

MODELS APLT - 10 KHZ, APOLLO TOTALIZING COUNTER AND PBLT - 4/6 DIGIT MODULE FOR USE WITH THE LARGE DIGIT DISPLAY (LDD)



- ACCEPTS INPUT COUNT RATES UP TO 10 KHZ
- AVAILABLE IN 6 OR 8-DIGIT VERSIONS

- BI-DIRECTIONAL COUNTING
- NON-VOLATILE MEMORY (E²PROM)
- 6-DIGIT, 0.56" (14.2 mm) / 8-DIGIT, 0.362" (9.2 mm) HIGH LED DISPLAYS (APLT)
- REMOTE RESET CAPABILITY
- DISPLAY STORE (LATCH)
- COUNT INHIBIT
- LEADING ZERO BLANKING
- NEMA 4/IP65 SEALED METAL FRONT BEZEL
- POWER-UP SELF-TEST
- FRONT PANEL RESET (ENABLE/DISABLE)



DESCRIPTION

The Apollo Totalizer, Model APLT and module (Model PBLT), are versatile totalizing counters that can be adapted to a wide variety of counting, measuring, and positioning readout applications. The APLT/PBLT features non-volatile memory, various control inputs, wide variety of sensor acceptance, and high count rate (10 KHz), which makes it an economical solution to any totalizing need. The units use the RLC standard programmable count input circuit. This input circuit accepts count pulses from all RLC sensors and from most other available sensors. It also accepts switch contact, voltage or current level signals as well as outputs from TTL and CMOS circuits.

The selection of control inputs provides an additional degree of application flexibility. These control inputs allow the APLT/PBLT to be used in a variety of specialized measuring applications that go well beyond routine counting. The APLT/PBLT totalizer can be used as a stand-alone counter or as a system component with other RLC counters and/or accessory items to provide complex counting, timing, and control functions not available in any single instrument.

These units have an internal non-volatile memory device which eliminates the need for battery back-up. When AC power is removed, this device will maintain all data necessary for system operation. The front panel reset button can also be enabled or disabled by a side panel DIP switch. This unit also has a self-test feature which is activated during power-up (*self-test DIP switch must be enabled*).

Power and input connections are made via a removable terminal strip located at the rear of the unit. This strip can accept one #14 AWG wire. DIP switches at the side of the unit are used to program the input configuration. The APLT has a sealed metal die-cast bezel which meets NEMA 4/IP65 specifications for wash-down and/or dust, when properly installed. Two mounting clips are provided for easy panel installation. The 6-digit totalizer's, 0.56" high LED display is readable to 23 feet (7 M), while the 8-digit totalizer's, 0.36" high LED display is readable to 15 feet (4.6 M).

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SPECIFICATIONS

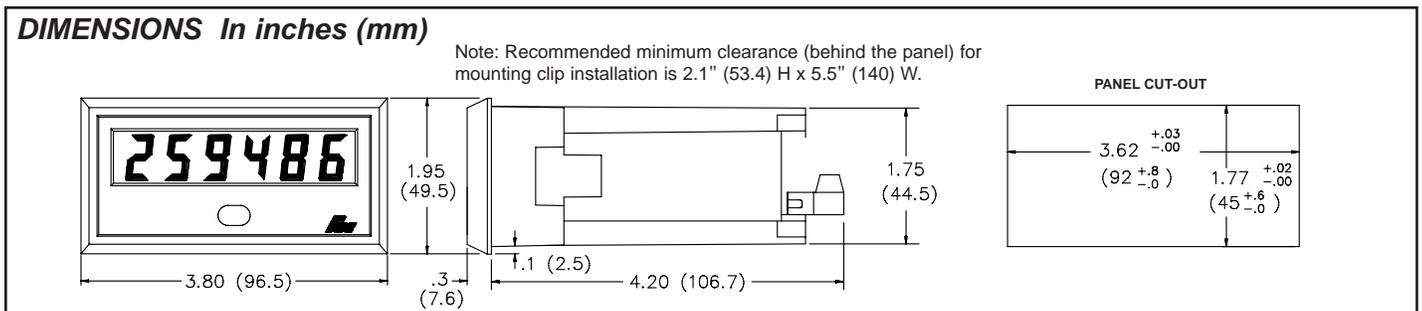
- DISPLAY (APLT):** 6-Digit, 0.56" (14.2 mm) high LED display.
8-digit, 0.362" (9.2 mm) high LED display.
- POWER REQUIREMENTS:**
APLT:
AC Operation: Available in two voltage ranges. 115/230 VAC (±10%), 50/60 Hz, 14 VA 6-digit, 15.5 VA 8-digit.
DC Operation: 11 to 14 VDC @ 0.6 A max.
PBLT:
AC Operation: Switch selected via the LDD power supply board, 115/230 (±10%), 50/60 Hz, 10 VA for 4-digit, 15 VA for 6-digit (including LDD)
- SENSOR POWER:** +12 VDC (±25%) @ 100 mA max.
- COUNT INPUT:** Switch selectable to accept count pulses from a variety of sources, including switch contacts, output from CMOS or TTL circuits, and all standard RLC sensors.
Current Sourcing: Unit provides 3.9 KΩ pull-down load for sensors with current sourcing outputs. (*Max. input voltage, 28 VDC @ 7 mA.*)

