Specifications - Terminal Bases and Power Supplies

In This Chapter:

T1K-08B(-1) I/O Terminal Base

Specifications		
Specification	**T1K-08B**	**T1K-08B-1**
Terminal Type	Screw type	Spring clamp type
Recommended Torque	1.77 - 3.54 lb-inch (0.2 - 0.4 Nm)	-
Recommended Screwdriver Blade Size	0.02 in. X 0.125 in. (0.5 mm X 3.0 mm)	Push in on clamp using screwdriver blade size: 0.016 X 0.79 in. to 0.032 X 0.16 in. (0.4 mm X 2 mm to 0.8 mm X 4 mm)
Wire Gauge Size	Solid conductor: 25 - 12 AWG Stranded conductor: 26 - 12 AWG*	Solid conductor: 25 - 14 AWG Stranded conductor: 26 - 14 AWG*
Weight	135 g	125 g

*Twist conductors before inserting into gate.

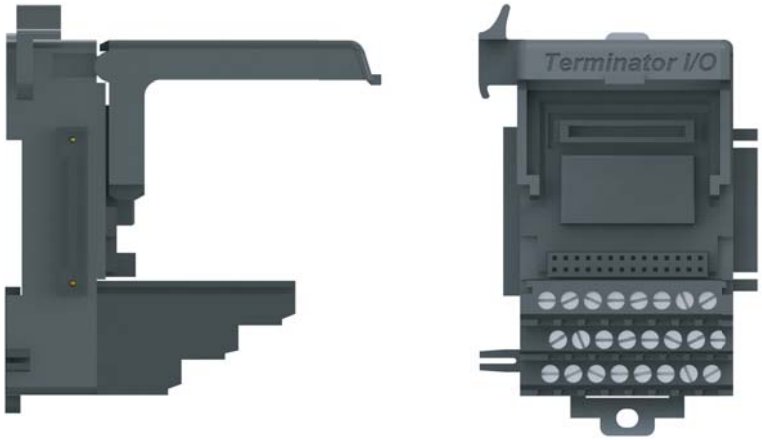
T1K-16B(-1) I/O Terminal Base

Specifications		
Specification	**T1K-16B**	**T1K-16B-1**
Terminal Type	Screw type	Spring clamp type
Recommended Torque	1.77 - 3.54 lb-inch (0.2 - 0.4 Nm)	-
Recommended Screwdriver Blade Size	0.02 in. X 0.125 in. (0.5 mm X 3.0 mm)	Push in on clamp using screwdriver blade size: 0.016 X 0.79 in. to 0.032 X 0.16 in. (0.4 mm X 2 mm to 0.8 mm X 4 mm)
Wire Gauge Size	Solid conductor: 25 - 12 AWG Stranded conductor: 26 - 12 AWG*	Solid conductor: 25 - 14 AWG Stranded conductor: 26 - 14 AWG*
Weight	220 g	210 g

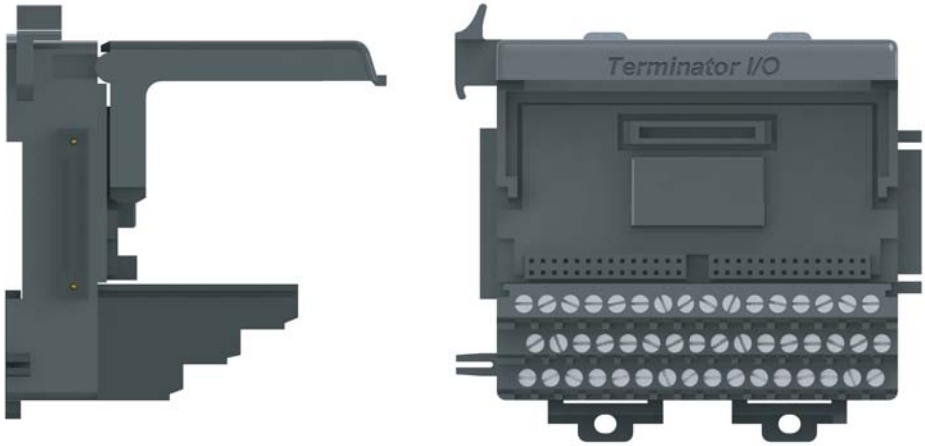
*Twist conductors before inserting into gate.

