Application Note for Using the Operator Station HE500TIU050/10X/11X/20X with the Mitsubishi FX PLC Protocol

Protocol File Name

HE500TIU050 = MitsiFX_R?.0xx
HE500TIU1xx = MitsiFX_R?.1xx
HE500TIU2xx = MitsiFX_R?.2xx
(The "?" = the TIU firmware revision)

Configuring the Operator Station

To verify the Automated Equipment type the Operator Station is setup for, watch the screen of the Operator Station on power up. The first screen message details the setup of the Operator Station. To configure the Operator Station for particular Automated Equipment, select the Automated Equipment in the Communication Settings from the Configure menu in ***CBREEZE*** software. Select the appropriate Manufacturer and the appropriate Remote Equipment Model. Then from the File menu select Update Protocol, the appropriate file name will appear in the file name field. The programmer may need to point to the correct folder name/location. If further information is required see the manual or ***CBREEZE*** help on update/change protocol.

Protocol Revisions

Version 1.00	Supports master only operation to the slave PLC.
Version 1.02	Supports 32 Bit Counters.
Version 1.03	Supports Blocks Over 32 Words
Version 1.04	Supports FX2C & FX2N extended addressing.
Version 1.05	Supports True octal addressing for X and Y register types.

Serial Port Format

The link settings of 9600 baud, seven data bits and even parity with no handshaking are forced in the terminal.

Node Address

No station numbers are required as only a one to one link is supported.

Register Type Specification

Read and writes are supported to the following areas: -

Word Types

- Data registers
- Special Data Registers
- Timer Values
- Counter Values

Thirty-two bit counters are automatically accessed when the appropriate counter Identifier is selected as the start Location.
Timer and Counter Presets are not directly accessible via communications as they are embedded in the ladder memory in the PLC. In order for the Operator Station to have access to the preset a Data Register should be used in the ladder rather than a constant.

Bit Types

Reads and writes are performed on blocks of sixteen bits with the bits being packed into words.
Reads and Writes are supported to the following bit types...

- Relays (M)
- Special Relays (M)
- Inputs
- Outputs
- State Relays (S)
- Timer Status
- Counter Status

Register Type Ranges

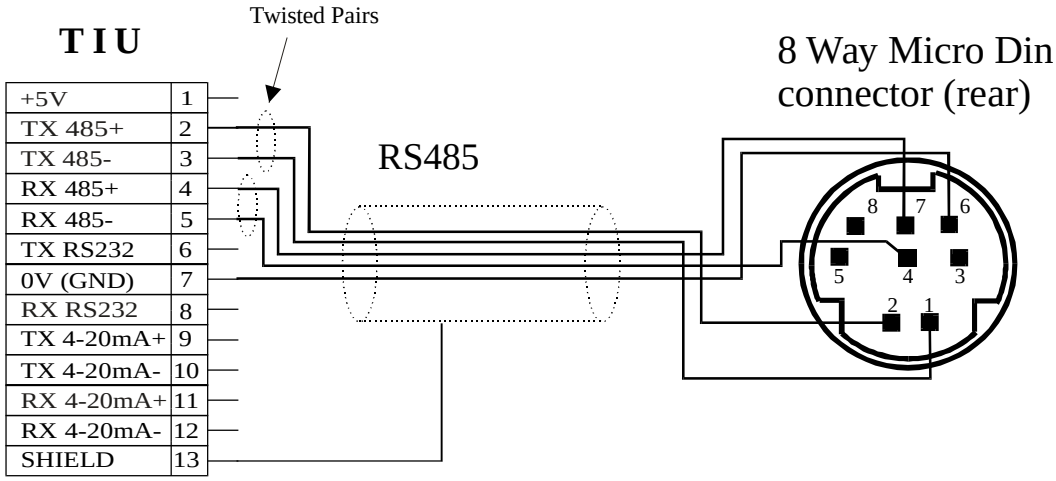
	FX0	FX0s	FX0N	FX(V3.07)	FX(2c)	FX2N
Data Registers (D)						
General use Registers	D0 – D29	D0 – D29	D0- D127	D0 – D199	D0 – D199	D0- D199
Latched Registers	D30 – D31	D30 – D31	D128 – D256	D200 – D999	D200 – D999	D200 – D7999
Diagnostic Registers	D8000 – D8026	D8000 – D8026	D8000 – D8039	D8000 – D8255	D8000 – D8255	D8000 – D0255
Relays (M)						
General use Relays	M0 – M495	M0 – M495	M0 – M383	M0 – M499	M0 – M499	M0 – M499
Latched Relays	M496 – M511	M496 – M511	M384 – M511	M500 – M1535	M500 – M1535	M500 – M3071
Special Relays	M8000 - M8055	M8000 - M8055	M8000 – M8191	M8000 – M8255	M8000 – M8255	M8000 – M8255
Inputs (X) (Octal)						
DC Inputs	X0 – X17	X0 – X17	X0 – X123	X0 - X377	X0 - X377	X0 - X377
Outputs (Y) (Octal)						
Outputs	Y0 – Y15	Y0 – Y15	Y0 – Y77	Y0 – Y377	Y0 – Y377	Y0 – Y377
Timers (T)						
Timer	T0 – T55	T0 – T55	T0 – T63	T0 – T255	T0 – T255	T0 – T255
Timer States (T)						
Timer	T0 – T55	T0 – T55	T0 – T63	T0 – T255	T0 – T255	T0 – T255
Counters (C)						
Counter (16 Bits)	C0 – C15	C0 – C15	C0 – C31	C0 – C199	C0 – C199	C0 – C199
Counter (32 Bits)	C235 – C254	C235 – C254	C235 – C254	C200 – C255	C200 – C255	C200– C255
Counter States (C)						
Counter (16 Bits)	C0 – C15	C0 – C15	C0 – C31	C0 – C199	C0 – C199	C0 – C199
Counter (32 Bits)	C235 – C254	C235 – C254	C235 – C254	C200 – C255	C200 – C255	C200– C255
States (S)						
States	S0 – S63	S0 – S63	S0 – S127	S0- S999	S0- S999	S0- S999

