Table of Contents

5.2 GE Fanuc SNP 5.2-3
5.2.1 General Information 5.2-3
5.2.2 Protocol Parameters GE Fanuc SNP 5.2-4
5.2.2.1 Parameter Maximum Waiting Time for Response 5.2-4
5.2.2.2 Parameter Delay Until Connection Setup 5.2-4
5.2.3 Configuring the PLC 5.2-4
5.2.3.1 CPU - ID 5.2-5
5.2.4 Data Types 5.2-5
5.2.5 Additional Functions 5.2-6
5.2.6 Physical Interfacing 5.2-8
5.2.6.1 Connecting Cable RS485 - GE Fanuc Series 90 ..... 5.2-9
5.2.6.2 Connecting Cable Universal Interface SER1 RS485 - GE Fanuc Series 90 ..... 5.2-10
5.2.6.3 Connecting Cable RS485 - GE Fanuc CMM311 ..... 5.2-11
5.2.6.4 Connecting Cable Universal Interface SER1 RS485 - GE Fanuc CMM311 ..... 5.2-12
5.2.7 Error Messages 5.2-13

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GE Fanuc SNP

5.2 GE Fanuc SNP

5.2.1 General Information

The operating terminals allow for a simple connection to every GE FANUC PLC of the 90 series thus making the operating terminals the perfect man-machine-interface for your FANUC PLC.

The operating terminal is connected to the **Programming and Communications Port** of the PLC-CPU. An additional communications module is not necessary. The data communication on the interface is handled by the FANUC-Series 90 protocol (SNP-protocol).

The software components of the system are fully adapted to the parameters and marginal conditions of the SNP interface.

This offers the user the following advantages:

- Random write and read access to any data within the PLC. Data of existing PLC programs can be displayed and modified directly in the operating terminal. It is not necessary to adapt the PLC program to the operating terminal in any respect since it is not required that communications data be stored in a specified address area or data type area.

- The operating terminal automatically polls the freely definable data areas for cyclic data.

- Configuration of a bus topology is possible. Use of a SNP multiplexer allows simultaneous connection of the operating terminal and the hand-held programming unit (HHP) or the Logicmaster (PC with LM90 software), respectively.

- Only a minimum of configuration is required in the PLC. Point-to-point connections require no configuration at all in the PLC. A bus topology will require setting of only one parameter for the communication, namely the slave identifier (CPU-ID) for the PLC. This slave identifier is entered once with the LM90.

- The SNP protocol is handled entirely by the operating system of the PLC. A PLC program in the PLC is not required for the handling of the communication.

- The protocol provides error control. Transmission errors are detected and, if possible, eliminated by repeating the transmission. A noise-immune interface hardware in accordance with the RS485 interface standard permits the application even in a harsh industrial environment.

- The parameters of the interface SER1 are assigned in the programming software in a protocol-specific manner and are stored in the application description. Modifying of the parameters is possible in the setup mask or in each other I/O-mask of the terminal at any time.

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– The programming system provides a maximum of support to the operator in programming the operating terminal. The definitions (abbreviations) used here are identical with the definitions used within the PLC program (e.g. %M3 corresponds to flag 3).

5.2.2 Protocol Parameters GE Fanuc SNP

The parameters of the interface SER1 are set to the following values:

Baud rate:	300, 600, 1200, 2400, 4800, 9600, **19200**, 38400, 357000, 500000 Baud
Parity:	none, even, **odd**
Data length:	5, 6, 7, **8** bits
Stopbits:	**1**, 1.5, 2
Handshake:	**No handshake**, Hardware, Software

The default values are printed in **bold**.
The operating terminal adapts to the default parameters of the SNP protocol. Therefore it is generally not necessary to alter the interface parameters in the PLC.

5.2.2.1 Parameter Maximum Waiting Time for Response

This timer indicates the length of time that the operating terminal (master) will wait for the response from the PLC (slave).
Permitted values are in the range of 0 ms to 65535 ms.
The default value is 1000 ms.

5.2.2.2 Parameter Delay Until Connection Setup

Specifies the period of time that the terminal allows to elapse after an unsuccessful attempt to establish the communication and before making another attempt.
Permitted values are in the range of 100 ms to 65535 ms.
The default value is 10000 ms.