Environmental Specifications	
Ambient Operating Temperature	32° F to 131° F (0° C to 55° C)
Storage Temperature	-4° F to 158° F (-20° C to 70° C)
Ambient Humidity	5% to 95% (Non-condensing)
Atmosphere	No corrosive gases. The level of environmental pollution = 2 (UL 840).
Vibration Resistance	MIL STD 810C. Method 514.2
Shock Resistance	MIL STD 810C. Method 516.2
Voltage Withstand	1500 VAC, 1 minute
Insulation Resistance	500 VDC, 10 MΩ
Noise Immunity	NEMA ICS3-304 Impulse Noise 1 μs, 1000V FCC class A RFI (144 MHz, 430 MHz 10W, 10 cm)
Agency Approvals	UL E185989, CE, FCC class A

T1K-08B, T1K-08B-1



T1K-16B, T1K-16B-1



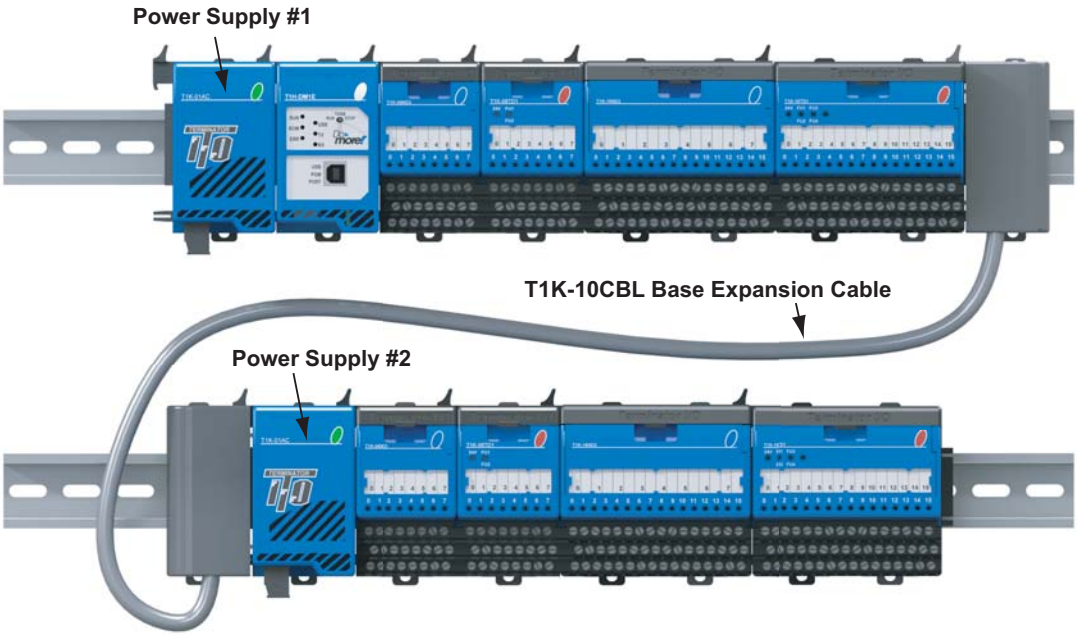
T1K-01AC, T1K-01DC Power Supply

Specifications			
Specification		**T1K-01AC**	**T1K-01DC**
Input Voltage Range		110 / 220 VAC (85 - 264 VAC)	12 / 24 VDC (10.8 - 26.4 VDC)
Input Frequency		50 / 60 Hz (47-63 Hz)	-
Maximum Power		50 VA	20 W
Maximum Inrush Current		20 A	10 A
Insulation Resistance		> 10 MΩ @ 500 VDC	
Voltage Withstand (Dielectric)		1 min. @ 1500 VAC between primary, secondary and field ground	
Auxiliary 24 VDC Supply		300 mA maximum	-
Output 1: 5 VDC Base Power Supplied	Voltage	5.25 VDC (5.00 - 5.50 VDC)	5.25 VDC (5.00 - 5.50 VDC)
	Current	a) 2.0 A maximum b) 1.5 A maximum (see note)	2.0 A maximum
	Ripple	5% maximum	5% maximum
Output 2: 24 VDC Base Power Supplied	Voltage	24 VDC (20.0-28.0 VDC)	-
	Current	a) 300 mA maximum b) 500 mA maximum (see note)	-
	Ripple	10% maximum	-
Replacement Terminal Block - Phoenix Contact		MVSTBW 2.5/4-ST-5.08 BK	MVSTBW 2.5/6-ST-5.08 BK
Fuse		1 (Primary) not replaceable	

