts [3I>>>.start delay]	0s	0～999	
3I>>>.R [50] [Instantaneous Overcurrent of Running]	E.3I>>>.R [3I>>> value of Running]	0	0～1	OFF；ON
	3I>>>.R [3I>>> value of running]	10A	0.04～100	
	3I>>>.Tr [3I>>>.Running delay]	0s	0～999	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]	0	0～1	OFF；ON
	3I>> [3I>> value]	10A	0.04～100	
	3I>>.T	0.1s	0～999	

	[3I>> delay]			
I>Inv. [51] [Inverse time overcurrent (IDMT)]	E.I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	I>.Inv [Inverse current]	1A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.1s	0～999	
	I>.Inv.X [Inverse curves]	0	0～2	NI；VI；EI
I0>>> [50N] [Instantaneous ground fault overcurrent]	E.I0>>> [Enable I0>>>]	0	0～1	OFF；ON
	I0>>> [I0>>> value]	10A	0.04～100	
	I0>>>T [I0>>> delay]	0.1s	0～999	
I0>> [50N] [Time limited ground fault overcurrent]	E. I0>> [Enable I0>>]	0	0～1	OFF；ON
	I0>> [I0>> value]	2A	0.04～100	
	I0>>T [I0>> delay]	0.5s	0～999	
I0.Inv [51N] [Inverse time ground fault]	E. I0.Inv [Enable I0.Inv]	0	0～1	OFF；ON
	I0.Inv [I0.Inv starting value]	1A	0.04～100	
	I0.Inv.K [I0.Inv time coefficient]	0.1s	0～999	
	I0.Inv.X [I0.Inv curves type]	0	0～2	NI；VI；EI

I2>>> [46] [Negative sequence instantaneous overcurrent]	E. I2>>> [Enable I2>>>]	0	0~1	OFF；ON
	I2>>> [I2>>> value]	10A	0.04~100	
	I2>>>.T [I2>>> delay]	0.1s	0~999	
I2>> [46] [Negative sequence time-limited overcurrent]	E. I2>> [Enable I2>>]	0	0~1	OFF；ON
	I2>> [I2>> value]	2A	0.04~100	
	I2>>.T [I2>> delay]	0.5s	0~999	
I2.Inv.Tr [46] [Negative sequence inverse overcurrent(IDMT)]	E. I2>Inv [Enable I2>Inverse]	0	0~1	OFF；ON
	I2>Inv [I2>Inverse value]	1A	0.04~100	
	I2>Inv.K [I2>Inverse. time coefficient]	0.1s	0~999	
	I2>Inv.X [I2>Inverse curves]	0	0~2	NI；VI；EI
[49] Overload	E.I>Lo [Enable Overload]	0	0~2	OFF;Alarm;Trip
	I>Lo [Overload value]	10A	0.04~100	
	I>Lo.T [Overload delay]	5s	0~999	
Stall protection	Jam protection surrender	0	0~1	exit; invest

[51LR] Locked rotor	E.Stall [Enable locked rotor]			OFF；ON
	Stall.I [Locked rotor Current value]	10A	0.04～100	
	Stall.T [Locked rotor delay]	1s	0～999	
[49M] Thermal overload	HeatPro.K [Thermal overload coefficient]	60s	0～999	
	E.OverHeat.A [Enable Thermal overload Alarm]	0	0～1	OFF；ON
	OverHeat.A [Thermal overload　Alarm value]	70%	0～200	
	E.OverHeat.T [Enable Thermal overload Trip]	0	0～1	OFF；ON
	OverHeat.T [Thermal overload Trip value]	100%	0～200	
HeatRestart Block	E.HeatRe [Enable HeatRestart Block]	0	0～1	OFF；ON
	HeatRe [Heat Restart value]	80%	0～200	
StartOutTime [66]	E.SoutT [Enable Start out time]	0	0～1	OFF；ON

[Motor Start time supervision]	SoutT [Startout time delay]	1.125	0～200	
Unb.I [60] [Unbalance Current Protection]	E.Unb.I [Enable Unbalance Current]	0	0～2	OFF；Alarm;Trip
	Unb.I [Unbalance Current value]	15%	0～200	
	Unb.I.T [Unbalance Current delay]	5s	0～999	
Unb.V [60] [Unbalance Voltage Protection]	E.Unb.V [Enable Unbalance voltage]	0	0～2	OFF；Alarm;Trip
	Unb.V [Unbalance voltage value]	15%	0～200	
	Unb.V.T [Unbalance Voltage delay]	5s	0～999	
Incorrect Phase Protection	E.Ph.Se. [Enable Staggered Phase]	0	0～2	OFF；Alarm;Trip
	Ph.Se.T [Staggered Phase delay]	0.1s	0～999	
	U2 Ratio [Negative voltage Ratio]	50%	0～200	
	U1 Ratio [Positive voltage Ratio]	30%	0～200	

	LiV.HSet [Line voltage high setting]	120V	0～200	
	LiV.LSet [Line voltage low setting]	70V	0～200	
Voltage Phase Break Protection	E.Ph.Br [Enable Voltage Phase Break]	0	0～1	OFF；ON
	Ph.Br.T [Voltage Phase Break delay]	0.5s	0～200	
	Ph.BrUmax [Maximum Voltage of Phase Break]	50V	0～200	
	Ph.BrUmin [Minimum Voltage of Phase Break]	30V	0～200	
	Ph.BrU.Dif [Phase Break differential Voltage]	120V	0～200	
OVP [59] [Overvoltage Protection]	E.OVP [Enable Overvoltage]	0	0～2	OFF；Alarm;Trip
	U.OVP [Overvoltage value]	40V	0.04～200	
	OVP.T [Overvoltage delay]	5s	0～999	
U0.OVP	E.U0.OVP	0	0～2	OFF；Alarm;Trip

[59N] [Residual over voltage]	[Enable Residual over voltage protection]			
	U0.OVP [Residual over voltage value]	40V	0.04～200	
	U0.OVP.T [Residual over voltage protection delay]	5s	0～100000	
LVP [27] [Undervoltage Protection]	E.LVP [Enable Undervoltage]	0	0～2	OFF；Alarm；Trip
	LVP [Undervoltage value]	50V	1～200	
	LVP.T [Undervoltage delay]	5s	0～999	
Non-electricity1 Trip	E.Non-el1.T [Enable Non-electricity1 Trip]	0	0～1	OFF；ON
	Non-el1.T.T [Enable Non-electricity1 Trip delay]	0.1s	0～999	
Non-electricity1 Alarm	E.Non-el1.A [Enable Non-electricity1 Alarm]	0	0～1	OFF；ON
	Non-el1.A.T [Enable Non-electricity1 Alarm delay]	5s	0～999	
Non-electricity2 Trip	E.Non-el2.T	0	0～1	OFF；ON

	[Enable Non-electricity2 Trip]			
	Non-el2.T.T [Enable Non-electricity2 Trip delay]	0.1s	0～999	
Non-electricity2 Alarm	E.Non-el2.A [Enable Non-electricity2 Alarm]	0	0～1	OFF；ON
	Non-el2.A.T [Enable Non-electricity2 Alarm delay]	5s	0～999	
FC Block	E. FCBlock [Enable FC Block]	0	0～1	OFF；ON [When the fault current is greater than FCBlock.I, the relay's DO will be blocked,in order to ensure that the fuse is first blown.]
	FCBlock.I [FC Block current value]	70A	0.04～120	
	FCBlock.T [FC Block delay]	0s	0～60	
PT supervision[60]	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	U2.Pt [Negative sequence voltage]	30V	0～200	
	PtBr.T [PT Break delay]	0.5s	0～999	
Control failure alarm	Control failure alarm and retreat	0	0～1	exit; invest

Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]			OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	0.3s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0～999	
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	

NOV3S-D2 Setting				
Protected name	Constant value name	default value	scope	Remark

Protection Name	Value Name	Default	Range	Remark
	RL [Rated Load]	120MVA	1～3000.00	MVA
	I_PT	350	0.1～10000	
	I_Mode	0	0～1	Y；D
	II_Mode	11	1～12	
	I_Lead	0	0～1	No;Yes
	II_Lead	0	0～1	No;Yes
	I_Ue	35kV	0～1000	kV
	II_Ue	10kV	0～1000	kV
	I_CT Ie1 [I-CT Primary]	600A	0～99999	
	I_CT Ie [I-CT Secondary]	5A	0～10000	
	II_CT Ie1 [II-CT Primary]	1000A	0～99999	
	II_CT Ie [II-CT Secondary]	5A	0～10000	
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode	0	0～1	3CT；2CT

	[Current measurement mode]			
	U0 Source	1	0～1	U0;self-produced
	U. Less [Under Voltage threshold]	15V	0～200	Composite Voltage Criterion
	U.Under [Under Voltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
[87T] Instantaneous Differential protection	E.Ins.Dif [Enable Instantaneous Differential]	0	0～1	OFF；ON
	Ins.Dif [Instantaneous Differential value]	$8*I_e$	$0.05*I_e$ ～$100*I_e$	$I_e = I_{e_h}$
[87T] Differential protection with ratio restraining	E.Dif.P.R [Enable Differential protection with ratio restraining]	0	0～1	OFF；ON
	Dif.P.R [Differential protection with ratio restraining value]	$0.5*I_e$	$0.05*I_e$ ～$100*I_e$	$I_e = I_{e_h}$
	Dif.I.OT [Differential current over limit delay]	10s	0～999	
	Dif.S.T	20s	0～999	

	[Differential protection Start delay]			
	E.CTBr.B.Dif.R [Enable CT Break Block Differential protection]	1	0～1	OFF；ON
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.T [CT Break Alarm time]	0.5s	0～999	
FC Block	E. FCBlock [Enable FC Block]	0	0～1	OFF;ON [When the fault current is greater than FCBlock.I, the relay's DO will be blocked, in order to ensure that the fuse is first blown.]
	FCBlock.I [FC Block current value]	70A	0～100	
	FCBlock.T [FC Block delay]	0s	0～999	
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	0.3s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0～999	
	CB Po.Ac	1	0～1	Auxiliary.C;CB M.

