



Instruction Manual

Cycle Counter

C1CM/C1SM (Standard Model)

C1CM-EX/C1SM-EX (Intrinsically Safe Model)

NOTE: This instruction manual has been edited for use with both standard and intrinsically safe models.

Contents

Introduction	1
Safety Considerations	2
Operation	4
Specifications	5
Configuration	6
Installation	7
Troubleshooting	13
TLV EXPRESS LIMITED WARRANTY	15
Service	17

Introduction

Thank you for purchasing the TLV cycle counter.

This product has been thoroughly inspected before being shipped from the factory. When the product is delivered, before doing anything else, check the specifications and external appearance to make sure nothing is out of the ordinary. Also be sure to read this manual carefully before use and follow the instructions to be sure of using the product properly.






For products with special order specifications or options, if detailed instructions for the special order specifications or options are not contained in this manual, please contact TLV for full details.

This instruction manual is intended for use with the model(s) listed on the front cover. It is necessary not only for installation but for subsequent maintenance, disassembly/reassembly and troubleshooting. Please keep it in a safe place for future reference.


Safety Considerations

- Read this section carefully before use and be sure to follow the instructions.
- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.
- The precautions listed in this manual are designed to ensure safety and prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, three different types of cautionary items are used to indicate the degree of urgency and the scale of potential damage and danger: DANGER, WARNING and CAUTION.
- The three types of cautionary items above are very important for safety: be sure to observe all of them as they relate to installation, use, maintenance, and repair. Furthermore, TLV accepts no responsibility for any accidents or damage occurring as a result of failure to observe these precautions.

Symbols

	<p>Indicates a DANGER, WARNING or CAUTION item.</p>
	<p>Indicates an urgent situation which poses a threat of death or serious injury</p>
	<p>Indicates that there is a potential threat of death or serious injury</p>
	<p>Indicates that there is a possibility of injury or equipment/product damage</p>
	<p>C1CM and C1SM are not explosion-proof. Use only the intrinsically safe C1CM-EX and C1SM-EX in hazardous areas. Product markings are provided on the nameplate attached on the product. The C1CM-EX and C1SM-EX have been evaluated by the Technology Institution of Industrial Safety (TIIS) and meet the following standards for intrinsic safety:</p> <ul style="list-style-type: none"> ■ C1CM-EX <ul style="list-style-type: none"> - Ex ib IIB T3 Certificate Number: CML 18JPN2209X or - Ex ib IIB T2 Certificate Number: CML 18JPN2209X ■ C1SM-EX <ul style="list-style-type: none"> - Ex ib IIC T3 Certificate Number: TC20438 or - Ex ib IIC T2 Certificate Number: TC20439 <p>For hazardous areas, the product should be selected and installed by trained personnel with knowledge of the hazardous locations/classifications. Intrinsically safe equipment, related equipment and the wiring to connect them should be arranged so that a current or voltage that may impair the intrinsic safety of the intrinsically safe circuit is not induced by electromagnetic induction or electrostatic induction in the intrinsically safe circuit.</p>

Continued on the next page

 CAUTION	<p>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.</p>
	<p>Make sure that the sensor body is properly tightened. Insufficient tightening may allow steam to blow out, resulting in burns.</p>
	<p>When disassembling or removing the product, wait until the internal pressure of the PowerTrap equals atmospheric pressure and the surface of the PowerTrap has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.</p>
	<p>NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.</p>
	<p>Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.</p>
	<p>When installing the product, use the appropriate tool such as an adjustable wrench. Using the improper tool may lead to injury or damage to the product.</p>
	<p>DO NOT disassemble/modify the product. This could damage the product and/or the built-in battery, or cause leakage of battery fluid, leading to burns or other injury.</p>

Operation

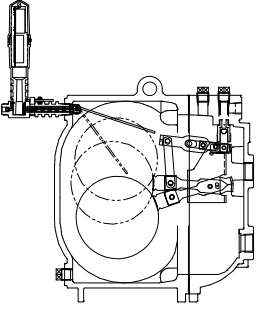
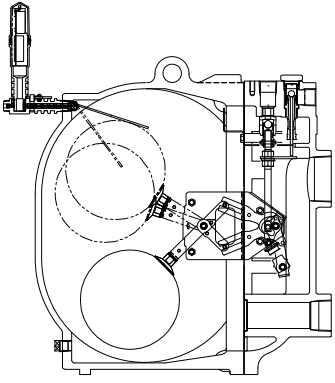
Cycle counter is a counter designed for use with GP series TLV PowerTraps. Cycle counter registers each cycling of the PowerTrap by using its sensor arm to detect the vertical movement of the PowerTrap's internal float. When the contact points of the reed switch inside the counter body (or the switch unit) connect, each cycling of the PowerTrap is counted.

There are two different types of cycle counter available.

Counter Unit Type (with a built-in LCD display) (C1CM/C1CM-EX)

This type includes a built-in LCD display to display the number of pump cycles of the PowerTrap. Install the cycle counter using the installation hole on the PowerTrap.

