

T44H Installation Guide

The light weight and compact T44H controller can be easily installed in many plastic or metal enclosures. You need to use 4 PCB standoffs to support the controller and to fasten it to a console box. Screw terminals are provided for quick connection to all input and output wires. In addition, each block of screw terminals can easily be detached from the controller body, enabling easy replacement of the controller board when necessary. The physical wiring of the T44H-pnp and the T44H-npn controllers are illustrated in Figure 2 and 3. The following sections describe various subsystems of the controller.

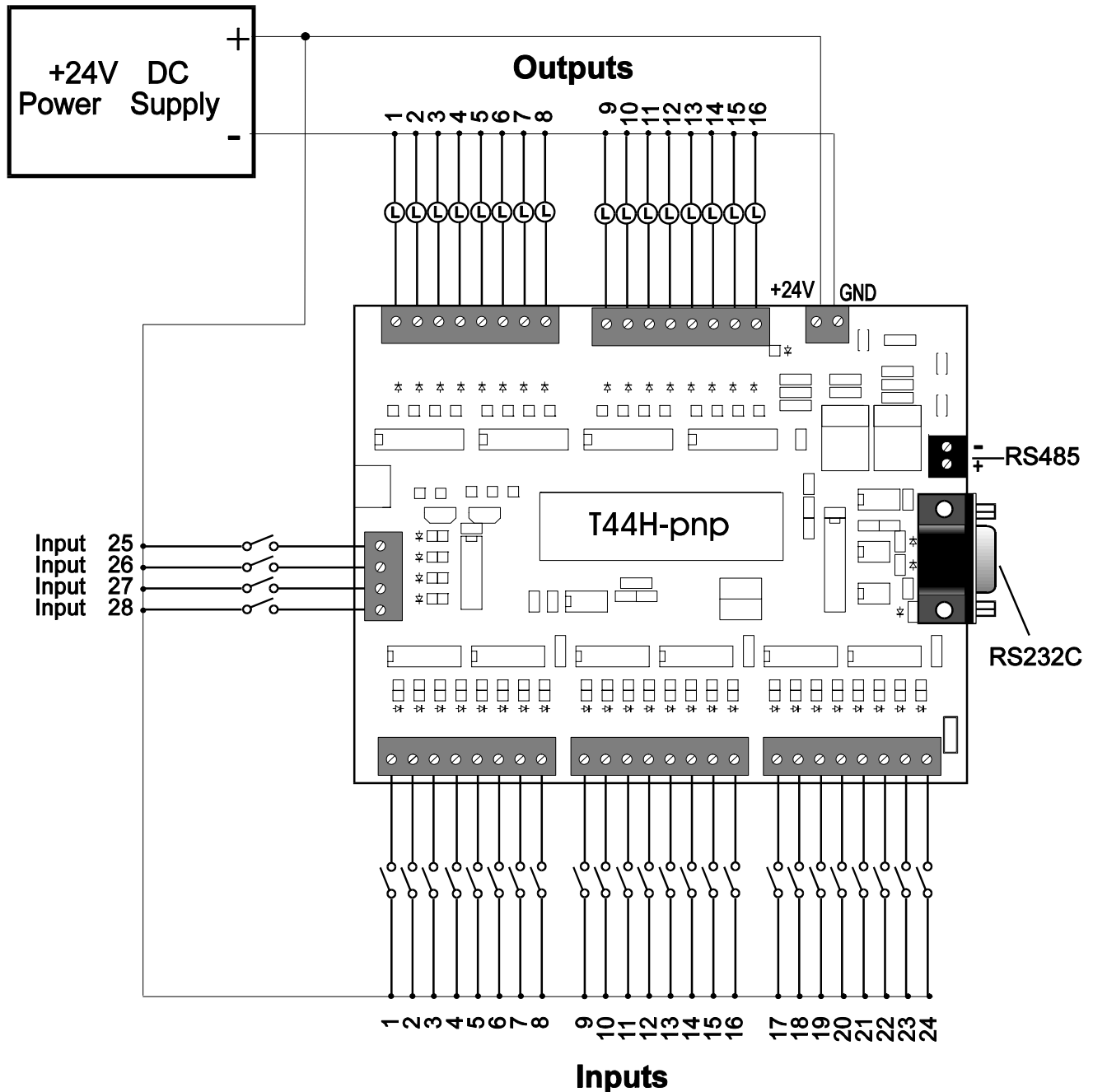


Figure 1: Installation of T44H-pnp Programmable Controller

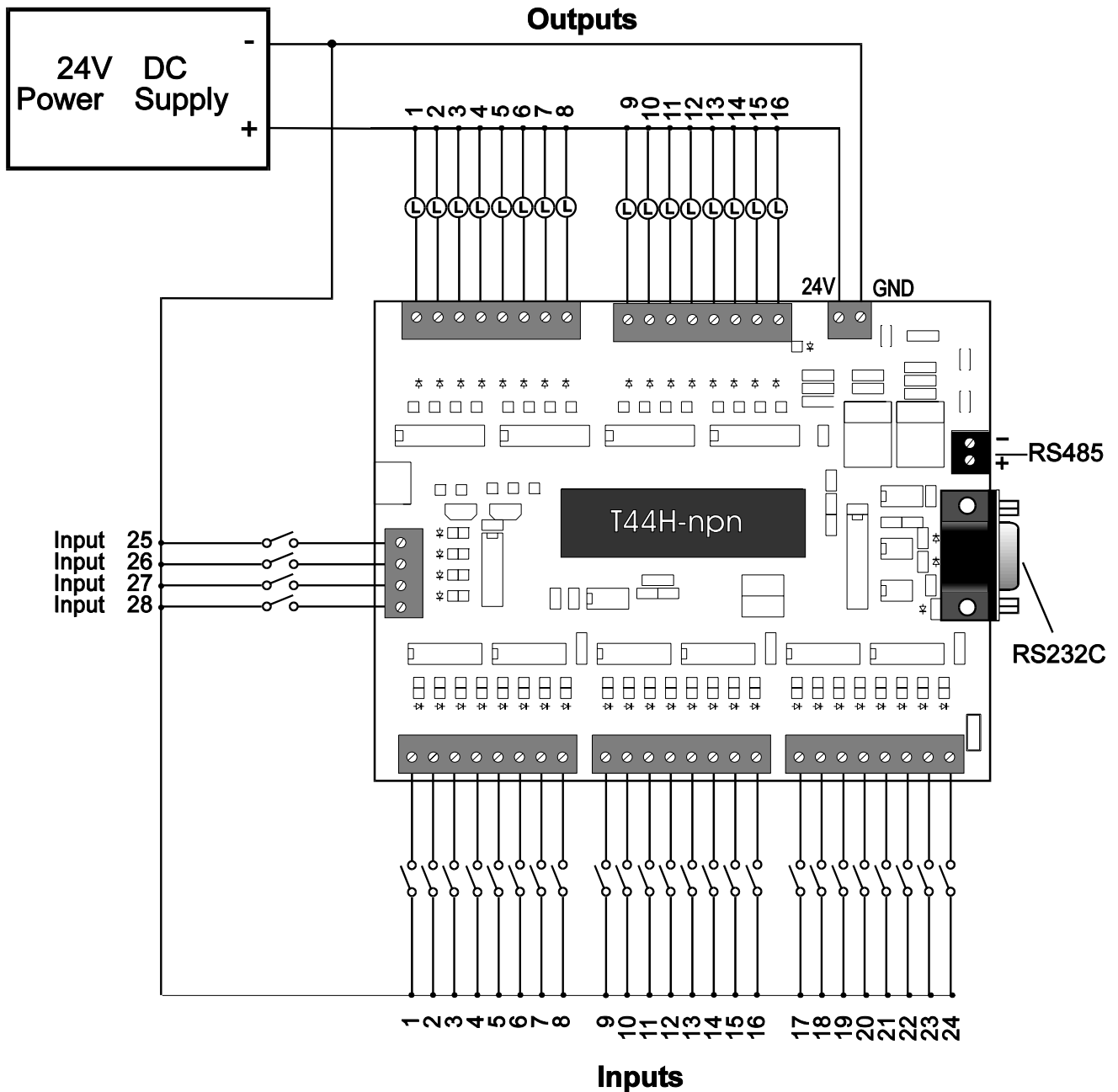
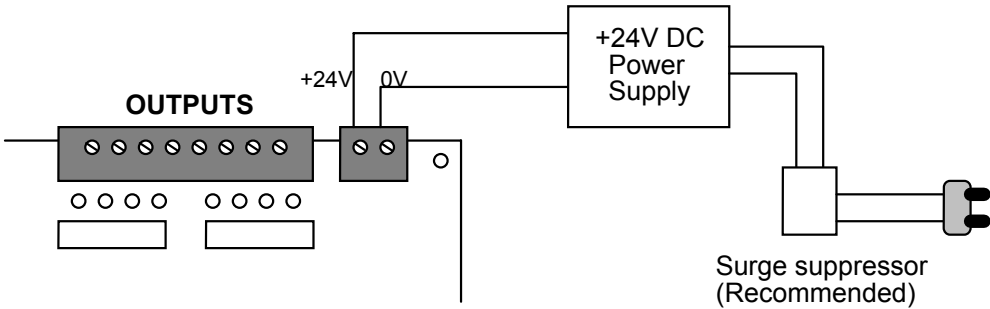