	[Circuit Breaker position Collection]			[Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	

NOV3S-TB Setting				
Protection Name	Value Name	Default	Range	Remark
	PT	100	0.1～10000	
	CT	50	0.1～10000	
	U Unit [Primary voltage display]	0	0～1	kV;V
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT

	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U0 Source	1	0～1	U0;3U0 U0;self-produced
	U.Less [Under Voltage threshold]	15V	0～200	Composite Voltage Criterion
	U.Under [Under Voltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
Starting air-cooled water chiller	E.S.Air.C [Enable Start Air-Cooled]	0	0～1	OFF；ON
	S.Air.C [Start Air-Cooled value]	2A	0.04～120	
	S.Air.C.T [Start Air-Cooled delay]	2s	0～999	
On-load tap charge lock-out	E.Vol.Re.B [Enable On-load tap charge lock-out]	0	0～1	OFF；ON
	Vol.Re.B [On-load tap charge lock-out value]	3A	0.04～120	
	Vol.Re.B.T [On-load tap charge lock-out	2s	0～999	

	delay]			
3I>>> [50] [Instantaneous overcurrent]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	3I>>> [3I>>> value]	10A	0.04～120	
	E.3I>>>.U2 [Enable.3I>>> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	E.3I>>>.D[67] [Enable.3I>>> .direction]	0	0～2	OFF；Line；Bus
	3I>>>.T [3I>>> delay]	0s	0～999	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>]	0	0～1	OFF；ON
	3I>> [3I>> value]	10A	0.04～120	
	E.3I>>.U2 [Enable.3I>> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>>.U2, composite voltage conditions should be considered for overcurrent

				protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	E.3I>>.D[67] [Enable.3I>> .direction]	0	0～2	OFF；Line；Bus
	3I>>.T [3I>> delay]	0.1s	0～999	
3I> [51] [Definite time overcurrent]	E.3I> [Enable.3I>]	0	0～1	OFF；ON
	3I> [3I> value]	10A	0.04～120	
	E.3I>.U2 [Enable.3I> .Composite Voltage]	0	0～1	OFF；ON [If enable 3I>.U2, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	E.3I>.D[67] [Enable.3I>.direction]	0	0～2	OFF；Line；Bus
	3I>.T [3I> delay]	0.5s	0～999	

I>Inv. [51] [Inverse time overcurrent (IDMT)]	E.I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	E.I>.Inv.U [Enable.I>Inv. composite voltage]	0	0～1	OFF；ON [If enable I>.Inv, composite voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less or the negative voltage greater than U2 the overcurrent protection DO is prepare work.]
	I>.Inv [Inverse current]	1A	0.04～120	
	I>.Inv.K [Inverse time coefficient]	0.1s	0～999	
	I>.Inv.X [Inverse curves]	0	0～2	NI；VI；EI
I0>>> [50N] [Instantaneous ground fault overcurrent]	E.I0>>> [Enable I0>>>]	0	0～1	OFF；ON
	I0>>> [I0>>> value]	10A	0.04～120	
	I0>>>T [I0>>> delay]	0.1s	0～999	
I0>> [51N] [Time limited ground fault overcurrent]	I0>> [Enable I0>>]	0	0～2	OFF；Alarm；Trip
	I0>> [I0>> value]	2A	0.04～120	
	I0>>T	0.5s	0～999	

	[I0>> delay]			
I0.Inv [51N] [Inverse time ground fault]	E.I0.Inv [Enable I0.Inverse]	0	0～1	OFF；ON
	I0.Inv [I0.Inv starting value]	1A	0.04～120	
	I0.Inv.K [I0 Inverse coefficient]	0.1s	0～999	
	I0.Inv.X [I0 Inverse curves]	0	0～2	NI；VI；EI
I>Lo.A [49F] [Overload Alarm]	E.I>Lo.A [Enable Overload Alarm]	0	0～1	OFF；ON
	I>Lo.A [Overload Alarm value]	10A	0.04～120	
	I>Lo.A.T [Overload Alarm delay]	5s	0～999	
I>Lo.T [49F] [Overload Trip]	E.I>Lo.T [Enable Overload Trip]	0	0～1	OFF；ON
	I>Lo.T [Overload Trip value]	10A	0.04～120	
	I>Lo.T.T [Overload Trip delay]	1s	0～999	
Light Gas Alarm	E.LGas.A [Enable Light Gas Alarm]	0	0～1	OFF；ON
	LGas.T [Light Gas Alarm delay]	5s	0～999	

Heavy Gas trip	E.SGas.T [Enable Heavy Gas Trip]	0	0～1	OFF；ON
	SGas.T [Heavy Gas delay]	0s	0～999	
Pressure Release	E. Pre.Re [Enable Pressure Release]	0	0～1	OFF；ON
	Pre.Re.T [Pressure Release delay]	5s	0～999	
High Temperation Alarm	E.OTem.A [Enable High Temperation Alarm]	0	0～1	OFF；ON
	OTem.T [High Temperation Alarm delay]	5s	0～999	
Over Temperation Trip	E.HTem.T [Enable Over Temperation Trip]	0	0～1	OFF；ON
	HTem.T [Over Temperation Trip delay]	0s	0～999	
Switch Gas Trip	E.S.G.T [Enable Switch Gas Trip]	0	0～1	OFF；ON
	S.G.T.T [Switch Gas Trip delay]	5s	0～999	
Overload alarm delay	Switch gas alarm and retreat	0	0～1	exit; invest

Switch Gas Alarm	E.S.G.A [Enable Switch Gas Alarm]			OFF；ON
	S.G.A.T [Switch Gas Alarm delay]	5s	0～999	
Body High Oil	E.B.H [Enable Body High Oil]	0	0～2	OFF；Alarm；Trip
	本体油位高延时 B.H.T [Body High Oil delay]	5s	0～999	
[50N] Clearance Instantaneous earth fault protection	E. C.I0>>> [Enable Clearance I0>>>]	0	0～1	OFF；ON
	C.I0>>> [Clearance I0>>> value]	10A	0.04～120	
	C.I0>>>.T [Clearance I0>>> delay]	0.1s	0～999	
[50N] Clearance Time-limited earth fault protection	E.C.I0>> [Enable Clearance I0>>]	0	0～2	OFF；Alarm；Trip
	C.I0>> [Clearance I0>> value]	10A	0.04～120	
	C.I0>>.T [Clearance I0>>> delay]	0.1s	0～999	
[50N] Self-produced Instantaneous earth fault protection	E.3I0>>> [Enable 3I0>>>]	0	0～1	OFF；ON
	E.3I0>>>D[67N] [Enable 3I0>>>.direction]	0	0～2	OFF；Line；Bus

	3I0>>> [3I0>>> value]	10A	0.04～120	
	3U01	5V	0～200	
	3I0>>>.T [3I0>>> delay]	0.1s	0～999	
[50N] Self-produced Time-limited earth fault protection	E.3I0>> [Enable 3I0>>]	0	0～2	OFF；Alarm；Trip
	E.3I0>>D[67N] [Enable 3I0>>.direction]	0	0～2	OFF；Line；Bus
	3I0>> [3I0>> value]	10A	0.04～120	
	3U02	5V	0～200	
	3I0>>.T [3I0>> delay]	0.1s	0～999	
U0.OVP.T [59N] [Residual over voltage Trip]	E.U0.OVP [Enable Residual over voltage trip]	0	0～1	OFF；ON
	U0.OVP [Residual over voltage trip value]	5V	0～200	
	U0.OVP.T [Residual over voltage trip delay]	5s	0～999	
Zero sequence overvoltage alarm	Zero-sequence overvoltage stage 2 alarm aborts	0	0～1	exit; invest

U0.OVP.A [59N] [Residual Over Voltage Alarm]	E.U0.OVP.A [Enable U0.OVP alarm]			OFF；ON
	U0.OVP.A [Residual over voltage alarm value]	5V	0～200	
	U0.OVP.A.T [Residual over voltage alarm delay]	5s	0～999	
PT supervision[60]	E.PtBr.A [Enable PT break alarm]	0	0～1	OFF；ON
	U2.Pt [PT break negative sequence voltage]	35V	0～200	
	U.None [No-Voltage]	10V	0～200	
	I.None [No-Current]	0.2A	0.04～100	
	PtBr.T [PT break alarm delay]	5s	0～999	
FC Block	E.FCBlock [Enable FC Block]	0	0～1	OFF；ON
	FCB.I [FC Block current value]	10A	0～120	
	FCB.T [FC Block delay]	0s	0～999	
Control failure alarm	E.CB.A	0	0～1	exit; invest

Trip and close circuit supervision	[Enable Trip and close circuit supervision alarm]			OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	0.3s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0～999	
	E.EMC.B [Enable EMC Block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
BCD DI Configure	DI.Conf.1 [DI configuration 1]	0	0～1	OFF；ON
	DI.Conf.2 [DI configuration 2]	0	0～1	OFF；ON
	DI.Conf.3 [DI configuration 3]	0	0～1	OFF；ON
	Remote.P.W [Remote Pulse Width]	2000ms	0～999999999	
	Remote.M.P.W [Remote adjustment Pulse Width]	3000ms	0～999999999	

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Body Low Oil	E.B.L.T [Enable Body Low Oil]	0	0～1	OFF；Alarm；Trip
	B.L.T.T [Body Low Oil delay]	5s	0～999	
Switch High Oil	E.S.H.T [Enable Switch High Oil]	0	0～1	OFF；Alarm；Trip
	S.H.T.T [Switch High Oil delay]	5s	0～999	
Switch Low Oil	E.S.L.T [Enable Switch Low Oil]	0	0～1	OFF；Alarm；Trip
	S.L.T.T [Switch Low Oil delay]	5s	0～999	
Over Haul-lockout	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Tripping pulse	0.3s	0～1	
	I0 P 2CT [I0 participate in 2CT calculation]	0	0～1	CT D.R；CT S.R [protective CT is different from zero sequence CT] ; [protective CT is same as zero sequence CT] [When there are 2CT, wheather zero sequence current is involved in the calculation of Ib.]

NOV3S-UB Setting				
Protection Name	Value Name	Default	Range	Remark
	Cabinet No.	0	0～1	I_PT；II_PT
	PT	100	0.1～10000	
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	U0 Source	1	0～1	U0；self-produced
	U. Less [Under Voltage threshold]	15V	0～200	Composite Voltage Criterion
	U. Under [Under Voltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
	I_PT.T [Put I_PT.delay]	5s	0～999	
	II_PT.T [Put II_PT.delay]	5s	0～999	
	J.B.W.T [Enable Judge Bus Work Position]	0	0～1	OFF；ON
	E.PTAu.P	0	0～1	OFF；ON

	[Enable PT Auto Parallel]			
	PTAu.P.T [PT Auto Parallel delay]	0s	0~999	
	E.PTRe.P [Enable PT Remote Parallel]	0	0~1	OFF；ON
	Re.P.RT [Remote Put Reset delay]	5s	0~999	
	Re.S.RT [Remote Split Reset delay]	10s	0~999	
LVP.A [27] [I_Bus Undervoltage Alarm]	E.1#LVPA [Enable 1#Undervoltage Alarm]	0	0~1	OFF；ON
	1#LVPA [1#Undervoltage Alarm value]	70V	0~200	
	1#LVPA.T [1#Undervoltage Alarm delay]	5s	0~999	
[59] [I_Bus Overvoltage Protection Alarm]	E.1#OVP.A [Enable 1#Overvoltage Alarm]	0	0~1	OFF；ON
	1#OVP.A [1#Overvoltage Alarm value]	70V	0~200	
	1#OVPA.T [1#Overvoltage Alarm delay]	5s	0~999	