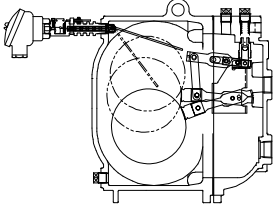
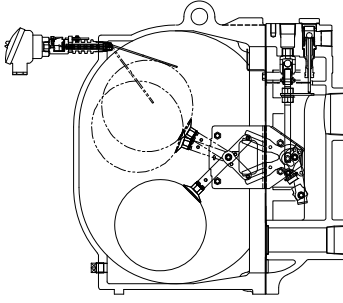
•Installation location

C1CM/C1CM-EX	
	
GP10L, GP10M GP14L, GP14M	GP10

Terminal Box Type (no display) (C1SM/C1SM-EX)


There is no display on this type. Use the product with a separately prepared self-powered counter, etc.

•Installation location

C1SM/C1SM-EX	
	
GP10L, GP10M GP14L, GP14M	GP10

NOTE	<p>Cycle counter protrudes from the PowerTrap body when installed on the PowerTrap. Make sure to maintain sufficient installation space as described in the instruction manual for the PowerTrap.</p> <p>Do not put extra force onto the cycle counter when lifting the PowerTrap up (for disassembly or maintenance, etc.).</p>
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Specifications

 CAUTION	<p>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.</p> <p>Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.</p>
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Model	Counter Unit Type ^{*6}		Terminal Box Type ^{*6}	
	Standard Model	Intrinsically Safe Model ^{*7}	Standard Model	Intrinsically Safe Model ^{*7}
	C1CM	C1CM-EX	C1SM	C1SM-EX
Installable PowerTrap Models	PowerTrap Unit: GP10, GP10L, GP10M, GP14L, GP14M System Package: GP10L-1AJ, GP10-1CJ, GP10-2FJ, GP14L-1AJ, GP14M-1BJ			
Connection	Screwed R(PT) or NPT			
Size	15 mm (1/2 in)			
Maximum Operating Pressure (PMO) ^{*1} / Maximum Operating Temperature (TMO) ^{*1}	2.1 MPaG/220 °C (300 psig/428 °F)			
Maximum Allowable Pressure (PMA) ^{*2} / Maximum Allowable Temperature (TMA) ^{*2}	2.1 MPaG/260 °C (300 psig/500 °F)			
Applicable Fluids ^{*3}	Steam Condensate, Water, Steam, Air, Nitrogen			
Protection Class	IP 65 ^{*4}			
Ambient Pressure/ Temperature	Atmospheric/-10 to 55 °C (14 to 131 °F)		Atmospheric/ -45 to 90 °C (-49 to 194 °F)	Atmospheric/ -20 to 80 °C (-4 to 176 °F)
Explosion-proof Specifications	—	Ex ib IIB T3/T2	—	Ex ib IIC T3/T2
Process Temp.	—	T3: 0 to 185 °C (32 to 365 °F) T2: 0 to 220 °C (32 to 428 °F)	—	T3: 0 to 185 °C (32 to 365 °F) T2: 0 to 220 °C (32 to 428 °F)
Display	8-digit display LCD (can be reset ^{*5})		—	
Power Supply	Special built-in lithium battery (3.6 V) Standard capacity: 3650 mAh Battery life: Approx. 10 years (Battery not replaceable ^{*6})		—	
Contact specifications (Internal reed switch specifications)	—		Contact capacity: 1.0VA Max. switching voltage: 24V (DC/AC) Max. switching current: 0.1A - Maximum switching current/voltage is the maximum current/voltage that can be applied to the equipment. However, make sure the value of the switching voltage × switching current ≤ 1.0 VA (contact capacity). - For the specifications and configuration of equipment that is connected externally, refer to the "Configuration Diagram: Terminal Box Type".	
Weight	Approx. 660 g (1.45 lbs)		Approx. 700 g (1.54 lbs)	
Accessories	Counter Resetter (Magnet)		—	

^{*1} Maximum Operating Pressure (PMO) and Maximum Operating Temperature (TMO) are operating conditions for the inserted portion only.

^{*2} Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are DESIGN CONDITIONS FOR THE INSERTED PORTION, **NOT** OPERATING CONDITIONS.

^{*3} Do not use with toxic, flammable or otherwise hazardous fluids.

^{*4} Waterproofing of the wiring inlet for terminal box type should be carried out by the user using a waterproof cable gland, etc.

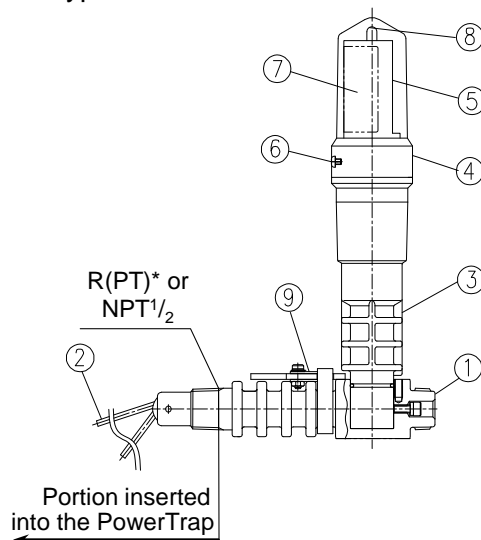
^{*5} Once the counter is reset, the previous value is lost and cannot be recovered.