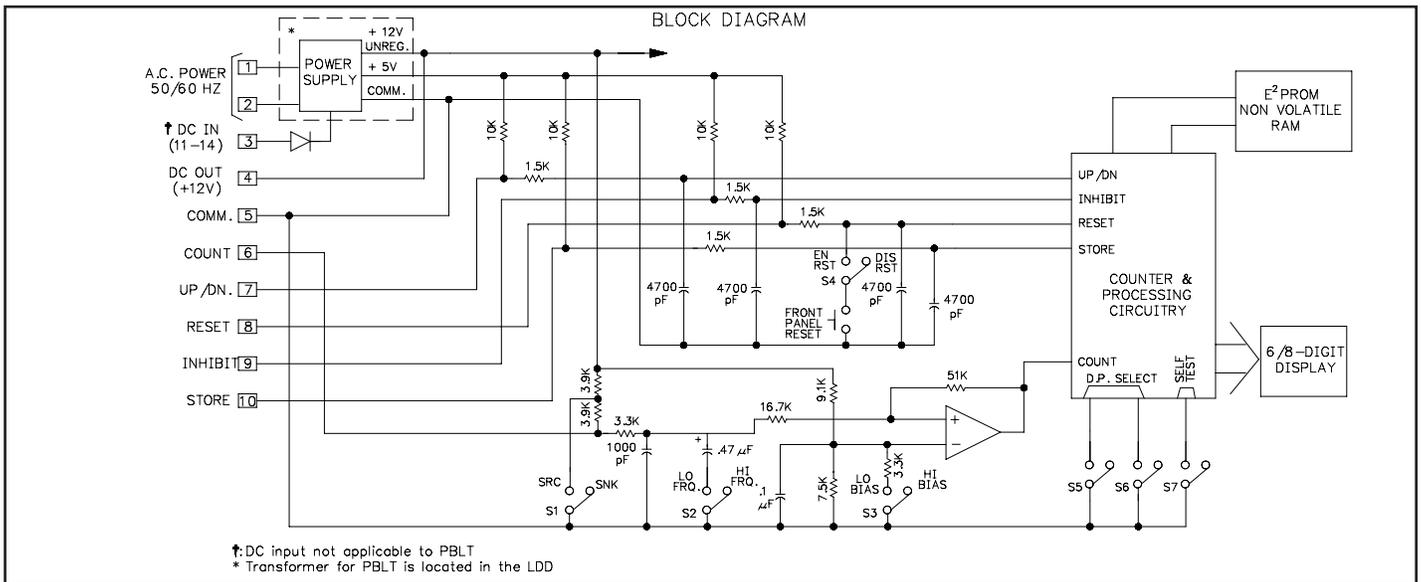


CAUTION: Read complete instructions prior to installation and operation of the unit.



CAUTION: Risk of electric shock.





SPECIFICATIONS (Con't)

4. COUNT INPUT:(Con't)

Current Sinking: Unit provides 7.8 K Ω pull-up load for sensors with current sinking outputs. (Max. sensor current, 1.6 mA.)

Debounce: Damping capacitor provided for switch contact debounce. Limits count speed to 100 Hz max. with 50% duty cycle.