	E.1#PtBr.A [Enable 1#PT Break Alarm]	0	0～1	OFF；ON
[I_Bus PT supervision]	1#PtBr.U [1#PT Break Alarm value]	16V	0～200	
	1#PT Break negative voltage value	35V	0～200	
	1#PtBr.T [1#PT Break delay]	5s	0～999	
[59N] [I_BUS Residual Overvoltage Alarm]	E.1#U0.OVP [Enable #1Residual Overvoltage]	0	0～1	OFF；ON
	1#U0.OVP [#1Residual Overvoltage value]	5V	0～200	
	1#UO.OVP.T [#1Residual Overvoltage delay]	5s	0～999	
LVP.A [27] [II_Bus Undervoltage Alarm]	E.2#LVPA [Enable 2#Undervoltage Alarm]	0	0～1	OFF；ON
	2#LVP.A [2#Undervoltage Alarm value]	70V	0～200	
	2#LVPA.T [2#Undervoltage Alarm	5s	0～999	

	delay]			
[59] [II_Bus Overvoltage Alarm]	E.2#OVPA [Enable 2#Overvoltage Alarm]	0	0～1	OFF；ON
	2#OVPA [2#Overvoltage value]	70V	0～200	
	2#OVPA.T [2#Overvoltage Alarm delay]	5s	0～999	
[II_Bus PT supervision]	E.2#PtBr.A [Enable 2#PT Break Alarm]	0	0～1	OFF；ON
	2#PtBr.U [2#PT Break Alarm value]	16V	0～200	
	2#PT Break negative voltage value	35V	0～200	
	2#PtBr.T [2#PT Break delay]	5s	0～999	
[59N] [II_U0 Overvoltage Protection Alarm]	E.2#U0.OVP [Enable #2 Residual Overvoltage]	0	0～1	OFF；ON
	2#U0.OVP [#2 Residual Overvoltage value]	5V	0～200	
	2#UO.OVP.T [#2 Residual Overvoltage delay]	5s	0～999	

	R.Pul.W [Relay Pulse width]	0.3s	0.1～999	
Ⅰ_Resonance elimination	E.1#RE [Enable 1#Resonance elimination]	0	0～1	OFF；ON
	1#U0.Fr. [1# Residual voltage Frequency value]	25V	5～70	
	1#R.S.U [1#Resonance Start voltage]	30V	0～200	
	1#R.A.T [1#Resonance Action delay]	0.1s	0～999	
	1#F.Fr.U [1#Fundamental Frequency voltage]	125V	0～200	
	1#1/3FrU [1# 1/3 Frequency voltage]	30V	0～200	
	1#1/2FrU [1# 1/2 Frequency voltage]	30V	0～200	
	1#3Fr.U [1# 3 Frequency voltage]	30V	0～200	
	1#SG.U.L [1#Single-phase ground under voltage]	40V	0～200	
	1# single phase grounding high setting value	120V	0～200	

	1#SG.U.U [1#Single-phase ground high voltage]			
II_Resonance elimination	E.2#RE [Enable 2#Resonance elimination]	0	0～1	OFF；ON
	2#U0.Fr. [2# Residual voltage Frequency value]	25V	5～70	
	2#R.S.U [2#Resonance Start voltage]	30V	0～200	
	2#R.A.T [2#Resonance Action delay]	0.1s	0～999	
	2#F.Fr.U [2#Fundamental Frequency voltage]	125V	0～200	
	2#1/3FrU [2# 1/3 Frequency voltage]	30V	0～200	
	2#1/2FrU [2# 1/2 Frequency voltage]	30V	0～200	
	2#3Fr.U [2# 3 Frequency voltage]	30V	0～200	
	2#SG.U.L [2#Single-phase ground low voltage]	40V	0～200	
	2# single phase grounding high setting value	120V	0～200	

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	2#SG.U.U [2#Single-phase ground high voltage]			

NOV3S-D3 Setting				
Protection Name	Value Name	Default	Range	Remark
	RL [Rated Load]	120MVA	1～3000.00	MVA
	I_PT	100	0.1～10000	
	I_Mode	0	0～1	Y；D
	II_Mode	11	1～12	
	III_Mode	11	1～12	
	I_Lead	0	0～1	NO;Yes
	II_Lead	0	0～1	NO;Yes
	III_Lead	0	0～1	NO;Yes
	I_Ue	110kV	0～1000	kV
	II_Ue	35kV	0～1000	kV
	III_Ue	10kV	0～1000	kV
	I_CT Ie1 [I-CT Primary]	600A	0～100000	
	I side CT secondary value	5A	0～120	

	I_CT Ie [I-CT Secondary]			
	II_CT Ie1 [II-CT Primary]	1000A	0～100000	
	II_CT Ie [II-CT Secondary]	5A	0～120	
	III_CT Ie1 [III-CT Primary]	2000A	0～100000	
	III_CT Ie [III-CT Secondary]	5A	0～120	
	PT mode [Voltage measurement mode]	0	0～1	3PT；2PT
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U0 Source	1	0～1	U0;self-produced
	U. Less [Undervoltage threshold]	15V	0～200	Composite Voltage Criterion
	U. Under [Undervoltage value]	70V	0～200	
	U2 [Negative voltage value]	35V	0～200	
[87T] Instantaneous Differential protection	E.Ins.Dif [Enable Instantaneous Differential]	0	0～1	OFF；ON

	Ins.Dif [Instantaneous Differential value]	$8* I_e$	$0.05* I_e \sim 120* I_e$	$I_e = I_{e_h}$
[87T] Differential protection with ratio restraining	E.Dif.P.R [Enable Differential protection with ratio restraining]	0	$0 \sim 1$	OFF；ON
	Dif.P.R [Differential protection with ratio restraining value]	$0.5* I_e$	$0.05* I_e \sim 120* I_e$	$I_e = I_{e_h}$
	Dif.I.OT [Differential current over limit delay]	10s	$0 \sim 100000$	
	Dif.S.T [[Differential protection Start delay]]	20s	$0 \sim 100000$	
	E.CTBr.B.Dif.R [Enable CT Break Block Differential protection]	1	$0 \sim 1$	OFF；ON
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	$0 \sim 1$	OFF；ON
	CTBr.T [CT Break Alarm time]	0.5s	$0 \sim 100000$	
FC Block	E.FCBlock [Enable FC Block]	0	$0 \sim 1$	OFF；ON
	FCB.I	70A	$0 \sim 120$	

	[FC Block current value]			
	FCB.T [FC Block delay]	0s	0～100000	
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	0.3s	0～100000	
	Acci.S.T [Accident Signal delay]	0.3s	0～999	
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker trip and close time]	0.3s	0～999	
	Tripping pulse	0.3s	0～1	

NOV3S-IS Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	10	0.1～9999	
	PT	100	0.1～9999	

	U Unit [Primary voltage display]	0	0～1	kV;V
	B.PT Mode [Bus voltage Mode]	0	0～1	3PT；2PT
	In.PT Mode [Incoming voltage Mode]	0	0～1	3PT；2PT
	P.CT Mode [Protective CT Mode]	0	0～1	3CT；2CT
	M.CT Mode [Measurment CT Mode]	0	0～1	3CT；2CT
	U.Less [Under Voltage threshold]	15V	0～200	
	U.Under [Under Voltage value]	70V	0～500	
3I>>> [50] [Instantaneous overcurrent]	E.3I>>> [Enable.3I>>>]	0	0～1	OFF；ON
	E.3I>>>.D[67] [Enable.3I>>> .direction]	0	0～2	OFF；Line；Bus
	E.3I>>>.U [Enable.3I>>> .Voltage]	0	0～1	OFF；ON [If enable 3I>>>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less

				than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	3I>>> [3I>>> value]	10A	0.04～100	
	3I>>>.T [3I>>> delay]	0s	0～60	
3I>> [51] [Time-limited overcurrent]	E.3I>> [Enable.3I>>.]	0	0～1	OFF；ON
	E.3I>>.D[67] [Enable.3I>> .direction]	0	0～2	OFF；Line；Bus
	E.3I>>.U [Enable.3I>> .Voltage]	0	0～1	OFF；ON [If enable 3I>>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	3I>> [3I>> value]	7.5A	0.04～100	
	3I>>.T [3I>> delay]	0.2s	0～60	
Three stages of overcurrent	Three-stage surrender due to overcurrent	0	0～1	exit; invest

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3I> [51] [Definite time overcurrent]	E.3I> [Enable.3I>]			OFF；ON
	E.3I>.D[67] [Enable.3I> .direction]	0	0～2	OFF；Line；Bus
	E.3I>.U [Enable.3I> .Voltage]	0	0～1	OFF；ON [If enable 3I>.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than U.Less, the overcurrent protection DO is prepare work.]
	3I> [3I> value]	7A	0.04～100	
	3I>.T [3I> delay]	0.5s	0～60	
I>Inv [51] [Inverse time overcurrent (IDMT)]	E. I>.Inv [Enable I> Inverse]	0	0～1	OFF；ON
	E.I>.Inv.U [Enable I>Inverse voltage]	0	0～1	OFF；ON [If enable I>.Inv.U, voltage conditions should be considered for overcurrent protection. When the smallest of the three line voltages is less than U.Under and greater than

				than U.Less, the overcurrent protection DO is prepare work.]
	I>.Inv [Inverse current]	5A	0.04～100	
	I>.Inv.K [Inverse time coefficient]	0.1s	0.1～100	
	I>.Inv.X [Inverse curves]	0	0～2	NI；VI；EI
[27] Undervoltage Protecion>>>	E.LVP>>> [Enable Undervoltage >>>]	0	0～2	OFF；Alarm；Trip
	LVP>>> [Undervoltage >>> value]	50V	1～500	
	LVP.T>>> [Undervoltage >>> delay]	5s	0～999	
	E.L.I.B>>> [Enable Undervoltage >>> current block]	0	0～1	OFF；ON [If enable LVP.I.B>>>, when the current is less than I.None, under voltage protection will be blocked.]
	E.PT.B>>> [Enable PT break block>>>]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]

	E.CB On>>> [Enable circuit breaker on block>>>]	0	0~1	OFF；ON
	E.LVThr.>>> [Enable Undervoltage threshold>>>]	1	0~1	OFF；ON
[27] Undervoltage Protecion>>	E.LVP>> [Enable Undervoltage >>]	0	0~1	OFF；Alarm；Trip
	LVP>> [Undervoltage >> value]	50V	1~500	
	LVP.T>> [Undervoltage >> delay]	5s	0~60	
	E.L.I.B>> [Enable Undervoltage >> current block]	0	0~1	OFF；ON [If enable LVP.I.B>>, when the current is less than I.None, under voltage protection will be blocked.]
	E.PT.B>> [Enable PT break block>>]	1	0~1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB On>> [Enable circuit breaker on block>>]	0	0~1	OFF；ON

