WDZ-5233 Motor management relay

Technical instruction

V1.02

Wiscom System Co., Ltd.

Preface

Thank you very much for purchasing **WDZ-5233** manufactured by Wiscom（Stock code: 002090）.

This technical instruction is for order only and has slight difference with the actual product. Thus if needed, please ask our design engineers for relative design drawings for engineering.

For more product information, instruction manual updates and services, please visit the Wiscom website http://www.wiscom.com.cn/.

Version: V 1.00
This instruction is for reference only.

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WDZ-5233 Motor management relay

1 Device functions

WDZ-5233 motor management relay is mainly applied to 10KV/below and 2000kW/above 3-phase asynchronous motor for protection, measurement and control function.

2 Protective functions and principles

WDZ-5233 motor management relay possesses all the functions of WDZ-5231 and WDZ-5232, except the magnetic balanced differential protection of WDZ-5231.

Please get to the section 2 of WDZ-5231 and WDZ-5232 for the detailed information.

Protection parameters

No.	Name	Symbol	Unit	Range
1	Rated motor current	I_e	A	0.20In-1.20In
2	Differential instantaneous current	I_{cdsd}	Ie	0.20-20.00
3	Minimum action current	I_{cdqd}	Ie	0.20-20.00
4	Ratio restraint slope	K		0.10-0.60
5	CT fuse-loss blocking percentage differential protection			On/Off
6	High action value, instantaneous current protection	I_{sdg}	A	0.20In-20.00In
7	Low action value, instantaneous current protection	I_{sdd}	A	0.20In-20.00In
8	Action time, instantaneous current protection	t_{sd}	s	0.00-10.00
9	Reverse power blocking instantaneous current protection			On/Off
10	Action current, 1^{st} zone negative overcurrent protection	I_{21dz}	A	0.20In-4.00In
11	Action time, 1^{st} zone negative overcurrent protection	t_{21dz}	s	0.10-20.00
12	Action current, 2^{nd} zone negative overcurrent protection	I_{22dz}	A	0.20In-4.00In
13	Action time, 2^{nd} zone negative overcurrent protection	t_{22dz}	s	0.10-100.00
14	Action curve, 2^{nd} zone negative overcurrent protection			Definite time/ Inverse time / Very inverse time/

No.	Name	Symbol	Unit	Range
				Extreme inverse time
15	Action mode, 2nd zone negative overcurrent protection			Alarm/Trip
16	Action current, 1st zone ZS overcurrent protection	I_{01dz}	A	0.010-6.000
17	Action time, 1st zone ZS overcurrent protection	t_{01dz}	s	0.00-10.00
18	Action mode, 1st zone ZS overcurrent protection			Alarm/Trip
19	Action current, 2nd zone ZS overcurrent protection	I_{02dz}	A	0.010-6.000
20	Action time, 2nd zone ZS overcurrent protection	t_{02dz}	s	0.10-100.00
21	Action mode, 2nd zone ZS overcurrent protection			Alarm/Trip
22	Action current, locked-rotor protection	I_{dz}	A	0.20In-20.00In
23	Action time, locked-rotor protection	t_{dz}	s	0.10-100.00
24	Action mode, locked-rotor protection			Alarm/Trip
25	Rated motor starting current	I_{qde}	A	0.20In-20.00In
26	Permitted motor locked-rotor time	t_{yd}	s	1.00-40.00
27	Action mode, startup overtime protection			Alarm/Trip
28	Action current, positive overcurrent protection	I_{1gl}	A	0.20In-12.00In
29	Action time, positive overcurrent protection	t_{1gl}	s	0.10-100.00
30	Action mode, positive overcurrent protection			Alarm/Trip
31	Action current, overload protection	I_{gfh}	A	0.20In-20.00In
32	Action time, overload protection	t_{gfh}	s	0.10-650.00
33	Action curve, overload protection			Definite time/ Inverse time / Very inverse time/ Extreme inverse time
34	Action mode, overload protection			Alarm/Trip
35	Overheat alarm value	θ_a		0.50-1.00
36	Restart overheat blocking value	θ_b		0.50-1.00
37	Heating time constant	T_{fr}	Min	1.00-100.00

