

Chapter 9 Diagnosis function

9.1 Loop-Back self diagnosis

Loop-Back self diagnosis is a checking function if this module operates normally by itself as not connected with external devices via communication cable. Through this function, self-diagnosis is available for all hardware of Cnet I/F module except for external communication line and RS-232C/RS-422 channels also can be tested simultaneously. For Loop-Back self diagnosis, set operation mode switch of the module to test mode.

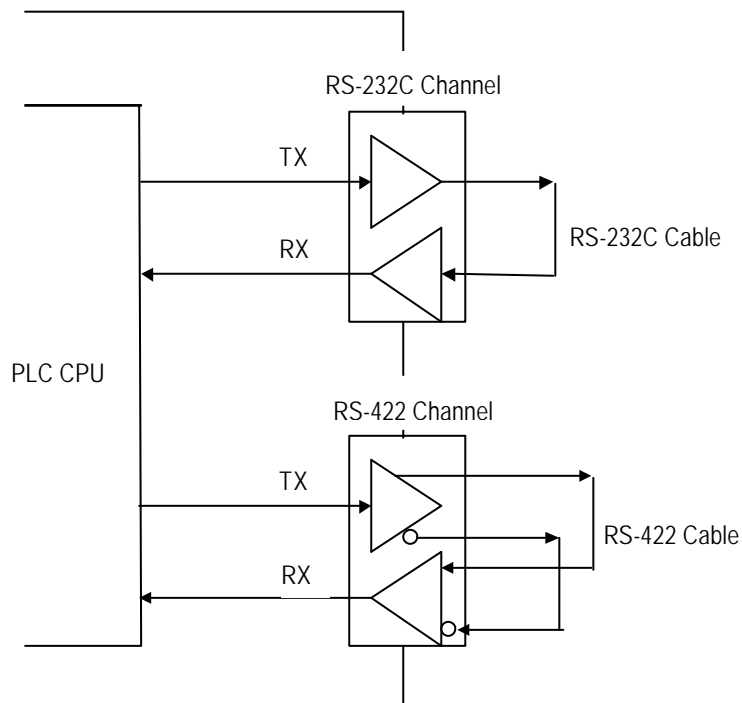
Remark

[Note1] GM7(G7L-CUEB/G7L-CUEC) series isn't provided with the diagnosis function.

9.1.1 Principle of operation

Loop-Back test sends test data from computer link itself without external cable connection to RS-232C/RS-422 channels and receives the data to display the diagnosis result on LED as compared with the sent data. [Figure 9.1] shows data flow in Loop-Back mode.

[Figure 9.1] Data flow chart in Loop-Back mode



9.1.2 Procedure of Loop-Back self diagnosis

Procedure of Loop-Back self diagnosis is as follows.

- 1) Let RS-232C/RS-422 channels connected respectively as shown in [Figure 9.2] & [Figure 9.3].
- 2) Set operation mode setting switch to Loop-Back Test mode.
- 3) After self-diagnosis is started as powered on, check LED display per channel if normal or not
- 4) Self-diagnosis will be repeated until powered off.

[Figure 9.2] RS-232C cable connection

Cnet (9-PIN)		Connection No. and Signal direction
Pin No.	Name	
1	CD	
2	RXD	
3	TXD	
4	DTR	
5	SG	
6	DSR	
7	RTS	
8	CTS	
9	RI	

[Figure 9.3] RS-422 cable connection

Cnet		Cable connection
Pin No.	Name	
1	RDA	
2	RDB	
3	SDA	
4	SDB	
5	S.G	
6	F.G	

9.1.3 Operation of Loop-Back test LED

This module sends itself Loop-Back test data applied as changed and receives the data to display the result compared on LED. LED status represents the such two cases below of the front LED display switch as pushed and not pushed.

- 1) Next is LED display status when normal and abnormal in case LED display switch is not pushed. [Table 9.1] describes LED display items of G3L-CUEA/G4L-CUEA modules, and [Table 9.2] describes LED display items of G6L-CUEB/G6L-CUEC modules when normal and abnormal.

[Table 9.1] LED status depending on operation contents (G3L-CUEA/G4L-CUEA)

LED No.	Name	LED status normal		LED status abnormal	
0	RUN	On	Operating	OFF	Operation stopped
1	TX	Flash	Sending	OFF	No transmission
2	RX	Flash	Receiving	OFF	No receiving
3	ACK	On	ACK responding	OFF	No ACK response
4	NAK	OFF	No NAK response	On	No NAK response
5	ERR	OFF	No error	Flash	Communication error occurred
6	MODEM	OFF	Not used	OFF	Not used
7	SYS-RUN	Dimly ON	CPU & I/F executed	OFF	CPU& I/F stopped
8	RUN	On	Operating	OFF	Operation stopped
9	TX	Flash	Sending	OFF	No transmission
10	RX	Flash	Receiving	OFF	No receiving
11	ACK	On	ACK responding	OFF	No ACK response
12	NAK	OFF	No NAK response	On	No NAK response
13	ERR	OFF	No error	Flash	Communication error occurred
14	RS-485	OFF	Not used	OFF	Not used
15	SYSTEM-ERR	OFF	Normal	Flash	Communication module in abnormal operation

If in normal operation, the following status will be displayed for RS-232C/RS-422 channels when display switch is not pushed.