NOTE: *500 mA @ 24 VDC is achieved by lowering the 5 VDC to 1.5 A from 2.0 A.*

Environmental Specifications	
Ambient Operating Temperature	32° F to 131° F (0° C to 55° C)
Storage Temperature	-4° F to 158° F (-20° C to 70° C)
Ambient Humidity	5% to 95% (Non-condensing)
Atmosphere	No corrosive gases. The level of environmental pollution = 2 (UL 840).
Vibration Resistance	MIL STD 810C. Method 514.2
Shock Resistance	MIL STD 810C. Method 514.2
Voltage Withstand	1500 VAC, 1 minute
Insulation Resistance	500 VDC, 10 MΩ
Noise Immunity	NEMA ICS3-304 Impulse Noise 1 μs, 1000 V FCC class A RFI (144 MHz, 430 MHz 10 W, 10 cm)

T1K-01DC **T1K-01AC**



Note: Use the T1K–01AC 24 VDC auxiliary supply or an external user supply for modules that require an external 24 VDC.

Important Power Budget Note: For each power supply in a system make sure the current required by the CPU and I/O modules does not exceed the current supplied at both 5 VDC and 24 VDC (if using the 24 VDC auxiliary supply).

Calculating the Power Budget

Managing the Power Resource

When determining the types and quantity of I/O modules to be used in the Do-more T1H Series PLC system, it is important to remember there is a limited amount of power available from the power supply. A chart is provided to help you easily see the amount of power available with AC and DC power supplies. At the end of this section you will also find an example of power budgeting and a worksheet showing sample calculations.

If the chosen I/O exceeds the maximum power available from the power supply the problem is corrected by simply adding another power supply .

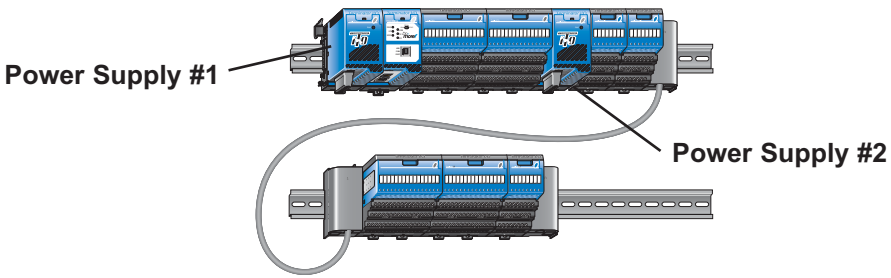
WARNING: It is extremely important to calculate the power budget correctly. If you exceed the power budget, the system may operate in an unpredictable manner which may result in a risk of personal injury or equipment damage.

Power Supply Specifications

The following chart shows the amount of current **supplied** by the Terminator I/O power supply. Use this to calculate the power budget for your system. The Auxiliary 24 V Power Source mentioned in the table can be used to power field devices or modules that require an external 24 VDC.

AC Power Supply	5 VDC Current Supplied in mA (internal)	Auxiliary 24 VDC Power Source Current Supplied in mA	DC Power Supply	5 VDC Current Supplied in mA (internal)	Auxiliary 24 VDC Power Source Current Supplied in mA
T1K-01AC	2000	300	T1K-01DC	2000	-
T1K-01AC (see Note)	1500	500			

Note: A max. of 500 mA @ 24 VDC can be achieved by lowering the 5 VDC to 1500 mA



NOTE: Important about Power Supplies *- One power supply is required in the leftmost component position (Power Supply #1), as shown above. Additional power supplies should be added between I/O modules as necessary to meet power budget requirements. Each power supply powers the modules to its right, but is interrupted by the next power supply. It is not mandatory to have a power supply in the leftmost position on an expansion rack.*

The system shown above: *Power Supply #1 powers the CPU module and the two I/O modules to its right. Power Supply #2 powers the remaining five I/O modules. This is only an example and the power budget requirements vary depending on the I/O modules used.*

Module Power Requirements

This chart shows the amount of maximum current ***required*** for each of the Do-more T1H PLC modules. Use this information to calculate the power budget for your system. If an external 24 VDC power source is required, you can use the built-in 24 VDC auxiliary supply as long as you do not exceed the power budget. If any device is connected to the Controller's serial port that uses the 5 VDC supply pin, be sure to include the device's power consumption in your 5 VDC power budget calculation.

