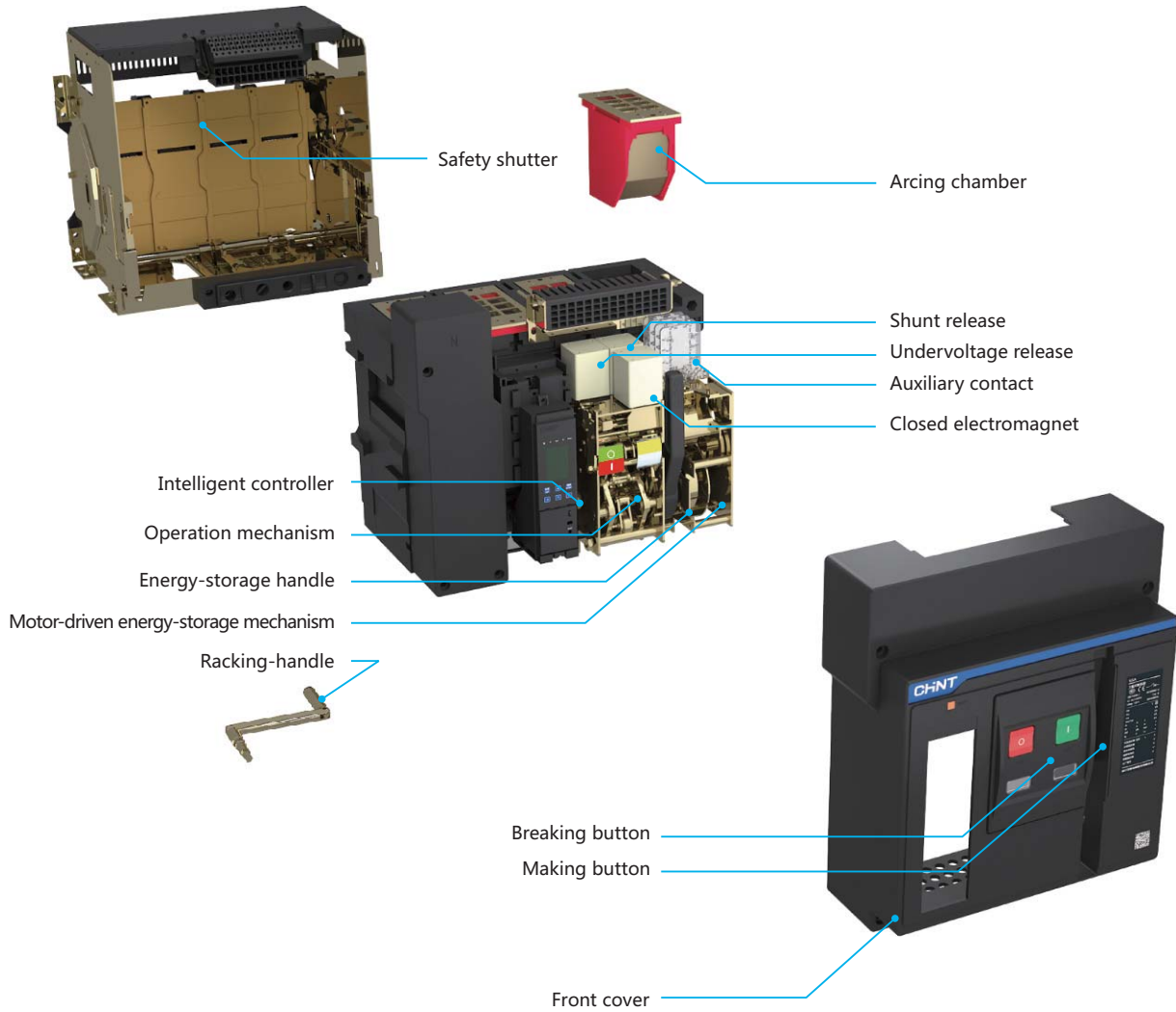
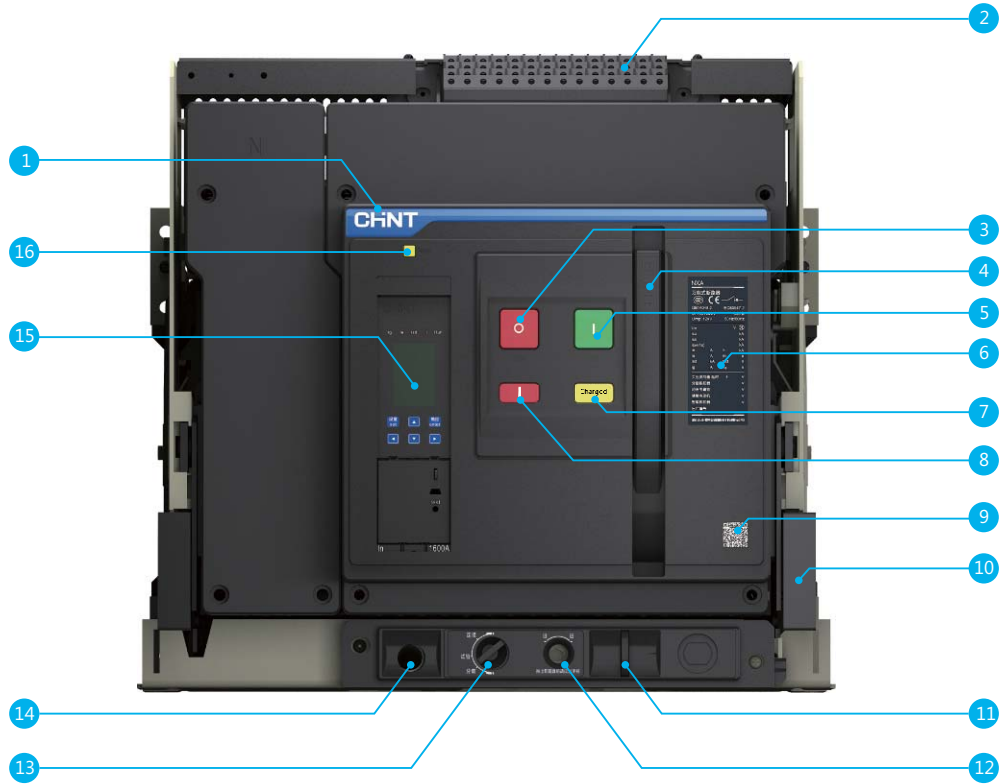


