

10 Troubleshooting VNC Automation

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10.1 Faults and Warnings

Faults and warnings are divided into the following three levels based on severity: No.1 > No.2 > No.3.

- No. 1 non-resettable fault
- No. 1 resettable fault
- No. 2 resettable fault
- No. 3 resettable warning

"Resettable" means the keypad stops displaying the fault/warning once receiving the reset signal.

To reset a fault/warning, use one of the following two methods:

- Set 200Dh-02h to 1 (Fault reset).
- Set the rising edge of bit7 of the control word 0x6040 through the host controller.

To reset a No. 1 or No. 2 fault, turn off the S-ON signal and send a fault reset signal.

For No. 3 warnings, the servo drive resets warnings automatically after the warning source is cleared.

Related parameter

Para. No.	Name	Value Range	Function	Setting Condition	Effective Time	Default Value
200Dh-02h	Fault reset	0: No operation 1: Reset the fault and warning	Used to stop the keypad from displaying the fault/warning when a resettable fault/warning occurs. After fault/warning reset, 200Dh-02h is restored to 0 (No operation) immediately.	At stop	Immediately	0

- Solutions to faults and warnings occurred upon start

Start Process	Fault Symptom	Cause	Confirming Method
Switch on the control power supply (L1C, L2C) and main power supply (L1, L2, L3).	The LED neither lights up nor displays "ry".	1. The voltage of the control circuit power supply is abnormal.	Check whether the value of H0B-63 is 1. Measure the AC voltage between L1C and L2C.
		2. Phase loss occurs on the input power supply.	Check whether the value of H0B-63 is 2. Voltage must be present in all the phases of a three-phase 380 V power supply.
		3. The voltage of the main circuit power supply is abnormal.	Check whether the value of H0B-63 is 3. ◆ For single-phase 220 V models, measure the AC voltage between L1 and L2. The keypad displays "nr" when the DC bus voltage amplitude (between terminals P and N) of the main circuit power supply is lower than 235 V. ◆ For three-phase 220 V/380 V models, measure the AC voltage among L1, L2, and L3. The keypad displays "nr" when the DC bus voltage amplitude (between terminals P and N) of the main circuit power supply is lower than 235 V/451 V.
		4. The servo drive is faulty.	-
	The keypad displays "Exxx.x".	See "10.3 Solutions to Faults" and "10.4 Solutions to Warnings" for solutions.	
The keypad displays "ry" when preceding faults are cleared.			