No.	Name	Symbol	Unit	Range
38	Ventilating time	T_{sr}	Min	1.00-300.00
39	Action mode, overheat protection			Alarm/Trip
40	Action voltage, undervoltage protection	U_{qy}	V	10.00-100.00
41	Action time, undervoltage protection	t_{qy}	s	0.10-30.00
42	FC overcurrent blocking value	I_{fcbs}	A	1.00In-20.00In
43	Action time, non-electric quantity protection1	t_{KI1}	S	0.10-650.00
44	Action mode, non-electric quantity protection1			Alarm/Trip
45	Action time, non-electric quantity protection2	t_{KI2}	S	0.10-650.00
46	Action mode, non-electric quantity protection2			Alarm/Trip

Soft strap

No.	Name	Symbol	Range
1	Differential instantaneous protection		On/Off
2	Percentage differential protection		On/Off
3	CT fuse-loss alarm		On/Off
4	Current instantaneous protection		On/Off
5	1st zone negative current protection		On/Off
6	2nd zone negative current protection		On/Off
7	1st zone ground fault protection		On/Off
8	2nd zone ground fault protection		On/Off
9	Overheat protection		On/Off
10	Locked-rotor protection		On/Off
11	Startup overtime protection		On/Off
12	Positive overcurrent protection		On/Off
13	Overload protection		On/Off
14	Undervoltage protection		On/Off
15	PT fuse-loss alarm		On/Off
16	FC overcurrent blocking		On/Off
17	Fuse protection		On/Off
18	Non-electric quantity protection1		On/Off
19	Non-electric quantity protection2		On/Off
20	UV interlock protection		On/Off

3 Measurement and control functions

3.1 Measurement function

3-phase voltage, 3-phase current, active power, reactive power, power factor and frequency

3.2 DIs

Standard 24 DIs.

3.3 DOs

Standard 5 relay outputs with7 DO contacts.

3.4 Remote control

Remote CB trip/closing operation

3.5 Metering

Positive active power, positive reactive power, negative active power, negative reactive power metering function and positive active/reactive power pulse output function.

Active energy and reactive energy accumulation function can be supplied too.

3.6 Operating circuits

Operating circuit covers trip coil, closing coil, tripping position supervision, closing position supervision, tripping position signal output, closing position signal output, control circuit fuse-loss output, relay tripping output, remote tripping output, remote closing output, manual tripping input, manual closing input, DCS tripping input, relay tripping input, 2 channels of position intertripping or relay intertripping output etc.

3.7 4~20mA output

1 channel of 4～20mA output is supplied; 2 channels of 4~20mA outputs are optional.

3.8 Motor management

Motor starting time, max. start current and oscillographic waveform during starting;

Accumulated motor running time and last running time;

Accumulated motor trip times and closing times;

Accumulated motor start times stat.

4 Backboard terminals and connection diagram

4.1 Analog inputs

U_a、U_b、U_c: motor voltage (rated phase-to-phase: 100A), used by protection and measurement functions.

I_A、I_B、I_C: Measured current (rated: 5A or 1A), imported from special measurement CT.

I_{ah}、I_{bh}、I_{ch}: 3-phase protective current in motor terminal (rated: 5A or 1A).

$3I_0$: ZS current, imported from special ZS TA or made by itself. Secondary ZS current range:10mA～6A.