For further details of the above devices refer to the “FX Series Programmable Controllers” manual section “Devices in Detail”.

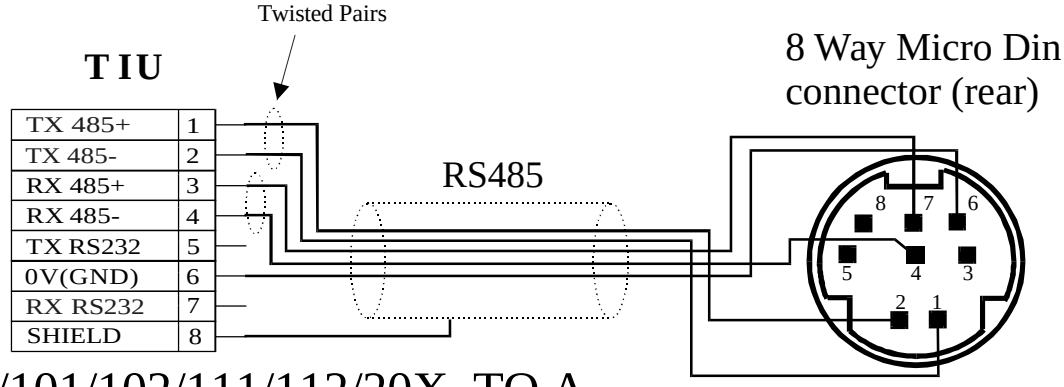
Connections

The Operator Station can be connected to the Mitsubishi FX PLC via the FX-232AW Communication Module. Alternatively the Operator Station can be connected directly into the PLC via the 25 Way Connector on the front of the PLC. However this may invalidate your Mitsubishi warranty. The following is the connection to be made direct into the PLC

CONNECTING AN OPERATOR STATION TO A MITSUBISHI FXO



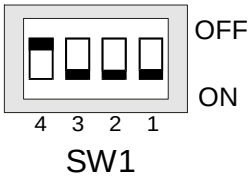
TIU 100/110 TO A MITSUBISHI FXO



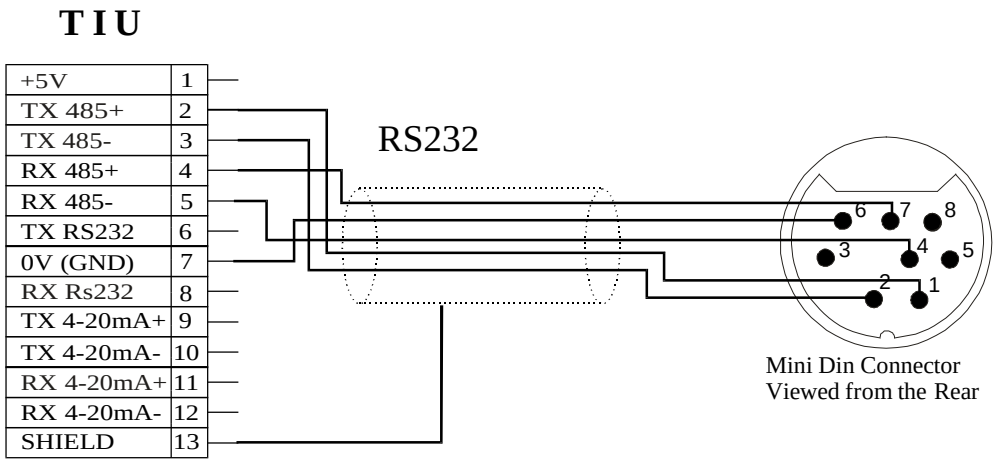
TIU 50/101/102/111/112/20X TO A MITSUBISHI FXO