	E.LVThr.>> [Enable Undervoltage threshold>>]	1	0～1	OFF；ON
[59] Overvoltage Protection>>>	E.OVP>>> [Enable Overvoltage >>>]	0	0～2	OFF；Alarm；Trip
	U.OVP>>> [Overvoltage >>> value]	120V	0～800	
	OVP.T>>> [Overvoltage >>> delay]	5s	0～999	
[59] Overvoltage Protection>>	E.OVP>> [Enable Overvoltage >>]	0	0～2	OFF；Alarm；Trip
	U.OVP>> [Overvoltage >> value]	120V	0～800	
	OVP.T>> [Overvoltage >> delay]	5s	0～999	
[81U] Under-Frequency Protection>>>	E.Un.Fr>>>. [Enable Under Frequency>>>]	0	0～1	OFF；ON
	E.U.F>>>.U [Enable Under Frequency >>> voltage block]	0	0～1	OFF;ON [If the maxmium vlotage is lower than U.B>>>, while the zero sequence voltage 3U0 is lower than 8V, or PT break , Under frequence function will be blocked.]
	E.U.F>>>.I [Enable Under	0	0～1	OFF;ON [When the maximum current value is lower than

	Frequency >>> current block]			I.B>>>,Under frequence function will be blocked.]
	E.UnF>>>.dHz. [Enable Under Frequency slip block]	0	0～1	OFF;ON [When df/dt lower than dHz.B>>>, Under frequence function will be blocked.]
	UnderFr>>> [Under Frequency >>> value]	49Hz	45～60	
	Un.Fr>>>.T [Under Frequency >>> delay]	3s	0～60	
	dHz.B>>> [Under Frequency>>> slip block value]	0.1Hz/s	0.1～10	
	I.B>>> [Under Frequency>>> current block value]	5A	0.2～100	
	U.B>>> [Under Frequency>>>voltage block value]	50V	0～200	
[81U] Under-Frequency Protection>>	E.Un.Fr>>. [Enable Under Frequency>>]	0	0～1	OFF；ON
	E.U.F>>.U [Enable Under Frequency>>voltage block]	0	0～1	OFF;ON [Ua is lower than U.B>>, while the zero sequence voltage 3U0 is lower than 8V, or PT break , Under frequence function will be blocked.]
	Second stage undercurrent lockout	0	0～1	OFF;ON

	E.U.F>>.I [Enable Under Frequency>>current block]			[When the maximum current value is lower than I.B>>,Under frequence function will be blocked.]
	E.UnF>>.dHz. [Enable Under Frequency>> slip block]	0	0～1	OFF;ON [When df/dt lower than dHz.B>>, Under frequence function will be blocked.]
	UnderFr>> [Under Frequency>> value]	49Hz	45～60	
	Un.Fr>>.T [Under Frequency>> delay]	3s	0～60	
	dHz.B>> [Under Frequency>> slip block value]	0.1Hz/s	0.1～10	
	I.B>> [Under Frequency >> current block value]	5A	0.2～100	
	U. B>> [Under Frequency >> voltage block value]	50V	0～200	
[81O] Over Frequency Protection>>>	E.OF>>> [Enable Over Frequency >>>]	0	0～1	OFF；ON
	OF>>> [Over Frequency >>> value]	50Hz	40～70	
	OF>>>.T [Over Frequency >>> delay]	5s	0～999	

	E.OF>> [Enable Over Frequency >>]	0	0～1	OFF；ON
[81O] Over Frequency Protection>>	OF>> [Over Frequency >> value]	50Hz	40～70	
	OF>>.T [Over Frequency >> delay]	5s	0～999	
	E.Fr.Muta. [Enable Rate Of Change Of Frequency]	0	0～1	OFF；ON
	Fr.Muta. [Rate Of Change Of Frequency value]	0.1Hz/s	0.01～100	
[81R] Rate Of Change Of Frequency	Fr.S [Frrquency Start delay]	0.2s	0～3	
	Fr.Muta.T [Rate Of Change Of Frequency delay]	0.4s	0～999	
	I Source [Current judgment Source]	1	0～1	Protective current； Measurment current
	I.Set [Current setting]	0.1A	0.04～100	
[32R] Directional Power Protection>>>	E.RP>>> [Enable Directional Power>>>]	0	0～1	OFF；ON
	A fixed value of reverse power	0	0～10000000000	

	RP>>> [Directional Power>>> Value]			
	RP>>>.T [Directional Power>>> delay]	0	0～999	
[32R] Directional Power Protection>>	E.RP>> [Enable Directional Power>>]	0	0～1	OFF；ON
	RP>> [Directional Power>> value]	0	0～10000000000	
	RP>>.T [Directional Power>> delay]	0	0～999	
[37] Under power protection >>>	E.LP>>> [Enable Under power>>>]	0	0～1	OFF；ON
	LP>>> [Under power>>> value]	0	0～10000000000	
	LP.T>>> [Under power>>> threshold]	1	0～10000000000	
	LP>>>T [Under power>>> delay]	0s	0～999	
[37] Under power protection>>	E.LP>> [Enable Under power>>]	0	0～1	OFF；ON
	LP>> [Under power>> value]	0	0～10000000000	
	LP.T>> [Under power>> threshold]	1	0～10000000000	

	LP>>.T [Under power>> delay]	0s	0～999	
Power Recovery>>>	E.P>>> [Enable Power Recovery>>>]	0	0～1	OFF；ON
	P>>> [Power Recovery>>> value]	0	0～10000000000	
	P>>>.T [Power Recovery>>> delay]	0s	0～999	
Power Recovery>>	E.P>> [Enable Power Recovery>>]	0	0～1	OFF；ON
	P>> [Power Recovery>>> value]	0	0～10000000000	
	P>>.T [Power Recovery>> delay]	0s	0～999	
	P.RT [Power Reset delay]	5s	0～999	
Auto-Close with voltage recovery	U Source [Voltage Source]	1	0～1	Bus voltage;Incoming voltage
	E.U.C [Enable Auto-Close with voltage recovery]	0	0～1	OFF；ON
	U.U.C [Auto-Close with voltage recovery upper limit]	410V	0～9999	

	U. D.C [Auto-Close with voltage recovery down limit]	260V	0～9999	
	U. C.T [Auto-Close with voltage recovery delay]	0.4s	0～999	
	Fr.U.U [Auto-Close with voltage recovery Frequency upper limit]	50Hz	40～70	
	Fr.U.D [Auto-Close with voltage recovery Frequency down limit]	49.8Hz	40～70	
	E.In.C On. [Enable Incoming circuit breaker on]	0	0～1	OFF；ON
	E.SameP.A. [Enable Synchro-Check Allowed]	0	0～1	OFF；ON
	Record.S [Record Selection]	0	0～1	Same.P；U.C.
[25] Synchro-Check	E.SameP. [Enable Synchro-Check]	0	0～1	OFF；ON
	SameP.StaT [Synchro-Check Stabilization	0.2s	0～999.999	

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	delay]			
	SameP.Type [Synchro-Check type]	1	0～1	Dif.Fr；Same.Fr [Differential Frequency;Same Frequency]
	Sy.CH [System Channel]	12	0～14	
	SyPr.U [System Side Primary Voltage]	10kV	0～9999	
	SyPT.Pr [System Side PT Primary Voltage]	10kV	0～9999	
	SyPT.Se [System Side PT Secondary Voltage]	100V	0～9999	
	Gr.C.CH [Generator voltage Channel]	7	0～14	
	GrC.PriU [Generator Primary voltage]	10kV	0～9999	
	GrC.PTPr [Generator PT Primary Voltage]	10kV	0～9999	
	GrC.PTSe [Generator PT Secondary Voltage]	100V	0～9999	

	Po.U.Dif% [Poaitive voltage difference allowed]	5%	0～30	
	Ne.U.Dif% [Negative voltage difference allowed]	5%	0～30	
	Rated Fr [Rated Frequency]	50Hz	40～70	
	Sy.Fr.Di [System Frequency difference]	0.1Hz	0～5	
	GrC.FrDi [Generator Frequency difference]	0.1Hz	0～5	
	Po.Fr.Di [Positive Frequency difference allowed]	0.1Hz	0～5	
	Ne.Fr.Di [Negative Frequency diffrence allowed]	0.1Hz	0～5	
	Fr.Dif.A [Frequency difference accelation allowed]	1Hz/s	0～10	
	SaFr.PhD [Same Frequency Phase Angle difference]	5°	0～60	
	Differential frequency grid-connected phase angle difference	5°	0～60	

	DiFr.PhD [Difference Frequency Phase Angle difference]			
	Sys.Ph.C [System Phase Angle Compensation]	0°	0～330	
	SameP.Le.T [Synchronism Lead Time]	0.1s	0.02～999	
	I0 Source	0	0～1	Self-produced;CH2
I0>>> [50N] [Instantaneous ground fault overcurrent]	E.I0>>> [Enable I0>>>]	0	0～1	OFF；ON
	E.I0>>>D[67N] [Enable I0>>> direction]	0	0～2	OFF；Line；Bus
	I0>>> [I0>>> value]	10A	0.04～100	
	I0>>>.T [I0>>> delay]	5s	0～60	
	I0>>>.3U0	2V	0～200	
I0>> [51N] [Time limited ground fault overcurrent]	E.I0>> [Enable I0>>]	0	0～2	OFF；Alarm；Trip
	E.I0>>D[67N] [Enable I0>> direction]	0	0～2	OFF；Line；Bus
	I0>> [I0>> value]	9A	0.04～100	

	I0>>.T [I0>> delay]	10s	0～60	
	I0>>.3U0	2V	0～200	
PT supervision[60]	E.PtBr.A [Enable PT break alarm]	0	0～1	OFF；ON
	PtBr.T [PT break alarm delay]	10s	0～999	
	U. None [No-voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	I.None [No-Current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	U2.Pt [PT break negative sequence voltage]	35V	0～200	
Trip and close circuit supervision alarm	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
FC Block	E.FCBlock [Enable FC Block]	0	0～1	OFF；ON
	FCB.I [FC Block current value]	10A	0.04～100	
	FC blocking delay	5s	0～60	

	FCB.T [FC Block delay]			
I0.Inv [51N] [Inverse time ground fault]	E. I0.Inv [Enable I0.Inverse]	0	0～1	OFF；ON
	I0.Inv [I0.Inverse value]	5A	0.04～100	
	I0.Inv.K [I0.Inverse time coefficient]	0.5s	0～100	
	I0.Inv.X [I0.Inverse curves]	0	0～2	NI；VI；EI
U0 OVP [59N] [Residual over voltage]	E.U0.OVP [Enable Residual over voltage]	0	0～2	OFF；Alarm；Trip
	U0.OVP [Residual over voltage value]	20V	0～500	
	U0.OVP.T [Residual over voltage delay]	5s	0～999	
Non-electricity1 protection	E. Non-el1 [Enable Non-el1]	0	0～1	OFF；ON
	E. Non-el1.M [Enable Non-electricity1 Mode]	0	0～1	Alarm；Trip
	Non-el1.T [Non-electricity1 delay]	1s	0～999	
Non-electricity2 protection	E. Non-el2 [Enable Non-electricity2]	0	0～1	OFF；ON
	E. Non-el2.M [Enable Non-electricity2 Mode]	0	0～1	Alarm；Trip
	Non-battery 2 delay	1s	0～999	