^{*6} Repair parts are not supplied. Once the battery is depleted the entire unit must be replaced as the battery for the counter unit cannot be taken out or replaced. In addition, as a used counter unit still contains its built-in battery, please return the unit to TLV or follow local regulations for disposal.

^{*7} The product is treated as IP20 class for intrinsic safety evaluation.

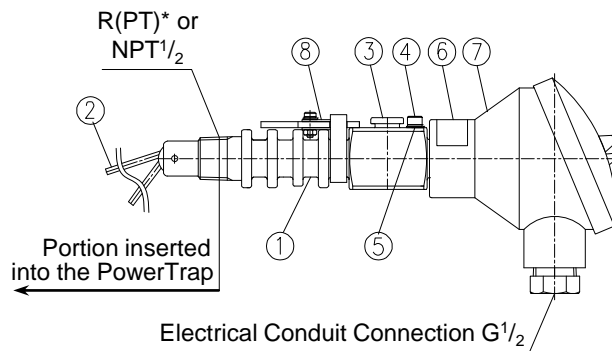
Configuration

Counter Unit Type: C1CM/C1CM-EX



No.	Name
1	Sensor Body
2	Sensor Arm
3	Counter Body
4	Cap
5	Display (LCD)
6	Hex Socket Head Bolt
7	Nameplate
8	LED
9	Magnet Booster Kit

Terminal Box Type: C1SM/C1SM-EX





No.	Name
1	Sensor Body
2	Sensor Arm
3	Switch Unit
4	Hex Socket Head Bolt
5	Washer
6	Nameplate
7	Terminal Box
8	Magnet Booster Kit

*R(PT) is equivalent to BSPT

NOTE:

- The portion inserted into the PowerTrap:
The tip of the cycle counter (screw part of the arm/sensor body) is the part that is inserted into the PowerTrap. For sketches showing installation location, refer to the "Operation" section.
- For both counter unit type and terminal box type, the insulation cover for the PowerTrap, RK9 (for GP10L), RK10 (for GP10), RK11 (for GP10M and GP14L) and RK12 (GP14M) can be used.
(Usable insulation thickness: maximum 40 mm (1½ in) when an insulation cover is used for the PowerTrap.)
- GP10, GP10L, GP10M, GP14L and GP14M cannot be equipped with a cycle counter and liquid level gauge simultaneously.

Installation

 WARNING	<p>C1CM, C1SM, C1CF, and C1SF are not explosion-proof. Use only the intrinsically safe C1CM-EX, C1SM-EX, C1CF-EX and C1SF-EX in hazardous areas.</p> <p>For hazardous areas, the product should be selected and installed by trained personnel with knowledge of the hazardous locations/classifications.</p>
 CAUTION	<p>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.</p> <p>Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.</p> <p>NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.</p> <p>Make sure that the sensor body is properly tightened. Insufficient tightening may allow steam to blow out, resulting in burns.</p> <p>When disassembling or removing the product, wait until the internal pressure of the PowerTrap equals atmospheric pressure and the surface of the PowerTrap has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.</p>

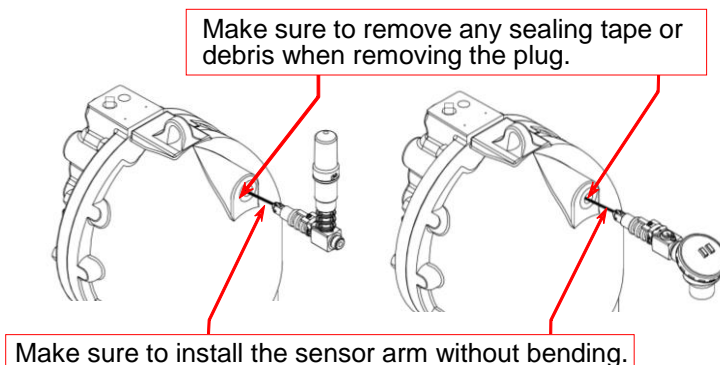
Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.

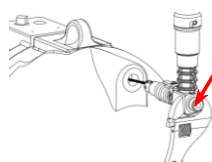
An explanation for installing cycle counter onto the GP14M PowerTrap is given as an example. The same procedure should be followed for other models.

1. Remove the plug from the PowerTrap in reference with the installation position in the "Operation" section. Screw the cycle counter into the place where the plug has been removed on the PowerTrap by turning it clockwise 4 to 5 times.