5.2.3 Configuring the PLC

Before any communication between the operating terminal and FANUC-PLC is possible, it will be necessary to set the CPU ID parameter with the aid of a LM90.

5.2.3.1 CPU - ID

The operating terminal considers the PLC a slave and, thus, references it via a slave number. This slave number is assigned to the variable during the creation of the application definition. Valid slave numbers range from value 1 to value 253.

Having defined a slave number 1 to 253 in the application definition will require that the same CPU-ID consisting of 3 characters must be specified in the PLC. Any blank digits will be filled in with zeros (slave number 23 corresponds to the CPU-identifier 023).

It is also possible to work without a CPU-identifier by specifying the slave identifier 254 in the application definition. In this event it must be ensured that the connection between terminal and PLC is a point-to-point-connection.

5.2.4 Data Types

User references are bit, byte, or word-structured.

Reference Type	Reference	Orientation
Discrete Inputs	% I	Bit / Byte
Discrete Outputs	%Q	Bit / Byte
Temporary Coils	%T	Bit / Byte
Internal Coils	%M	Bit / Byte
System Status References	%SA, %SB, %SC, %S	Bit / Byte
Discrete Globals	%G	Bit / Byte
Analog Inputs	%AI	Word / Double word
Analog Outputs	%AQ	Word / Double word
Registers	%R	Word / Double word

Table 5.2-1: Data types

The size of each reference area is governed by the size of the PLC´s CPU.

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5.2.5 Additional Functions

In addition to the random write and read access to PLC variables, a memory area comprising 11 or 12 bytes is specified in the application definition as poll area. The location of this memory area is specified in the application definition.
Only marginal conditions regarding this memory area:
- the PLC must be able to access in bit-mode and the SNP in byte-mode
- the memory area must be contiguous.

Byte-structured Memory Mapping
The data area comprises a maximum of 11 bytes
The start address must be located on a physical byte boundary.

The following start addresses are possible in accordance with (8 * n) + 1 ; n = 0, 1 , 2 : M1, M9, M17.

Example: Cyclic Data starts at %M1

MSB	Description	LSB
%M8	Write Coordination Byte	%M1
%M16	Message Channel Low byte	%M9
%M24	Message Channel High byte	%M17
%M32	LED 1 to 4	%M25
%M40	LED 5 to 8	%M33
%M48	LED 8 to 12	%M41
%M56	LED 13 to 16	%M49
%M64	LED 17 to 20	%M57
%M72	LED 21 to 24	%M65
%M80	LED 25 to 28	%M73
%M88	LED 29 to 32	%M81

Table 5.2-2: Example of byte-structured poll area

Word-structured Memory Mapping
The data area comprises a maximum of 6 words or 12 bytes.

Example: The cyclic data on %R1

Word Address	Reference	High Byte	Low Byte
Word Address + 0	%R1	Write Coordination Byte	Reserved
Word Address + 1	%R2	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	%R3	LED 1 to 4	LED 5 to 8
Word Address + 3	%R4	LED 9 to 12	LED 13 to 16
Word Address + 4	%R5	LED 17 to 20	LED 21 to 24
Word Address + 5	%R6	LED 25 to 28	LED 29 to 32

Table 5.2-3: Example of word-structured poll area

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5.2.6 Physical Interfacing

Pin	Designation	Function
1	Shield	Shielding
2	T(A)	Transmit Data, Channel A
3	R(A)	Receive Data, Channel A
4	RTS(A)	Request To Send, Channel A
5	CTS(A)	Clear To Send, Channel A
6	nc	not connected
7	nc	not connected
8	SG	Signal Ground
9	T(B)	Transmit Data, Channel B
10	R(B)	Receive Data, Channel B
11	RTS(B)	Request To Send, Channel B
12	CTS(B)	Clear To Send, Channel B
13	nc	not connected
14	nc	not connected
15	nc	not connected

Table 5.2-4: Pin assignment of the interface RS485

Pin	Designation	Function
8	T(A)	Transmit Data, Channel A
9	T(B)	Transmit Data, Channel B
11	SGND	Signal Ground
22	R(A)	Receive Data, Channel A
23	R(B)	Receive Data, Channel B

