TBU 1,2, 4 Operations Guide

TBU Asset Loops

All asset loop bases having mating connectors for quick connect/disconnect of the cables. Asset cables are not provided for asset loops bases and need to be purchased separately.

TBU1
Single Port Base for Asset Cable

TBU2
Two Port Base for Asset Cables

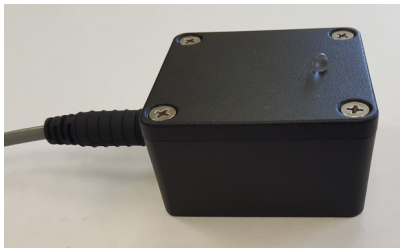
TBU4
Four Port Base for Asset Cables

Use with End of Line Devices

The **TEK Box Clamshell™** is designed to attach to the end of an Asset Cable, loop through/around an asset or assets, and clip back on to the cable to create a loop. Any attempt to open or break this loop will trigger an alarm condition. Each clamshell requires one cable and one active port on a base.

TBU-CLAM

The **TBU-Mini** is designed to be permanently attached to other structure. If it is attached to a structure, then the cable would be threaded through the asset(s) before connecting to the Mini. In either case, the cable would need to be disconnected before an asset may be moved, triggering an alarm condition. Each Mini requires one cable and one active port on a base.



TBU-MINI

To enable LoopBack or Base-to-Base:

Some ports can be configured as terminators instead of active monitoring loops. A terminator is similar to the TEK Box Clamshell™. On a single or dual base, Port 1 can be configured as a terminator, while on a quad base, Port 1 and/or Port 3 may be configured as terminators.

Installing J2 configures Port1 as a terminator. Removing J2 configures Port1 as active.
Installing J7 configures Port3 as a terminator. Removing J7 configures Port3 as active.

When a port is configured as a terminator, it must be connected to a port configured as active in order to work properly. A terminator port that is not connected to an active port will indicate a fault. Likewise, an active port that is not connected to a terminator port or a clamshell will indicate a fault.

Note: Cables must be configured for Loopback or Base-to-Base models; contact your sales rep for ordering information and pricing.

Mixed Configurations:

TEK Box Clamshells, TBU-Minis, base-to-base, and LoopBack may be mixed within a system, even within a single base. For example, a single TBU4 could be set up to have one base-to-base connection, one clamshell loop, and one loopback loop. To do this, you would need one TBU4, one TBU1, one clamshell, and three TEK Box Asset Cables.

You might connect Port1 of the two bases together for base-to-base operation. In this case, one base or the other (but not both) should have J2 installed.

You might then connect Port3 to Port4 for LoopBack mode (with J7 installed).

This would leave Port2 for use with the clamshell.

Fault Detection:

The system can detect a number of different faults. When any fault is detected, the corresponding actions are taken based on the selected mode and armed/disarmed status. Following are some of the faults that can be detected:

- Clamshell open
- Clamshell disconnected
- Clamshell tamper
- Broken wire
- Shorted port or cable
- Box tamper (base or Mini)
- Active port not connected to terminator port
- Terminator port not connected to active port

LED operation:

There are two LEDs on the front of the box. One is yellow, the other red. Other than when adjusting the alarm timeout (see below), this is what they indicate:

Red	Yellow
On – system is not armed, no faults detected Blinking – system is armed, no faults detected Off – fault detected	On – system is armed, fault latched (a fault was detected at some time since system was last disarmed) Off – system is disarmed, or no fault has been detected since it was last armed.

Modes of operation:

The TBU1, TBU2, and TBU4 have two, three, or five 'zones', respectively. One is the box tamper (this will be triggered if the lid of the box is removed), the others are the tamper loops.

All TBUs have a time adjust knob. This will adjust how long an alarm condition is active. Time can be adjusted from 0.5 seconds to 5 minutes, or forever. Factory default is five minutes.

Stand-alone mode. In this mode each zone has a dedicated relay. Each relay will close if the system is armed and any fault is detected in the associated zone. When the first fault is detected, the associated relay will close, the yellow light will come on, and the timer will be started. If additional faults are detected, other relays will close, but the timer will not be restarted. When the timer expires, all relays will open. The yellow light will remain on, but new faults will not be detected. If the system is disarmed, all relays will opened, the timer (if active) will immediately time out, and the yellow light will go out. The system can then be re-armed and will detect new faults. In this mode the alarm relay is used for the box tamper zone. This mode is selected by removing both J4 and J6.

Remote-access mode. In this mode the ARM signal and the timer adjustment are ignored. All zone relays indicate current zone status at all times. In this mode the alarm relay is used for the box tamper zone. This mode is selected by removing J6 and installing J4.

Alarm-with-indicator mode. In this mode the alarm relay closes and the yellow light comes on when a fault is detected in any zone and the system is armed. After the timeout period, the alarm relay will open and the yellow light will remain on. Additional faults will not turn the alarm relay back on until the system has been disarmed and re-armed. The four loop zone relays will indicate loop status at all times. If a box tamper is detected, all loop zone relays that are present will close. The TBU1, 2, and 4 have 1, 2, and 4 loop zone relays, respectively. This mode is selected by removing J4 and installing J6. This is the factory default setting.

Setting the Alarm Time:

There is a small blue knob on the circuit board that can be turned by hand or with a screwdriver to adjust the time. Possible settings are:

- Half a second (MIN)
- 1 to 10 seconds in 1-second increments
- 10 to 60 seconds in 5 second increments
- 1 to 5 minutes in 30 second increments
- Forever (MAX)

The knob is more sensitive at the low end, so that each step takes about the same amount of movement of the knob, regardless of how much time that step adds. In other words, to adjust from 1 second to 2 seconds takes about as much movement as to adjust from 4:30 to 5:00 minutes. The 'forever' setting is a little larger than the rest.

Whenever the knob is adjusted, the LEDs will turn off if they are not already off. After about two seconds of inactivity on the knob, the LEDs will blink to indicate the new setting. Note that small adjustments to the knob may trigger the blinking indication without changing the time. If the knob is moved during the blink sequence, the blinking immediately stops, and will start over after two seconds of inactivity. The number of blinks will indicate the time as follows:

Yellow - number of minutes. If the setting is less than 1 minute, yellow will not flash.
Red - 10s of seconds. If the setting is less than 10 seconds, red will not flash.
Both together - seconds. If the setting is 10 seconds or more, both will not flash together.

Limitation of Liability:

In no event shall TEK Industries, LLC, regardless of claim, right or theory, be liable for any incidental, consequential, indirect, special or punitive damages of any kind or nature, or for loss of revenue, profit, sales, anticipated savings, use of money or use of products, loss of business, loss of data, or other financial loss arising out of or in connection with the sale, installation, use, performance, failure or interruption of the products, technical failure and breaches of logical security, whether such liability is asserted on the basis of contract, tort (including negligence, products liability or strict liability) or otherwise. In the event that a court of competent jurisdiction rules that this limitation is invalid, the liability of TEK Industries, LLC shall not exceed the purchase price paid for the product.