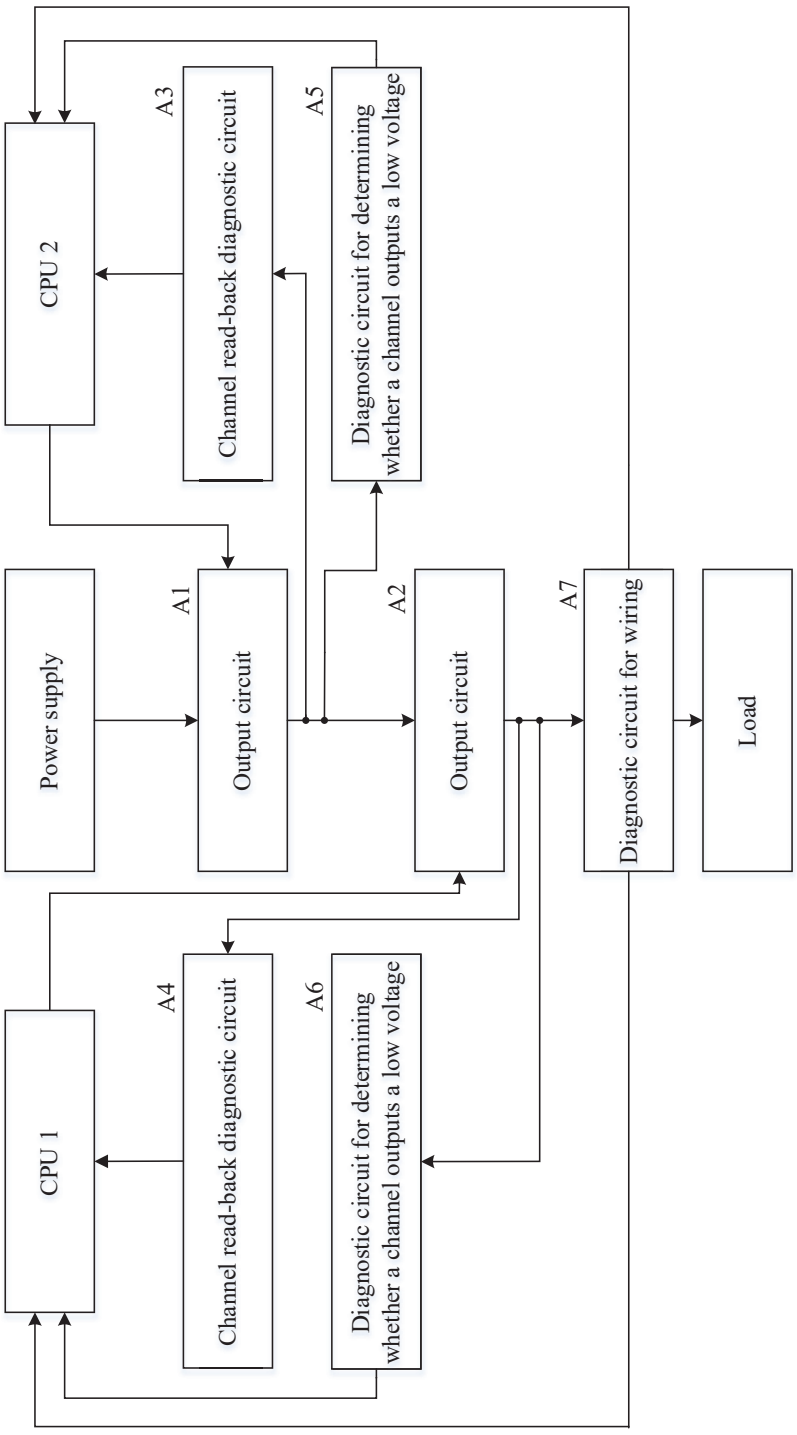
CPU 2
A3
Channel read-back diagnostic circuit
A5
Diagnostic circuit for determining whether a channel outputs a low voltage
Power supply
A1
Output circuit
A2
Output circuit
A7
Diagnostic circuit for wiring
Load
CPU 1
A4
Channel read-back diagnostic circuit
A6
Diagnostic circuit for determining whether a channel outputs a low voltage