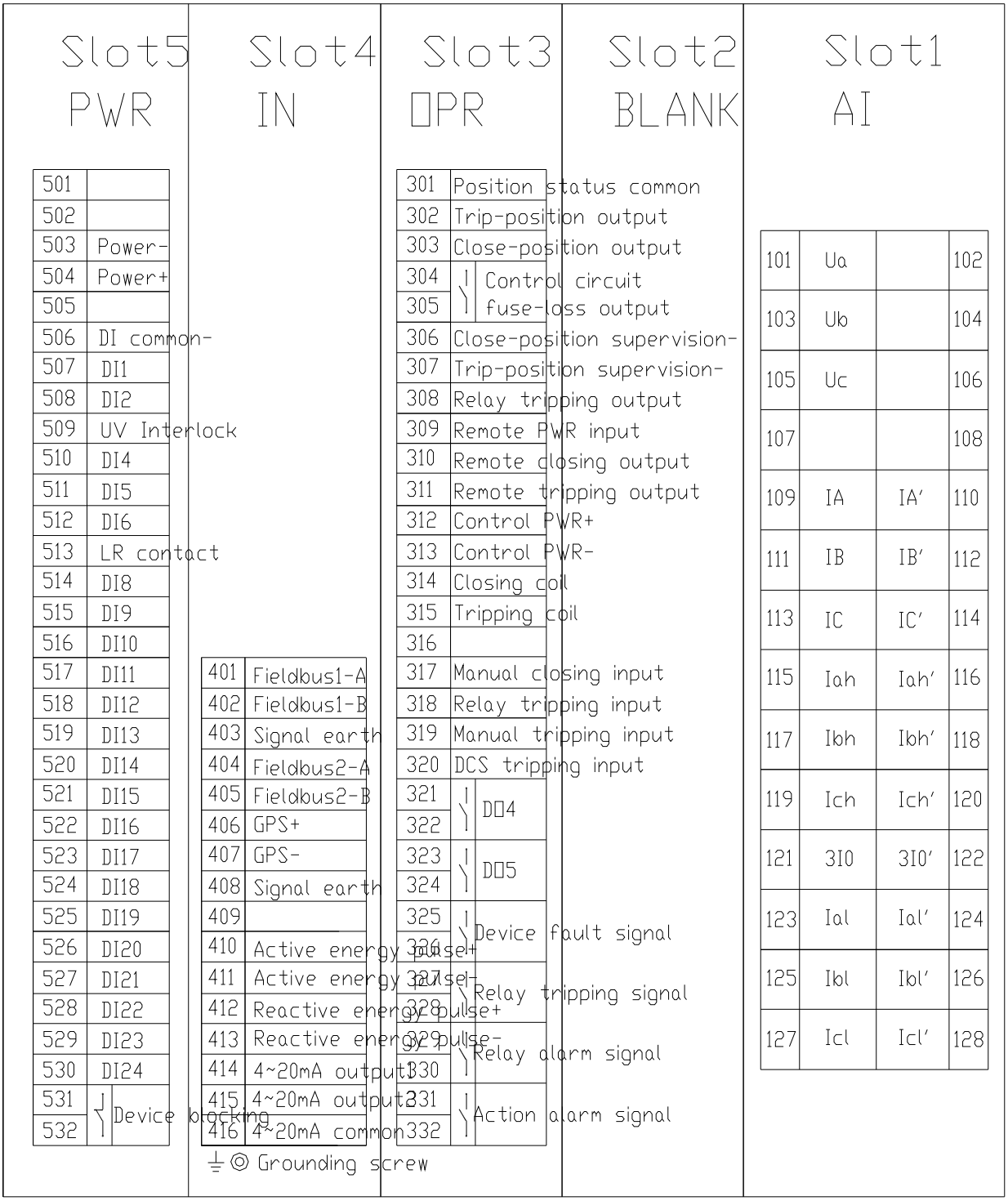
I_{al}、I_{bl}、I_{cl}: 3-phase protective current in motor neutral side (rated: 5A or 1A).

4.2 Backboard terminals

From the front view, the slots are arranged with number from 1 to 5 from left to right.

Terminal number has 3 digits. The first digit is the slot number and the last two digits are the terminal series number from above to below. Take 301 for example, it means the first terminal in slot3.

4.2.1 Basic terminal configuration with Operation board



Slot1：AI board

Terminal 101, 103 and 105: Line voltage inputs;

Terminal 109～110: Phase-A measured current input;

Terminal 111～112: Phase-B measured current input;

Terminal 113～114: Phase-C measured current input;

Terminal 115～116: Phase-A current input of motor terminal protection;

Terminal 117～118: Phase-B current input of motor terminal protection;

Terminal 119～120: Phase-C current input of motor terminal protection;

Terminal 121～122: Zero sequence current 3I0 input;

Terminal 123～124: Phase-A current input of motor neutral side protection;

Terminal 125～126: Phase-B current input of motor neutral side protection;

Terminal 127～128: Phase-C current input of motor neutral side protection;