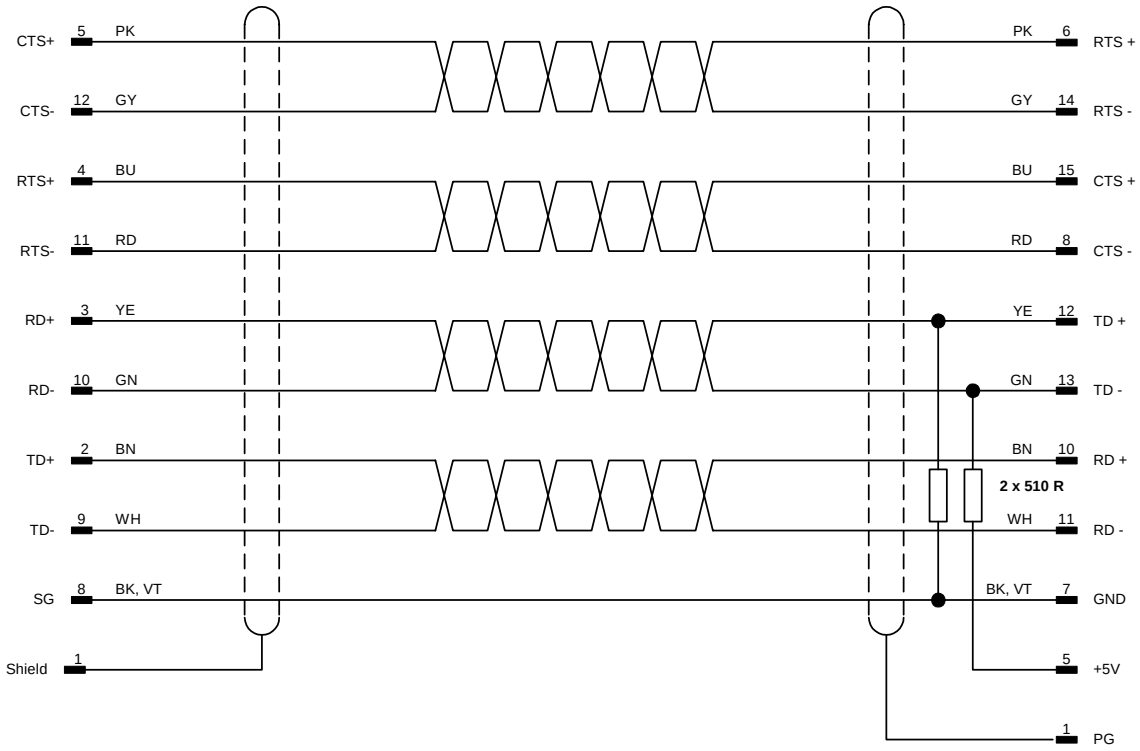
Table 5.2-5: Pin assignment of the universal interface SER1 RS485

5.2.6.1 Connecting Cable RS485 - GE Fanuc Series 90

The following wiring diagram does not apply to terminals with universal interface.

TesiMod
Operating Terminal

GE Fanuc
Series 90



D-Subminiature
Male Connector
15-pin

D-Subminiature
Male Connector
15-pin

Pin 1 is connected to the shield / metallic enclosure.
Each end of the shield is connected to the metallic enclosure.