## Structural features of the circuit breaker



## Circuit breaker description



- |                                    |   |
|------------------------------------|---|
| 1 Trademark                        | 9 QR code   |
| 2 Secondary wiring terminal        | 10 Extraction draw plate (only applicable to draw-out type)           |
| 3 Breaking button                  | 11 "Disconnected" position locking (only applicable to draw-out type) |
| 4 Energy-storage handle            | 12 Racking-handle entry (only applicable to draw-out type)            |
| 5 Making button                    | 13 Position indication (only applicable to draw-out type)             |
| 6 Nameplate                        | 14 Racking-handle storage (only applicable to draw-out type)          |
| 7 Energy-storage/release indicator | 15 Intelligent controller   |
| 8 Breaking/making indicator        | 16 Fault-breaking indicator reset button                              |





### Circuit breaker

- Frame size (A): 1600, 2000, 3200, 4000
- Breaking capacity: N,S,H
- Rated operational voltage Ue (VAC): 380/400/415
- Number of poles: 3P, 4P
- Installation method: draw-out type, fixed type
- Wiring type: horizontal rear connection

### Operation conditions and environment adaptability

- Operation temperature:
  - The electrical and mechanical characteristics are applicable to the ambient temperature of -5°C-+40°C. NXA can also operate in the ambient temperature of -45°C-+70°C (M type, A type), -20°C-+70°C (P type, H type, CD-1), the derating factor is seen in P21-22.
- Storage conditions: apply to -45°C-70°C
- NXA can resist the following electromagnetic interference
  - Overvoltage generated by electromagnetic interference
  - Overvoltage caused by environment interference or a power distributing system
  - Electrostatic discharge of radio waves (radio, intercom, radar and the like)
- The NXA circuit breaker has successfully passed the test for electromagnetic compatibility specified according to the following standards (EMC) IEC/EN 60947-2 Annex F
  - The test can guarantee no false tripping and no interference on tripping time
- Protection grade:
  - Front IP 20, other side IP 00

### Intelligent controller

- M type (basic type)
  - Basic function: Current measurement and display, protective function L S I&G
- A type (current type)
  - Comprising all protective functions of M type
  - Unbalanced current protection
- P type (power type)
  - Basic function, protective function: L, S, I&G
  - Power measurement functions of current, voltage, power etc.
  - LCD display
- H type (harmonic type)
  - Comprising all protection and measurement functions of P type
  - Harmonic measurement and analysis
  - Communication function



### Connection

- Rear connection
  - Horizontal connection
- Optional accessories
  - Interphase barrier

### Lock

- Padlocks of "Making" and "Breaking" push button
- Position padlock (for locking the circuit breaker at disconnected position)
- Chassis padlock
- Door interlock: the circuit breaker is arranged at the connected or test part so as to prohibit to open the door

### Indication contact

- Standard contact
  - Making and breaking indication contacts
  - Fault tripping indication contact
  - Spring charged indication contact
- Optional accessories
  - Position indication contact

### Remote operation

- Standard accessories
  - Electric operating mechanism
  - Closing electromagnet CC
  - Shunt release ST
- Optional accessories
  - Standard undervoltage release: UVT
  - UVT delay unit: UVTD