Configuration Bank		
Switch	**ON**	**OFF**
1	Pull-up	No Pull-up
2	120 termination	No termination
3	Pull-down	No Pull-down
4	Reserved for future use	

Cable Screened Twisted Multipair Beldon 9503
One Pair Tx Data
One Pair Rx Data
One Pair 0V



CONNECTING AN OPERATOR STATION TO A MITSUBISHI FXO



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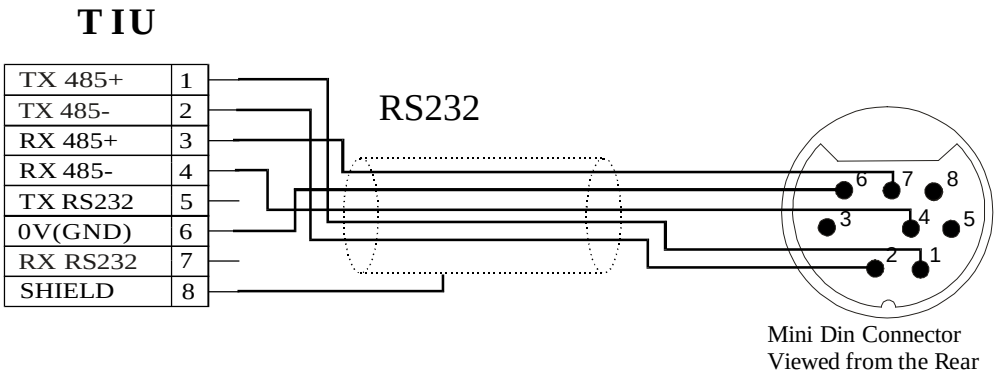
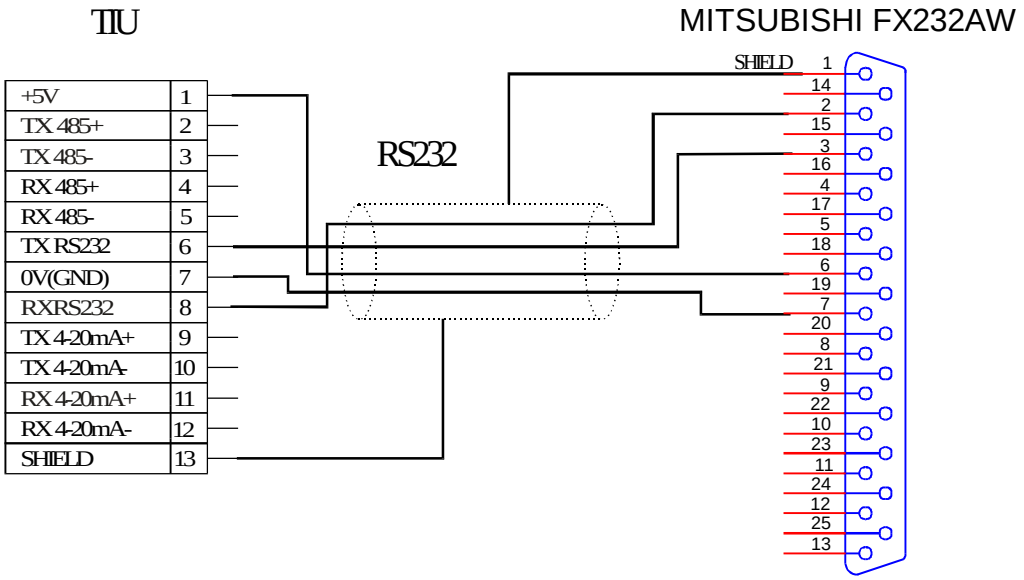