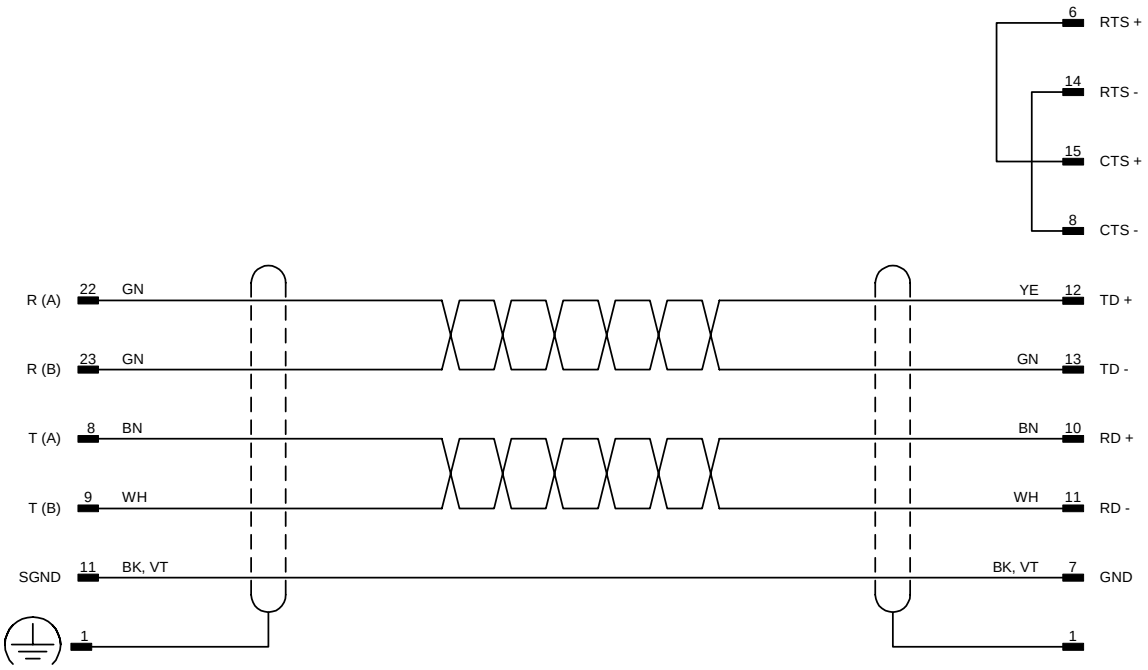
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5.2.6.2 Connecting Cable Universal Interface SER1 RS485 - GE Fanuc Series 90

The following wiring diagram applies to terminals with universal interface only.

TesiMod
Operating Terminal

GE Fanuc
Series 90



D-Subminiature
Male Connector
25-pin

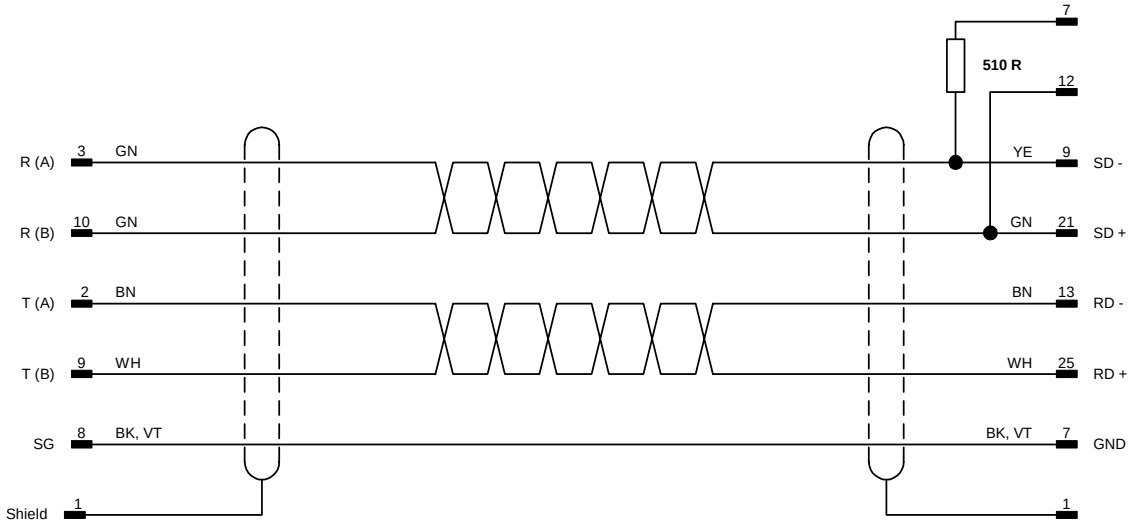
D-Subminiature
Male Connector
15-pin

Pin 1 is connected to the shield / metallic enclosure.

5.2.6.3 Connecting Cable RS485 - GE Fanuc CMM311

The following wiring diagram does not apply to terminals with universal interface.

TesiMod Operating Terminal	GE Fanuc CMM311



D-Subminiature Male Connector 15-pin	D-Subminiature Male Connector 25-pin

Pin 1 is connected to the shield / metallic enclosure.
Each end of the shield is connected to the metallic enclosure.