Lo Bias: Input Trigger Levels $V_{IL} = 1.5$ V, $V_{IH} = 3.75$ V.

Hi Bias: Input Trigger Levels $V_{IL} = 5.5$ V, $V_{IH} = 7.5$ V.

Note: Bias levels $\pm 10\%$ @ 12 VDC sensor voltage. These levels vary proportionally with sensor supply voltage.

5. MAXIMUM COUNT RATE:

High Frequency: 10,000 Hz max. for all electronic sensors. Signal must be square wave inputs.

Low Frequency: 100 Hz for switch contact closure.

Note: Unit will operate with VCM [E-H] modules.

6. CONTROL INPUTS:

Up/Down Control: Active low ($V_{IL} = 1.5$ V max.), internally pulled up to 5 VDC through a 10 K Ω resistor ($I_{SNK} = 0.5$ mA). Response time = 50 μ sec. This input determines the direction of the count. When it is at +5 VDC, the unit will count up. When this terminal is at a low (zero volts), the unit will count down.

Remote Reset: Active low ($V_{IL} = 1.5$ V max.), internally pulled up to 5 VDC through a 10 K Ω resistor ($I_{SNK} = 0.5$ mA). Response time = 10 msec. A low will stop the display from updating. When the voltage goes back to +5 VDC, the display is reset to zero.

Front Panel Reset: When pressed, the display stops updating. When released, the display is reset to zero.

Inhibit: Active low ($V_{IL} = 1.5$ V max.), internally pulled up to 5 VDC through a 10 K Ω resistor ($I_{SNK} = 0.5$ mA). Response time = 50 μ sec. A low will prevent the unit from counting.

Store: Active low ($V_{IL} = 1.5$ V max.), internally pulled up to 5 VDC through a 10 K Ω resistor ($I_{SNK} = 0.5$ mA). A low will stop the display from updating. When the voltage level goes back to +5 VDC, the display will show the current count value.

7. MEMORY RETENTION:

Uses a "no power E²PROM", which maintains all information when the power is removed. The life expectancy of this device is at least 100,000 power down cycles, and the length of memory retention for a single power down can be as long as 10 yrs.

8. CERTIFICATIONS AND COMPLIANCES:

SAFETY

IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC 529

Type 4 Enclosure rating (Face only), UL50

EMC EMISSIONS:

Meets EN 50081-2: Industrial Environment.

CISPR 11 Radiated and conducted emissions

EMC IMMUNITY:

Meets EN 50082-2: Industrial Environment.

ENV 50140 - Radio-frequency radiated electromagnetic field

ENV 50141 - Radio-frequency conducted electromagnetic field ¹

EN 61000-4-2 - Electrostatic discharge (ESD) ²

EN 61000-4-4 - Electrical fast transient/burst (EFT) ¹

EN 61000-4-8 - Power frequency magnetic field

Notes for APLT only:

1. EMI filter placed on the DC power supply, when DC powered : Corcom #1VR3 or Schaffner #FN610-1/07 (RLC #LFIL0000).

2. Metal bezel of the unit connected to earth ground (protective earth) at the mounting panel.

Refer to the EMC Installation Guidelines section of this bulletin for additional information.

9. **INPUT AND POWER CONNECTIONS:** There is a plug-in compression type, barrier strip located at the rear of the unit. This strip can be removed from the rear of the unit for ease of wiring. After wiring is complete, the connector can be plugged back onto the unit.

10. ENVIRONMENTAL CONDITIONS:

Operating Temperature: 0°C to 50°C.

Storage Temperature: -40°C to 70°C.

Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 50°C

Altitude: Up to 2000 meters

11. **CONSTRUCTION:** Die-cast metal bezel with black, high impact plastic case insert. Front panel meets NEMA 4/IP65 requirements for indoor use when properly installed. Installation Category II, Pollution Degree 2 (Panel gasket and mounting clip included with unit.)

12. WEIGHT:

APLT: 1.5 lbs. (0.7 kg)

PBLT: 0.4 lbs. (0.18 kg)

INPUT SET-UP

The selection of input set-up is accomplished by the first four of seven DIP switches, located along the side of the unit. DIP switches 1 to 3 are used to configure the input and DIP switch 4 is used to enable or disable the front panel reset button. Each switch is discussed below.

