Application Note for Using the Operator Station HE500TIU050 / 10X / 11X / 20X / 3XX with a GE Fanuc Series 90 Protocol PLC (SNP)

1.0. Serial Link Format

Both the Operator Station and the GE SNP defaults to operation at 19200 baud with eight data bits, one stop bit and an odd parity bit.
The physical interface of the Operator Station is software selectable and defaults to RS422/RS485 four wire mode.

2.0. Station Number

Where a station number greater than 0 is selected the station number string will consist of a six digit decimal identifier with leading zeroes. Otherwise it will consist of six NULL characters.

3.0. Start Locations

All discrete types (%M, %I, %Q, %T, %Sx) may be accessed as analog values starting at byte boundaries (8 bits) and in one word blocks (16 bits).
i.e. For %M49 the bits will be packed in the following format: :-

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
%M64	%M63	%M62	%M61	%M60	%M59	%M58	%M57	%M56	%M55	%M54	%M53	%M52	%M51	%M50	%M49

When accessed as bits they are written on a Read-Modify-Write basis e.g. if the register is specified as %M54 is selected then %M49 to %M64 are read then the state of %M54 is updated and %M49 to %M64 are written back to the PLC. It is therefore advisable that the PLC programmer sets aside a word block purely for the Operator Station to write to so that the PLC isn't changing bits during a Read-Modify-Write cycle.
For word types (%R, %AI, %AQ, %G) the start address can be any valid register id.

3.1. Register Ranges

REGISTER TYPE	ID	Start	End
DATA	%R	1	16384
RELAY	%M	1	32768
INPUT	%I	1	32768
OUTPUT	%Q	1	32768
TEMPORARY	%T	1	512
ANALOG INPUTS	%AI	1	8192
ANALOG OUTPUTS	%AQ	1	8192
DISCRETE SA	%SA	1	256

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DISCRETE SB	%SB	1	256
DISCRETE SC	%SC	1	256
DISCRETE S	%S	1	256
GENIUS GLOBALS	%G	1	960

Table 1. Register ranges

4.0. System Timing

The following timing values are used :

T1 (Inter Message Gap)	10ms
T2 (Acknowledgement Timeout)	3 seconds
T3 (Maximum Link Idle Time)	Determined by Operator Station configuration
T4 (Break Processing Time)	Gap Between Break and Attach message

Table 2. Protocol Timing

5.0. PLC message buffer requirements

The minimum message buffer size in the PLC is 12.
Defaults for this setting are

90/30	1000 bytes
90/70	8192 bytes

These values are always acceptable.

6.0. Connecting the Operator Station to the GE Series 90 PLC Programming Port

The line should be terminated correctly at the PLC end this involves connecting pin 9 to either pin 10 or pin 11 depending on the model of PLC. See table below.

PLC Type	Series 90-30	Series 90-70 except CPUs IC6967CPU731 & IC697CPU771	Series 90-70 CPUs IC6967CPU731 & C697CPU771
Pin Number	10	10	11

Table 2.0 Termination pins versus PLC model

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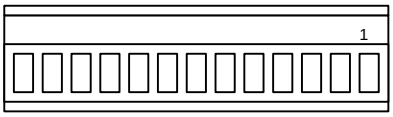
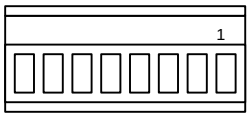
7.0. Connection details to GEF Series 90 PLC SNP Port