	Non-el2.T [Non-electricity2 delay]			
	Default.T [Trip Default Time]	0s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0～999	
	E.EMC.B [Enable EMC Block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C [Excess Return Coefficient]	0.95	0.001～1	
	Under R.C [Under Return Coefficient]	1.05	1～2	
CT supervision[60]	E.CTBr.A [Enable CT Break Alarm]	0	0～1	OFF；ON
	CTBr.I.N [CT Break No-Current]	0.125A	0.04～100	
	CTBr.I.S [CT Break Current setting]	0.2A	0.04～100	

	CTBr.T [CT Break Alarm time]	5s	0～999	
Over haul- block	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Exc Fr.R.C [Excess Frequency return coefficient]	0.995	0.001～1	
	Und Fr.R.C [Under Frequency return coefficient]	1.005	1.000～2	
	E.Acci.S [Enable Accident Signal]	0	0～1	OFF；ON
	CB.T [Circuit Breaker action delay]	3s	0～999	
	Tripping pulse	0.3s	0～1	

NOV3S-FE Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	10	0.1～9999	
	PT	100	0.1～9999	
	Primary voltage display	0	0～1	kV;V

	U Unit [Primary voltage display]			
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT
	P.CT Mode [Protective CT Mode]	0	0～1	3CT；2CT
	M.CT Mode [Measurment CT Mode]	0	0～1	3CT；2CT
[27] Undervoltage Protecion>>>	E.LVP>>> [Enable Undervoltage >>>]	0	0～2	OFF；Alarm；Trip
	LVP>>> [Undervoltage >>> value]	50V	1～500	
	LVP.T>>> [Undervoltage >>> delay]	5s	0～999	
	E.L.I.B>>> [Enable Undervoltage >>> current block]	0	0～1	OFF；ON [If enable LVP.I.B>>>, when the current is less than I.None, under voltage protection will be blocked.]
	E.PT.B>>> [Enable PT break block>>>]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB On>>>	0	0～1	OFF；ON

	[Enable circuit breaker on block>>>]			
	E.LVThr.>>> [Enable Undervoltage threshold>>>]	1	0～1	OFF；ON
[27] Undervoltage Protecion>>	E.LVP>> [Enable Undervoltage >>]	0	0～2	OFF；Alarm；Trip
	LVP>> [Undervoltage >> value]	50V	1～500	
	LVP.T>> [Undervoltage >> delay]	5s	0～999	
	E.L.I.B>> [Enable Undervoltage >> current block]	0	0～1	OFF；ON [If enable LVP.I.B>>, when the current is less than I.None, under voltage protection will be blocked.]
	E.PT.B>> [Enable PT break block>>]	1	0～1	OFF；ON [When PT break occurs, the relay will send an alarm signal and lock out the under voltage protection.]
	E.CB On>> [Enable circuit breaker on block>>]	0	0～1	OFF；ON
	E.LVThr.>> [Enable Undervoltage	1	0～1	OFF；ON

	threshold>>]			
[59] Overvoltage Protection>>>	E.OVP>>> [Enable Overvoltage >>>]	0	0～2	OFF；Alarm；Trip
	U.OVP>>> [Overvoltage >>> value]	120V	0～800	
	OVP.T>>> [Overvoltage >>> delay]	5s	0～999	
[59] Overvoltage Protection>>	E.OVP>> [Enable Overvoltage >>]	0	0～2	OFF；Alarm；Trip
	U.OVP>> [Overvoltage >> value]	120V	0～800	
	OVP.T>> [Overvoltage >> delay]	5s	0～999	
[81U] Under-Frequency Protection>>>	E.Un.Fr>>>. [Enable Under Frequency>>>]	0	0～1	OFF；ON
	E.U.F>>>.U [Enable Under Frequency >>> voltage block]	0	0～1	OFF;ON [Ua is lower than U.B>>>, while the self-produced zero sequence voltage 3U0 is lower than 8V, or PT break, Under frequence function will be blocked.]
	E.U.F>>>.I [Enable Under Frequency >>> current block]	0	0～1	OFF;ON [When the maximum current value is lower than I.B>>>,Under frequence function will be blocked.]
	One-stage slip lock	0	0～1	exit; invest

	E.UnF>>>.dHz. [Enable Under Frequency slip block]			OFF;ON [When df/dt lower than dHz.B>>>, Under frequence function will be blocked.]
	UnderFr>>> [Under Frequency >>> value]	49Hz	45~60	
	Un.Fr>>>.T [Under Frequency >>> delay]	3s	0~60	
	dHz.B>>> [Under Frequency>>> slip block value]	0.1Hz/s	0.1~10	
	I.B>>> [Under Frequency>>> current block value]	5A	0.2~100	
	U.B>>> [Under Frequency>>> voltage block value]	50V	0~200	
[81U] Under-Frequency Protection>>	E.Un.Fr>>. [Enable Under Frequency>>]	0	0~1	OFF；ON
	E.U.F>>.U [Enable Under Frequency>>voltage block]	0	0~1	OFF;ON [Ua is lower than U.B>>, while the zero sequence voltage 3U0 is lower than 8V, or PT break , Under frequence function will be blockeded.]
	E.U.F>>.I [Enable Under Frequency>>current block]	0	0~1	OFF;ON [When the maximum current value is lower than I.B>>,Under frequence

				function will be blocked.]
	E.UnF>>.dHz. [Enable Under Frequency>> slip block]	0	0～1	OFF;ON [When df/dt lower than dHz.B>>, Under frequence function will be blocked.]
	UnderFr>> [Under Frequency>> value]	49Hz	45～60	
	Un.Fr>>.T [Under Frequency>> delay]	3s	0～60	
	dHz.B>> [Under Frequency>> slip block value]	0.1Hz/s	0.1～10	
	I.B>> [Under Frequency >> current block value]	5A	0.2～100	
	V. B>> [Under Frequency >> voltage block value]	50V	0～200	
[81O] Over Frequency Protection>>>	E.OF>>> [Enable Over Frequency>>>]	0	0～1	OFF；ON
	OF>>> [Over Frequency>>> value]	50Hz	40～70	
	OF>>>.T [Over Frequency>>> delay]	5s	0～999	
[81O] Over Frequency	E.OF>> [Enable Over Frequency>>]	0	0～1	OFF；ON

Protection>>				
	OF>> [Over Frequency>> value]	50Hz	40～70	
	OF>>.T [Over Frequency>> delay]	5s	0～999	
[81R] Rate Of Change Of Frequency	E.Fr.Muta. [Enable Rate Of Change Of Frequency]	0	0～1	OFF；ON
	Fr.Muta. [Rate Of Change Of Frequency value]	0.1Hz/s	0.01～100	
	Fr.S [Frrquency Start delay]	0.2s	0～3	
	Fr.Muta.T [Rate Of Change Of Frequency delay]	0.4s	0～999	
	I Source [Current judgment Source]	1	0～1	Protective current； Measurement current
	I.Set [Current setting]	0.1A	0.04～100	
PT supervision[60]	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	PtBr.T [PT Break alarm delay]	10s	0～999	
	U.None	15V	0～200	[Less than U.None means that there is no voltage]

	[No-Voltage]			
	I.None [No-Current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	U2.Pt [PT break negative sequence voltage]	35V	0～200	
Trip and close circuit supervision	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
	Default.T [Trip Default Time]	0s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0.01～60	
	E.EMC.B [Enable EMC Block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T [Circuit Breaker time]	0.3s	0～999	
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C	0.95	0.001～1	

	[Excess Return Coefficient]			
	Under R.C [Under Return coefficient]	1.05	1～2	
Over haul- block	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Exc Fr.R.C [Excess Frequency return coefficient]	0.995	0.001～1	
	Und Fr.R.C [Under Frequency return coefficient]	1.005	1.000～2	
	Tripping pulse	0.3s	0～1	

NOV3S-FA Setting				
Protection Name	Value Name	Default	Range	Remark
	CT	10	0.1～9999	
	PT	100	0.1～9999	
	U Unit [Primary voltage display]	0	0～1	kV;V
	PT Mode [Voltage measurement mode]	0	0～1	3PT；2PT

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	P.CT Mode [Protective CT Mode]	0	0～1	3CT；2CT
	M.CT Mode [Measurment CT Mode]	0	0～1	3CT；2CT
	I Source [Current judgment Source]	0	0～1	Protective current； Measurement current
	I Set [Current setting]	0.5A	0.04～100	
	I.None [No-Current]	0.2A	0.04～100	[Less than I.None means that there is no current]
	E.L.I.B>>> [Enable current block]	0	0～1	OFF；ON [If enable L.I.B, when the current is less than I.None, protection will be blocked.]
	E.CB On>>> [Enable circuit breaker on block]	0	0～1	OFF；ON
[27] Undervoltage Protecion>>>	E.LVP>>> [Enable Undervoltage >>>]	0	0～2	OFF；Alarm；Trip
	LVP>>> [Undervoltage >>> value]	50V	1～500	
	LVP.T>>> [Undervoltage >>> delay]	5s	0～999	
	A section of PT is disconnected and locked	1	0～1	exit; invest

	E.PT.B>>> [Enable PT break block>>>]			OFF；ON
	E.LVThr.>>> [Enable Undervoltage threshold>>>]	1	0～1	OFF；ON
[27] Undervoltage Protecion>>	E.LVP>> [Enable Undervoltage >>]	0	0～1	OFF；Alarm；Trip
	LVP>> [Undervoltage >> value]	50V	1～500	
	LVP.T>> [Undervoltage >> delay]	5s	0～60	
	E.PT.B>> [Enable PT break block>>]	1	0～1	OFF；ON
	E.LVThr>> [Enable Undervoltage threshold>>]	1	0～1	OFF；ON
[59] Overvoltage Protection>>>	E.OVP>>> [Enable Overvoltage >>>]	0	0～1	OFF；ON
	U.OVP>>> [Overvoltage >>> value]	120V	0～800	
	OVP.T>>> [Overvoltage >>> delay]	5s	0～999	
[59] Over Voltage Protection>>	E.OVP>> [Enable Overvoltage >>]	0	0～1	OFF；ON
	Overvoltage second stage setting	120V	0～800	

	U.OVP>> [Overvoltage >> value]			
	OVP.T>> [Overvoltage >> delay]	5s	0～999	
[81U] Under-Frequency Protection>>>	E.Un.Fr>>>. [Enable Under Frequency>>>]	0	0～1	OFF；ON
	E.U.F>>>.U [Enable Under Frequency >>> voltage block]	0	0～1	OFF；ON [Ua is lower than U.B, while the zero sequence voltage 3U0 is lower than 8V, or PT break , Under frequence function will be blocked.]
	E.UnF>>>.dHz. [Enable Under Frequency>>> slip block]	0	0～1	OFF；ON
	UnderFr>>> [Under Frequency >>> value]	49Hz	45～60	
	Un.Fr>>>.T [Under Frequency >>> delay]	3s	0～60	
	dHz.B>>> [Under Frequency>>> slip block value]	0.1Hz/s	0.1～10	
	U.B>>>	50V	0～200	