S1 - Snk: Provides a 7.8 K Ω pull-up resistor for sensors with sinking outputs.
Src: Provides a 3.9 K Ω pull-down resistor for sensors with sourcing outputs.

S2 - Hi Frq: Removes damping capacitor and allows operation up to the high speed count specification.

Lo Frq: Connects damping capacitor for switch contact de-bounce. Limits count speed to 100 Hz. with 50% duty cycle.

S3 - Hi Bias: Sets input trigger levels at mid-range, to accept outputs from 2-wire proximity sensors, resistive photocells, and logic pulses with full 0 to +12 V swings. ($V_{IL} = 5.5$ V, $V_{IH} = 7.5$ V)

Lo Bias: Sets input trigger levels to the low range, to accept logic pulses with 0 to +5 swings. ($V_{IL} = 1.5$ V, $V_{IH} = 3.75$ V)

S4 - Dis Rst: Disables front panel reset.

En Rst: Enables front panel reset.

POWER-UP DIAGNOSTICS

Upon applying power, the unit performs an internal self-diagnostic test of the stored data. If the tests do not agree, an "E" appears on the right side of the display. The unit must be reset (by Remote reset or Front Panel) before normal operations can continue. If the error persists, replace the unit.

DECIMAL POINT SELECTION

The selection of decimal point is accomplished by DIP switches 5 and 6. The table at right shows what combination of switches is needed to obtain the desired decimal point location. The unit always has leading zero blanking.

SW5	SW6	D.P. LOCATION
↓ (0)	↓ (0)	0
↓ (0)	↑ (1)	0.0
↑ (1)	↓ (0)	0.00
↑ (1)	↑ (1)	0.000

SELF-TEST

There is a built-in self-test feature which can only be activated immediately after power-up (*the unit will not count while in self-test*). To activate self-test, set the self-test DIP switch (*number 7*) to the enable position. Then power the unit up. With this test, all digits are cycled through starting with a string of all zeros. This will be shown for about half a second, then a string of ones will appear for about the same time duration. Following these, a string of twos and so on, up to nines will be displayed. After the nines are shown, a string of decimal points will appear. Next, an interlace pattern of 1, 0, 1, 0, 1, 0, 1, 0, then 1, 2, 1, 2, 1, 2, 1, 2, and so on until all digits from zero to nine have been displayed.

The next portion of self-test will display a group of ones and/or zeros.

Digit 8 (MSD)	=	N/A
7	=	N/A
6	=	1 if STORE is pulled low
5	=	1 if INHIBIT is pulled low
4	=	1 if UP/DN is pulled low
3	=	1 if RESET is pulled low
2	=	1 if DIP switch 6 is ON
1 (LSD)	=	1 if DIP switch 5 is ON

EMC INSTALLATION GUIDELINES

Although this unit is designed with a high degree of immunity to ElectroMagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. The unit becomes more immune to EMI with fewer I/O connections. Cable length, routing and shield termination are very important and can mean the difference between a successful or a troublesome installation.

Listed below are some additional EMC guidelines for successful installation in an industrial environment.

- The unit should be mounted in a metal enclosure, that is properly connected to protective earth.
 - If the bezel is exposed to high Electro-Static Discharge (ESD) levels, above 4 Kv, it should be connected to protective earth. This can be done by making sure the metal bezel makes proper contact to the panel cut-out or connecting the bezel screw with a spade terminal and wire to protective earth.
- Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
 - Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
 - Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
 - Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
- Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
- Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
- In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure.

The following EMI suppression devices (or equivalent) are recommended:

Ferrite Suppression Cores for signal and control cables:

Fair-Rite # 0443167251 (RLC #FCOR0000)
 TDK # ZCAT3035-1330A
 Steward #28B2029-0A0

Line Filters for input power cables:

Schaffner # FN610-1/07 (RLC #LFIL0000)
 Schaffner # FN670-1.8/07
 Corcom #1VR3

Note: Reference manufacturer's instructions when installing a line filter.

- Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.

INPUT & POWER CONNECTIONS

As depicted in the drawing showing the rear view of the Apollo Totalizer, there is a terminal block where all wiring connections are made. All conductors should meet voltage and current ratings for each terminal. Also cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that power supplied to the unit (AC or DC) be protected by a fuse or circuit breaker. Remove the block for easy access to the terminal screws. Enclosed with the PBLT module is an adhesive backed label(s) showing the terminal block pin-out. This label is for wiring reference only, do not use for specifications. This label should be applied to the appropriate location by the user.