TIU 50/101/102/111/112/20X TO A MITSUBISHI FXO

CONNECTING AN OPERATOR STATION TO A MITSUBISHI FX via FX232AW MODULE



TIU100/TIU110 TO A MITSUBISHI FX232AW

25 Pin Male D type (Rear)

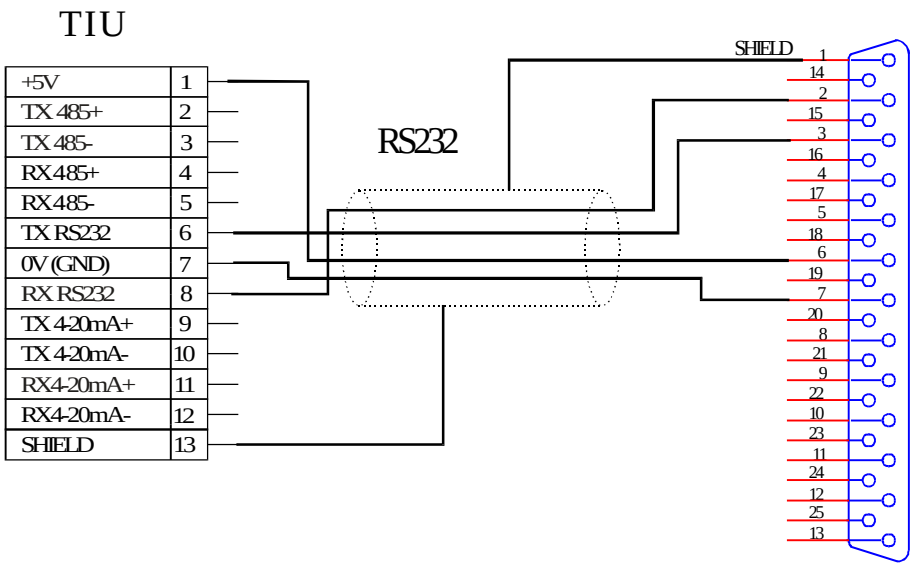
TIU

TX 485+	1
TX 485-	2
RX485+	3
RX 485-	4
TX RS232	5
0V(GND)	6
RX RS232	7
SHIELD	8

TIU 50/101/102/111/112/20X TO A MITSUBISHI FX232AW IS NOT POSSIBLE AS THERE IS NO +5V AVAILABLE AT THE TIU

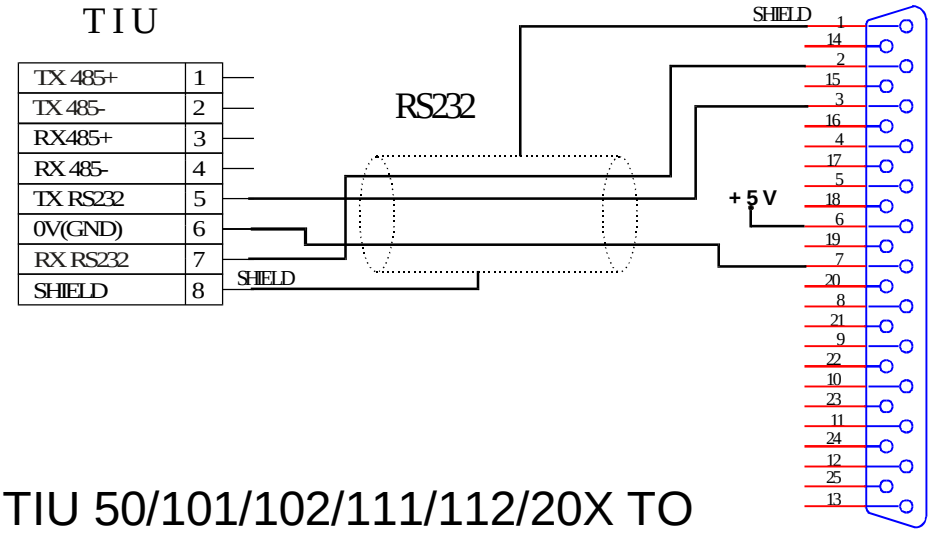
CONNECTING AN OPERATOR STATION TO A MITSUBISHI FX via FX232AW MODULE