10.2 Communication Faults and Warning Codes

■ List of fault codes

Fault	Display	Name	Type	Reset	Fault Range	Error Code (603Fh)	Auxiliary Code (203Fh)
E101	E101.0	System parameter error	No.1	No	Servo drive fault	0x6320	0x01010101
	E101.1	2000h/2001h parameter error	No.1	No	Servo drive fault	0x6320	0x11010101
E102	E102.0	FPGA communication initialization error	No.1	No	Servo drive fault	0x7500	0x01020102
	E102.8	Software version mismatch	No.1	No	Servo drive fault	0x7500	0x81020102
E104	E104.1	MCU operation timeout	No.1	No	Servo drive fault	0x7500	0x11040104
	E104.2	Current loop operation timeout	No.1	No	Servo drive fault	0x7500	0x21040104
	E104.4	MCU reference update timeout	No.1	No	Servo drive fault	0x7500	0x41040104
E108	E108.0	Parameter write error	No.2	Yes	Servo drive fault	0x5530	0x01080108
	E108.1	Parameter read error	No.2	Yes	Servo drive fault	0x5530	0x11080108
	E108.2	Invalid check on data written in EEPROM	No.2	Yes	Servo drive fault	0x5530	0x21080108
	E108.3	Invalid check on data read in EEPROM	No.2	Yes	Servo drive fault	0x5530	0x31080108
E120	E120.0	Unknown encoder type	No.1	No	Axis fault	0x7122	0x01200120
	E120.1	Unknown motor model	No.1	No	Axis fault	0x7122	0x11200120
	E120.2	Unknown drive model	No.1	No	Axis fault	0x7122	0x21200120
	E120.5	Motor current and drive current mismatch	No.1	No	Axis fault	0x7122	0x51200120
	E120.6	FPGA and motor model mismatch	No.1	No	Axis fault	0x7122	0x61200120
E122	E122.0	Multi-turn absolute encoder setting error	No.2	Yes	Axis fault	0x6320	0x01220122
	E122.1	Different DIs assigned with the same function	No.2	Yes	Axis fault	0x6320	0x11220122
	E122.3	Upper limit invalid	No.2	Yes	Axis fault	0x6320	0x31220122
E136	E136.0	Encoder parameter error	No.1	No	Axis fault	0x7305	0x01360136
	E136.1	Encoder communication error	No.1	No	Axis fault	0x7305	0x11360136
E140	E140.0	Encryption chip check error	No.1	No	Servo drive fault	0x0140	0x01400140
	E140.1	Encryption chip check failure	No.1	No	Servo drive fault	0x0140	0x01400140
E150	E150.0	STO signal input protection activated	No.1	Yes	Servo drive fault	0x0150	0x01500150
	E150.1	STO signal input error	No.1	Yes	Servo drive fault	0x0150	0x11500150
	E150.2	Abnormal voltage detected	No.1	Yes	Servo drive fault	0x0150	0x21500150
	E150.3	STO upstream optocoupler detection failure	No.1	Yes	Servo drive fault	0x0150	0x31500150
	E150.4	PWM Buffer detection failure	No.1	Yes	Servo drive fault	0x0150	0x41500150
E201	E201.0	Phase-P overcurrent	No.1	No	Servo drive fault	0x2312	0x02010201
	E201.1	Phase-U overcurrent	No.1	No	Axis fault	0x2312	0x12010201
	E201.2	Phase-V overcurrent	No.1	No	Axis fault	0x2312	0x22010201
	E201.4	Phase-N overcurrent	No.1	No	Servo drive fault	0x2312	0x42010201

Fault	Display	Name	Type	Reset	Fault Range	Error Code (603Fh)	Auxiliary Code (203Fh)
E208	E208.0	MCU position reference updated frequently	No.1	Yes	Axis fault	0x0208	0x02080208
	E208.2	Encoder communication timeout	No.1	Yes	Axis fault	0x0208	0x22080208
	E208.3	Current sampling fault	No.1	Yes	Axis fault	0x0208	0x32080208
	E208.4	FPGA current loop operation timeout	No.1	Yes	Axis fault	0x0208	0x42080208
E210	E210.0	Output short-circuited to ground	No.1	No	Axis fault	0x2330	0x02100210
E234	E234.0	Runaway protection	No.1	No	Axis fault	0x0234	0x02340234
E400	E400.0	Main circuit overvoltage	No.1	Yes	Servo drive fault	0x3210	0x04000400
E410	E410.0	Main circuit undervoltage	No.1	Yes	Servo drive fault	0x3220	0x04100410
E420	E420.0	Phase loss fault	No.2	Yes	Servo drive fault	0x3130	0x04200420
E430	E430.0	Control circuit undervoltage	No.2	Yes	Servo drive fault	0x0430	0x04300430
E500	E500.0	Motor overspeed	No.1	Yes	Axis fault	0x8400	0x05000500
	E500.1	Speed feedback overflow	No.1	Yes	Axis fault	0x8400	0x15000500
	E500.2	FPGA position feedback pulse overspeed	No.1	Yes	Axis fault	-	0x25000500
E602	E602.0	Angle auto-tuning error	No.1	Yes	Axis fault	0x0602	0x06020602
	E602.2	Wrong UVW phase sequence detected during angle auto-tuning	No.1	Yes	Axis fault	0x0602	0x26020602
E605	E605.0	Speed upon S-ON too high	No.1	Yes	Axis fault	0x8400	0x06050605
E620	E620.0	Motor overload	No.1	Yes	Axis fault	0x3230	0x06200620
E630	E630.0	Motor stall	No.1	Yes	Axis fault	0x7121	0x06300630
E640	E640.0	IGBT over-temperature	No.1	Yes	Axis fault	0x4210	0x06400640
	E640.1	Flywheel diode over-temperature	No.1	Yes	Axis fault	0x4210	0x06400640
E650	E650.0	Heatsink over-temperature	No.1	Yes	Axis fault	0x4210	0x06500650
E660	E660.0	Air-cooled motor over-temperature	No.1	Yes	Axis fault	0x4210	0x06600660
E661	E661.0	Auto-tuned gains too low	No.2	Yes	Axis fault	0x4210	0x06610661
E731	E731.0	Encoder battery failure	No.2	Yes	Axis fault	0x0661	0x07310731
E733	E733.0	Encoder multi-turn counting error	No.2	Yes	Axis fault	0x7305	0x07330733
E735	E735.0	Encoder multi-turn counting overflow	No.2	Yes	Axis fault	0x7305	0x07350735
E740	E740.2	Absolute encoder error	No.1	No	Axis fault	0x7305	0x27400740
	E740.3	Absolute encoder single-turn calculation error	No.1	No	Axis fault	0x7305	0x37400740
	E740.6	Encoder write error	No.1	No	Axis fault	0x7305	0x67400740
E755	E755.0	Nikon encoder communication failure	No.1	No	Axis fault	-	0x07550755
E760	E760.0	Encoder over-temperature	No.2	Yes	Axis fault	0x4210	0x07600760
E765	E765.0	Nikon encoder beyond the limit	No.1	No	Axis fault	-	0x07650765
EB00	EB00.0	Position deviation too large	No.2	Yes	Axis fault	0x8611	0x0B000B00
	EB00.1	Position deviation overflow	No.2	Yes	Axis fault	0x8611	0x1B000B00
EA33	EA33.0	Encoder read/write check error	No.1	No	Axis fault	0x7305	0x0A330A33