CAUTION: The terminal block should **NOT** be removed with power applied to the unit. The module should not be removed from the LDD with power applied to the LDD or the module.

Terminals 1 and 2 are the primary AC power terminals (*marked AC power, located on the left-hand side of the block*). For best results, the AC power should be relatively "clean" and within the specified $\pm 10\%$ variation limits.

Drawing power from heavily loaded circuits, or from circuits that also power loads that cycle on and off, should be avoided.

Terminal 3 is the "DC IN" terminal. (APLT only) A +11 to +14 VDC is applied here which will operate the unit when AC power is not available.

Terminal 4 is the "DC OUT" (+12 VDC) terminal. This is for sensor supply and can provide up to 100 mA of current.

Terminal 5 is the "COMM." (Common) terminal, which is the common line to which the sensor and other input commons are connected.

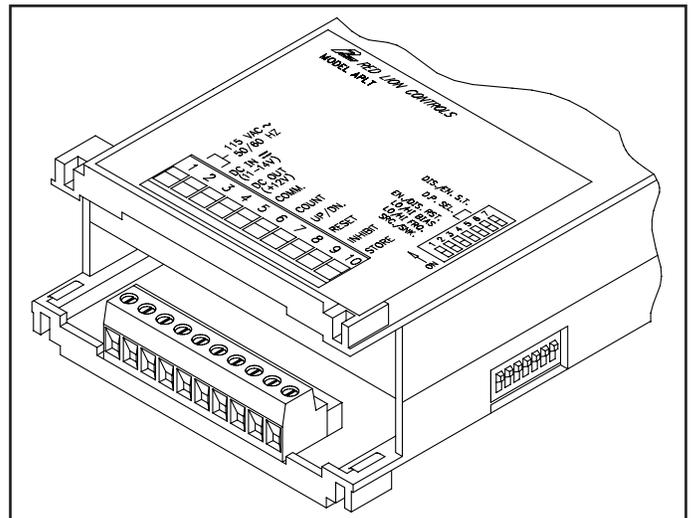
Terminal 6 is the "COUNT" (Count Input) terminal. When the signal at this terminal is pulled low (Zero volts), a count will be registered. (See "Count Input Rates" under Specifications section.)

Terminal 7 is the "UP/DN" (Count Direction Control) terminal. When this terminal is at a high level, the count direction is "UP". When the terminal is grounded, the count direction is "DOWN".