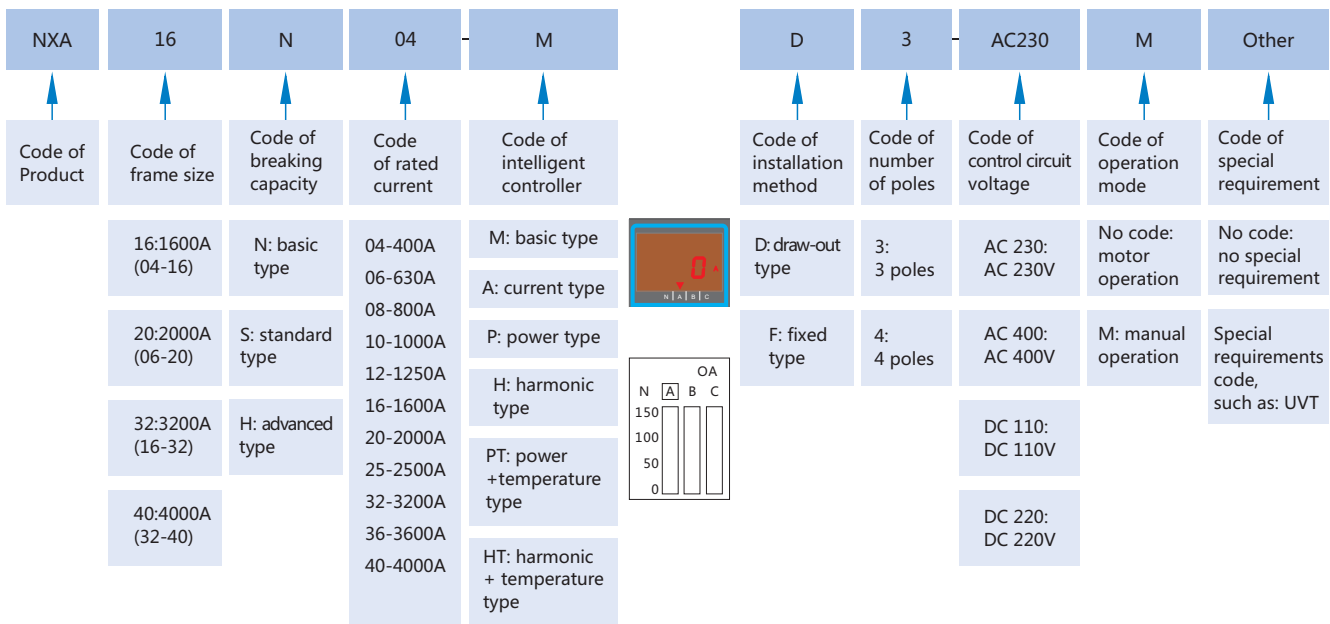
### Source-changeover systems

- Mechanical interlock
  - 1 normal and 1 replacement
  - 2 incoming and 1 busbar
- Source-changeover controller (with adaptor)
  - 1 normal and 1 replacement: mechanical interlock+2A type controller
  - 2 incoming and 1 busbar: mechanical interlock+3A type controller

**NXA series air circuit breaker**

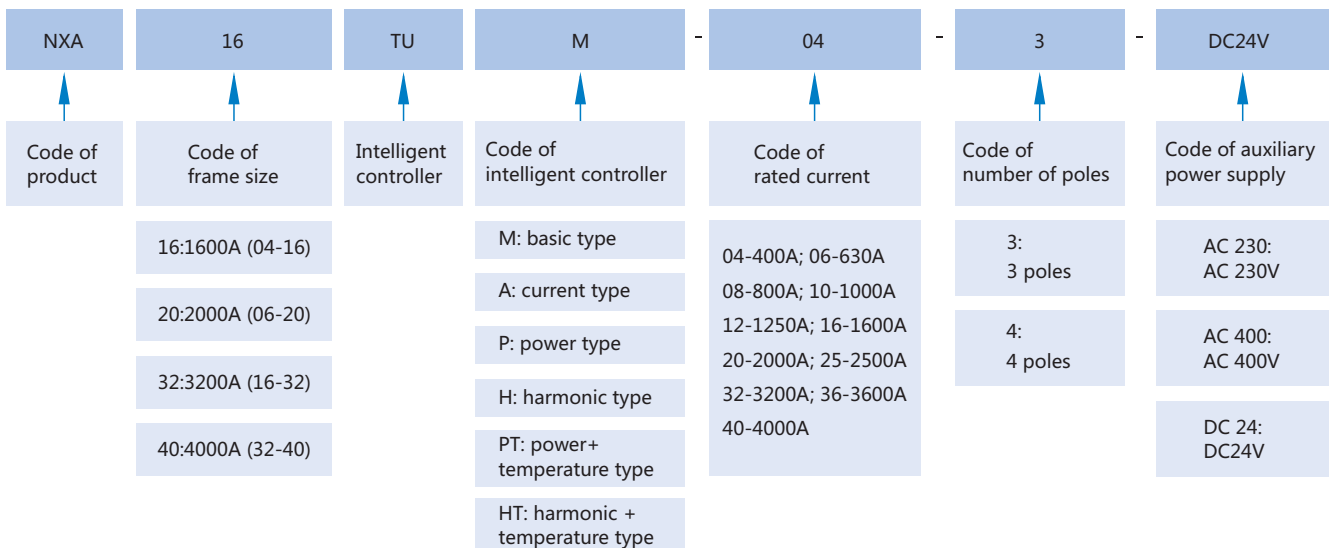
Frame size	Breaking capacity	Rated current											
		400	630	800	1000	1250	1600	2000	2500	3200	3600	4000	
1600A	N	■	■	■	■	■	■						
	H	■	■	■	■	■	■						
2000A	N		■	■	■	■	■	■					
	H		■	■	■	■	■	■					
3200A	N						■	■	■	■			
	H						■	■	■	■			
4000A	N									■	■	■	
	H									■	■	■	

