LI M I T E D W A R R A N T Y

TSI warrants to the first retail purchaser that the controller conforms to the manufacturer’s specifications and will be free from defects in workmanship and materials for a period of one (1) year from the date of original purchase. For warranty service, you may need to show proof of the date of original purchase. TSI will exchange or repair the controller without charge for parts or labor. The replacement controller may be new or refurbished to the TSI standard of quality. Exchange products assume the remaining warranty period of your original product covered by this limited warranty.

This warranty does not cover damage or malfunction due to misuse, abuse, improper installation, neglect, improper shipping, damage caused by disasters such as fire, flood and lightning, improper electrical current or service other than by TSI.

This warranty does not cover service calls other than parts and labor to repair the defective unit.

TSI’s liability will not exceed the original retail-selling price of the covered controller.

TSI shall not be liable for any loss or damage, including direct, special, incidental or consequential damages resulting from the use or inability to use the TSI controller.

Some jurisdictions do not allow limitations on how long an implied warranty lasts, and some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights, which vary from jurisdiction to jurisdiction.
• **General Description**

The Timekeeper SE is an affordable well timer designed for the customer who needs more information than a simple on/off timer provides. The Timekeeper SE has three main components: the battery for power, a latch valve for motor valve control and a microprocessor for real time operations. This unit comes standard with four operating times and some data logging capability. It allows the customer to view information such as the last 10 plunger run times, number of plunger arrivals and failures, and total valve open time. This unit is designed to operate a pneumatically operated motor valve using up to 30psi.

• **Features**

- 4 time periods (Open, Shut, Afterflow, and Recovery)
- External open and shut inputs
- Synchronize mode
- Records last 10 plunger runs
- Long battery life
- Battery Monitor
- Reverse Battery Protection

• **Operating Principle**

The Timekeeper SE is based on the basic principle of an on-off timer used to start and stop the gas production of oil and gas wells. A user settable open and shut time is provided for this basic operation. In addition to these two basic times, there is an afterflow and a recovery time to assist the operator in achieving more production in a plunger lift application where a plunger sensor is utilized. Afterflow is a time set to sell gas after the plunger has arrived at the surface. Recovery time is an extra shut time to allow a well to recover if the plunger fails to arrive at the surface.
• **Maximum Plunger Fails**

Maximum Plunger Fails is a setting that can be used to put the controller in a load condition upon a certain number of consecutive plunger fails. In the load condition, the motor valve will be shut until opened manually. When the Maximum Plunger Fails is set to zero, this feature is ignored altogether. Whenever the plunger surfaces, the internal counter is set to zero and the controller will not go into load condition until the plunger fails to surface the number of times set in the Maximum Plunger Fails setting.

• **Synchronize Mode**

A Synchronize mode is incorporated to allow several wells to sell gas at different times, but not together. When synchronize mode is turned on, the controller will automatically keep in time regardless of plunger senses, setpoints, or external open and shuts. If afterflow time is set, the open time and afterflow times are considered in the total open time. If a recovery time is set, the controller will still keep in time by skipping a cycle if necessary to ensure a full open time. The external open and any open setpoint will be ignored in the shut time when synchronize mode is on. Shut inputs will cause the motor valve to shut in any open time period, but as soon as the shut input is removed, the motor valve will open again. If fall time is set (if available) fall time and shut time are considered in the total shut time.

• **Battery Replacement**

When the unit displays ‘Low Battery,’ it is time to replace the batteries. All four D-cell alkaline batteries should be changed at once with new alkaline batteries. To change the batteries, open the face panel by removing the two thumbscrews. The batteries pull straight out of their holders. Observe the polarity on the battery pack when placing the batteries back in. This unit has reverse battery protection in both the battery pack and on the circuit board. If the batteries are placed in backwards, the unit will not operate and should not be damaged.
• **External Inputs**

A plunger arrival sensor input is located on the back of the circuit board to allow for the input of a plunger sensor. There are three terminal positions: PWR, PS-, and PS+. The PWR terminal is available to any sensor that is not powered by its own battery. When using the PWR terminal, the plunger sensor attached will only consume current when the Timekeeper ST is in ‘Open Time’ thus saving power. If using the PWR terminal, the current rating of the plunger sensor should be less than 20mA. The PS- terminal is for the grounding wire of the sensor as indicated by the sensor manufacturer. The PS+ terminal is the sensing terminal. When the plunger sensor detects a plunger, the sensor should pull the PS+ terminal to ground causing the Timekeeper ST to realize a plunger arrival.