Figure 2: Installation of T44H-npn Programmable Controller

1. Power Supply

The T44H controller requires a single +24V (+/- 10%) DC regulated supply connected to the upper-right screw terminal block as shown in Figure 1. Use only industrial grade switching or linear regulated power supply from established manufacturers for best results. Using a poorly-made power supply can give rise to some problems if the output voltage of the supply fluctuates widely when the load is turned ON/OFF. If the AC main is affected by nearby machines drawing large currents (such as large three-phase motors), use a surge-suppressor to prevent any unwanted noise voltage from being coupled into the T44H power supply.



The T44H controller consumes only about 0.2A of current when all its inputs/outputs are off, and each LED indicator on the input and output consumes only about 5mA. Thus the required current rating for the power supply depends mainly on the total average load current, taking into consideration the peak current demand and duty cycle of the operation. Normally, a 24V, 2 - 3A DC power supply is quite sufficient for most of the T44H applications.

2. Input Units

There are a total of 28 physical inputs in the basic T44H. These inputs are numbered from 1 to 28. These numbers correspond directly to the first 28 entries in the TRiLOGI's™ Input Table. Input interfacing to the T44H-pnp controller is different from that of the T44H-npn controller, as follow:

	T44H-pnp	T44H-npn
Input Voltage for Logic 0:	Open circuit or 0V to +5V	Open Circuit or +8.5V to +30V DC
Input Voltage for Logic 1:	+12V to +36V	0V to +4V

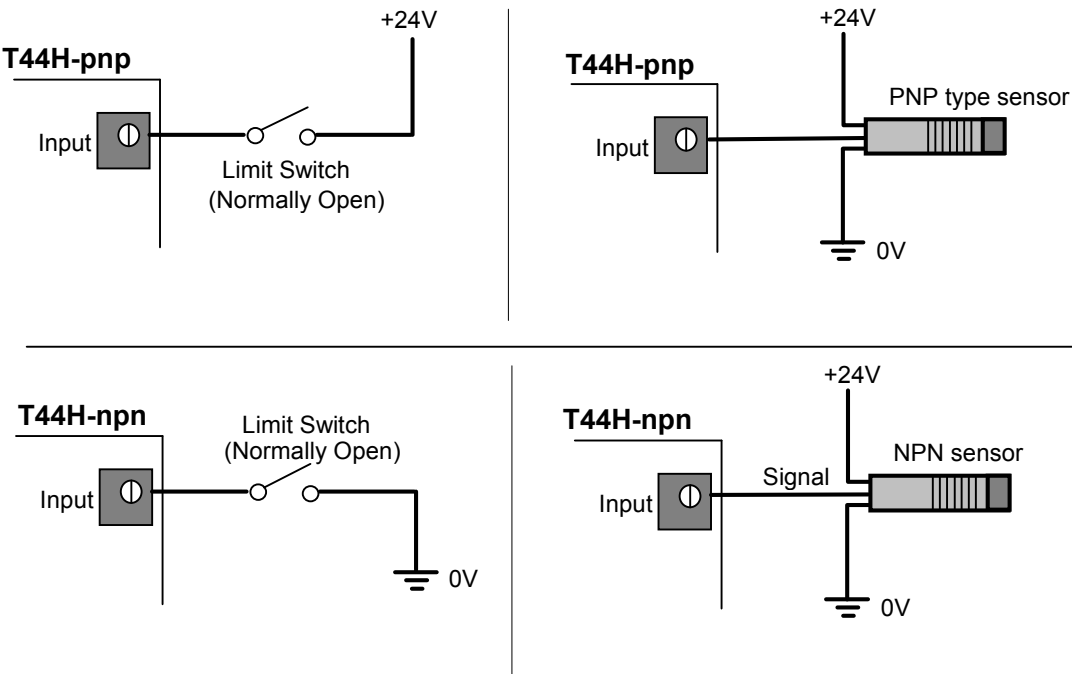


Figure 3 - Input interfacing to sensors

In addition to the 28 physical inputs (1-28) , 16 *memory inputs* numbering from 33 to 48 are available on the T44H controller. These inputs have no physical connections and can only be turned on or off by a host computer using control commands sent via the serial port.