**Model definition and description**



- <sup>1)</sup> Intelligent controller PT/HT type. The basic functions are the same with P/H type. T refers to the internal temperature measurement function.
- <sup>2)</sup> Manual operation does not contain motor-driven mechanism, closing electromagnet and shunt release. Motor operation contains all standard accessories of remote operation.
- <sup>3)</sup> Auxiliary working voltage of the intelligent controller: corresponding power modules is required if DC220V or DC110V is selected.
- <sup>4)</sup> NXA16N10-AD3-AC230: frame size is 1600A, N type breaking capacity, rated current is 1000A, A type intelligent controller, draw-out type and 3 poles, control voltage is AC 230V motor operation.

**Model definition and description-intelligent controller**





### Model definition and description-accessories

NXA	16	-	CC	-	230VAC
↑	↑		↑		↑
Code of product	Frame size		Code of accessories		Code of rated voltage
	16:1600A		CC: Closed electromagnet		230VAC: AC230V
	20:2000A		ST: Shunt tripper		400VAC: AC400V
	32:3200A		UVT: Undervoltage tripper		110VDC: DC110V
	40:4000A		MO: Motor		220VDC: DC220V
	20/40:2000A-4000A		UVTD:UVT delay unit		
	20/32:2000A-3200A				

### Model definition and description-accessories

NXA	16	OF	C04
↑	↑	↑	↑
Code of product	Frame size	Code of accessories	Specification of accessories
	16:1600A	OF: Auxiliary contact	C04: Four groups of contacts
	20:2000A		C05: Five groups of contacts
	32:3200A		C06: Six groups of contacts
	40:4000A		N3: Three normally open and three normally closed
	20/40:2000A-4000A		N4: Four normally open and four normally closed
	20/32:2000A-3200A		N5: Five normally open and five normally closed
			1S1S: One lock and one key
			2S1S: Two locks and one key
			3S2S: Three locks and two keys
			KL: Key lock
		FCDP: Fixed type door frame	
		DCDP: Draw-out type door frame	
		FD: Fixed type interphased partition	
		DD: Draw-out type interphased partition	
		CE-CD-CT: Position signal	
		ILK2: Mechanical interlocking two interlocking steel cables	



## Technical Parameters

### Features

Number of poles	3/4	
Rated operational voltage Ue (V)	380/400/415	
Rated insulation voltage Ui (V)	1000	
Rated impulse withstand voltage Uimp (kV)	12	
Rated frequency Hz	50/60	
Flashover distance (mm)	0	
Applicable to isolation	IEC/EN 60947-2	Applicable
Pollution grade	IEC 60664-1	N:3

### Frame size

Rated current (A)	
Rated current of the fourth pole (A)	

### Type of the circuit breaker

Rated ultimate short circuit breaking capacity (kA rms) VAC 50/60Hz	Icu	380/400/415V
Rated service short circuit breaking capacity (kA rms) VAC 50/60Hz	Ics	380/400/415V
Utilization category		
Rated short-time withstand current (kA rms) VAC 50/60Hz	Icw	1s, 380/400/415V
Closed capacity (kA peak) VAC 50/60Hz	Icm	380/400/415V
Making current tripping protection function (MCR kA rms)		
Breaking time (ms)		
Closing time (ms)		

### Installation, connection and service life

Service life C/O cycle	Mechanical	Without maintenance
	Electrical	Without maintenance
Connection	Horizontal	
Size (width × depth × height)	Fixed type	3P
		4P
	Draw-out type	3P
		4P



			1600A				2000A				3200A				4000A				
	400	630	800	1000	1250	1600	630	800	1000	1250	1600	2000	1600	2000	2500	3200	3200	3600	4000
	400	630	800	1000	1250	1600	630	800	1000	1250	1600	2000	1600	2000	2500	3200	3200	3600	4000
			N	S	H		N	S	H		N	S	H		N	S	H		
	50	42	55			80	65	80			80	80	100		80	85	100		
	30	42	42			50	65	65			65	80	80		65	85	85		
	B			B			B			B			B						
	30	42	42			50	65	65			65	80	80		65	85	85		
	105	88.2	121			176	143	176			176	176	220		176	187	220		
	10	16	16			16	16	16			26	26	26		26	26	26		
	32			32			32			32			32						
	70			70			70			70			70						
	15000			15000			15000			10000			10000						
	8000			8000			8000			7000			3000						
	■			■			■			■			■						
	254×243.5×318.5			374×344×400			439×373.5×400			550×337.5×400									
	324×243.5×318.5			469×344×400			554×373.5×400			700×337.5×400									
	308×331.5×351			403×430×438.5			463×499.5×438.5			569×416×438.5									
	378×331.5×351			498×430×438.5			578×499.5×438.5			719×416×438.5									