Terminator Module Power Consumption					
Module	***5 VDC (mA)***	***24 VDC (mA)***	***Module***	***5 VDC (mA)***	***24 VDC (mA)***
CPU Modules			***Analog Input Modules***		
T1H-DM1	250	0	T1F-08AD-1	75	50 (see note 1)
T1H-DM1E	275	0	T1F-16AD-1	75	50 (see note 1)
DC Input Modules			T1F-08AD-2	75	50 (see note 1)
T1K-08ND3	35	0	T1F-16AD-2	75	50 (see note 1)
T1K-16ND3	70	0	T1F-16RTD	150	0
AC Input Modules			T1F-14THM	60	70 (see note 1)
T1K-08NA-1	35	0	***Analog Output Modules***		
T1K-16NA-1	70	0	T1F-08DA-1	75	150 (see note 1)
DC Output Modules			T1F-16DA-1	75	150 (see note 1)
T1K-08TD1	100	200 (see note 1)			
T1K-08TD2-1	100	0	T1F-08DA-2	75	150 (see note 1)
T1H-08TDS	200	0			
T1K-16TD1	200	400 (see note 1)	T1F-16DA-2	75	150 (see note 1)
T1K-16TD2-1	200	0			
AC Output Modules			***Combination Analog Modules***		
T1K-08TA	250	0	T1F-8AD4DA-1	75	60 (see note 1 and 2)
T1K-16TA	450	0			
T1K-08TAS	300	0	T1F-8AD4DA-2	75	70 (see note 1)
Relay Output Modules			***Specialty Module and other devices***		
T1K-08TR	350	0	T1H- CTRIO	400	0
T1K-16TR	700	0			
T1K-08TRS	400	0			

Note 1: Use T1K-01AC 24 VDC auxiliary supply or external user supply.

Note 2: 60 mA plus 20 mA per output loop

NOTE: Important Power Budget - *For each power supply in a system, make sure the current required by the CPU module and I/O modules does not exceed the current supplied at both 5 VDC and 24 VDC.*

Power Budget Calculation Example

The following example shows how to calculate the power budget for a Do-more T1H Series PLC system.

PLC			
Power Supply #1	***Part Number***	***5 VDC (mA) Required***	***24 VDC (mA) Required***
Power Supplied T1K-01AC		**2000**	**300**
CPU	T1H-DM1E	275	0
Module	T1K-16NA-1	70	0
Module	T1K-16TA	450	0
Maximum power required		**795**	**0**
Remaning power available		**2000-795 = 1205**	**300-0 = 300**
Power Supply #2	***Part Number***	***5 VDC (mA) Required***	***24 VDC (mA) Required***
Power Supplied T1K-01AC		**1500**	**500**
Module	T1K-08AD-2	75	50
Module	T1K-08AD-2	75	50
Module	T1K-16TD1	200	400
Module	T1K-08TR	350	0
Module	T1K-08ND3	35	0
Maximum power required		**735**	**500**
Remaining power available		**1500-735 = 765**	**500-500 = 0 (see note 1)**

Note 1: An external user power supply must be used if the 24 VDC current requirement exceeds the T1K-01AC 24 VDC auxiliary supply.

1. Fill in the information for the CPU, I/O modules, and any other devices that will use system power, including devices that use the 24 VDC output. Devices which fall into the “Other" category are devices such as an operator interface which also has power requirements but do attach as a module to the system.
2. Add the current columns starting with the CPU and put the total in the row labeled ”Maximum power required".
3. Subtract the row labeled “Maximum power required" from the “Power Supplied". Place the difference in the row labeled “Remaining Power Available".
4. If “Maximum Power Required" is greater than “Power Supplied" in either of the two columns, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your configuration.