	[Under Frequency>>> voltage block value]			
[81U] Under-Frequency Protection>>	E.Un.Fr. [Enable Under Frequency >>]	0	0～1	OFF；ON
	E.U.F>>.U [Enable Under Frequency >> voltage block]	0	0～1	OFF；ON
	E.UnF>>.dHz. [Enable Under Frequency>>> slip block]	0	0～1	OFF；ON
	UnderFr>> [Under Frequency>> value]	49Hz	45～60	
	Un.Fr>>.T [Under Frequency>> delay]	3s	0～60	
	dHz.B>> [Under Frequency>> slip block value]	0.1Hz/s	0.1～10	
	U.B>> [Under Frequency>> voltage block value]	50V	0～200	
[81O] Over Frequency Protection>>>	E.OF>>> [Enable Over Frequency>>>]	0	0～1	OFF；ON
	OF>>> [Over Frequency>>> value]	50Hz	40～70	
	high frequency delay	5s	0～999	

	OF>>>.T [Over Frequency>>> delay]			
[81O] Over Frequency Protection>>	E.OF>> [Enable Over Frequency>>]	0	0～1	OFF；ON
	OF>> [Over Frequency>> value]	50Hz	40～70	
	OF>>.T [Over Frequency>> delay]	5s	0～999	
U0.OVP>>> [59N] [Residual over voltage>>>]	E.U0>>> [Enable Residual over voltage>>>]	0	0～1	OFF；ON
	U0.O>>> [Residual over voltage>>> value]	20V	0～800	
	U0>>>.T [Residual over voltage>>> delay]	5s	0～999	
U0.OVP>> [59N] [Residual over voltage>>]	E.U0>> [Enable Residual over voltage>>]	0	0～1	OFF；ON
	U0.O>> [Residual over voltage>> value]	20V	0～800	
	U0>>.T [Residual over voltage>> delay]	5s	0～999	

	E.PtBr.A [Enable PT Break alarm]	0	0～1	OFF；ON
	PtBr.T [PT Break delay]	10s	0～999	
PT supervision[60]	U.None [No-Voltage]	15V	0～200	[Less than U.None means that there is no voltage]
	U2.Pt [PT break negative sequence voltage]	35V	0～200	
	E.CB.A [Enable Trip and close circuit supervision alarm]	0	0～1	OFF；ON
Trip and close circuit supervision	CB.A.T [Trip and close circuit supervision alarm delay]	10s	0～999	
	Default.T [Trip Default Time]	0s	0～999	
	Acci.S.T [Accident Signal delay]	0.3s	0.01～60	
	E.EMC.B [Enable EMC Block]	1	0～1	OFF；ON
	CB Po.Ac [Circuit Breaker position Collection]	1	0～1	Auxiliary.C;CB M. [Auxiliary contact;Circuit Breaker Monitor]
	Cir.Br.T	0.3s	0～999	

	[Circuit Breaker time]			
	Sp.En.D. [Discharge delay]	0s	0～999	
	Excess R.C [Excess Return coefficient]	0.95	0.001～1	
	Under R.C [Under Return coefficient]	1.05	1～2	
Over haul- block	E. M.BC [Enable Overhaul-lockout communication]	0	0～1	OFF；ON
	E. M.BE [Enable Overhaul-lockout DO]	0	0～1	OFF；ON
	Exc Fr.R.C [Excess Frequency return coefficient]	0.995	0.001～1	
	Und Fr.R.C [Under Frequency return coefficient]	1.005	1.000～2	
	Tripping pulse	0.3s	0～1	

NOV3S-K Setting				
Protection Function	Value Name	Default	Range	Notice
	CT	10	0.1～9999	
	PT	100	0.1～9999	
	Voltage wiring method	0	0～1	3PT；2PT

	PT Mode [Voltage measurement mode]			
	CT Mode [Current measurement mode]	0	0～1	3CT；2CT
	U Unit [Primary voltage display]	0	0～1	kV;V
	Remote pulse	2000	0～999999999	

Relay Event

NOV3S-M Event Record				
Event code	Event name	Parameter name	Parameter values	Parameter unit
0	[Instantaneous overcurrent] 3I>>>	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
		Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
1	[Time-limited overcurrent] 3I>>	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V

		Negative sequence voltage U2	Float	V
		Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
2	[Definite time overcurrent] 3I>	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
		Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
3	[Motor Start Instantaneous overcurrent] 3I>>>.S	Ia	Float	A
		Ib	Float	A
		Ic	Float	A

4	[Motor Run Instantaneous overcurrent] 3I>>>.R	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
5	[Ia Inverse Definite Minimum Time overcurrent] Ia>InverseT.	t	Float	s
		Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
6	[Ib Inverse Definite Minimum Time overcurrent] Ib>InverseT.	t	Float	s
		Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
7	C reverse time overcurrent protection	time	floating point number	s

		t		
	[Ic Inverse Definite Minimum Time overcurrent] Ic>InverseT.	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
8	[I01 ground fault Instantaneous overcurrent] I01>>>	I01	Float	A
9	[I01 ground fault Time-limited overcurrent] I01>>	I01	Float	A
10	[I02 ground fault Instantaneous overcurrent] I02>>>	I02	Float	A
11	[I02 ground fault Time-limited overcurrent] I02>>	I02	Float	A
12	[I01 ground fault Inverse Definite Minimum Time overcurrent] I01>InverseT.	t	Float	s
		I01	Float	A
13	[I02 ground fault Inverse Definite Minimum Time overcurrent] I02>InverseT.	t	Float	s
		I02	Float	A

14	[Post-accelerated overcurrent] I>P.T	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
15	[Auto-recloser] Reclose	——	——	——
16	[Under Frequency] UnderFr.	Frequency	Float	Hz
17	[ManualClose]	——	——	——
18	[ManualTrip]	——	——	——
19	I>Lo.T [OverLoadTrip]	Maximum current Im	Float	A
20	[Negative sequence Instantaneous overcurrent] I2>>>	Negative sequence current I2	Float	A
		Maximum current Im	Float	A
21	[Negative sequence Inverse Definite Minimum Time] overcurrent I2>InverseT	t	Float	s
		Negative sequence current I2	Float	A
22	[Thermal overload Trip] OverHeat.T	Trip Percent	Float	%
		Maximum current Im	Float	A
		Positive sequence current I1	Float	A
		Negative sequence	Float	A

		current I2		
23	[Blocking Rotor StallTrip]	Maximum current Im	Float	A
24	[Starting time-out] StartOutTime	Maximum current Im	Float	A
25	[Under Voltage Trip] LVP.T	Maximum voltage Um	Float	V
26	[Under Voltage Trip] LVP.T	UAB	Float	V
		UBC	Float	V
		UCA	Float	V
27	[Over Voltage Trip] OVP.T	UAB	Float	V
		UBC	Float	V
		UCA	Float	V
28	[Residual Over Voltage Trip/Self-produced Residual Over Voltage Trip] U0.OVP/3U0.OVP	Residual voltage U0	Float	V
29	[Unbalance Voltage Trip] Unb.V.T	Unbalance Voltage Unb.V	Float	V
30	[Unbalance Current Trip] Unb.I.T	Unbalance Current Unb.I	Float	A
31	[Severe Gas Trip] SevereGas.T	——	——	——
32	[Pressure Release Trip] Pre.Re.T	——	——	——
33	[High Temperature Trip] HighTemp.T	——	——	——

34	[Non-electricity 1 Trip/Meter-door 1 Trip] Non-el1.T/Me.do1.T	——	——	——
35	[Non-electricity 2 Trip/Meter-door 2 Trip] Non-el2.T/Me.do2.T	——	——	——
36	[Bus Standby Power Automatic Switch Close Bus] B.S.C.B.	——	——	——
37	[Bus Standby Power Automatic Switch Trip 1 Incoming] B.S.T.1	——	——	——
38	[Bus Standby Power Automatic Switch Trip 2 Incoming] B.S.T.2	——	——	——
39	[2 Incoming Spare power, 1 Incoming Primary power, trip 1 Incoming] 2S.1T.1-In.	——	——	——
40	[2 Incoming Spare power, 1 Incoming Primary power, close 2 Incoming] 2S.1C.2-In.	——	——	——
41	[1 Incoming Spare power, 2 Incoming Primary power, trip 2 Incoming] 1S.2T.2-In.	——	——	——
42	[1 Incoming Spare power, 2 Incoming Primary power, close 1 Incoming] 1S.2C.1-In.	——	——	——
43	[Bus Standby Power	——	——	——

	Automatic Reset Close 1 Incoming] B.R.C.1			
44	[Bus Standby Power Automatic Reset Close 2 Incoming] B.R.C.2	——	——	——
45	[Bus Standby Power Automatic Reset Trip Bus] B.R.T.B.	——	——	——
46	[2 Incoming Spare power, 1 Incoming Primary power, Reset close 1 Incoming] 2S.1R.C.1	——	——	——
47	[2 Incoming Spare power, 1 Incoming Primary power, Reset trip 2 Incoming] 2S.1R.T.2	——	——	——
48	[1 Incoming Spare power, 2 Incoming Primary power, Reset close 2 Incoming] 1S.2R.C.2	——	——	——
49	[1 Incoming Spare power, 2 Incoming Primary power, Reset trip 1 Incoming] 1S.2R.T.1	——	——	——
50	[FC Block]	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
51	[Transformer Door Open Trip] DoorOpenT	——	——	——
52	[RemoteClose]	——	——	——
53	Remote control opening	——	——	——

	[RemoteTrip]			
54	[Loss of Voltage Trip] LVP.T	Maximum voltage Um	Float	V
55	[Low oil Trip] Low oil.T	——	——	——
56	[High oil Trip] High oil.T	——	——	——
57	[Inverse Definite Time overcurrent] I>InverseT.	t	Float	s
		Ia	Float	A
		Ib	Float	A
		Ic	Float	A
58	[I01 ground fault Definite time overcurrent] I01>	I01	Float	A
59	[I01 ground fault Post-accelerated overcurrent] I01>P.T	t	Float	s
		I01	Float	A
60	[Over Temperature Trip] OverTemp.T	——	——	——
61	[Light Gas Trip] LightGasT	——	——	——
62	[2 Incoming Spare power, 1 Incoming Primary power, trip bus] 2S.1T.B.	——	——	——
63	[2 Incoming Spare power, 1 Incoming Primary power, Reset close bus] 2S.1R.C.B.	——	——	——
64	Diesel engine ready to jump into line 1	——	——	——

	[Diesel Generator Standby Power Automatic Switch Trip 1 Incoming] Die.S.T.1			
65	[Diesel Generator Standby Power Automatic Switch Trip 2 Incoming] Die.S.T.2	——	——	——
66	[Diesel Generator Standby Power Automatic Switch Close Bus] Die.S.C.B.	——	——	——
67	[Diesel Generator Standby Power Automatic Switch Close Diesel Gnerator] Die.S.C.D.	——	——	——
68	[Non-electricity 3 Trip] Non-el3.T	——	——	——
69	[Non-electricity 4 Trip] Non-el4.T	——	——	——
70	[Spare 1 Trip] Spare1.T	——	——	——
71	[Spare 2 Trip] Spare2.T	——	——	——
73	[Spare 3 Trip] Spare3.T	——	——	——
74	[Isolation Intertrip] Iso.Cab.T	——	——	——
75	[System Resonanc Trip] Sys.Res.T	——	——	——
76	[Over Frequency] OF.T	Frequency	Float	Hz