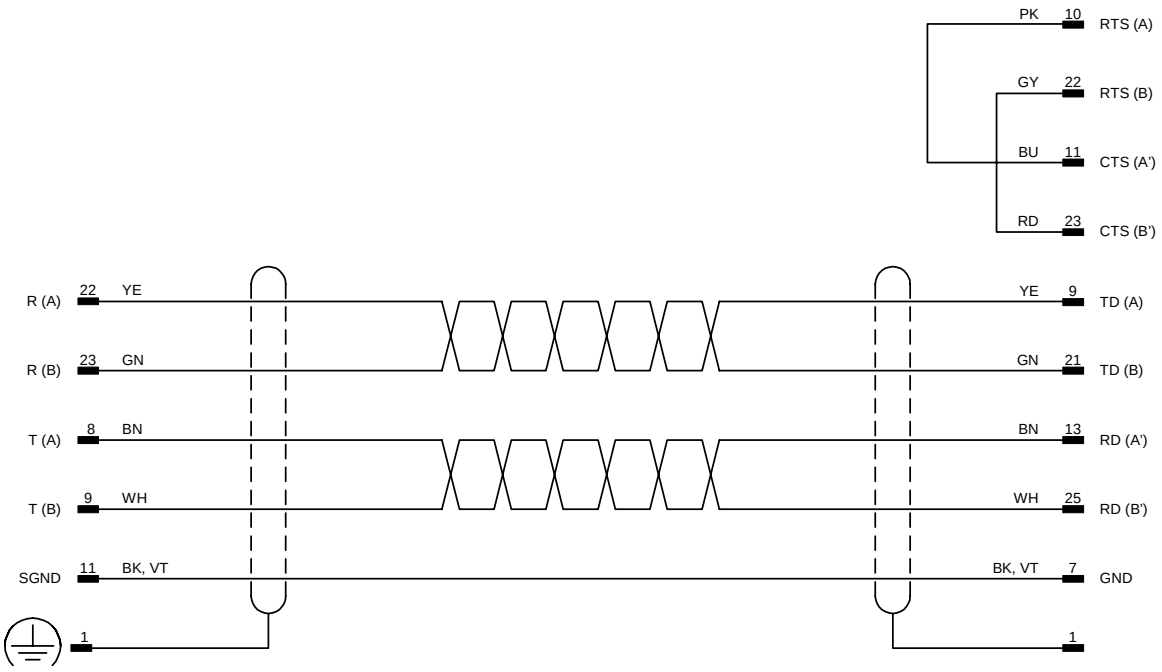
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5.2.6.4 Connecting Cable Universal Interface SER1 RS485 - GE Fanuc CMM311

The following wiring diagram applies to terminals with universal interface only.

TesiMod
Operating Terminal

GE Fanuc
CMM311



D-Subminiature
Male Connector
25-pin

D-Subminiature
Male Connector
25-pin

Pin 1 is connected to the shield / metallic enclosure.

5.2.7 Error Messages

Code	1	E_SLAVE_NOT_READY	Slave not ready or incorrect CPU-ID
	2	E_PROTOKOL	Sequence of the packets
	3	E_FRAME	Character frame error
	4	E_TIMEOUT	Timeout error
	5	E_CRC_BCC	CRC error
	6	E_PARITY	Parity error
	7	E_SEND_ABORT	Abort send process
	8	E_REC_ABORT	Abort receive process
	9	E_BUF_SIZE	Insufficient cyclic buffer
	10	E_NO_DEFINE	No cyclic data defined
	12	E_DEFINE	Cyclic data already defined
	14	E_SLAVE_ADDRESS	Invalid slave address (e.g. 0x00 master-address)
	15	E_NO_PROTOCOL	Selected protocol is not supported
	16	E_OVERRUN	Receive buffer overrun
	18	E_NAK_0	BCC or parity error from PLC
	19	E_NAK_0	Overrun or framing error from PLC
	20	E_NAK_0	Sequence error from PLC
	21	E_NAK_0	Bad Next Message Length error from PLC
	40	E_SYS_ADDRESS	Undefined system variable or invalid slave number 255

Fanuc-specific error messages

Code	50 - 138	Major error status code	The error number consists of the constant 50 and the error status
	178 - 255	Minor error status code of the SNP-partner-module	

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GE Fanuc SNP