NOTE	<ul style="list-style-type: none"> - Wrap the threaded portion of the sensor body with sealing tape for screwing into the PowerTrap. Ensure not to wrap the tape around any part of the sensor body other than the threaded portion. The cycle counter may not operate properly if tape is wrapped around a moving part such as the sensor arm. - Do not use sealant. If sealant adheres to the moving part of the sensor arm it may interfere with the arm's movement.
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NOTE	<p>Sometimes the display on the counter unit type does not show "0" when delivered. The number can be reset after installation. Reset as needed. (Refer to the "Resetting the counter on the LCD display of the counter unit type" section described later in this manual.)</p>
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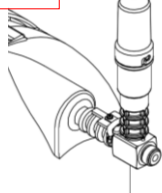




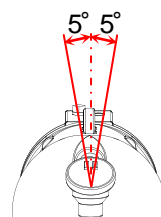
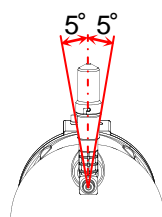
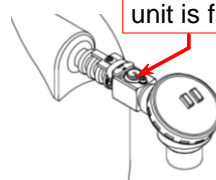
For both the counter unit and terminal box types, use a tool such as an adjustable wrench to grip the square portion of the sensor body (distance across flats: 30 mm ($1\frac{3}{16}$ in)) and screw the product in. Applying a force to any part of the product other than the square portion may deform or damage the product.

2. The following figure shows the product once installation is complete. Make sure to screw in the product with the body centered and facing upwards.

Make sure that the LED on the tip is facing upwards.



Make sure that the switch unit is facing upwards.

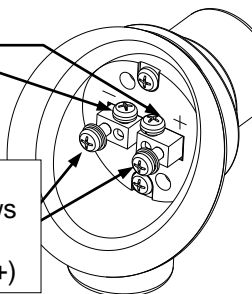


Inclination should be within 5°.

3. Before use, the wiring needs to be carried out for the terminal box type. Follow the figure shown below for the location of the wiring connections. Also refer to the next section “Configuration Diagram: Terminal Box Type (C1CM)”.

Do not loosen these screws.

Connect the wires by loosening these screws (size: M4).
(Polarity: left -, right: +)

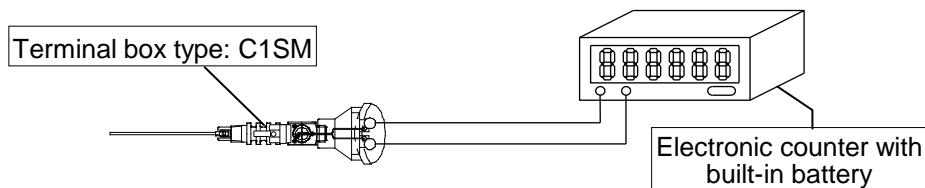


For the terminal box type, wiring is necessary to the terminal box. Before wiring, refer to the “Specifications” section to make sure that the supply power voltage meets these specifications. Make sure that the wires are securely connected to the terminal box using the ring or the spade terminals. Waterproofing of the wiring inlet should be carried out using a waterproof cable gland, etc.

4. Make sure that the product is properly tightened before proceeding with the test operation.
For performing a test operation after the product has been installed, follow the procedure in the PowerTrap instruction manual.
Check motive medium supply piping and other piping connections before operation. Operation should be carried out by trained personnel.
If the display needs to be reset on the counter unit after the test operation, refer to the “Resetting the counter on the LCD display of the counter unit” section described later in this manual.

Configuration Diagram: Terminal Box Type (C1SM)

An example of wiring for C1SM (terminal box type) using an electronic counter with built-in battery is shown below.



Make sure not to connect to a power source with a voltage/current that exceeds the specifications (refer to the “Specifications” section for details) for the reed switch. Failure to do so may lead to damage or malfunction of the equipment. The wiring and terminal should be selected according to the equipment to be used. Operation has been confirmed for the following electronic counters with built-in battery:

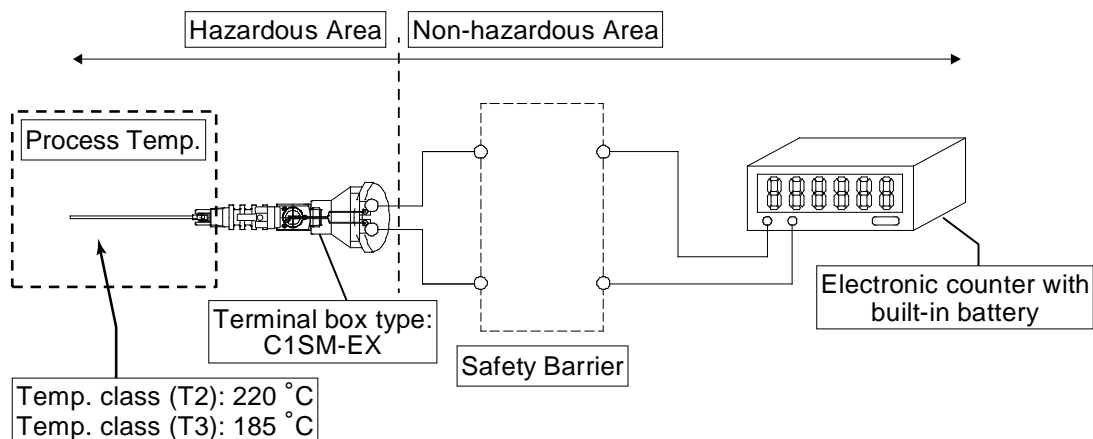
- OMRON H7EC-N total counter
- Panasonic LC2H-FE-2KK total electronic counter

Please note that TLV CO., LTD will not guarantee against failures due to combination with products (relays, fuses, safety barriers, etc. including products whose operation has been confirmed) from other companies.