77	[Temperature Controller Failure Trip] Th.Fa.T	——	——	——
78	[Self-produce ground fault Instantaneous overcurrent] 3I0>>>	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		3I0	Float	A
79	[Self-produce ground fault Time-limited overcurrent] 3I0>>	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		3I0	Float	A
80	I>Lo.A [Over Load Alarm] OverLoadAla.	Maximum current Im	Float	A
81	（AM5、AM4-U） [PT Break Alarm] PT BreakAla.	UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative sequence voltage U2	Float	V
82	[Control Circuit Break Alarm] CtrErrorAla.	——	——	——
83	[Negative sequence Time-limited overcurrent Alarm] I2>>.A	I2	Float	A
		Maximum current Im	Float	A

		Alarm percent	Float	%
84	[Thermal overload Alarm] OverHeat.A	Maximum current Im	Float	A
		Positive sequence current I1	Float	A
		Negative sequence current I2	Float	A
85	LVP.A （AM5\AM4-U1） [I Bus Under Voltage Alarm] I Bus LVP.A	Maximum voltage Um	Float	V
86	（AM5\AM4-U1） [I Bus Over Voltage Alarm] I Bus OVP.A	Maximum voltage Um	Float	V
87	（AM5\AM4-U1） [I Bus Residual Over Voltage] Alarm I Bus U0.OVP.A	Residual Voltage U0	Float	V
88	[Light Gas Alarm] LightGasA			
89	[Over Temperature Alarm] OverTemp.A			
90	[Non-electricity 2 Alarm] Non-el2.A	——	——	——
91	[Non-electricity 3 Alarm] Non-el3.A	——	——	——
92	[BusCharge]	——	——	——
93	[1 In-coming Charge] I-In.Charge	——	——	——

94	[2 In-coming Charge] 2-In.Charge	——	——	——
95	（AM5\AM4-U1） [I Bus Self-produced Residual Over Voltage Alarm] I Bus 3U0.OVP.A	Residual Voltage U0	Float	V
96	（AM5\AM4-U2） [II Bus Under Voltage Alarm] II Bus LVP.A	Maximum voltage Um	Float	V
97	（AM5\AM4-U2） [II Bus Residual Over Voltage Alarm] II Bus U0.OVP.A	Residual Voltage U0	Float	V
98	（AM5\AM4-U2） [II Bus PT Break Alarm] II Bus PT BreakAla.	UAB2	Float	V
		UBC2	Float	V
		UCA2	Float	V
		Negative sequence voltage U2	Float	V
99	（AM5\AM4-U2） [II Bus Over Voltage Alarm] II Bus OVP.A	Maximum voltage Um	Float	V
100	（AM5\AM4-U2） [II Bus Self-produced Residual Over Voltage Alarm] II Bus 3U0.OVP.A	Residual Voltage U0	Float	V
101	[Motor Standby Power Automatic Switch Trip 1,2 Incoming] M.S.T.1,2	——	——	——
102	[Motor Standby Power Automatic Switch Close	——	——	——

	Motor] M.S.C.M.			
103	[Definite time overcurrent Alarm] 3I>.A	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
104	[I01 ground fault Instantaneous overcurrent Alarm] I01>>>.A	t	Float	s
		I01	Float	A
105	[I01 ground fault Time-limited overcurrent Alarm] I01>>.A	t	Float	s
		I01	Float	A
106	[I01 ground fault Definite time overcurrent Alarm] I01>.A	t	Float	s
		I01	Float	A
107	[I01 ground fault Inverse Definite Minimum Time overcurrent Alarm] I01>InverseT.A	t	Float	s
		I01	Float	A
108	[I01 ground fault Post-accelerated overcurrent Alarm] I01>P.A	t	Float	s
		I01	Float	A
109	[I02 ground fault overcurrent Alarm] I02>.A	t	Float	s
		I02	Float	A
110	[I02 ground fault Inverse Definite Time overcurrent Alarm]	t	Float	s
		I02	Float	A

	I02>InverseT.A			
111	[Negative sequence Instantaneous overcurrent Alarm] I2>>>.A	Negative sequenc current I2	Float	A
		Maximum current Im	Float	A
112	[High Temperature Alarm] HighTemp.A			
113	[Severe Gas Alarm] SevereGas.A			
114	[Loss of Voltage Alarm] LVP.A	Maximum voltage Um	Float	V
115	[I02 ground fault Instantaneous overcurrent Alarm] I02>>>.A	t	Float	s
		I02	Float	A
116	[I02 ground fault Time-limited overcurrent Alarm] I02>>.A	t	Float	s
		I02	Float	A
117	[Transformer Door Alarm] DoorOpenA	t	Float	s
118	[In-coming PT Break Alarm] I.PtBr.A	——	——	——
119	[Non-electricity 1 Alarm] Non-el1.A			s
120	[Non-electricity 4 Alarm] Non-el4.A			s
121	[Auto-reclose Charge] chargeOK	——	——	——

122	[Spare 1 Alarm] Spare1.A	——	——	——
123	[Spare 2 Alarm] Spare2.A	——	——	——
124	[Spare 3 Alarm] Spare3.A	——	——	——
125	[Power Supply Charge] Mark.Charge	——	——	——
126	[Power Supply Standby Power Automatic Switch Trip Generator] Mark.S.T.D.	——	——	——
127	[Power Supply Standby Power Automatic Switch Close 1 In-coming] Mark.S.C.1	——	——	——
128	[Power Supply Standby Power Automatic Switch Close 2 In-coming] Mark.S.C.2	——	——	——
129	[Reverse Power Trip] RP.T	Active power	Float	kW
		Power factor	Float	
130	[Pressure Release Alarm] Pre.Re.A	——	——	——
131	[Generator Spare power, 1 In-coming Primary power Charge] Al.S.1.Charge	——	——	——
132	[Generator Spare power, 2 In-coming Primary power Charge] Al.S.2.Charge	——	——	——

133	[Diesel Generator Spare power, 1 In-coming Primary, Trip 1QF] Die.S.1T.1QF	——	——	——
134	[Diesel Generator Spare power, 1 In-coming Primary, Close 4QF] Die.S.1C.4QF	——	——	——
135	[Diesel Generator Spare power, 2 In-coming Primary, Trip 2QF] Die.S.2T.2QF	——	——	——
136	[Diesel Generator Spare power, 2 In-coming Primary, Close 4QF] Die.S.2C.4QF	——	——	——
137	[Temperature Controller Failure Alarm] Th.Fa.A	——	——	——
138	[Secondary Over Voltage Alarm] Se.OVP.A	——	——	——
139	[Unbalance Current Alarm] Unb.3I0.A	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
		3I0	Float	A
150	[DI1 Set] DI1	——	——	——
151	[DI2 Set] DI2	——	——	——
152	DI3	——	——	——

	[DI3 Set] DI3			
153	[DI4 Set] DI4	——	——	——
154	[DI5 Set] DI5	——	——	——
155	[DI6 Set] DI6	——	——	——
156	[DI7 Set] DI7	——	——	——
157	[DI8 Set] DI8	——	——	——
158	[DI9 Set] DI9	——	——	——
159	[DI10 Set] DI10	——	——	——
160	[DI11 Set] DI1	——	——	——
161	[DI12 Set] DI12	——	——	——
162	[DI13 Set] DI13	——	——	——
163	[DI14 Set] DI14	——	——	——
164	[DI15 Set] DI15	——	——	——
165	[DI16 Set] DI16	——	——	——
166	[DI17 Set] DI17	——	——	——

167	[DI18 Set] DI18	——	——	——
168	[DI19 Set] DI19	——	——	——
169	[DI20 Set] DI20	——	——	——
170	[Position after closing set]	——	——	——
171	[Circuit Breaker On Set] CCB On set	——	——	——
172	[Circuit Breaker Off Set] CCB Off set	——	——	——
173	[Anti-pumping set]	——	——	——
174	[Device on power]	——	——	——
179	[PT Break]	——	——	——
180	[3 In-coming Spare power, 1 In-coming Primary power Charge] 3S.1 Charge	——	——	——
181	[3 In-coming Spare power, 2 In-coming Primary power Charge] 3S.2 Charge	——	——	——
182	[Phase A Differential Voltage Trip] UdA.T	Phase A Differential Voltage UdA	Float	V
183	[Phase B Differential Voltage] UdB.T	Phase B Differential Voltage UdB	Float	V
184	[Phase C Differential Voltage]	Phase C Differential	Float	V

	UdC.T	Voltage UdC		
185	[Standby Power Automatic Switch Reset 1#, Close 3QF] S.R.1#.C.3QF	——	——	——
186	[Loss of Voltage Reset Charge] No-Vol.R.Charge	——	——	——
187	[Loss of Voltage Reset 2 In-coming Trip 4 In-coming] No-Vol.R.2.T.4	——	——	——
188	[Loss of Voltage Reset 2 In-coming Close 4 In-coming] No-Vol.R.2.C.2	——	——	——
189	[Loss of Voltage Reset 1 In-coming Trip 4 In-coming] No-Vol.R.1.T.4	——	——	——
190	[Loss of Voltage Reset 1 In-coming Close 1 In-coming] No-Vol.R.1.C.1	——	——	——
191	[Loss of Voltage Reset 1 In-coming Close 3 In-coming] No-Vol.R.1.C.3	——	——	——
192	[Remote button close]	——	——	——
193	[Remote button trip]	——	——	——
194	[Emergency trip]	——	——	——
195	[2 In-coming Spare power, 1 In-coming Primary power, Close Diesel Generator] 2S.1C.Die.	——	——	——
196	[2 In-coming Spare power, 1 In-coming Primary power, Reset Trip Diesel Generator]	——	——	——

	2S.1R.T.Die.			
197	[Load Control Trip] Neg.Con.T	——	——	——
198	[Residual Monitor Alarm] Insul.Monit.A	——	——	——
199	[Residual Monitor Trip] Insul.Monit.T	——	——	——
200	[Loss of Voltage Charge] No-Vol.Charge	——	——	——
201	[Loss of Voltage Trip 2 In-coming] No-Vol.T.2	——	——	——
202	[Loss of Voltage Close 1 In-coming] No-Vol.C.1	——	——	——
203	[Spare In-coming Standby Power Automatic Switch 1 In-coming Charge] Sp.In.S1 Charge	——	——	——
204	[Spare In-coming Standby Power Automatic Switch 2 In-coming Charge] Sp.In.S2 Charge	——	——	——
205	[Spare In-coming Standby Power Automatic Switch 1 In-coming Trip 1 In-coming] Sp.In.S1.T.1	——	——	——
206	[Spare In-coming Standby Power Automatic Switch 1 In-coming Close Spare In-coming] Sp.In.S1.C.Sp.	——	——	——
207	[Spare In-coming Standby	——	——	——