3. Output Units

A T44H controller provides 16 high-current transistor output points. Circuit wirings to the load for the T44H-pnp model differs from that of the T44H-npn model, as follow:

	T44H-pnp	T44H-npn
Output Driver type:	PNP Darlington transistors	NPN Darlington transistors
Output voltage when OFF	Floating	Floating
Output voltage when ON	+22.6V @ $I_{out} = 0.5A$	+1.2V @ $I_{out} = 0.5A$
Inductive Kick Protection	Built-in diode internally connected to ground	Built-in diode internally connected to +24V

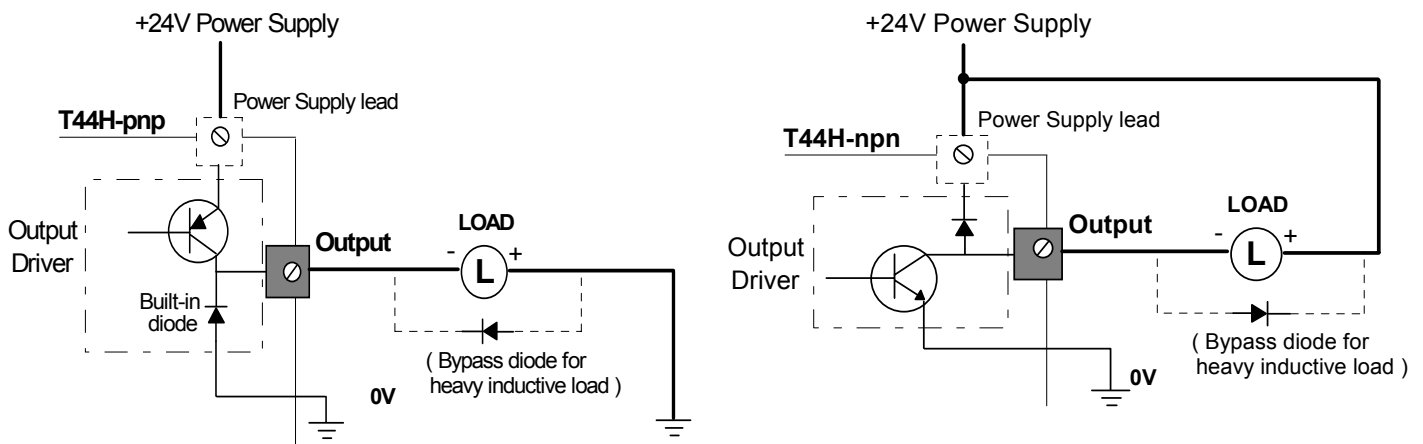


Figure 3 - Input interfacing to sensors

Note: When driving heavy inductive load which are situated far away from the controller, it may be necessary to connect external bypass diode across the load to suppress inductive noise, as shown in the above diagrams. The further the load is from the output driver (longer wires), the less effective is the built-in inductive bypass diode in suppressing the inductive noise.

Current Rating

Each transistor output terminal is capable of sourcing (PNP type) or sinking (NPN type) up to 1.0A of peak current. Every four adjacent output points are driven by one IC driver as shown in the following groupings:

- Driver 1: Outputs 1,2,3,4
- Driver 2: Outputs 5,6,7,8
- Driver 3: Outputs 9,10,11,12
- Driver 4: Outputs 13,14,15,16

Without using a heat sink, every driver IC is capable of driving a continuous total current of 1.0A. For reliable operation, ensure that the sum of continuous current drawn by the four output-points to a driver does not exceed 1.0A in total. It is also recommended that each output pin should not be allowed to drive more than 500mA continuously.

A good ventilation system, including the possibility of using a cooling fan, is strongly recommended for operating the controller near these limits.

5. Internal Relays

The T44H supports up to 128 internal relays. Internal relays are useful for storing temporary logic states or serving as flags to a host computer which may examine them via the serial port. If DIP switch SW1-1 is ON, then the first 32 internal relays retain their logic states when the power is off.

6. Timers

The 20 software countdown timers in T64H-RELAY occupy the first 20 entries in TRiLOGI's Timers table. The range of the timer preset value is from 0.1 to 999.9 seconds. If DIP switch SW1-1 is ON, then the first 8 timers retain their present values and logic states when the power is off.

Additional timers may be created by feeding a built-in clock source to unused counters. The T44H PLC supports 6 clock sources of various periods: 0.01s, 0.02s, 0.1s, 0.2s, 1 sec and 1 minute. The 0.01s clock source can be used to create high speed timers of 0.01s resolution.