Figure 1

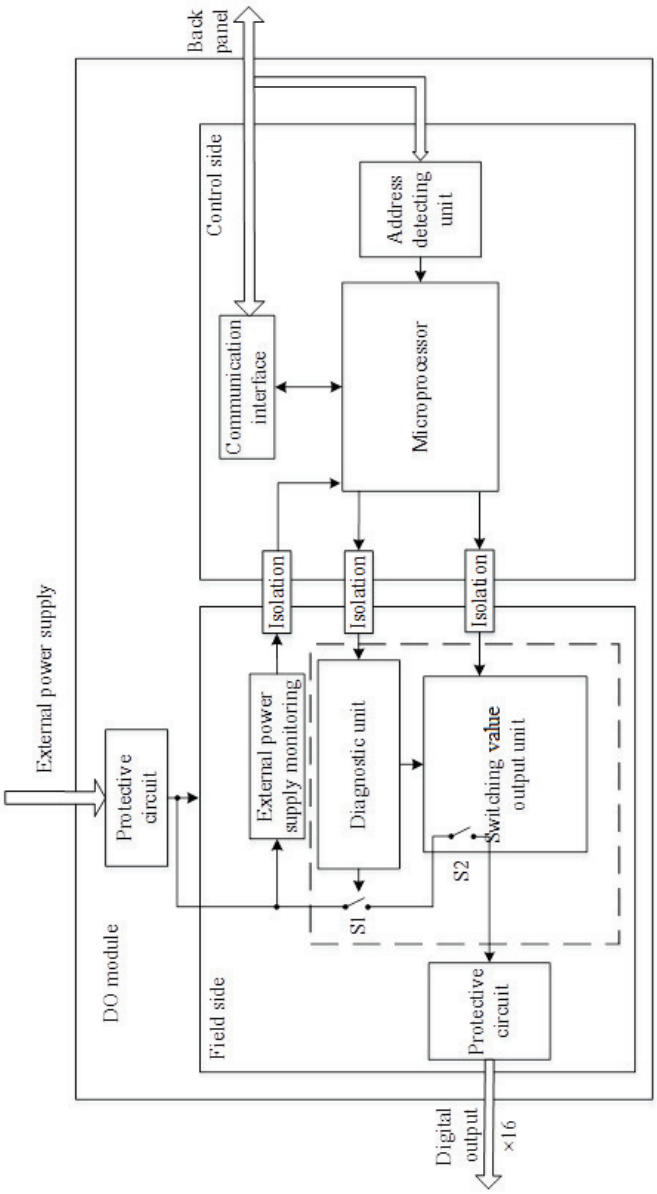
Back panel
Control side
Address detecting unit
Communication interface
Microprocessor
Isolation
Isolation
Isolation
External power supply
Protective circuit
External power supply monitoring
Diagnostic unit
Switching value output unit
S2
S1
DO module
Field side
Protective circuit
Digital output
×16