MITSUBISHI FX232AW



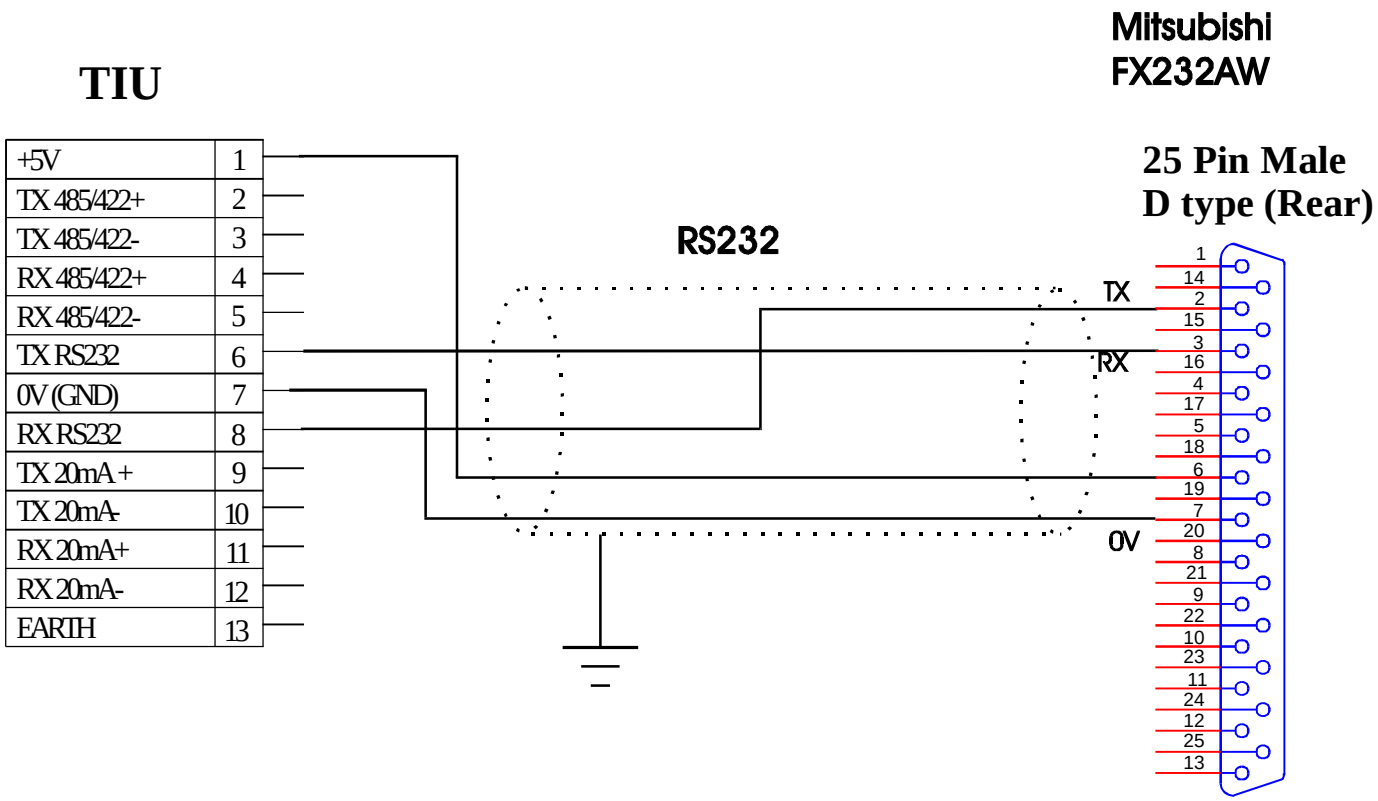
TIU100/TIU110 TO A MITSUBISHI FX232AW

25 Pin
Male D Type
View From Front

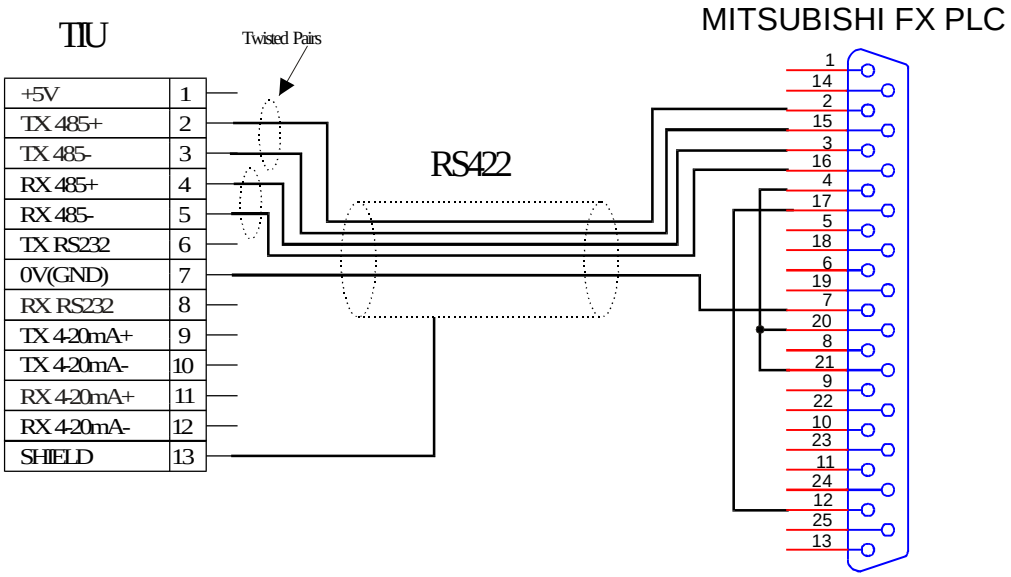


TIU 50/101/102/111/112/20X TO A MITSUBISHI FX232AW

Connecting The HE500TIU100 to a Mitsubishi FX

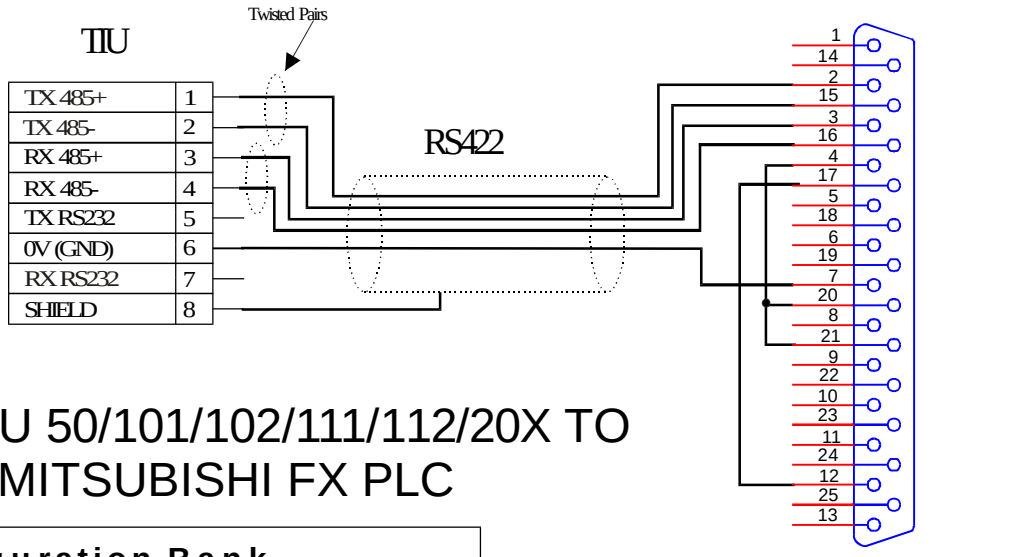


CONNECTING AN OPERATOR STATION TO A MITSUBISHI FX USING RS422