7. Counters

There are 20 independent counters in T64H-RELAY. These counters occupy the first 20 entries in TRiLOGI's Counters table. All counters range from 1 to 9999. These counters either operate as down-counters from a preset value or as reversible Up/Down counters. Any one or all of the first 8 counters can also double as step counters for the 8 sequencers available in T44H. If DIP switch SW1 is ON, then the first 8 counters retain their present values and logic states when the power is off.

8. Sequencers

Model T44H controller supports 8 sequencers of 32 steps each. A sequencer is a highly convenient feature for programming machines or processes which operate in fixed sequences. Any one or all of the first 8 counters can be used as step counters for the sequencers which correspond to sequencers "Seq1" to "Seq8". A Sequencer operates in "steps". Each time the execution condition for the special function -----[AVseq] goes from OFF to ON, the sequencer will forward (increment) one step (starting from 0 to the preset values). See TRiLOGI Programmer's Reference for an example on the use of the Sequencers.

9. Maximum Program Steps

A program step is approximately equivalent to a normally-open or normally-closed contact on the ladder diagram. (Please refer to TRiLOGI's manual for details). T44H allows program of up to 400 steps to be written.

10. DIP Switch Settings

A 4-position DIP switch is situated just below the T44H CPU on the controller. The switches allow the controller to be configured for different operating modes, as indicated in the following table.

DIP Switch	OFF	ON
SW1-1	All outputs, relays, timers and counter values are non-retentive.	The first 32 relays, timers #1-8 and counters #1-8 retain their logic status and present values when power off.
SW1-2	Select RS232C interface	Select RS485 interface
SW1-3	Baud Rate always = 9600	Use baud rate set by "BW" command (See Section 4)
SW1-4	Normal Run mode	Suspends execution of ladder logic program. However, host communication remains active.

9. Host computer connection

The T44H PLC features a built-in serial port with two kinds of electrical interface:

- 1) An opto-isolated RS232C interface.
- 2) A RS485 two-wire network interface.

Although you may connect the T44H to both interface simultaneously, only one of them may be active. If DIP switch SW1-2 is off, the RS232C is active, otherwise T44H will respond to commands coming from the RS485 port. (Please refer to the H-series User's Manual for details description on RS485 interfacing)

The opto-isolated RS232C serial interface can be linked to any IBM compatible PC. This interface provides up to 1500VDC of isolation between the host computer and the controller. Programming of the T44H controller is done entirely on the PC and the program is subsequently downloaded to the controller via this serial port. A female 9-pin D-sub connector (DB9) is provided for easy connection to a host PC using any standard PC serial cable. The RS232C may be connected to either COM1: or COM2: of the PC.

Note: The RS232C interface is only guaranteed to operate reliably at baud rate up to 9600 bps. Use the RS485 interface if you wish to operate T44H at above 9600 baud.

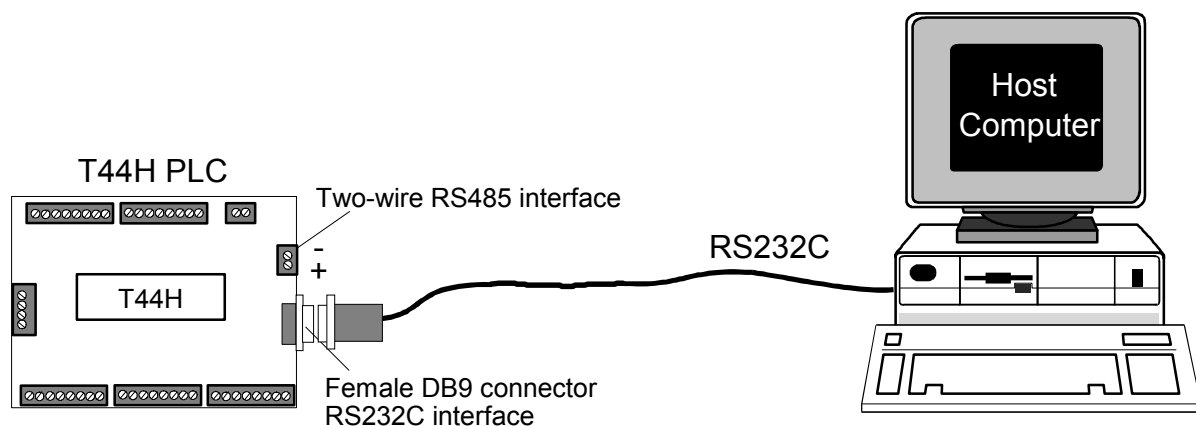


Figure 4 - RS232 interfacing to host computer