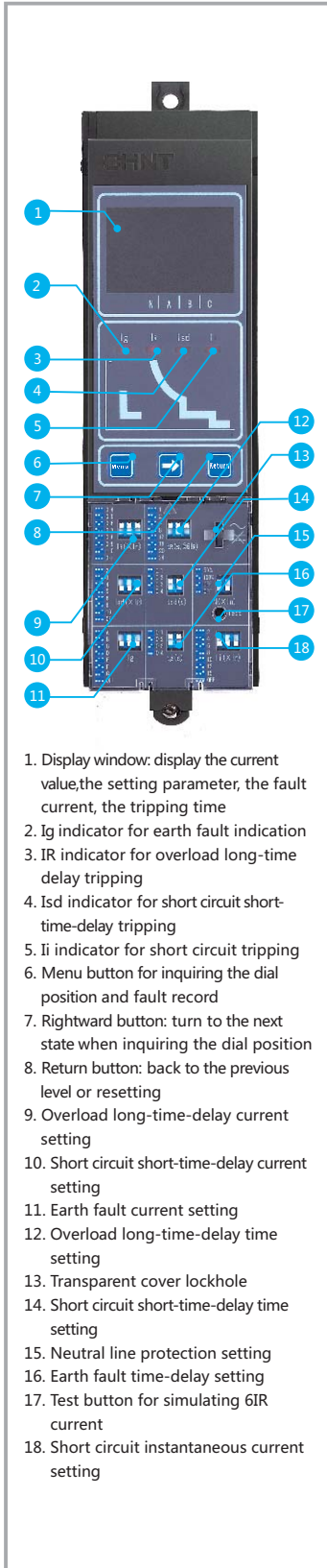
## Intelligent Controller

### M type intelligent controller (Basic type)

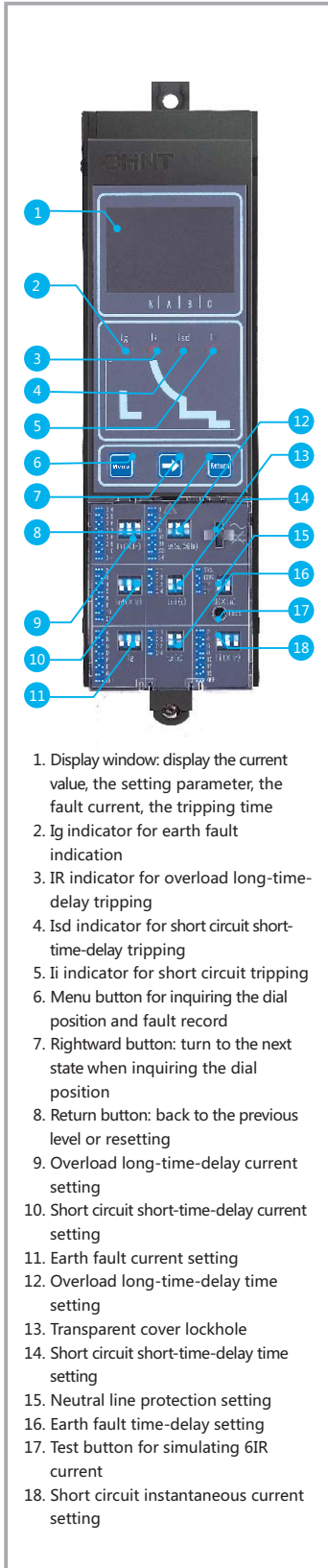
#### Protection

All the protective threshold and time delay are set by a dial switch

- Overload protection
  - True RMS long-time-delay protection
  - Thermal memory: heat accumulation before and after tripping
  
- Short circuit protection
  - Short-time delay (RMS) and instantaneous protection
  - Optional four steps time-delay setting
  
- Earth fault protection
  - Optional four steps time-delay setting
  
- Neutral line overcurrent protection (4P)
  - The neutral protective threshold can be adjusted to 50%, 100% and OFF
  
- Test function
  - Simulating 6IR test current for test tripping
  
- Tripping record function
  
- Ampere meter
  - Measure the real and effective value (RMS) of current with the precision of 2% for 40% to 150% in setting



1. Display window: display the current value, the setting parameter, the fault current, the tripping time
2. Ig indicator for earth fault indication
3. IR indicator for overload long-time delay tripping
4. Isd indicator for short circuit short-time-delay tripping
5. Ii indicator for short circuit tripping
6. Menu button for inquiring the dial position and fault record
7. Rightward button: turn to the next state when inquiring the dial position
8. Return button: back to the previous level or resetting
9. Overload long-time-delay current setting
10. Short circuit short-time-delay current setting
11. Earth fault current setting
12. Overload long-time-delay time setting
13. Transparent cover lockhole
14. Short circuit short-time-delay time setting
15. Neutral line protection setting
16. Earth fault time-delay setting
17. Test button for simulating 6IR current
18. Short circuit instantaneous current setting