TIU100/TIU110 TO A MITSUBISHI FX PLC

25 Pin Male D type (Rear)

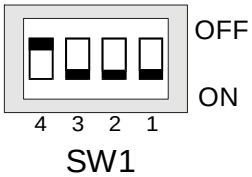


TIU 50/101/102/111/112/20X TO A MITSUBISHI FX PLC

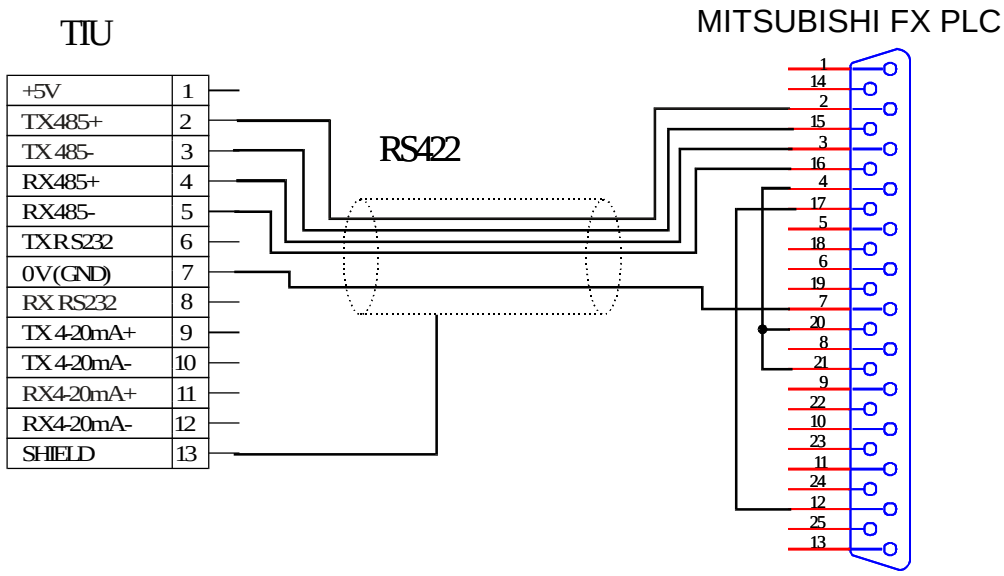
Configuration Bank		
Switch	ON	OFF
1	Pull-up	No Pull-up
2	120 termination	No termination
3	Pull-down	No Pull-down
4	Reserved for future use	

NOTE: Switch 1 and 3 must be used together.