NOTE	Do not bring other electrical wires, etc. near to the electrical leads used for connection. Failure to do so may result in damage to and/or malfunction of the product caused by induced voltage or current exceeding contact specifications.
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Configuration Diagram: Terminal Box Type (Ex-proof type: C1SM-EX)

Make sure to use the explosion-proof terminal box type cycle counter C1SM-EX by connecting the safety barrier as shown below. An example of connecting an electronic counter with built-in battery to the safety barrier is shown below.



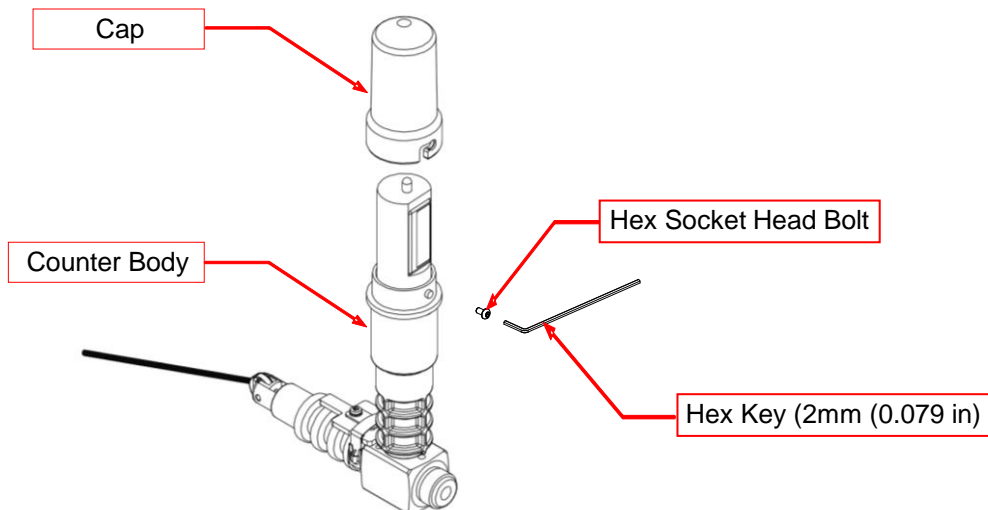
1. Ambient temperature: -20 °C to 80 °C
2. The safety barrier connecting to the cycle counter shall pass type approval and satisfy the following conditions.
 - a) Safety barrier rating
 - Maximum voltage for intrinsically safe circuit : 28 V or less
 - Maximum current for intrinsically safe circuit : 120 mA or less
 - Maximum wattage for intrinsically safe circuit : 0.84 W or less
 - b) Protection type and electrical equipment group
 - Protection type: ib
 - Electrical equipment group: IIC
 - c) Relationship between allowed inductance for intrinsically safe circuit (L_o) and allowed inductance of the external wiring for intrinsically safe circuit (L_c), and relationship between allowed capacitance for intrinsically safe circuit (C_o) and capacitance of the external wiring for intrinsically safe circuit (C_c):
 - Max. allowed inductance for intrinsically safe circuit (L_o): Value that exceeds (L_c)
 - Max. allowed capacitance for intrinsically safe circuit (C_o): Value that exceeds (C_c)
3. Intrinsically safe equipment, related equipment and the wiring to connect them should be arranged so that a current or voltage that may impair the intrinsic safety of the intrinsically safe circuit is not induced by electromagnetic induction or electrostatic induction in the intrinsically safe circuit.

Adjusting the angle of the LCD display on the counter unit

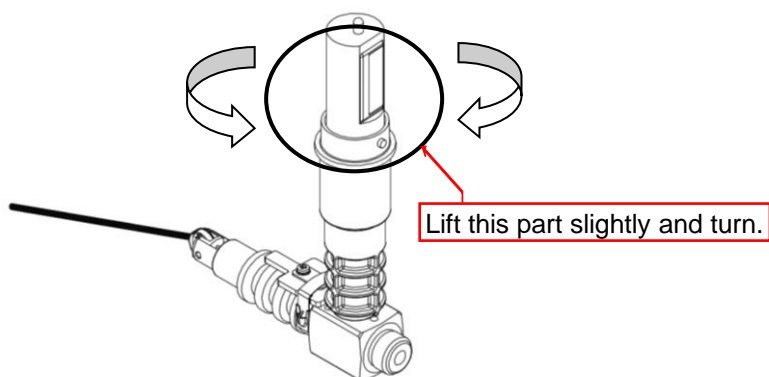
The angle of the LCD display on the counter unit can be changed.