- RUN/ACK LED is ON and TX/RX LEDs flash in a cycle of 1 sec.
- No.8 SYS-RUN LED is dimly ON.
- Other LEDs than those above are OFF.

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If displayed as above, module operation is normal including communication.

[Table 9.2] LED status depending on operation contents (G6L-CUEB/G6L-CUEC)

LED No.	Name	LED status normal		LED status abnormal	
0	G6L-CUEB	RUN	On	Operating	OFF Operation stopped
1		TX	Flash	Sending	OFF No transmission
2		RX	Flash	Receiving	OFF No receiving
3		ACK	On	ACK responding	OFF No ACK response
4		NAK	OFF	No NAK response	On No NAK response
5		ERR	OFF	No error	Flash Communication error occurred
6		MODEM	OFF	Not used	OFF Not used
7		SYS-RUN	Dimly ON	CPU & I/F executed	OFF CPU & I/F stopped
0	G6L-CUEC	RUN	On	Operating	OFF Operation stopped
1		TX	Flash	Sending	OFF No transmission
2		RX	Flash	Receiving	OFF No receiving
3		ACK	On	ACK responding	OFF No ACK response
4		NAK	OFF	No NAK response	On No NAK response
5		ERR	OFF	No error	Flash Communication error occurred
6		RS-485	OFF	Not used	OFF Not used
7		SYSTEM-ERR	OFF	Normal	Flash Communication module in abnormal operation

2) LED display in case LED display switch is pushed (Except for G6L-CUEB/G6L-CUEC)

If LED display switch is pushed during Loop-Back diagnosis, the result from comparison between the sent test data and the received data through Loop-Back is displayed on LED. Cnet I/F module creates/sends test data in a cycle of 1 sec. and checks the data if received exactly through Loop Back channel and then displays the result on LED. If normal, all LEDs shall be OFF when LED display switch is pressed down. If abnormal in communication, the number of errors per channel is displayed on LED display of LED No. 0-7 for the test result of RS-232C channel and LED No. 8-15 for the test result of RS-422 channel. [Table 9.3] describes how to calculate the number of errors on the basis of the displayed value on LED.

[Table 9.3] Error counter value when LED display switch is pushed

RS-232C error counter value (HEX)			RS-422 error counter value (HEX)		
LED #	BIT value	Conversion method	LED #	BIT value	Conversion method
0	D0	Counter values calculated by converting binary into HEX regarding D0 as lower bit, and D7 as upper bit.	8	D0	Counter values calculated by converting binary into HEX regarding D0 as lower bit, and D7 as upper bit.
1	D1		9	D1	
2	D2		10	D2	
3	D3		11	D3	
4	D4		12	D4	
5	D5		13	D5	
6	D6		14	D6	
7	D7		15	D7	

(Example of calculation)

- Calculation of the number of errors when LED No.D0, D2 & D5 are turned ON.
 $2^0 + 2^2 + 2^5 = 1 + 4 + 64 = 69$
- Calculation of the number of errors when LED No D1, D5 & D7 are turned ON.
 $2^1 + 2^5 + 2^7 = 2 + 32 + 128 = 162$

Remark

[Note1] If Cnet I/F module is normal and connection of Loop-Back Test is correctly applied, the number of errors shall be '0', and if displaying button is pushed, all LEDs are to be OFF.

[Note2] Communication of the test data shall be as specified in Tx/Rx specification user has set.

9.2 Diagnosis during power on

Cnet I/F module performs self-diagnosis test and checking of PLC CPU & interface as in the sequence below.

[Table 9.4] Checking sequence when powered on

CHECKING SEQUENCE	CHECKING ITEM	LED LIGHTING SEQUENCE
1	LED display check	All LEDs ON/OFF as executed
2	Self-memory check	LED '0' On
3	Flash memory check	LED '1' On
4	UART check	LED '2' On
5	Common memory check	LED '3' On
6	PLC interface check	LED '4' On
7	Operation mode check	LED '5' On

- 1) Upon being powered on, all module's LEDs are turned ON for approx. 1 sec. and then OFF to check LED display. The LED if not turned on during the first lighting ON is in error.
- 2) After LED check, LEDs from No.1 to No.5 are turned ON by turns to execute self-diagnosis and checking of PLC CPU & interface.
- 3) LED display during self-diagnosis and PLC Interface test is turned ON according to the sequence below.
0 → 1 → 2 → 3 → 4 → 5
- 4) After self-diagnosis is over in the sequence above, it is switched to the LED display status of normal operation mode according to operation mode and basic setting to start normal operation.
- 5) If not agreed with the displaying specification of self-diagnosis, check connection & installation status of base slot and then supply power again.
- 6) If still operated as not agreed with the LED display items above even for normal installation of module, the applied module hardware seems in error. Please contact service station.

Remark

[Note1] When [Operation mode check] in sequence7 of self-diagnosis checking sequence is applied as powered on, LED No.5 is turned On-Off in a twinkling, which may be hard to recognize by naked eye, however, this is not indicating that Cnet I/F module is in error if switched to normal operation mode later.