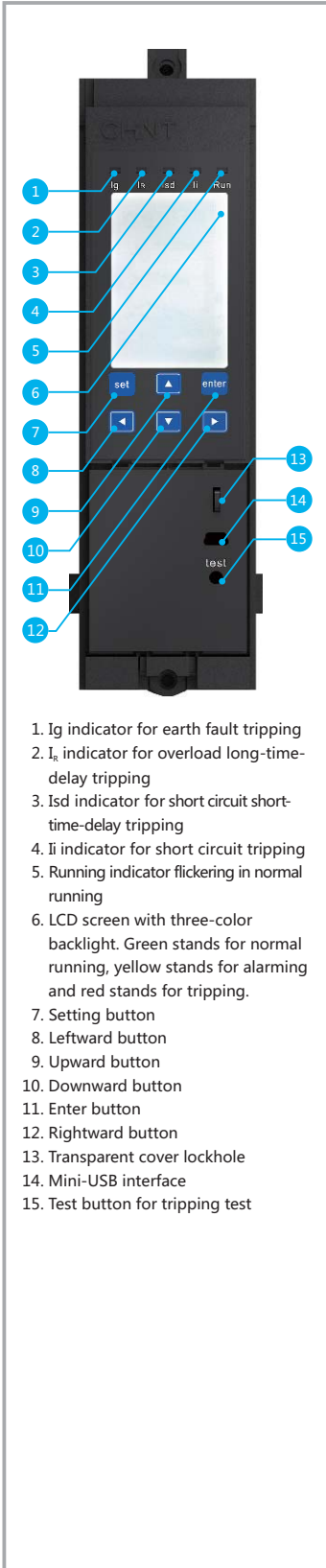


### A type intelligent controller (Current type)

#### Protection

Setting all the protective threshold values and a dial switch for time delay. The setting values can be displayed on LCD display window.

- Overload protection
  - True RMS long-time-delay protection
  - Thermal memory: heat accumulation before and after tripping
  
- Short circuit protection
  - Short-time delay (RMS) and instantaneous protection
  - Optional four steps time-delay setting
  
- Earth fault protection
  - Optional four steps time-delay setting
  
- Neutral line overcurrent protection (4P)
  - The neutral protective threshold can be adjusted to 50%, 100% and OFF
  
- Unbalanced current protection
  - Protecting phase failure or three phase unbalance
  
- Test function
  - Simulating 6IR test current for test tripping
  
- Tripping record function
  
- Ampere meter
  - Measure the real and effective value (RMS) of current with the precision of 2% for 40% to 150% in setting



1. Ig indicator for earth fault tripping
2. Ir indicator for overload long-time-delay tripping
3. Isd indicator for short circuit short-time-delay tripping
4. Ii indicator for short circuit tripping
5. Running indicator flickering in normal running
6. LCD screen with three-color backlight. Green stands for normal running, yellow stands for alarming and red stands for tripping.
7. Setting button
8. Leftward button
9. Upward button
10. Downward button
11. Enter button
12. Rightward button
13. Transparent cover lockhole
14. Mini-USB interface
15. Test button for tripping test

### P type intelligent controller (Power type)

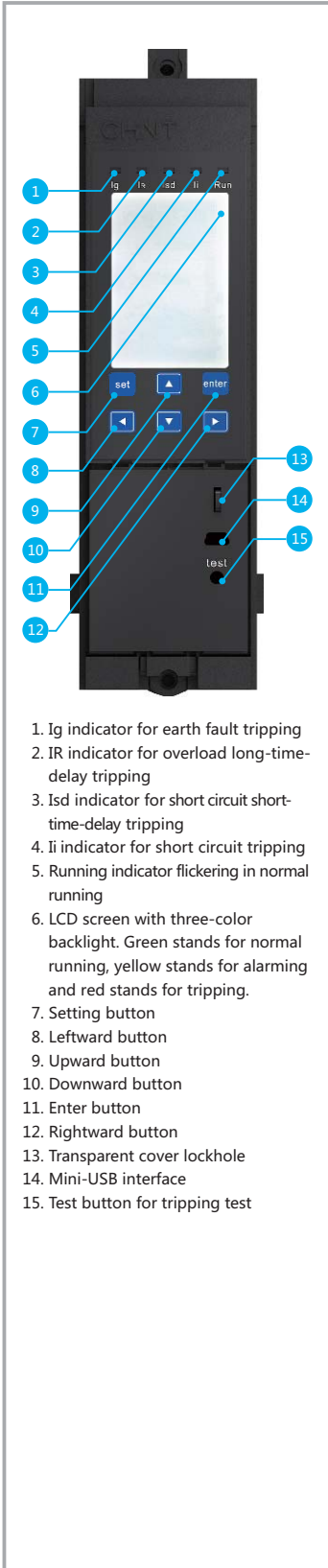
#### Protection

Setting all protective threshold values and time-delay

- Protection functions of all A type control units are included
- Earth current protection function (Optional)
  - External transformer and protection module are configured
- Advanced protection function
  - Unbalanced voltage protection
  - Overvoltage and undervoltage protection
  - Overfrequency and underfrequency protection
  - Phase sequence protection
  - Reverse power protection function
  - Required value protection function

The required value of the real and effective value of each current is calculated within a measurement window. When the required value is off limit, the protection action is carried out. The setting of a sliding time window is in the menu of "setting of a measurement meter".