Fault	Display	Name	Type	Reset	Fault Range	Error Code (603Fh)	Auxiliary Code (203Fh)
EB01	EB01.1	Position reference increment too large for once	No.2	Yes	Axis fault	0x6320	0x1B010B01
	EB01.2	Position reference increment too large continuously	No.2	Yes	Axis fault	0x6320	0x2B010B01
	EB01.3	Reference overflow	No.2	Yes	Axis fault	0x6320	0x3B010B01
	EB01.4	EB01.4: Target position beyond upper/lower limit	No.2	Yes	Axis fault	0x6320	0x4B010B01
EE09	EE09.0	Software position limit setting error	No.2	Yes	Axis fault	0x6320	0x0E090E09
	EE09.1	Home setting error	No.2	Yes	Axis fault	0x6320	0x1E090E09
	EE09.2	Gear ratio beyond the limit	No.2	Yes	Axis fault	0x6320	0x2E090E09
	EE09.3	No synchronization signal	No.2	Yes	Axis fault	0x6320	0x3E090E09
	EE09.5	PDO mapping beyond the limit	No.2	Yes	Axis fault	0x6320	0x5E090E09
EE08	EE08.0	SYNC signal loss	No.2	Yes	Axis fault	0x0FFF	0x0E080E08
	EE08.1	Network status switchover error	No.2	Yes	Axis fault	0x0FFF	0x1E080E08
	EE08.2	IRQ loss	No.2	Yes	Axis fault	0x0FFF	0x2E080E08
	EE08.3	LAN cable connected improperly	No.2	Yes	Axis fault	0x0FFF	0x3E080E08
	EE08.4	Data frame loss protection error	No.2	Yes	Axis fault	0x0FFF	0x4E080E08
	EE08.5	Data frame transfer error	No.2	Yes	Axis fault	0x0FFF	0x5E080E08
	EE08.6	Data update timeout	No.2	Yes	Axis fault	0x0FFF	0x6E080E08
EE11	EE11.0	ESI check error	No.2	Yes	Servo drive fault	0x5530	0x0E110E11
	EE11.1	EEPROM read failure	No.2	Yes	Servo drive fault	0x5530	0x1E110E11
	EE11.2	EEPROM update failure	No.2	Yes	Servo drive fault	0x5530	0x2E110E11
EE12	EE12.0	EtherCAT external device error	No.1	No	Servo drive fault	0x0E12	0x0E120E12
EE13	EE13.0	Synchronization cycle setting error	No.2	Yes	Servo drive fault	0x6320	0x0E130E13
EE15	EE15.0	Number of synchronization cycle errors too large	No.2	Yes	Servo drive fault	0x0E15	0x0E150E15