Slot 2：Blank board

Slot 3: OPR board

Terminal 301~303: Position status output. 302～301: trip-position status output; 303～301:Close-position status output;

Terminal 304～305: Control circuit fuse-loss output;

Terminal 306: -Closing position supervision relay;

Terminal 307: -Trip position supervision relay;

Terminal 308: Relay tripping output（BTJ）,which can be connected to Terminal 318 directly or via press strap;

Terminal 309: + remote PWR input. Only when it is connected to the positive power source, remote tripping/ closing functions can be enabled then;

Terminal 310: Remote closing output（YHJ）, which can be connected to Terminal 317 directly or via press strap;

Terminal 311: Remote tripping output (YTJ), which can be connected to Terminal 319 directly or via press strap;

Terminal 312: +control power source input;

Terminal 313: -control power source input;

Terminal 314: CB closing coil;

Terminal 315: CB tripping coil;

Terminal 317: Manual closing input;

Terminal 318: Relay tripping input;

Terminal 319: Manual tripping input;

Terminal 320: DCS tripping input;

Terminal 321～322: DO4, Defaulted relay intertripping output, or it can be position intertripping via jumper selection;

Terminal 323～324: DO5, Defaulted relay intertripping output, or it can be position intertripping via jumper selection;

Terminal 325～326: Device fault alarm signal output;

Terminal 327～328: Relay tripping signal output;

Terminal 329～330: Relay alarm signal output;

Terminal 331～332: Action alarm signal output, when relay acts or alarms, the signal will be issued.

Slot 4: IN board

Terminal 401～402: Fieldbus 1 input, 401: positive, 402: Negative. CAN or ProfiBus interface is ok.

Terminal 403: Signal earth;

Terminal 404～405: Fieldbus 2 input, 404: positive, 405: Negative. CAN or ProfiBus interface is ok.

Terminal 406～407: GPS timing input, connected to 485 differential level.

Terminal 408: Signal earth;

Terminal 410～411: Active energy pulse output, 24V dry idle contact output. 410: positive, 411: Negative.

Terminal 412～413: Reactive energy pulse output, 24V dry idle contact output. 412: positive, 413: Negative.

Terminal 414～416: 2 channels of 4～20mA outputs. 414～416: one 4～20mA output, 414: positive, 416: Negative；415～416: the other 4～20mA output, 415: positive, 416: Negative.

Grounding screw must be connected to earth mat reliably and tightly.