- A-phase maximal required current value,
- B-phase maximal required current value,
- C-phase maximal required current value,
- N-phase maximal required current value are respectively set for each circumstance of the required value protection without being affected by the setting of the neutral line protection.
- Extended function
  - Self-diagnosis by the intelligent controller
  - Operation times/fault tripping/alarming/deflection recording function provides the latest eight times of recording
  - Main contact abrasion display function for evaluating the contact abrasion degree according to mechanical life, electrical services and breaking capacities of different frames.
  - Internal clock function
  - A Mini-USB interface is connected with a PC to achieve the functions of protection setting, fault record downloading, whole power quantity detection and parameter reading of a circuit breaker.
  - "test" push button
- Electric energy meter
  - Current measurement
  - Voltage measurement
  - Frequency measurement
  - Required value measurement
  - Power (active power, reactive power and apparent) measurement
  - Electric energy (active power, reactive power and apparent) measurement
  - Power factor measurement
- Busbar temperature measurement (Optional)
  - The temperature of the busbar is measured by a temperature transformer in the busbar, and can be display on a LCD screen in real time. Customers can set the temperature threshold value and set the alarm.
- LCD three-color backlight
  - Green stands for normal running, yellow stands for alarming and red stands for tripping.



1. Ig indicator for earth fault tripping
2. IR indicator for overload long-time-delay tripping
3. Isd indicator for short circuit short-time-delay tripping
4. Ii indicator for short circuit tripping
5. Running indicator flickering in normal running
6. LCD screen with three-color backlight. Green stands for normal running, yellow stands for alarming and red stands for tripping.
7. Setting button
8. Leftward button
9. Upward button
10. Downward button
11. Enter button
12. Rightward button
13. Transparent cover lockhole
14. Mini-USB interface
15. Test button for tripping test

### H type intelligent controller (Harmonic wave type)

#### Protection

Setting all protective threshold values and a button for time-delay

Besides the protective extended function of all P type control units,

H type control unit also comprises:

- Load monitoring function
- Zone selective interlock (ZSI)
- Communication function
  - Modbus-RTU communication protocol
- Input/output function
  - 2DI, 2DO or 4DO
  - DI signal: AC230V ( Standard configuration, and others can be selected); AC400V; DC110V; DC220V; DC24V
  - DO needs to be configured with a power supply module (24VDC output) and a relay module.
- Harmonic analysis function
  - Measurement of the fundamental wave current, the fundamental wave line voltage, the fundamental wave phase voltage, the fundamental wave power and each 3-31 odd harmonic wave current percentage (HRIh), the harmonic voltage percentage (HRUh), the total harmonic wave current distortion rate (THDi, thdi) and the total harmonic wave voltage distortion rate (THDu, thdu).
  - The harmonic wave percentage(HR) refers to the ratio of root-mean-square value of the Nth harmonic wave component contained in periodic alternative current quantity to the root-mean-square value of the fundamental wave component, and is expressed in percentage.

## Protection Features

The protection features of the intelligent controller comprise inverse time characteristic and constant time characteristic. When the fault current exceeds the set value of the inverse time limit, the controller performs constant time protection. The inverse time limit corresponds to the feature curve  $I^2t$ .

### Overload long-time-delay protection feature

Overload long-time-delay protection action threshold value  
 < 1.05IR : > 2h, no action  
 > 1.3IR : < 1h, action

Ir current setting value range: 0.4In, 0.5 In, 0.6 In, 0.7 In, 0.8 In, 0.9 In, 1.0 In+OFF  
 Inverse time limit action feature:  $I^2t$ , wherein  $t=(6/N)^2 \cdot t_r$

Setting Multiple of Current	Action Time							
1.5I <sub>R</sub>	16	32	64	128	192	256	320	384
2I <sub>R</sub>	9	18	36	72	108	144	180	216
6I <sub>R</sub>	1	2	4	8	12	16	20	24

Note: N --- the multiple I/IR obtained by dividing failure current by set current  
 t --- time delay action of the failure action  
 t<sub>r</sub> --- long-time-delay set value  
 Allowed error of the action time ±15%

### Short circuit short-time-delay protection feature

Short circuit short-time-delay protection action threshold value  
 < 0.85Isd: no action  
 > 1.15Isd: action  
 Isd current set value range: 2I<sub>R</sub>, 3I<sub>R</sub>, 4 I<sub>R</sub>, 5I<sub>R</sub>, 6I<sub>R</sub>, 8I<sub>R</sub>, 10I<sub>R</sub> +OFF (MAX 50kA)