NOTE	In order to prevent burns, make sure the product is removed from the PowerTrap before starting to work.
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1. Remove the hex socket head bolt on the counter body.
Turn the cap counterclockwise, then pull up to remove it from the counter body.



2. Once the cap is removed, turn the silicon-molded LCD display so that the LCD display is readable. After the adjustment is made, put the transparent cap back on and retighten the hex socket head bolt (tightening torque: 0.5 N·m (0.4 lbf·ft)).



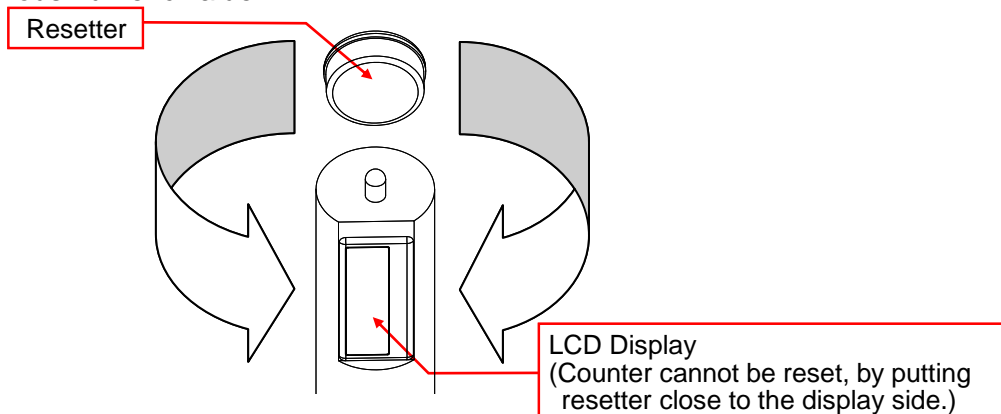
NOTE	Do not turn the LCD display part more than 360° to the left or right. Turning the display more than one rotation in either direction could cause disconnection of internal wiring or other malfunctions.
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Resetting the counter on the LCD display of the counter unit

The numeric value displayed on the LCD of the counter unit can be reset.

NOTE	Once the counter is reset, the previous value is lost and cannot be recovered. In addition, failures of the PowerTrap caused by resetting the counter will not be covered under warranty.
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Put the counter resetter close to the back of the LCD display as shown below. (The cap is removed in the figure below. The counter can be reset without removing the cap.) After the display clears momentarily, "0" will be displayed. Do not put the counter resetter close to the cycle counter other than for the purpose of resetting the counter display. Once the counter is reset to zero, it cannot be returned to displaying the previous numeric value.



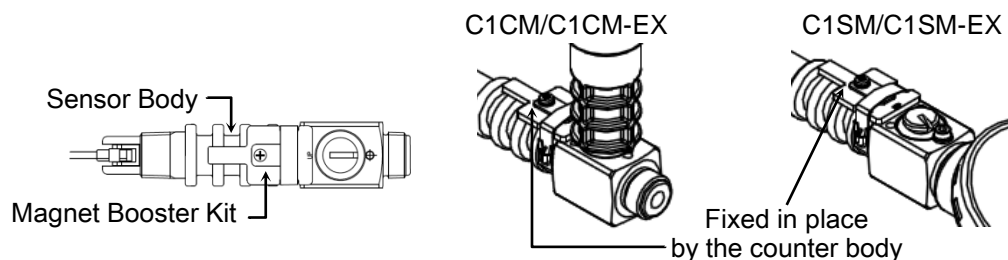
Magnet booster kit

If the cycle counter has been used in a high-temperature environment for a long period of time, the magnetic force of the reed switch becomes weaker, resulting in operational failure (the counter does not count).


For this reason, the magnet booster kit is installed on the upper part of the sensor body to prevent operational failure.

This booster kit has a built-in magnet to restore the magnetic force of the reed switch, preventing operational failure.

Contact TLV in the event if the magnet booster kit falls from the cycle counter.



Troubleshooting

 CAUTION	<p>When disassembling or removing the product, wait until the internal pressure of the PowerTrap equals atmospheric pressure and the surface of the PowerTrap has cooled to room temperature.</p> <p>Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.</p>
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When the product fails to operate properly, use the following table to locate the cause and remedy.

	Problem	Cause	Remedy
Counter Unit Type	Nothing is displayed on the LCD display	Battery has been completely discharged	Replace with a new counter unit (the battery itself cannot be replaced)
	Cycle counter is not operating even though the PowerTrap is in operation (you can hear the snap action unit operating sound)	Sensitivity of the sensor is reduced	Adjust the sensitivity (See the “Adjusting the sensitivity for the counter unit type” section)
		Dirt or foreign matter has clogged the hinge part of the sensor arm, hindering its movement	Clean the moving area
Terminal Box Type	Cycle counter is not operating even though the PowerTrap is in operation (you can hear the snap action unit operating sound)	Sensitivity of the sensor is reduced	Adjust the sensitivity (See the “Adjusting the sensitivity for the terminal box type” section)
		Dirt or foreign matter has clogged the hinge part of the sensor arm, hindering its movement	Clean the moving area
	Improper wiring	Readjust the wiring	

If problems do not improve even after applying the remedies listed in “Troubleshooting”, contact TLV.

