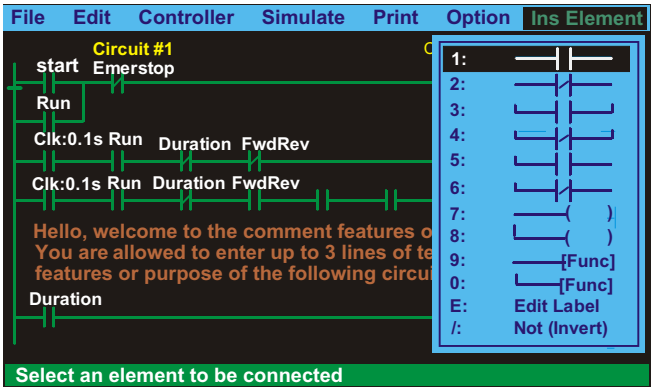
The *H-series* Programmable Logic Controllers

Pocket-size PLC!!

T22H-npn - 12 Inputs (12-24V DC)
- 10 Outputs (1A @12-24VDC)



TRiLOGI - Ladder Logic Editor

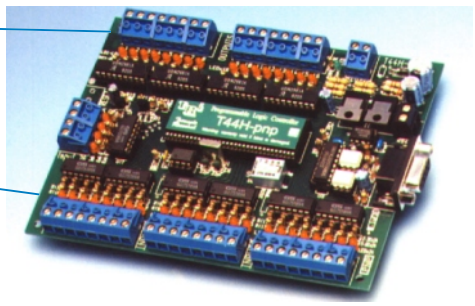
The H-series programmable logic controllers are ideal for small control projects requiring lots of logic relays, timers and counters. Their low cost and compact size make them the favourite choice among OEM machine makers around the world. Thousands of H-series PLCs have already been installed on equipment from simple food processing machines to million-dollar production lines of multi-nationals like Philips, SGS Thomson and Apple Computer, among others. Many H-series PLCs have also been installed in extremely harsh environment such as on board ocean vessels, coal-mining machines and coal and cement transportation conveyors in China and Pakistan. Our many regular customers readily attest to the quality and reliability of the H-series PLCs which have a consistent record of flawless performance.

Why do our customers choose the H-series PLCs over other brands? The unanimous reason cited is the extreme ease of programming a H-series PLC, which reduces drastically the programming time and increases considerably the productivity of PLC programmers. All H-series PLCs are programmable using a very powerful ladder logic editor-cum-simulator software - **TRiLOGI.** TRiLOGI runs on any PC, XT or AT compatible computer. Featuring pull-down menus, pop-up windows and on-line context-sensitive help systems, TRiLOGI is the most user-friendly ladder logic editor available. Its built-in logic **SIMULATOR** allows you to fully test your program on your PC screen before downloading to the target PLC. You don't even need to connect to the target PLC to test your program because TRiLOGI's simulator is completely functional on its own. You may download a free evaluation copy of TRiLOGI from our website at: http://www.tri.com.sg to try out the amazing simulation features of TRiLOGI.

Currently the H-series comprises 5 models ranging from the 12-input, 10-output T22H-npn; to the 40-input, 24-output T64H-Relay. All H-series PLCs comprise 128 internal relays, 20 timers, 20 counters and 8 sequencers. The T64H-Relay has twice the number of internal relays, timers, counters and programming steps. In addition to basic high speed AND/OR/OUT instructions, the H-series supports a number of useful special functions such as sequencers, reversible up/down counters, differentiated instructions and latch relays to handle the most demanding applications.

16 Outputs
1A @24VDC

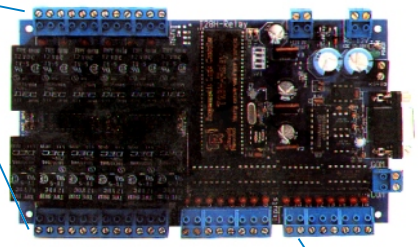
28 Inputs
(24V DC)



T44H-pnp/npn

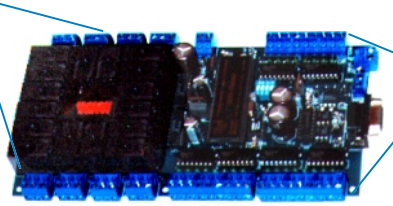
12 Outputs
(10A @250VAC)

T28H-Relay



16 Inputs
(12V NPN)

16 Outputs
(10A @250VAC)

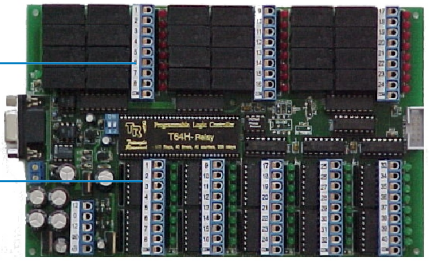


24 Inputs
(Opto-Isolated)

T40H-Relay

T64H-Relay

24 Outputs
2A @250V AC



40 Inputs
(Opto-Isolated)

Triangle Research
INTERNATIONAL, INC.