Current	Action time		Remark
Isd < I ≤ 10I <sub>R</sub>	Inverse time limit	Action feature $I^2t = (10I_R)^2 \cdot tsd$	P, H
		Setting time s 0.1, 0.2, 0.3, 0.4	
1 ≥ 1.1Isd	Constant time limit	Setting time s 0.1, 0.2, 0.3, 0.4	M, A, P, H
		Minimum s 0.06, 0.16, 0.255, 0.34	
	Maximum s 0.14, 0.24, 0.345, 0.46		
	Return time	0.05, 0.14, 0.25, 0.33	

Note: Isd---short-time-delay current set value  
 I--- failure current value  
 IR--- long-time-delay set value  
 t--- failure action time-delay time  
 tsd---short-time-delay inverse time limit set value  
 Permissible error of action time ±15%



### Short circuit instantaneous protection features

Short circuit instantaneous protection action threshold value

< 0.85I<sub>i</sub>: no action

> 1.15I<sub>i</sub>: action

The current setting value of instantaneous action: 2I<sub>n</sub>, 4I<sub>n</sub>, 6I<sub>n</sub>, 8I<sub>n</sub>, 10I<sub>n</sub>, 12I<sub>n</sub>, 15I<sub>n</sub>+OFF(NXA40 MAX50kA)

Note: action time ≤ 50ms

### Earth fault protection action features

Earth fault protection action threshold value

< 0.9I<sub>g</sub>: no action

> 1.1I<sub>g</sub>: action

Current setting value	A	B	C	D	E	F	G	OFF
NXA16, 20	0.2I <sub>n</sub>	0.3I <sub>n</sub>	0.4I <sub>n</sub>	0.5I <sub>n</sub>	0.6I <sub>n</sub>	0.8I <sub>n</sub>	I <sub>n</sub>	
NXA32, 40, 63	500A	640A	800A	960A	1040A	1120A	1200A	
<b>T<sub>g</sub>(s)</b>	<b>Inverse time limit</b>	<b>Action features</b>						

$$t = \frac{(I_g)^2}{I^2} \times t_g$$

Constant time limit	Setting time (s)	0.1	0.2	0.3	0.4
	Minimum (s)	0.06	0.16	0.255	0.34
	Maximal (s)	0.14	0.24	0.345	0.46
	Return time	0.05	0.14	0.25	0.33

Note: I<sub>g</sub> --- earth fault protection setting value. When I<sub>n</sub> ≥ 1250A, I<sub>g</sub> = 1200A. When I<sub>n</sub> < 1250A, I<sub>g</sub> = I<sub>n</sub>. When I<sub>n</sub> ≥ 1250A, I<sub>g</sub> MAX = 1200A

I --- failure current value

t --- failure action time-delay time

t<sub>g</sub> --- earthing inverse time limit set value

The permissible error of the inverse time limit action time: ±15%

## Measurement Precision Of The Intelligent Controller

Current measurement	
Measurement range	Ia, Ib, Ic and IN are not less than 15In (rated current of the circuit breaker)
Measurement precision	Below 0.1In: the measurement is inaccurate
	0.1In-0.4In: the accuracy will be changed linearly from 5% to 2%
	0.4In-1.5In: the accuracy is 2%
	> 1.5In: the accuracy will be changed linearly from 2% to 15%
The measurement accuracy of the earthing current is 10%	

Voltage measurement	
Measurement range	Line voltage: 0V~1300V
	Phase voltage: 0V~900V
Measurement precision	Error: ±1%

Frequency	
Measurement range	40HZ~70HZ
Measurement precision	Error: ± 0.1HZ

Power	
Measurement mode	The effective value mode
Measurement content	3P type: total active power, total reactive power and total apparent power
	4P type: phase splitting active power, phase splitting reactive power, phase splitting apparent power, total active power, total reactive power, total apparent power
Measurement power	Active power: -32768KW~ + 32767KW
	Reactive power: -32768Kvar~ + 32767Kvar
	Apparent power: 0KVA~65535KVA
	Error: ±2.5%

Power factor	
Measurement content	3P type: total power factor 4P type: phase splitting power factor
Measurement range	-1.00~+1.00

Electric energy	
Measurement content	Input reactive electric energy EQin, output reactive electric energy EQout Input active electric energy EPin, output active electric energy EPOut Total active electric energy EPTotal, total reactive electric energy EQtotal, total apparent electric energy ESTotal
Measurement range	Active electric energy: -32768KWh~ + 32767KWh Reactive electric energy: -32768Kvarh~ + 32767Kvarh Apparent electric energy: 0~65535KVAh
Measurement precision	Error ±2.5%

Harmonic wave measurement	
Fundamental wave measurement	Current: Ia, Ib, Ic Voltage: Uab, Ubc, Uca
Total harmonic wave distortion THDu and thdu	THD: the total distortion rate of the harmonic wave relatively to the fundamental wave Thd: the total distortion rate of the harmonic wave relatively to the effective value
Amplitude wave spectrum of harmonic wave	The controller can display FFT amplitude of odd harmonic wave from 3 to 31in percentage
Measurement precision of control unit	±2%