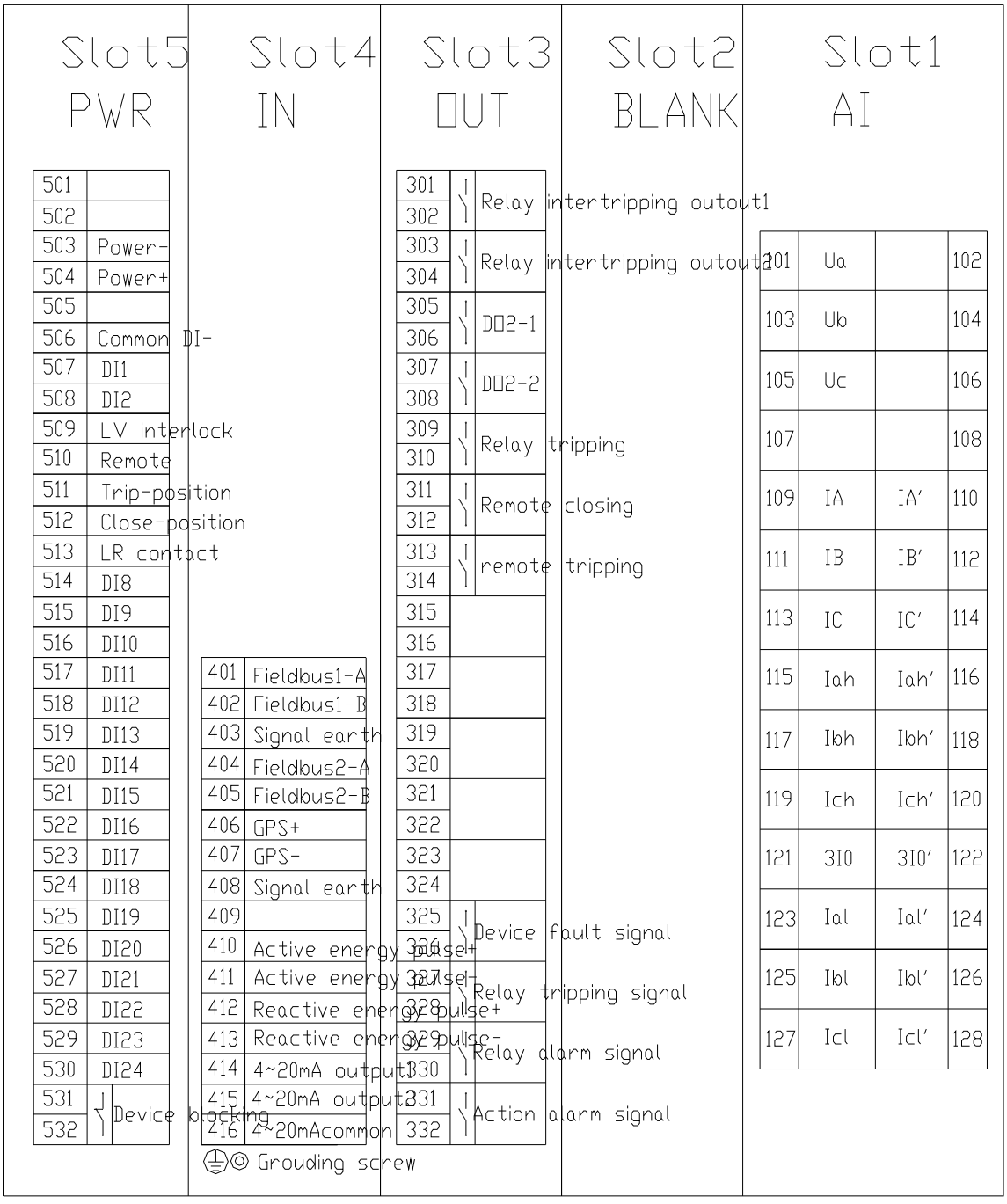
Slot 5：PWR board

Terminal 503～504: Device power source input, DC/AC 220V or DC/AV110V. 503: -Device power source input，504: + Device power source input;

Terminal 506～530: 24 channels of DC 110V or DC220V strong current inputs. 506: -common DI, 507～530: 24 DIs. 507, 508 and 509: defaulted 3 non-electrical quantity protections. Defaulted 509 is LV interlock contact and defaulted 513 us locked rotor contact.

Terminal 531～532: Device blocking output, break contact. When the device 24V power is lost or internal CPU fails, the contact will be closed.

4.2.2 Basic configuration without operation board



Slot 1: AI board

The same as explained in operation board configuration

Slot 2：Blank board

Slot 3：OUT board

Terminal 301～304: Relay intertripping outputs. 301～302: one pair of contact output；

303～304: The other pair of contact output.

Terminal 305～308: DO2. 305～306: one pair of contact output；207～208: the other pair of contact output.

Terminal 309～310: Relay tripping output;

Terminal 311～312: Remote closing output;

Terminal 313～314: Remote tripping output;

Terminal 325～326: Device fault alarm signal output;

Terminal 327～328: Relay tripping signal output;

Terminal 329～330: Relay alarm signal output;

Terminal 331～332: Action alarm signal output, when relay acts or alarms, the signal will be issued.