Sensitivity adjustment for the counter unit type

When operating sounds can be heard from the PowerTrap however the cycle counter does not count or other symptoms appear, it is possible that the sensitivity of the sensor (the sensing accuracy of the reed switch) may have lowered due to aging of the product.

In such cases, the sensitivity of the sensor can be restored by readjusting the distance between the magnet built in to the sensor body and the built-in reed switch in the counter body (or the switch unit for the terminal box type).

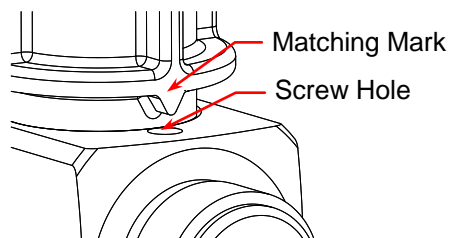
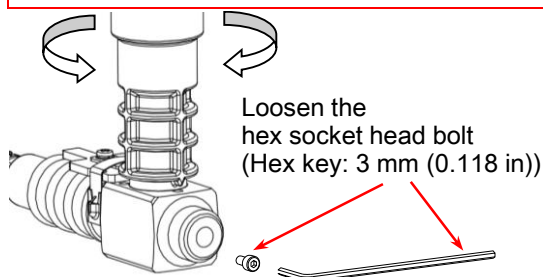
In this section, this is called sensitivity adjustment.

Make sure that the product is removed from the PowerTrap before you make the sensitivity adjustments. Take precautions against burns, etc. when removing the unit.

- Loosen the hex socket head bolt holding the counter body in place.
- Then rotate the counter body as shown in the figure on the next page while moving the sensor arm up and down. The counter body may be turned in either direction. Check the sensitivity by turning both ways (to the left and right). However do not turn more than 15° to the left or right.
- Once the LED lights up in time with the movement of the sensor arm and has begun to count properly, the counter is considered to be operating normally.
- Secure the counter by re-tightening the hex socket head bolt (tightening torque: 1.5 N·m (1.1 lbf·ft)).

Loosen the hex socket head bolt and turn the counter body slightly to make sure that the counter is functioning properly.

Adjust the counter body by twisting within 15° to the left or right. The angle should be adjusted based on the matching mark on the body.



NOTE DO NOT turn the body more than 15° to the left or right when adjusting the sensitivity.

NOTE When removing/installing the hex socket head bolt, coat threaded portion with sealing agent to maintain waterproofing.

Sensitivity adjustment for the terminal box type

Make sure that the product is removed from the PowerTrap before you make sensitivity adjustments. Take precautions against burns, etc. when removing the unit. To adjust the sensitivity, you can use a circuit tester, or else rewiring will be necessary after removing the unit from the PowerTrap. In this section, we will describe the adjustment method using a circuit tester.

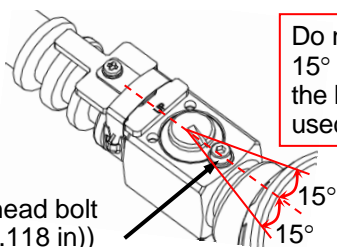
First, set the range of the circuit tester so that the resistance measurement can be carried out, then connect the leads to the plus and minus terminals on the terminal box (refer to the “Installation” section).

Then move the sensor arm up and down and turn the switch unit little by little. The switch unit may be turned in either direction, however do not turn more than 15° to the left or right. When the resistance value of the circuit tester changes in time with the movement of the sensor arm, the unit is considered to be operating normally. After the adjustment is made, retighten the hex socket head bolt (tightening torque: 1.5 N·m (1.1 lbf·ft)).

Loosen the hex socket head bolt and turn the switch unit slightly with a coin, etc. to make sure that the counter is functioning properly.

Do not turn the switch unit more than 15° to the left or right. The position of the hex socket head bolt should be used to determine the angle.

Loosen the hex socket head bolt (Hex key: 3 mm (0.118 in))



NOTE DO NOT turn the body more than 15° to the left or right when adjusting the sensitivity.

TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV CO., LTD., a Japanese corporation (“**TLV**”), warrants that products which are sold by it, TLV International Inc. (“**TII**”) or one of its group companies excluding TLV Corporation (a corporation of the United States of America), (hereinafter the “**Products**”) are designed and manufactured by TLV, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. The party from whom the Products were purchased shall be known hereinafter as the “**Seller**”. With regard to products or components manufactured by unrelated third parties (the “**Components**”), TLV provides no warranty other than the warranty from the third party manufacturer(s), if any.