Figure 2

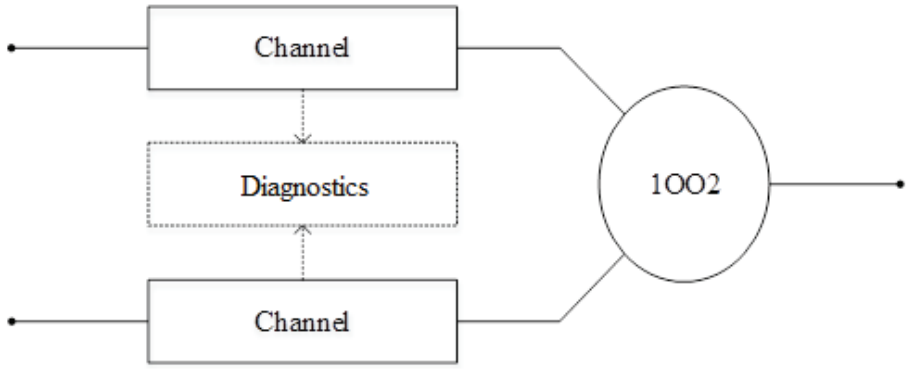

Figure 3

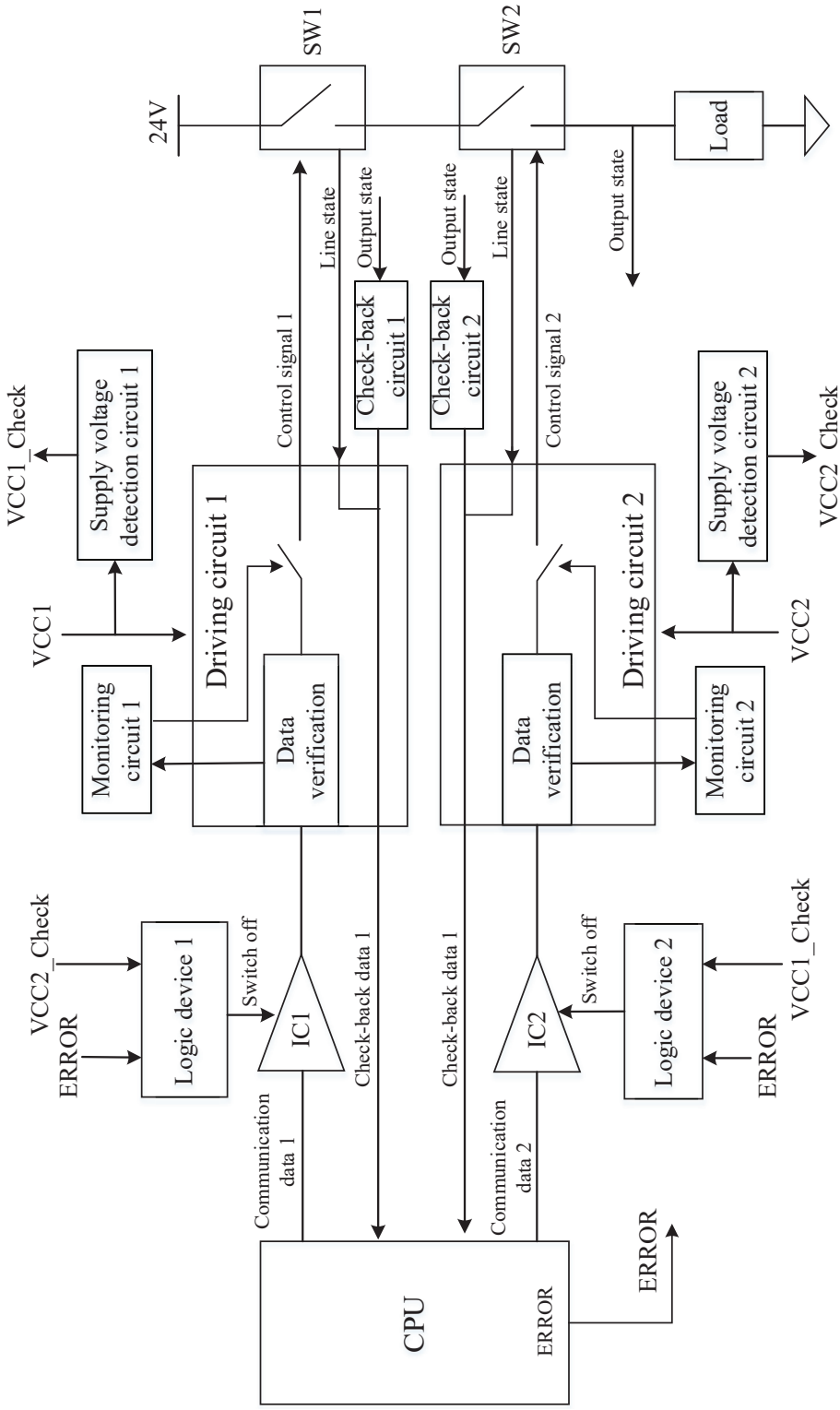
24V
SW1
SW2
Load
Output state
Line state
Output state
Check-back circuit 1
Check-back circuit 2
Control signal 1
Control signal 2
Supply voltage detection circuit 1
Supply voltage detection circuit 2
VCC1_Check
VCC2_Check
VCC1
VCC2
Driving circuit 1
Driving circuit 2
Monitoring circuit 1
Monitoring circuit 2
Data verification
Data verification
VCC2_Check
ERROR
Logic device 1
Logic device 2
VCC1_Check
ERROR
Switch off
Switch off
IC1
IC2
Check-back data 1
Check-back data 1
Communication data 1
Communication data 2
CPU
ERROR
ERROR

Figure 4

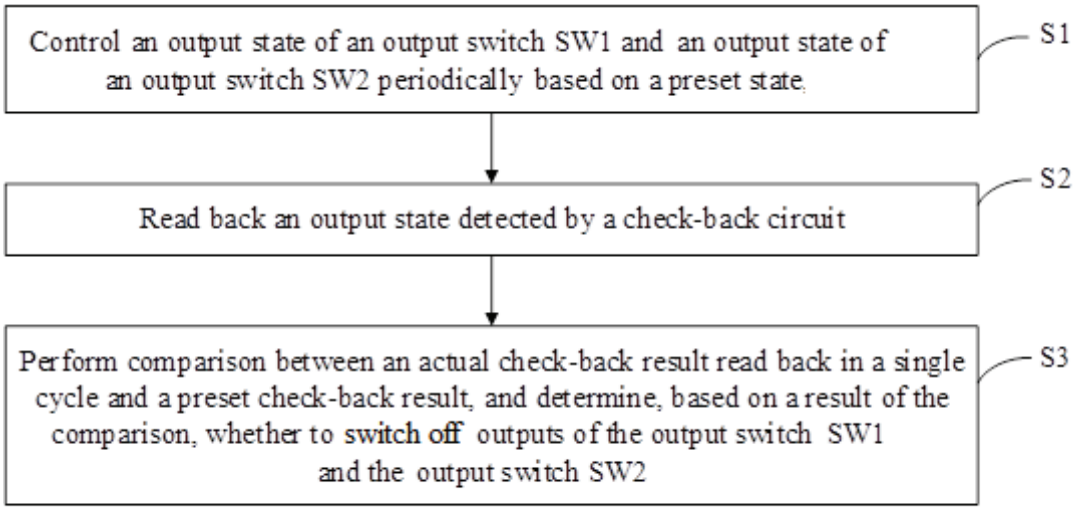
Control an output state of an output switch SW1 and an output state of an output switch SW2 periodically based on a preset state
S1
Read back an output state detected by a check-back circuit
S2
Perform comparison between an actual check-back result read back in a single cycle and a preset check-back result, and determine, based on a result of the comparison, whether to switch off outputs of the output switch SW1 and the output switch SW2
S3

Figure 5