13-Pin Screw Terminal Block



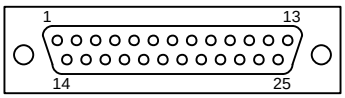
TIU100, TIU110

8-Pin Screw Terminal



TIU050, 101, 102, 103, 111, 112, 113, 201, 202, 203

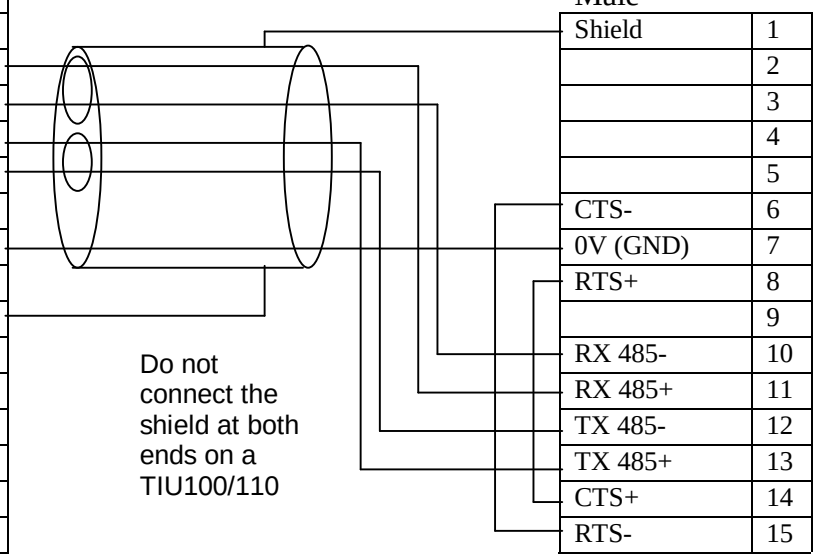
25-Pin D-Type Male



TIU300, 301, 302, 303, 304, 310, 311, 312, 313, 314, 320, 321, 322, 323, 324

TIU Type Signal Name	13-Pin	8-Pin	25-Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS422 Connection



Do not connect to unlisted pins.

TIU1XX and 2XX PLC Port switch settings.

If the TIU is the last unit on a multi-drop network or is connected point to point then termination is required and the TIU PLC Port switch settings should be set as in figure 1. Below otherwise they should be set as in figure 2.

Switch	Description	State
1	Pull-up	On
2	120 Ω termination	On
3	Pull-down	On
4	Not used.	Off

Figure 1.

Switch	Description	State
1	Pull-up	Off
2	120 Ω termination	Off
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Figure 2.

Recommended cable : Beldon 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC

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7.1. Connection details to GEF Series 90 CMM Module

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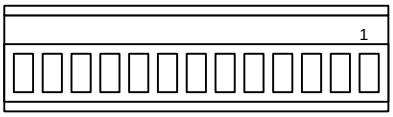

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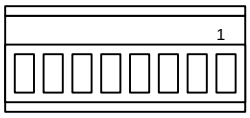

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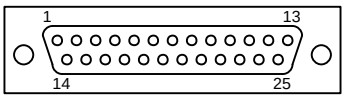

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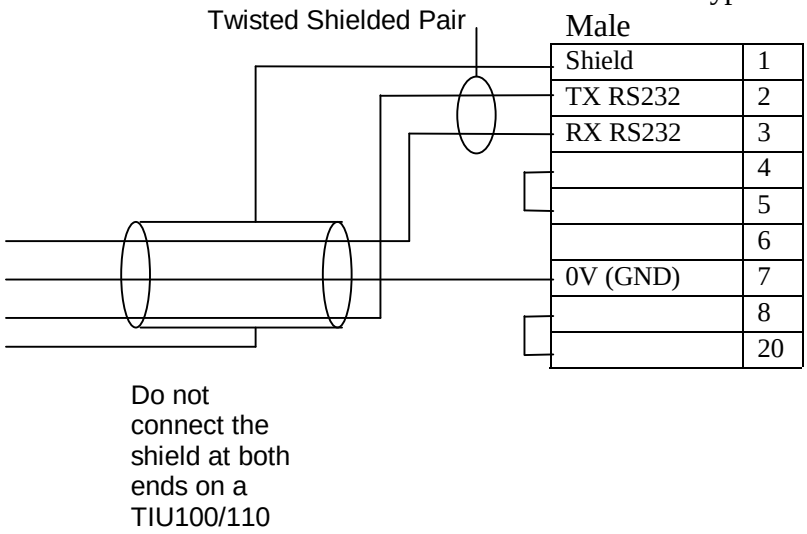
RS232 Connection



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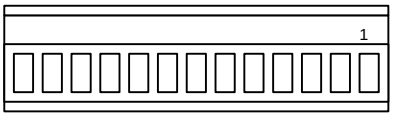

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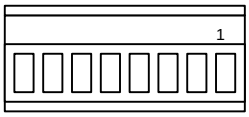

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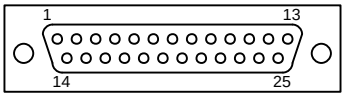

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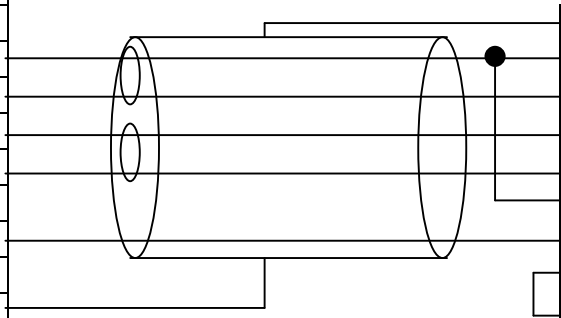
RS422 Connection



GEF SERIES 90-30 CMM 25 Pin D-Type Male	
Shield	1
RX 485+	24
RX 485-	13
TX 485+	21
TX 485-	9
RX 485+	25
0V (GND)	7
	10
	11
	22
	23

Do not connect the shield at both ends on a TIU100/110

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