Exceptions to Warranty

This warranty does not cover defects or failures caused by:

1. improper shipping, installation, use, handling, etc., by persons other than TLV, TII or TLV group company personnel, or service representatives authorized by TLV; or
2. dirt, scale or rust, etc.; or
3. improper disassembly and reassembly, or inadequate inspection and maintenance by persons other than TLV or TLV group company personnel, or service representatives authorized by TLV; or
4. disasters or forces of nature or Acts of God; or
5. abuse, abnormal use, accidents or any other cause beyond the control of TLV, TII or TLV group companies; or
6. improper storage, maintenance or repair; or
7. operation of the Products not in accordance with instructions issued with the Products or with accepted industry practices; or
8. use for a purpose or in a manner for which the Products were not intended; or
9. use of the Products in a manner inconsistent with the Specifications; or
10. use of the Products with Hazardous Fluids (fluids other than steam, air, water, nitrogen, carbon dioxide and inert gases (helium, neon, argon, krypton, xenon and radon)); or
11. failure to follow the instructions contained in the TLV Instruction Manual for the Product.

Duration of Warranty

This warranty is effective for a period of one (1) year after delivery of Products to the first end user. Notwithstanding the foregoing, asserting a claim under this warranty must be brought within three (3) years after the date of delivery to the initial buyer if not sold initially to the first end user.

ANY IMPLIED WARRANTIES NOT NEGATED HEREBY WHICH MAY ARISE BY OPERATION OF LAW, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY EXPRESS WARRANTIES NOT NEGATED HEREBY, ARE GIVEN SOLELY TO THE INITIAL BUYER AND ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF SHIPMENT BY THE SELLER.

Exclusive Remedy

THE EXCLUSIVE REMEDY UNDER THIS WARRANTY, UNDER ANY EXPRESS WARRANTY OR UNDER ANY IMPLIED WARRANTIES NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), IS **REPLACEMENT**; PROVIDED: (a) THE CLAIMED DEFECT IS

REPORTED TO THE SELLER IN WRITING WITHIN THE WARRANTY PERIOD, INCLUDING A DETAILED WRITTEN DESCRIPTION OF THE CLAIMED DEFECT AND HOW AND WHEN THE CLAIMED DEFECTIVE PRODUCT WAS USED; AND (b) THE CLAIMED DEFECTIVE PRODUCT AND A COPY OF THE PURCHASE INVOICE IS RETURNED TO THE SELLER, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY THE SELLER. ALL LABOR COSTS, SHIPPING COSTS, AND TRANSPORTATION COSTS ASSOCIATED WITH THE RETURN OR REPLACEMENT OF THE CLAIMED DEFECTIVE PRODUCT ARE SOLELY THE RESPONSIBILITY OF BUYER OR THE FIRST END USER. THE SELLER RESERVES THE RIGHT TO INSPECT ON THE FIRST END USER'S SITE ANY PRODUCTS CLAIMED TO BE DEFECTIVE BEFORE ISSUING A RETURN MATERIAL AUTHORIZATION. SHOULD SUCH INSPECTION REVEAL, IN THE SELLER'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY THE SELLER FOR THE TIME AND EXPENSES RELATED TO SUCH ON-SITE INSPECTION.

Exclusion of Consequential and Incidental Damages

IT IS SPECIFICALLY ACKNOWLEDGED THAT THIS WARRANTY, ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY, AND ANY IMPLIED WARRANTY NOT NEGATED HEREBY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DO NOT COVER, AND NEITHER TLV, TII NOR ITS TLV GROUP COMPANIES WILL IN ANY EVENT BE LIABLE FOR, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST PROFITS, THE COST OF DISASSEMBLY AND SHIPMENT OF THE DEFECTIVE PRODUCT, INJURY TO OTHER PROPERTY, DAMAGE TO BUYER'S OR THE FIRST END USER'S PRODUCT, DAMAGE TO BUYER'S OR THE FIRST END USER'S PROCESSES, LOSS OF USE, OR OTHER COMMERCIAL LOSSES. WHERE, DUE TO OPERATION OF LAW, CONSEQUENTIAL AND INCIDENTAL DAMAGES UNDER THIS WARRANTY, UNDER ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY OR UNDER ANY IMPLIED WARRANTY NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) CANNOT BE EXCLUDED, SUCH DAMAGES ARE EXPRESSLY LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES, AND THE PROVISION OF THIS WARRANTY LIMITING REMEDIES HEREUNDER TO REPLACEMENT, ARE INDEPENDENT PROVISIONS, AND ANY DETERMINATION THAT THE LIMITATION OF REMEDIES FAILS OF ITS ESSENTIAL PURPOSE OR ANY OTHER DETERMINATION THAT EITHER OF THE ABOVE REMEDIES IS UNENFORCEABLE, SHALL NOT BE CONSTRUED TO MAKE THE OTHER PROVISIONS UNENFORCEABLE.

Exclusion of Other Warranties

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED.

Severability

Any provision of this warranty which is invalid, prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such invalidity, prohibition or unenforceability without invalidating the remaining provisions hereof, and any such invalidity, prohibition or unenforceability in any such jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

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