Slot 4：IN board

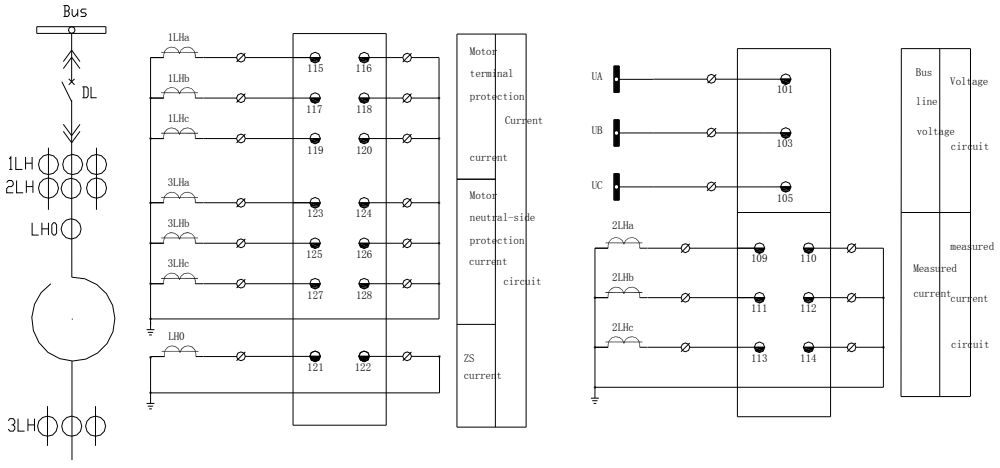
The same as explained in operation board configuration.

Slot 5：PWR board

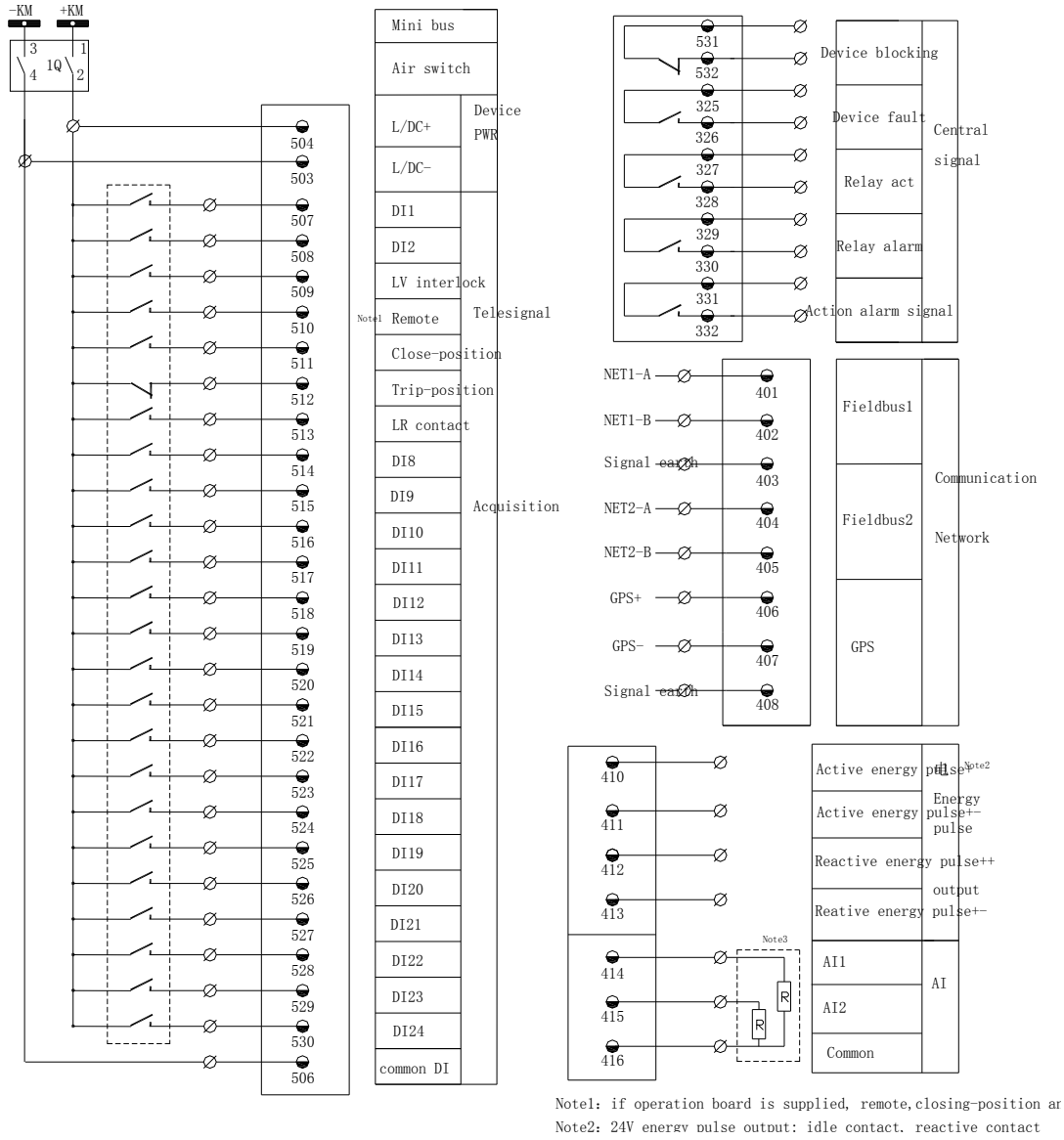
510: Defaulted remote position, 511 and 512: Defaulted CB trip-position, close-position input. Others are the same as explained in operation board configuration.