Cable Screened Twisted Multipair Beldon 9503
One Pair Tx Data
One Pair Rx Data
Use third pair for 0V

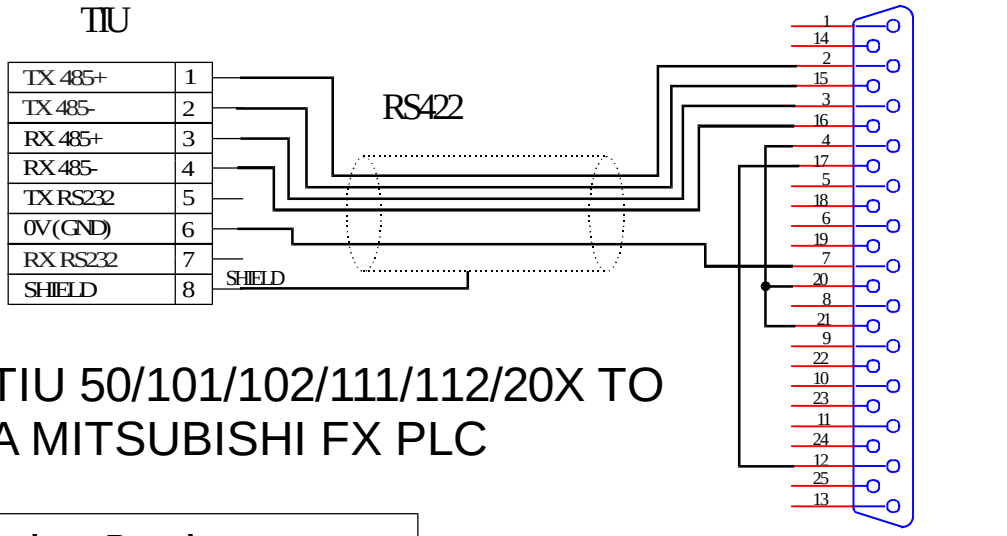


CONNECTING AN OPERATOR STATION TO A MITSUBISHI FX USING RS422



TIU100/TIU110 TO A MITSUBISHI FX PLC

25 Pin
Male D Type
View From Front



TIU 50/101/102/111/112/20X TO A MITSUBISHI FX PLC

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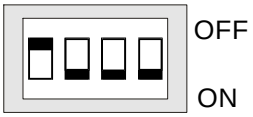