I. H-Series PLC Hardware Specifications

Item \ Model	T22H-npn	T44H-pnp/npn	T28H-Relay	T40H-Relay	T64H-Relay
1. Inputs					
No. of Inputs	**12**	**28**	**16**	**24**	**40**
Interface	Transistor	Transistor	Transistor	NEC P2505 Optocoupler	NEC P2505 Optocoupler
Logic '1' voltage	NPN: 0 to 4V	NPN: 0 to 4V PNP: +12 to +24V	Relative to COM 0 to +3V	Relative to COM +10V to +24V	Relative to COM +10V to +24V
Logic '0' voltage	NPN: 8.5 to 24V (Or Open Circuit)	NPN: 8.5 to 24V PNP: 0 to +5V (Or Open Circuit)	Relative to COM +8V to +12V (Or Open Circuit)	Relative to COM 0V to ±3V (Or Open Circuit)	Relative to COM 0V to ±3V (Or Open Circuit)
2. Outputs					
No. of Outputs	**10**	**16**	**12**	**16**	**24**
Interface	NPN Darlington Transistor	PNP or NPN Darlington Transistor	Dry Contact	Dry Contact	Dry Contact
Maximum Current per output	1 A (24V DC)	1 A (24VDC)	10 A (250VAC or 30VDC)	10 A (250VAC or 30VDC)	2 A (250VAC or 30VDC)
Logic '1' voltage	NPN: 1.2V(0.5A) PNP:22.6V(0.5A)	NPN: 1.2V(0.5A) PNP:22.6V(0.5A)	- (12 Independent)	- (8 common)	- (3 common)
Back EMF Bypass	Internal Diode	Internal Diode	-	-	-
3. CPU	With Normal CPU		With Enhanced-CPU (Hplus) option		
Memory Type	EEPROM		EEPROM		EEPROM
Maximum capacity	400 steps		800 steps		800 steps
Storage Period	100 year		100 year		100 year
Endurance	100,000 cycle		100,000 cycle		100,000 cycle
Average Execution speed	12 µs / step		12 µs / step		12 µs / step
4. Internal Resources	With Normal CPU		With Enhanced-CPU (Hplus) option		
Internal Relays	128		256		256
Timers	20 (0.1 to 999.9 s)		40 (0.1 to 999.9s)		40
Counters	20 (1 to 9999 counts)		40 (1 to 9999 counts)		40
Sequencers	8 (step 0 to 31)		8 (step 0 to 31)		8
5. Power Supply					
External P/S Required	12 or 24VDC Regulated (+/- 10%)	24VDC Regulated (+/- 10%)	12V AC (+/- 10%) 1A transformer	12V AC (+/- 10%) 1.5A transformer	12-0-12V AC 0.5A transformer
CPU Current	0.1A	0.1A	0.1A	0.1A	0.1A
6. Serial Port					
No. of Channel	1	1	1	1	2
RS232	1	1 (opto-isolated)	1 (opto-isolated)	1 (opto-isolated)	1 (opto-isolated)
Twisted pair RS485	1	1	1	1	1
7. Environment	Internal Tests conducted showed that the H-series PLC conforms to the IEC standard as follow:				IEC Reference
Heat / Humidity cycling	Temperature :25°C-55°C , RH = 95%. 48 hrs cycling				IEC 68-2-30/1980
Vibration Test (Severe Vibration)	2Hz to 25Hz Amplitude = ±1.6mm 25Hz to 100Hz Amplitude = ±1.acceleration = ± 4.0g				IEC 68-2-6/1980
Electrical Interference	2KV (on Power Supply), 500V-2KV (on I/O), 50ns pulse width				IEC801-4 (1988)
Environment	0°C - 70°C				
8. Dimension					
L x W x H (cm)	10.0 x 8.8 x 2.0	15.0 x 11.5 x 2.0	16.5 x 10.5 x 3.0	19.5 x 12.0 x 3.0	20.7 x 12.5 x 2.0
9. Weight	100g	200 g	350 g	440g	350g

Note: Specifications are subject to change without prior notice

II. Software Features

1. Sequencers	**8** sequencers, 32 steps each. Each step of the sequencer can be used as a normally-open or normally-closed contact to the ladder diagram.
2. Special Bits	**6** Clock pulse bits: 0.01s, 0.02s, 0.1s, 0.2s, 1.0s and 1 minute period. First Scan Pulse, Normally-On flag
3. Special Functions	
a) Reversible Counter	- Any one of the available counters can be used. A reversible counter can be incremented or decremented between 0 and the set value.
b) Latch/Clear Relay	- Any one of the relays bits of or the output bits can be programmed. A latch relay, once energized. will remain ON until it is reset by the [Clear] function.
c) Advance /Set Sequencer Step	- Advance (increment) the sequencer to the next step. The sequencer can be set to any step between 0 and 31 by the [StepN] function.
d) Interlock Begin/End	- All outputs in the section of ladder logic between [ILock] and [ILoff] are turned off, timers are reset and all other instructions not executed.
e) Differentiate Up [DIFU] Differentiate Down [DIFD]	- Any of the 128 relays or the 24 output bits can be used. [DIFU] function turns on the coil for one-scan-time only when its execution condition goes from logic '0' to logic '1'. [DIFD] turns on the coil for one-scan-time only when its execution condition goes from logic '1' to logic '0'.
f) Master Reset	- Single function clears all relays and output bits to zero, reset all timers and reset all counters/sequencers to inactive state.