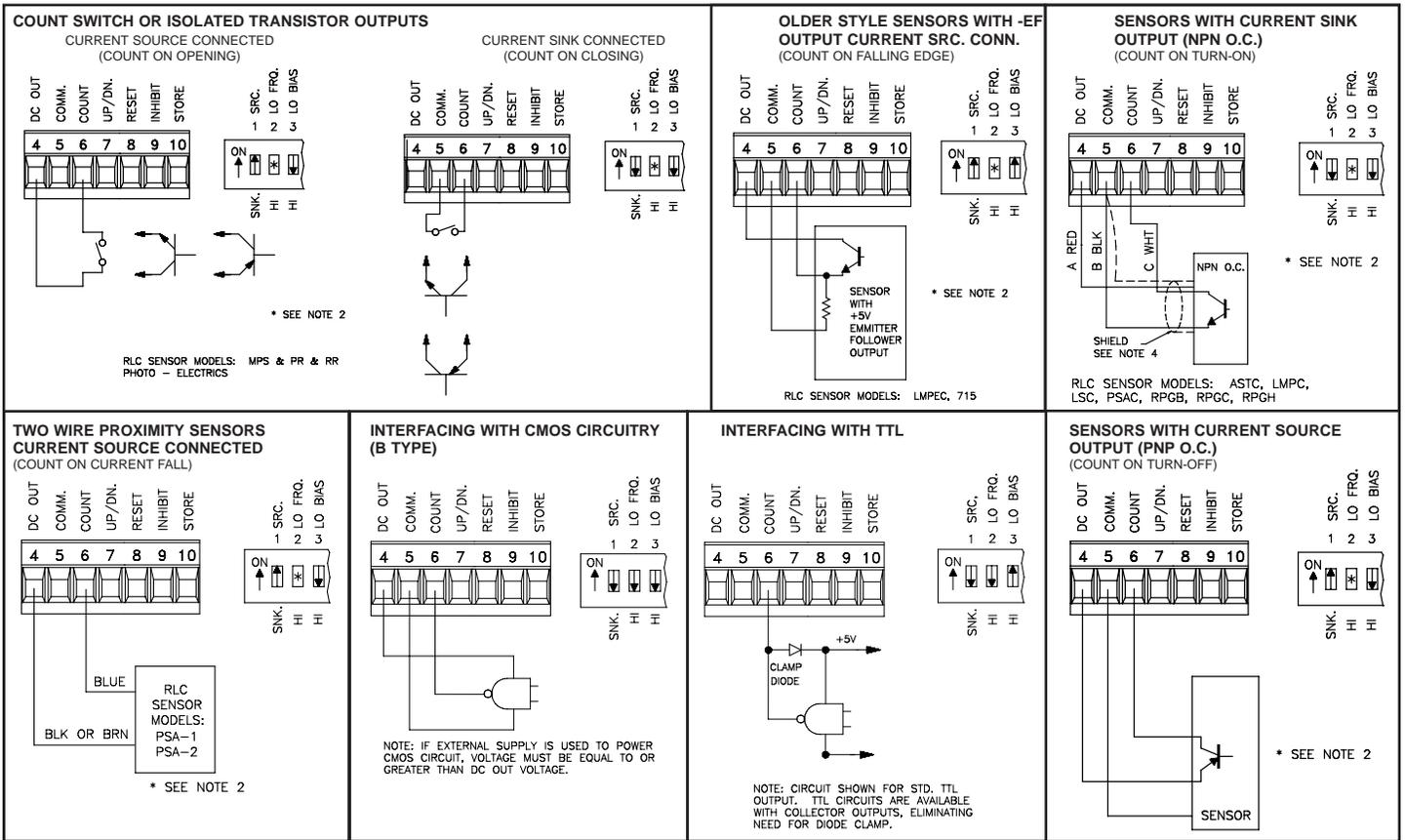
Terminal 8 is the "REM. RST." (Remote Reset) terminal. When this terminal is at a low level (connected to COMMON), the display will stop updating. When the voltage goes back to +5 VDC, the display will reset to zero.

Terminal 9 is the "INHIBIT" terminal. When this terminal is at a low level (connected to COMMON), the unit will not register any counts.

Terminal 10 is the "STORE" terminal. When this terminal is at a low level (connected to COMMON), the unit will stop updating the display (latch). Counting will continue. When the terminal goes back high, the display will update to the latest count value.



CONNECTIONS & CONFIGURATION SWITCH SET-UPS FOR VARIOUS SENSOR OUTPUTS



NOTES:

1. SENSOR SUPPLY VOLTAGE AND CURRENT

The +12 V sensor supply voltage on the "DC OUT" Terminal is nominal with ±25% variation due to line and internal load variations. All RLC sensors will accommodate this variation.

2. HI/LO FRQ. SELECTION

The "HI/LO FRQ." Selection switch must be set on "LO FRQ." when switch contacts are used to generate count input signals. Since the "LO FRQ." mode also provides very high immunity against electrical noise pickup, it is recommended that this mode also be used, whenever possible, with

electronic sensor outputs, as added insurance. The "LO FRQ." mode can be used with any type of sensor output, provided count pulse widths never decrease below 5 milliseconds, and the count rate does not exceed 100 cps.

3. V_{IL} and V_{IH} levels given are nominal values ±10% when counter voltage on "DC OUT" Terminal is +12 VDC. These nominal values will vary in proportion to the variations in "DC OUT" Terminal voltage, caused by line voltage and load changes.

4. When shielded cable is used, the shield should be connected to "COMM." at the counter and left unconnected at sensor end.

INSTALLATION ENVIRONMENT

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

INSTALLATION

PBLT installation information is contained in the LDD bulletin. Refer to that bulletin for instructions on installing the module.