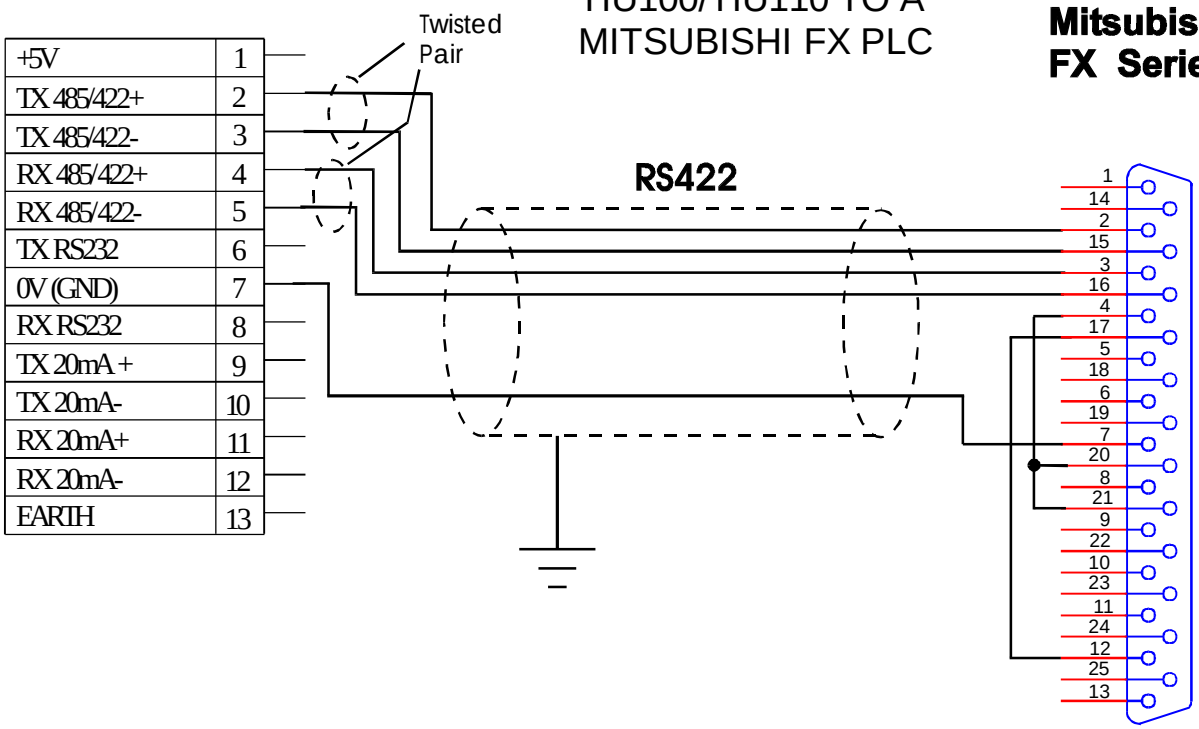
SW1

Connecting The HE500TIU100 to a Mitsubishi FX

TIU

TIU100/TIU110 TO A MITSUBISHI FX PLC

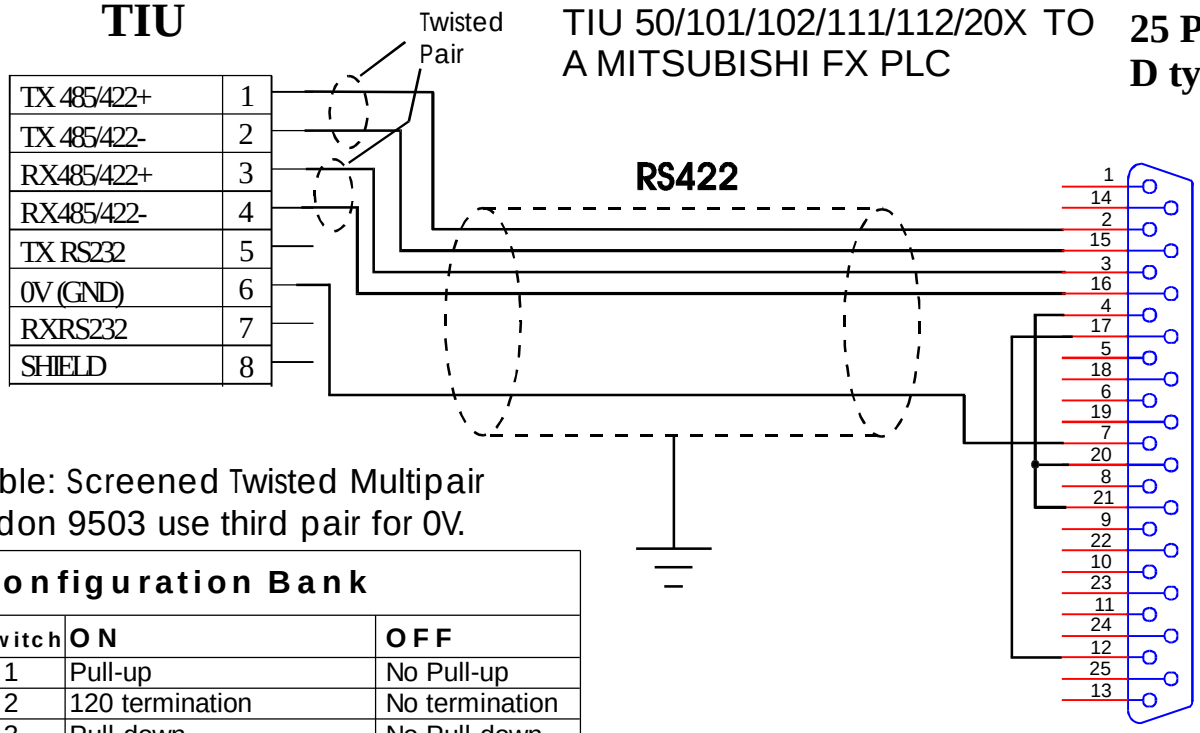
Mitsubishi FX Series PLC



TIU

TIU 50/101/102/111/112/20X TO A MITSUBISHI FX PLC

25 Pin Male D type (Rear)



Cable: Screened Twisted Multipair
Beldon 9503 use third pair for 0V.

Configuration Bank		
Switch	ON	OFF
1	Pull-up	No Pull-up
2	120 termination	No termination
3	Pull-down	No Pull-down
4	Reserved for future use	

NOTE: Switch 1 and 3 must be used together.

25 Pin Male D type (Rear)