	Power Automatic Switch 2 In-coming Trip 2 In-coming] Sp.In.S2.T.2			
208	[Spare In-coming Standby Power Automatic Switch 2 In-coming Close Spare In-coming] Sp.In.S2.C.Sp	——	——	——
209	[Loss of Voltage Trip 1,2 In-coming] No-Vol.T.1,2	——	——	——
210	[Loss of Voltage Close Bus] No-Vol.C.B.	——	——	——
211	[Loss of Voltage Close Spare In-coming] No-Vol.C.Sp.In.	——	——	——
212	[Under Current Alarm] LIP.A	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
213	[Unbalance Voltage Trip] Unb.V.DI.T	——	——	——
214	[Bus Standby Power Automatic Switch Close 3 In-coming] B.S.C.3	——	——	——
215	[Bus Standby Power Automatic Switch Close 4 In-coming] B.S.C.4	——	——	——
216	[1 In-coming Reverse Power Trip] 1-In.RP.T	——	——	——
217	2 backups, 1 jump into the line, 1 hand car	——	——	——

	[2 In-coming Spare power, 1 In-coming Primary power, trip 1 In-coming Handcart] 2S.1T.1-In.Hand.			
218	[2 In-coming Spare power, 1 In-coming Primary power, Reset Close 1 In-coming Handcart] 2S.1R.C.1-In.Hand.	——	——	——
219	[Low side net-door Alarm] Low S.D.A	——	——	——
220	[Low side net-door Trip] Low S.D.T	——	——	——
221	[Accident Signal]	——	——	——
222	[Unbalance Voltage Trip] Unb.V.T	——	——	——
223	[Incorrect Phase Sequence Voltage Trip] Ph.Se.T	——	——	——
224	[Voltage Phase Loss Trip] Break ph.T	——	——	——
225	[I Bus PT Input] I PT Invest.	——	——	——
226	[II Bus PT Input] II PT Invest.	——	——	——
227	[PT Parallel] PT Juxtaposition	——	——	——
228	[1,2 In-coming Primary power loss Alarm] 1,2 Main supply outage.A	——	——	——
229	[Remote Parallel] Remote Juxtaposition	——	——	——

230	[Remote Disconnection] Remote Splitting	——	——	——
231	[Bus Charge Trip] B.Cha.T	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
232	[Secondary CT Over Voltage Trip] CT Se.OVP.T	——	——	——
233	[Secondary CT Over Voltage Alarm] CT Se.OVP.A	——	——	——
234	[Isolation Handcart Intertrip] Iso.Handcart.T	——	——	——
235	[Standby Power Automatic Switch Permission] Standby allowed	——	——	——
236	[Close Circuit Breaker Signal Permission] Allowable C.signal	——	——	——
237	[Diesel Generator Standby Power Automatic Switch Trip Bus] Die.S.T.B.			
238	[Standby Power Automatic Switch Start Diesel Generator Signal] S.Sta.Die.Sig.			
239	[High oil Alarm] High oil.A			
240	[Loss of Voltage Trip Bus] No-Vol.T.B.			

241	[Negative sequence Time-limited overcurrent] I2>>	I2	Float	A
		Maximum Current Im	Float	A
242	[Differential total start flag]	——	——	——
243	[Instantaneous Differential Differential quick break protection]	Action time	Float	s
		Differential IA IdA	Float	A
		Differential IB IdB	Float	A
		Differential IC IdC	Float	A
		Restraint IA IrA	Float	A
		Restraint IB IrB	Float	A
		Restraint IC IrC	Float	A
244	[Differential protection with Ratio Restraining] Ratio differential protection	Action time	Float	s
		Differential IA IdA	Float	A
		Differential IB IdB	Float	A
		Differential IC IdC	Float	A
		Restraint IA IrA	Float	A
		Restraint IB IrB	Float	A

		Restraint IC IrC	Float	A
245	[Differential current overshoot]	Differential IA IdA	Float	A
		Differential IB IdB	Float	A
		Differential IC IdC	Float	A
246	[Positive sequence Instantaneous overcurrent] I1>>>	Fixed value	Float	A
		Delayed	Float	s
		Positive sequence current I1	Float	A
247	[Positive sequence Time-limited overcurrent] I1>>	Fixed value	Float	A
		Delayed	Float	s
		Positive sequence current I1	Float	A
248	[Positive sequence Inverse Definite Time overcurrent] I1>InverseT.	Curve type	Integer	S1/S2/S3
		Starting current	Float	A
		Time coefficient	Float	s
		Action time	Float	s
		Positive sequence current I1	Float	A
249	[Starting time-out Alarm Long start protection alarm]	Timing threshold	Float	A
		action time	floating point number	s

		Action time	Float	
250	[Unbalance current Alarm] Unb.I.A	Fixed value	Float	A
		Delayed	Float	s
		Action value	Float	A
		Iavg	Float	A
251	[Unbalance Voltage Alarm] Unb.V.A	Fixed value	Float	V
		Delayed	Float	s
		Action value	Float	V
		Average Voltage Uavg	Float	V
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
252	[Over Voltage Alarm] OVP.A	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Residual Voltage U0	Float	V
253	[Residual Over Voltage Alarm] U0.OVP.A	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V

		UBC	Float	V
		UCA	Float	V
		Residual Voltage U0	Float	V
254	[Positive Over Voltage Alarm] U1.OVP.A	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Positive Voltage U1	Float	V
255	[Positive Over Voltage Trip] U1.OVP.T	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Positive Voltage U1	Float	V
256	[Negative Over Voltage Alarm] U2.OVP.A	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V

		Negative Voltage U2	Float	V
257	[Negative Over Voltage Trip] U2.OVP.T	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Negative Voltage U2	Float	V
258	[Under Voltage Alarm] LVP.A	Fixed value	Float	V
		Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Residual Voltage U0	Float	V
259	[Incorrect Phase Sequence Voltage Alarm] Ph.Se.A	Delayed	Float	s
		UAB	Float	V
		UBC	Float	V
		UCA	Float	V
		Residual Voltage U0	Float	V
		Positive Voltage U1	Float	V

		Negative Voltage U2	Float	V
		Average Voltage Uavg	Float	V
260	[I CT Break Alarm] F.CT Break.A	——	——	——
261	[II CT Break Alarm] T.CT Break.A	——	——	——
262	[I02 ground fault Post-acceleration overcurrent] I02>P.T	t	Float	s
		I02	Float	A
263	[I02 ground fault Post-acceleration overcurrent Alarm] I02>P.A	t	Float	s
		I02	Float	A
264	[Long term start of differential protection]	Differential IA IdA	Float	A
		Differential IB IdB	Float	A
		Differential IC IdC	Float	A
265				
266				
267	[I CT Break Alarm] I CT Break.A	——	——	——
268	[II CT Break Alarm] II CT Break.A	——	——	——

269	[III CT Break Alarm] III CT Break.A	——	——	——
270	[IV CT Break Alarm] IV CT Break.A	——	——	——
271	[Voltage and current trip Pressure and current outlet action]	——	——	——
272				
	Reserve			
289				
290	[Start air-cooled water chiller]	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
291	[Blocking voltage regulation]	Ia	Float	A
		Ib	Float	A
		Ic	Float	A
292	[Transient ground fault Instantaneous overcurrent] Clearance I0>>>	Transient ground fault current Clearance I0	Float	A
293	[Transient ground fault Time-limited overcurrent] Clearance I0>>	Transient ground fault current Clearance I0	Float	A
294	[I Bus PT Input] I PT Invest.	——	——	——
295	[II Bus PT Input] II PT Invest.	——	——	——
296	[PT auto-Parallel] PT Juxtaposition	——	——	——
297	remote control parallel	——	——	——

	[Remote Parallel] Remote Juxtaposition			
298	[Remote Disconnection] Remote Splitting	——	——	——
299	[Load Control Trip] Neg.Con.T	t	Float	s
300	[Load Control Alarm] Neg.Con.A	t	Float	s
301	[PT Disconnection] PT Splitting	——	——	——
302	[Second Harmonic Block] SHB.	Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
303	[1 In-coming Spare power, 2 In-coming Primary power, trip Unimportant Load] 1S.2T.Unimp.Lo.	——	——	——
304	[2 In-coming Spare power, 1 In-coming Primary power, trip Unimportant Load] 2S.1T.Unimp.Lo.	——	——	——
305	[I02 ground fault Definite time overcurrent] I02>	I02	Float	A
306	[I02 ground fault Definite time overcurrent Alarm] I02>.A	I02	Float	A
307	[Maintenance Block] Maint.Sta.B.	——	——	——

308	[Motor Temperature 1 Trip] M.Tem1.T	——	——	——
309	[Motor Temperature 1 Alarm] M.Tem1.A	——	——	——
310	[Motor Temperature 2 Trip] M.Tem2.T	——	——	——
311	[Motor Temperature 2 Alarm] M.Tem2.A	——	——	——
312	[Power Monitor Trip] Pow.Monit.T	——	——	——
313	[Power Monitor Alarm] Pow.Monit.A	——	——	——
314	[Standby Power Automatic Switch Stop Diesel Generator Signal] S.St.Die.Sig.			
315	[Starting Cabinet Failure Trip] St.Cab.Fa.T	——	——	——
316	[Starting Cabinet Failure Alarm] St.Cab.Fa.A	——	——	——
317	[Synchronous Close Permission] Synchronous.C	——	——	——
318	[In-coming Reset Charge] In.R.Charge	——	——	——
319	[Diesel Generator Charge] Die.Charge	——	——	——
320	[Power Supply Reset Charge] Mark.R.Charge	——	——	——
321	Diesel engine recharges	——	——	——

	[Diesel Generator Reset Charge] Die.R.Charge			
322	[Diesel Generator Standby Power Automatic Switch Close Diesel Generator] Die.S.C.D.	——	——	——
323	[Power Supply Standby Power Automatic Switch Reset Trip Diesel Generator] Mark.R.T.D.	——	——	——
324	[Power Supply Standby Power Automatic Switch Reset Close Power Supply] Mark.R.C.Mark.	——	——	——
325	[Diesel Generator Standby Power Automatic Switch Reset Close Diesel Generator] Mark.R.C.D.	——	——	——
326	[Arc flash Protection Trip] Arc.Pro.T	——	——	——
327	[Arc flash Protection Alarm] Arc.Pro.A	——	——	——
328	[Loss of Voltage 1 In-coming Charge] No-Vol.1-In.Charge	——	——	——
329	[Loss of Voltage 2 In-coming Charge] No-Vol.2-In.Charge	——	——	——
330	[Loss of Voltage Close 2 In-coming] No-Vol.C.2	——	——	——
331	[Loss of Voltage Trip 1	——	——	——

	In-coming] No-Vol.T.1			
332	[Loss of Voltage Trip 3 In-coming] No-Vol.T.3	——	——	——
333	[Ia Second Harmonic Block] A.SH.	Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
334	[Ib Second Harmonic Block] B.SH.	Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A
335	[Ic Second Harmonic Block] C.SH.	Ia Second Harmonic Ia_H2	Float	A
		Ib Second Harmonic Ib_H2	Float	A
		Ic Second Harmonic Ic_H2	Float	A