4.3 Terminal connection diagram

4.3.1 Analog input connection diagram

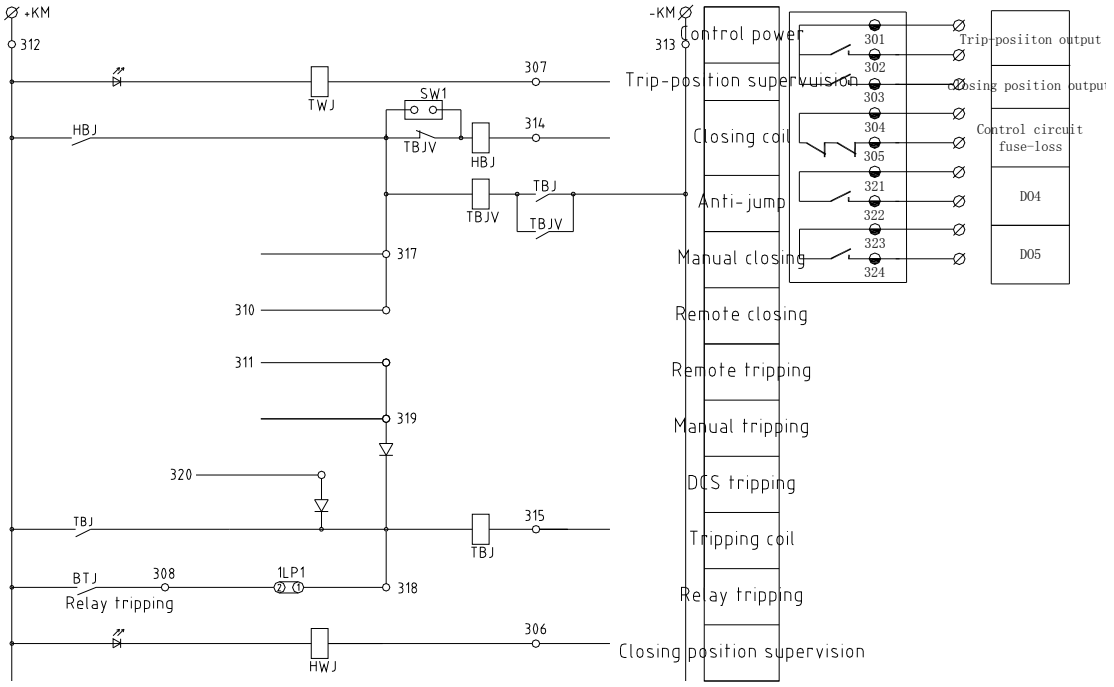


4.3.2 DI、Central signal、network、AO and energy pulse output circuit connection diagram

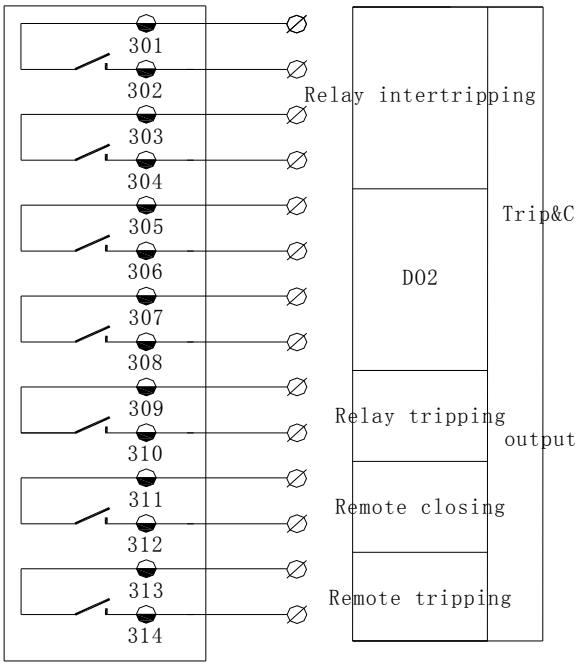


Note1: if operation board is supplied, remote,closing-position ar
Note2: 24V energy pulse output: idle contact, reactive contact

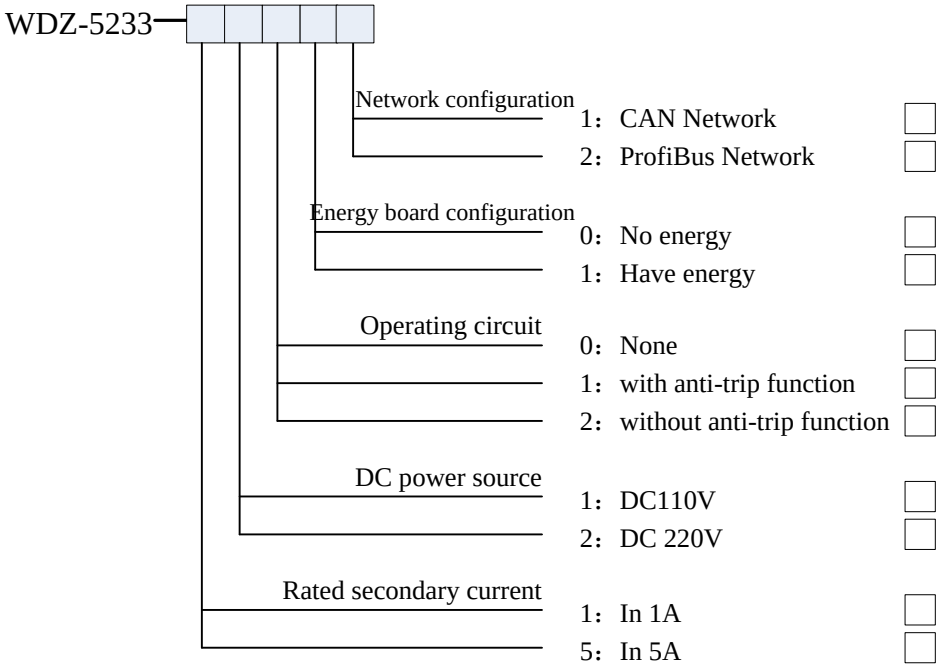
4.3.3 Operation board Operating-circuit diagram



4.3.4 DO circuit connection diagram without operation board



5. Order information



（1）Redundant CAN or ProfiBus communication interface. If RS485 interface is needed, please make order especially;

（2）Optional hardware energy board is supported;

（3）Operating-circuit is optional and the anti-trip function can be enabled/disabled manually. Defaulted intertripping relay is protection intertripping and the defaulted operating-circuit tripping/closing current is self-adapted 0.3~4A，if 0.05~0.3A or 4~10A is needed, please note especially;

（4）Operating-circuit power source and DI power source can be DC110V or DC220V; while the device power source has no such kind of discrimination;

（5） Rated secondary current, as the protective and measured current, can be 1A or 5A;

（6） The device is equipped with 1 channel of 4~20mA output, if no such output is needed or 2 channels of 4~20mA are needed, please order it specially;

（7）ZS TA working range: 10mA~6A. If the zero sequence current is out of the range, just make a special note.

（8）Secondary rated voltage is 100V、50Hz，phase-to-phase voltage input；

（9） The device can extend DIs and DOs. If needed, please note it specially.

6. Setting explanation

6.1 General

This part is for reference only.

6.2 Details

See the relative section in WDZ-5231 and WDZ-5232 introductions.