■ List of warning codes

Warning	Display	Name	Type	Resettable or not	Fault Range	Error Code (603Fh)	Auxiliary Code (203Fh)
E121	E121.0	Invalid S-ON command	No.3	Yes	Warning	0x0121	0x01210121
E600	E600.0	Inertia auto-tuning failure	No.3	Yes	Warning	0x0600	0x06000600
E601	E601.0	Homing timeout	No.3	Yes	Warning	0x0601	0x06010601
	E601.1	Home switch error	No.3	Yes	Warning	0x0601	0x16010601
	E601.2	Homing mode setting error	No.3	Yes	Warning	0x6320	0x2601E602
E730	E730.0	Encoder battery warning	No.3	Yes	Warning	0x7305	0x07300730
E900	E900.0	Emergency stop	No.3	Yes	Warning	0x0900	0x09000900
E902	E902.0	Invalid DI setting	No.3	Yes	Warning	0x6320	0x09020902
	E902.1	Invalid DO setting	No.3	Yes	Warning	0x0902	0x19020902
E908	E908.0	Model identification check byte invalid	No.3	Yes	Warning	0x0908	0x09080908
E909	E909.0	Motor overload warning	No.3	Yes	Warning	0x3230	0x09090909
E920	E920.0	Regenerative resistor overload	No.3	Yes	Warning	0x3210	0x09200920

Warning	Display	Name	Type	Resettable or not	Fault Range	Error Code (603Fh)	Auxiliary Code (203Fh)
E922	E922.0	Resistance of external regenerative resistor too small	No.3	Yes	Warning	0x6320	0x09220922
E924	E924.0	Braking transistor over-temperature	No.3	Yes	Warning	0x3230	0x09240924
E941	E941.0	Parameter modifications not activated	No.3	Yes	Warning	0x6320	0x09410941
E942	E942.0	Parameter saved frequently	No.3	Yes	Warning	0x7600	0x09420942
E950	E950.0	Forward overtravel warning	No.3	Yes	Warning	0x5443	0x09500950
E952	E952.0	Reverse overtravel warning	No.3	Yes	Warning	0x5444	0x09520952
EA41	EA41.0	Torque ripple compensation failure	No.3	Yes	Warning	0x0A41	0x0A410A41

10.3 Solutions to Faults

■ E101.0: System parameter error

Direct cause:

The total number of parameters changes, which generally occurs after software update.

Parameter values in groups 2002h and above exceed the limit, which generally occurs after software update.

Root Cause	Confirming Method	Solution
1. The control power voltage drops instantaneously.	Check whether the voltage drops during control power (L1C, L2C) cutoff or whether instantaneous power failure occurs.	Restore system parameters to default values (2002-20h = 1), and write parameters again.
	Measure whether the voltage input to the control circuit cable during operation is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: -10% to +10% (342 V to 484 V)	Increase the power capacity or replace with a power supply of larger capacity. Restore system parameters to default values (2002-20h = 1), and write parameters again.
2. Instantaneous power failure occurs during parameter saving.	Check whether instantaneous power failure occurs during parameter saving.	Power on the system again, restore system parameters to default values (2002-20h = 1), and write parameters again.
3. The number of write operations exceeds the limit.	Check whether parameters are updated frequently through the host controller.	Change the write mode and write parameters again. If the servo drive is faulty, replace it.
4. The software has been updated.	Check whether the software has been updated.	Reset the servo drive model and the servo motor model, and restore system parameters to default values (2002-20h = 1).
5. The servo drive is faulty.	If the fault persists after several times of restart and parameter initialization, the servo drive is faulty.	Replace the servo drive.