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel with a gasket to provide a water-tight seal. Two mounting clips and screws are provided for easy installation. Consideration should be given to the thickness of the panel. A panel which is too thin may distort and not provide a water-tight seal. (Recommended minimum panel thickness is 1/8" {3.2 mm}.)

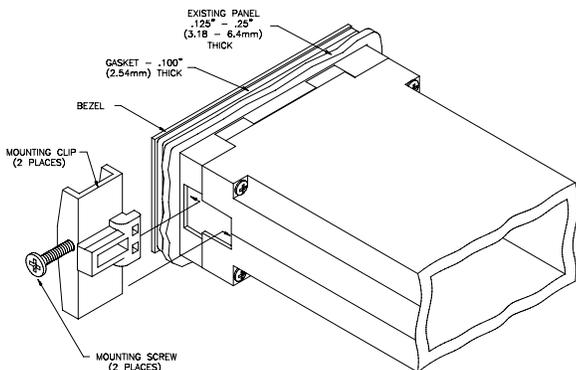
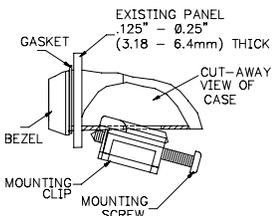
After the panel cut-out has been completed and deburred, carefully slide the panel gasket over the rear of the unit to the back of the bezel. Insert the unit into the panel.

As depicted in the drawing, install the screws into the narrow end of the mounting clips. Thread the screws into the clips until the pointed end just protrudes through the other side.

Install each of the mounting clips by inserting the wide lip of the clips into the wide end of the hole, located on either side of the case. Then snap the clip onto the case.

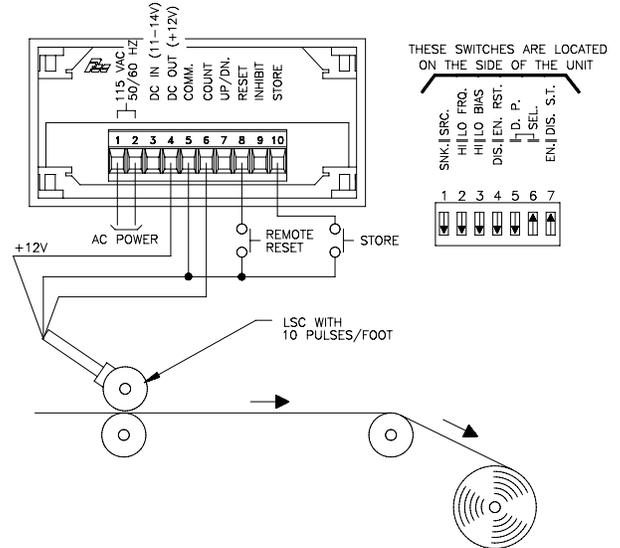
Tighten the screws evenly to apply uniform compression, thus providing a water-tight seal.

CAUTION: Only minimum pressure is required to seal panel. Do **NOT** overtighten screws.



TYPICAL APPLICATION

LENGTH MEASUREMENT SYSTEM



The web system, shown in the drawing above, accumulates the total length of paper wound onto a roll. An LSC length sensor feeds 10 pulses into the totalizer for every foot of paper wound onto the roll. Therefore, the Apollo Totalizer is set up to display a decimal point in the tenth's position so the unit will directly display in tenth's of feet. The unit has the front panel reset disabled so reset can only occur through the remote reset terminal. The "STORE" terminal is connected through a push button to common. This allows the operator to "freeze" the display (no counts are lost) so the latest reading can be recorded. (Note: With the Apollo Totalizer non-volatile memory, the system can be turned off at any stage winding and the Apollo will retain, in its internal memory, the amount of paper already wound onto the roll.)

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS	
		230 VAC	115 VAC
APLT	Apollo 6-Digit Totalizer	APLT0610	APLT0600
	Apollo 8-Digit Totalizer	APLT0810	APLT0800

For more information on Pricing, Enclosures & Panel Mount Kits, refer to the RLC Catalog or contact your local RLC distributor.

PERSONALITY MODULE

MODEL NO.	DESCRIPTION	PART NUMBERS
		115/230 VAC
PBLT*	Apollo 6-Digit Totalizer Module for use with the 4 or 6 Digit Large Digit Display	PBLT0600

*Requires an LDD for use.

LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to one year from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

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