The Timekeeper SE incorporates an external shut and an external open input. These can be hooked to external equipment or sensors. The terminals are labeled ‘Open’, ‘Com’, and ‘Shut’. When attaching a device to the terminals, the device that is being attached should effectively connect either the ‘Open’ and ‘Com’ or ‘Shut’ and ‘Com’ terminals together to achieve activation. When the external shut is active, the controller will enter shut time but will not start timing until the shut input is released. If the external open is activated, the controller will enter open time, but it will not start timing down until the external open input is released.

When the controller is in synchronize mode, time will continue count to keep the controller synchronized. If the shut time elapses and the shut input is active, the controller will not open the valve, but will continue to count through the open time. The controller also will not open the valve in shut time with an external open input.

During Recovery time and Fall time (if available) all external inputs will be ignored.
• **Button Operation Instructions**

**Open Valve / Close Valve**
Push to manually open or close the motor valve. If the valve is opened, the open time period will start counting. If the motor valve is closed, the shut time period will begin counting. If synchronize mode is ‘ON’, pressing this button will restart the synchronized time period either in open or shut time.

**Open Time**
The ‘Open Time’ button is used to set the open time. When the button is pressed and held, the display will show ‘Set Open Time’. To change the setting, press and hold the UP or DOWN arrows located at the bottom of the panel until desired time setting is reached. As the button is held, the changing time will accelerate. This is the length of time the valve will be open unless a plunger arrival is sensed or another external shut input is activated.

**Shut Time**
The ‘Shut Time’ button is used to set the shut time. When the button is pressed and held, the display will show ‘Set Shut Time’. To change the setting, press and hold the UP or DOWN arrows located at the bottom of the panel until the desired time setting is reached. As the button is held, the changing time will accelerate. Shut time is the time period when the valve will be shut unless and open input is activated.

**Afterflow Time**
The ‘Afterflow Time’ button is used to set the afterflow time. When the button is pressed, the display will show ‘Set Afterflow Time.’ To change the setting, press and hold the UP or DOWN arrows located at the bottom of the panel until the desired time setting is reached. As the button is held, the changing time will accelerate. Afterflow time is a period of time when the valve will remain open after a plunger arrival has been detected.
Recovery Time
The ‘Recovery Time’ button is used to set the recovery time period. When the button is pressed, the display will show ‘Set Recovery Time’. To change the setting, press and hold the UP or DOWN arrows located at the bottom of the panel until desired time setting is reached. As the button is held, the changing time will accelerate. Recovery time is an extra period of shut time if no plunger arrival was sensed. This allows the well an opportunity to recover from a possible load condition.

Fall time may also be available as a factory option. Pressing and holding the ‘Recovery Time’ button a second time will show ‘Set Fall Time’. To change the setting, press and hold the UP or DOWN arrows located at the bottom of the panel until desired time setting is reached. Fall time is an extra shut time allowing the plunger to fall to the bottom if a plunger arrival was sensed. All open inputs are ignored during this time.

Data / Options
The ‘Data / Options’ button will cycle through a set of data readings giving the operator better knowledge of what is happening. The first is ‘Plunger Counts’ which will display the number of arrivals ‘A=’ and number of failures ‘F=’ of the plunger. The second is ‘External Counts’ displaying both the number of external open inputs ‘O=’ and external shut inputs ‘S=’. Thirdly, the total open time will be displayed. Any of the previous counts may be reset by pressing the UP or DOWN arrow while viewing the count. Next, the battery voltage will be displayed. After the battery voltage, a few options will be available by pressing and holding the ‘Data / Options’ button. The first option is Maximum Plunger Fails. This option is described earlier in the manual. To change the setting, simply use the UP or DOWN arrows to change. The second option is Synchronize mode. To turn this option on or off, simply press the UP or DOWN arrow while viewing. Synchronize mode is described earlier in this manual. The last option, ‘Set Time With’ allows the time units to be change either; hours, minutes or seconds. Use the arrow keys to change the units while holding the ‘Data / Options’ button. These are the units in which the time periods can be set.
Plunger Run Times
The ‘Plunger Run Times’ button will display the last 10 plunger run times if a plunger arrival sensor has been installed. Each time the button is pressed, a plunger travel time will be displayed with its corresponding run number. ‘1)’ will be the most recent run. If the plunger failed to arrive at the surface before the open time, ‘Failed’ will appear on the display.

- Specifications

Approximate Size: L=8” W=6” H=5.5”
Approximate Weight: 10LBS
Battery Type: (4) Alkaline D-Cell
Battery Life: Over 2 years
Input Voltage: 5 – 10Vdc w/ low battery warning
Valve: 6 Volt Latching 3-way
Max Pressure: 50 PSI
Enclosure type: Fiberglass
Max On/Off Times: 7 days, 23 Hours, 59 minutes
Setting Increments: Hours, Minutes or Seconds
Display: Character LCD w/power saving mode
Inputs: (3) Open, Shut & Plunger Sensor